

The ESG-digital nexus: Integrating sustainability imperatives with digital transformation in Asian firms

Kwan Hong TAN *

School of Business, Singapore University of Social Sciences, Blk C@Clementi Campus, 463 Clementi Road, Singapore 599494, Singapore.

International Journal of Science and Research Archive, 2026, 20(01), 385–391

Publication history: Received on 01 June 2026; revised on 09 July 2026; accepted on 11 July 2026

Article DOI: <https://doi.org/10.30574/ijrsra.2026.20.1.1473>

Abstract

Asian firms increasingly face a dual strategic requirement: they must accelerate digital transformation while meeting rising environmental, social and governance (ESG) expectations. This paper develops the ESG-digital nexus as a strategic management framework explaining how digital capabilities can strengthen ESG performance and how ESG objectives can discipline digital investment toward long-term value creation. Using an integrative conceptual synthesis informed by the resource-based view, dynamic capabilities theory and selected Asian sustainability contexts, the paper reframes digital transformation and ESG integration as mutually reinforcing organisational capabilities rather than separate compliance or technology agendas. The framework identifies three mechanisms: digitally enabled ESG measurement, behavioural embedding through digital institutional behavioural design and stakeholder-facing transparency. The illustrative evidence and maturity matrix suggest that firms with high digital and ESG maturity are better positioned to convert sustainability commitments into operational routines, financial resilience and reputational advantage. The paper contributes a practical quadrant model for diagnosing organisational maturity and for guiding staged managerial action in Asian firms operating under tightening sustainability reporting regimes.

Keywords: Digital Transformation; ESG Integration; Dynamic Capabilities; Asian Firms; Sustainable Competitive Advantage; Corporate Governance

1. Introduction

The twenty-first-century corporate environment is shaped by two structural changes: the rapid diffusion of digital technologies and the rising demand for corporate sustainability through environmental, social and governance (ESG) criteria. In many organisations, these agendas remain managed as separate silos. Digital transformation is often treated as a productivity, automation or customer-experience programme, while ESG is treated as a compliance, reporting or reputational function. This separation is increasingly untenable in Asian markets where sustainability reporting requirements, climate-related disclosures and green transition policies are becoming more demanding. In Singapore, for example, listed issuers are required to prepare sustainability reports under the SGX sustainability reporting guide, while updated climate reporting requirements have placed particular emphasis on Scope 1 and Scope 2 greenhouse gas emissions from financial year 2025 [1].

The strategic problem is that firms may invest heavily in digital infrastructure without achieving proportional productivity, social or sustainability gains. This problem reflects a contemporary form of the digital productivity paradox, in which technological investment can concentrate benefits, displace work, increase complexity or generate legitimacy risks when it is not aligned with broader organisational and social purposes [4]. At the same time, ESG programmes may remain symbolic unless firms possess the digital capabilities required for measurement, verification, behavioural embedding and stakeholder communication. The key question is therefore not whether firms should

* Corresponding author: Kwan Hong TAN

choose between digital transformation and ESG integration, but how they can combine both to create sustainable competitive advantage.

This paper proposes the ESG-digital nexus as a strategic framework for integrating sustainability imperatives with digital transformation capabilities in Asian firms. The framework combines the resource-based view, which explains how valuable, rare, inimitable and organisationally embedded resources can support advantage [2], with dynamic capabilities theory, which emphasises the capacity to integrate, build and reconfigure competencies in changing environments [3]. The objective is to explain how digital and ESG capabilities interact, how this interaction can be operationalised through digital institutional behavioural design (DIBD), and how managers can diagnose their firms' maturity positions through a four-quadrant model.

2. Materials and methods

This study adopts a conceptual research design supported by illustrative analytical mapping. Because the purpose is theory development rather than hypothesis testing with proprietary primary data, the paper synthesises three bodies of literature: strategic management theory, ESG-financial performance research and digital transformation scholarship. The synthesis follows a framework-building logic. First, it identifies strategic constructs that recur across the literature, including digital maturity, ESG integration, dynamic capabilities, behavioural design and stakeholder engagement. Second, it examines how these constructs interact in the Asian institutional context, with particular attention to Singapore's sustainability reporting and green transition environment. Third, it converts these relationships into a diagnostic framework and maturity matrix that can be used by managers and policy analysts.

The figures in this manuscript are used as conceptual and illustrative analytic devices. Figures 2 and 3 visualise the types of correlations and maturity patterns that the proposed framework expects to observe in practice. They are not presented as causal estimates from a disclosed primary dataset; rather, they demonstrate how the ESG-digital nexus could be operationalised using firm-level ESG scores, financial-performance indicators and digital-transformation maturity indices in future empirical research. This distinction is important because IJSRA requires sufficient methodological detail for reproducibility. A future confirmatory study can reproduce the framework empirically by constructing a panel of Asian listed firms, coding ESG and digital maturity indicators, and testing the interaction effect between digital capability and ESG integration on financial outcomes.

The conceptual procedure therefore consists of: (i) defining the digital and ESG capability domains; (ii) mapping their theoretically expected complementarities; (iii) identifying organisational mechanisms that connect strategic intent to daily behaviour; and (iv) deriving actionable maturity quadrants. The unit of analysis is the firm. The analytical focus is on Asian enterprises facing accelerating ESG disclosure expectations and digital transformation pressures.

3. Results and discussion

3.1. Theoretical basis of the ESG-digital nexus

The resource-based view suggests that competitive advantage is more likely when a firm's resources are valuable, rare, difficult to imitate and supported by organisational processes [2]. Digital technologies alone do not automatically meet these conditions because many tools are commercially available and easily replicated. Their strategic value emerges when they are embedded in data architectures, routines, decision rights and organisational learning processes. Dynamic capabilities theory extends this logic by explaining how firms renew and recombine competencies when environments change [3]. In the ESG-digital nexus, digital transformation becomes a dynamic capability when it allows the firm to sense sustainability risks, seize green opportunities and reconfigure operations toward more accountable forms of value creation.

This interpretation responds to the digital productivity paradox. Technology investments that pursue automation without institutional purpose may improve local efficiency but produce weak aggregate returns, fragmented organisational learning or declining stakeholder trust [4]. ESG imperatives can discipline digital transformation by defining what technological investment should optimise: carbon visibility, supply-chain responsibility, governance transparency, inclusive employment, stakeholder dialogue and long-term resilience. Conversely, digital capabilities make ESG goals less symbolic by transforming them into measurable, auditable and behaviourally embedded routines.

3.2. Conceptual framework

Figure 1 presents the ESG-digital nexus. The left side of the framework represents dynamic digital capabilities, including digital productivity paradox resolution, digital institutional behavioural design and corporate digital stakeholder engagement. The right side represents ESG imperatives, including regulatory compliance, ESG-financial value creation, stakeholder theory and the Singapore Green Plan 2030. The central claim is that sustainable competitive advantage is produced when these two domains are integrated rather than managed independently.

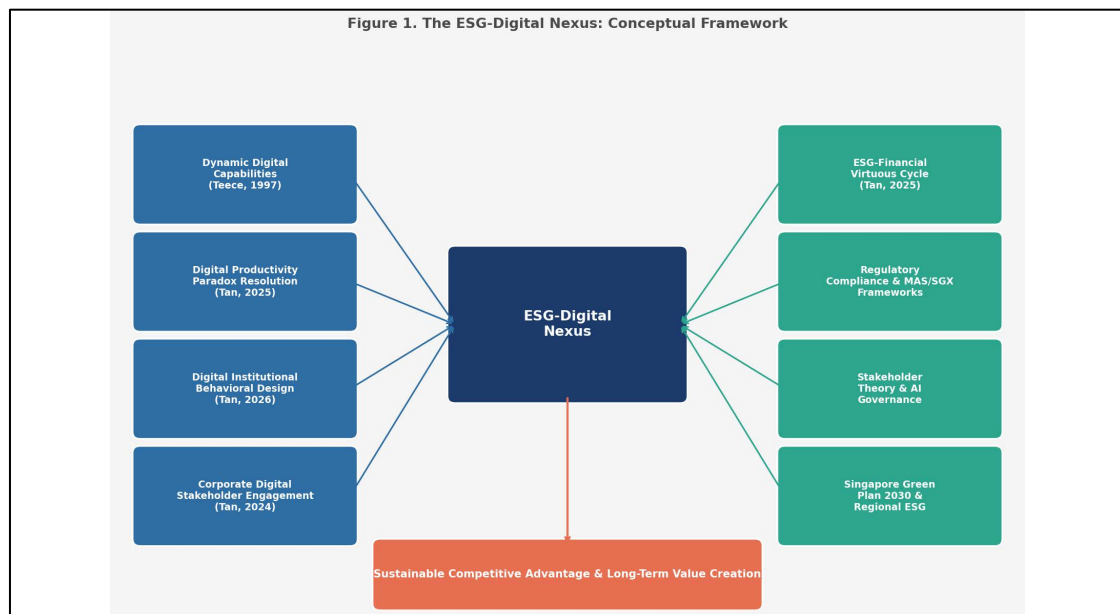


Figure 1 The ESG-digital nexus conceptual framework, illustrating the integration of dynamic digital capabilities and ESG imperatives to drive sustainable competitive advantage.

3.3. ESG, financial performance and digital capability

Prior ESG research commonly finds that the relationship between ESG and financial performance is complex, bidirectional and contingent on industry, measurement and governance quality. Tan's analysis of the ESG-financial relationship argues that stronger ESG practices can improve risk management, reputation and operational resilience, while stronger financial performance can provide resources for further ESG investment [5]. This produces a potential virtuous cycle rather than a simple one-way relationship. Digital maturity can amplify this cycle because digital tools improve ESG data capture, emissions tracking, supplier screening, employee engagement and stakeholder communication.

Figure 2 illustrates how ESG components may align differently with financial performance metrics and across sectors. Governance is expected to be strongly associated with asset efficiency because transparent decision structures reduce agency risk and improve capital discipline. Social performance may be associated with equity returns through workforce stability, customer trust and brand legitimacy. Environmental performance may be reflected in valuation where investors price long-term transition readiness. The sector comparison suggests that technology and healthcare firms may combine higher ESG scores with stronger financial-performance indices because digital intensity and stakeholder scrutiny are both high in these sectors.

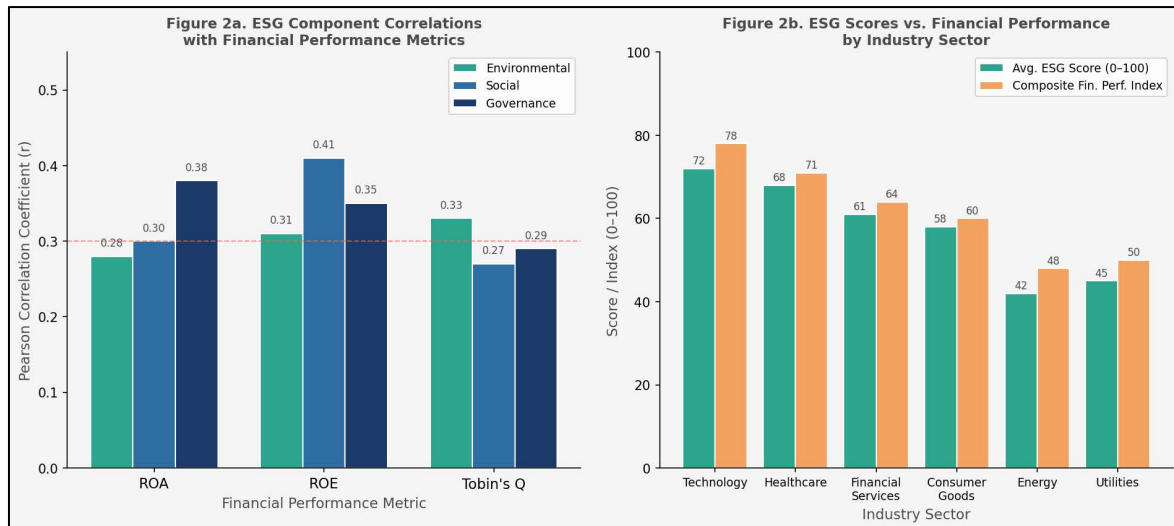


Figure 2 Illustrative ESG component correlations with financial performance metrics and sector-level comparison of ESG scores against a composite financial performance index.

Figure 3 further illustrates the expected positive association between digital-transformation maturity and composite ESG score across Asian firms. This pattern is theoretically plausible because mature digital organisations possess better data infrastructure, analytics capability and workflow integration. These capabilities support sustainability reporting, internal accountability and traceability across operations and supply chains. However, the relationship should not be interpreted as technological determinism. Digital maturity can enable ESG integration, but it must be governed by clear sustainability objectives, stakeholder responsibilities and ethical constraints.

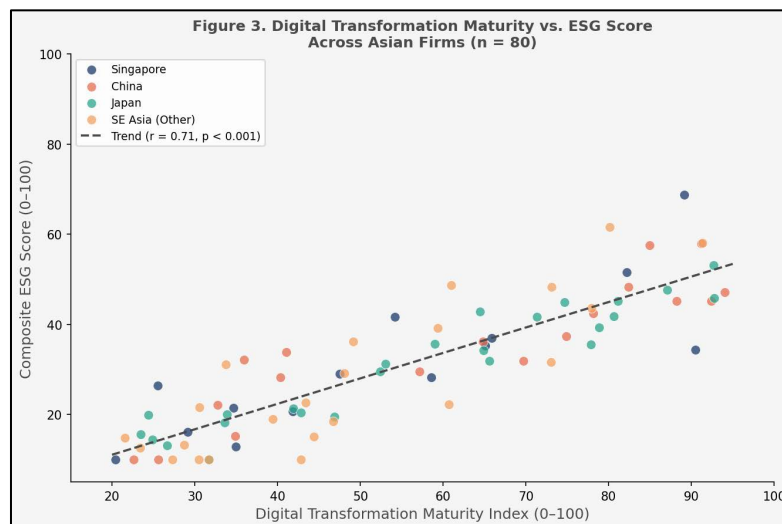


Figure 3 Illustrative association between digital transformation maturity and composite ESG score across Asian firms.

3.4. Digital institutional behavioural design as an implementation mechanism

A recurring implementation problem is the gap between corporate ESG commitments and routine employee behaviour. Digital institutional behavioural design addresses this gap by embedding behavioural prompts, defaults and feedback loops into digital systems [7]. Instead of relying only on policy documents or manual supervision, firms can configure enterprise software so that sustainable choices become easier, more visible or more salient. Examples include procurement platforms that prioritise low-carbon suppliers, travel systems that display emissions implications, human-resource systems that encourage inclusive hiring practices and dashboards that make ESG indicators visible to operational teams.

This mechanism also links ESG integration with stakeholder engagement. Corporate social media, digital reporting portals and interactive dashboards can strengthen stakeholder transparency, but they also expose firms to reputational

and power-related risks if messages are inconsistent with actual practices [6]. The ESG-digital nexus therefore requires governance: digital platforms must be used not only for communication but also for evidence, responsiveness and accountability.

3.5. The ESG-digital maturity matrix

Figure 4 converts the framework into a practical maturity matrix. The matrix classifies firms according to two dimensions: digital transformation maturity and ESG maturity. The four quadrants provide a diagnostic tool for identifying strategic priorities.

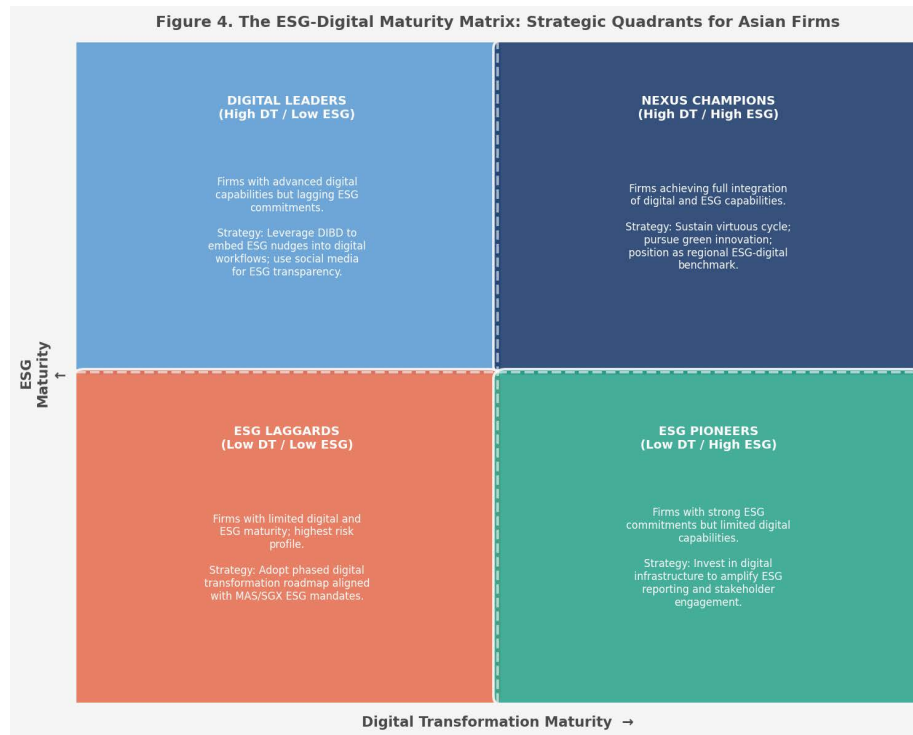


Figure 4 The ESG-digital maturity matrix, outlining strategic quadrants for organisational development.

- **ESG laggards (low digital transformation / low ESG):** These firms face high regulatory, legitimacy and competitiveness risks. Their immediate priority is to adopt a phased digital transformation roadmap aligned with foundational ESG reporting and compliance mandates.
- **Digital leaders (high digital transformation / low ESG):** These firms possess technological infrastructure but have not yet directed it toward sustainability outcomes. They should use DIBD, ESG analytics and transparent stakeholder engagement to embed sustainability into existing workflows.
- **ESG pioneers (low digital transformation / high ESG):** These firms have strong sustainability commitments but weaker measurement and scalability capabilities. They should invest in digital infrastructure, Internet of Things monitoring, artificial intelligence analytics and reporting systems to operationalise ESG commitments.
- **Nexus champions (high digital transformation / high ESG):** These firms have integrated both domains and are positioned to generate a virtuous cycle of financial and sustainability performance. Their strategic priority is continuous green innovation, benchmarking and regional thought leadership.

3.6. Managerial and policy implications

For corporate leaders, the key implication is that ESG should not be added after digital transformation as a reporting layer. Instead, ESG objectives should shape the design of data architecture, analytics priorities, platform governance and workflow defaults from the beginning. For boards, the matrix provides a way to ask whether digital investments are producing measurable sustainability and stakeholder outcomes. For policymakers, the framework suggests that reporting mandates should be accompanied by capability-building support, especially for firms that are ESG-aware but digitally underdeveloped.

In Singapore and similar Asian markets, policy initiatives such as the Singapore Green Plan 2030 create the institutional demand for ESG action by setting targets for solar deployment, waste reduction, green buildings and cleaner transport [8,9]. Firms that can translate these macro-level objectives into digital operational systems will be better prepared for regulatory tightening and investor scrutiny. The ESG-digital nexus therefore provides a bridge between national sustainability ambition and firm-level strategic execution.

4. Conclusion

The integration of digital transformation and ESG initiatives is a central determinant of corporate resilience and competitive advantage. The ESG-digital nexus demonstrates that digital capabilities and sustainability imperatives become strategically powerful when they are mutually reinforcing. Digital transformation supplies the data, analytics and workflow infrastructure needed to make ESG measurable and operational. ESG integration supplies the purpose, legitimacy and long-term orientation needed to ensure that digital investment creates durable value rather than isolated efficiency gains. The maturity matrix developed in this paper offers a practical diagnostic tool for Asian firms seeking to move from fragmented initiatives toward nexus champion status. Future empirical research can test the framework using longitudinal firm-level data and can examine whether the interaction between digital maturity and ESG maturity predicts superior financial performance, lower risk and stronger stakeholder trust.

Compliance with ethical standards

Acknowledgments

The author acknowledges the academic and professional communities whose scholarship and practice informed the conceptual development of this manuscript.

Disclosure of conflict of interest

The author declares that there are no financial or non-financial conflicts of interest in connection with this paper.

Statement of ethical approval

The present research work does not contain any studies performed on animals or human subjects by the author.

Statement of informed consent

Not applicable because this study does not involve individual human participants.

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Data availability

No primary datasets were generated or analysed for this conceptual research paper. The figures are conceptual and illustrative analytical representations developed for theory-building purposes.

References

- [1] Singapore Exchange Regulation. Practice Note 7.6 Sustainability Reporting Guide [Internet]. Singapore: Singapore Exchange Regulation. Available from: <https://rulebook.sgx.com/rulebook/practice-note-76-sustainability-reporting-guide>
- [2] Barney J. Firm resources and sustained competitive advantage. *Journal of Management*. 1991;17(1):99-120.
- [3] Teece DJ, Pisano G, Shuen A. Dynamic capabilities and strategic management. *Strategic Management Journal*. 1997;18(7):509-533.
- [4] Tan KH. The Digital Productivity Paradox: A Novel Framework for Understanding the Asymmetric Distribution of Technological Benefits [Internet]. ResearchGate; 2025. Available from: <https://www.researchgate.net/publication/399079534>

- [5] Tan KH. The Bidirectional Relationship Between ESG Ratings and Financial Performance: A Critical Analysis [Internet]. ResearchGate; 2025. Available from: <https://www.researchgate.net/publication/391063744>
- [6] Tan KH. Navigating the Digital Terrain: Risks, Opportunities, and Power Dynamics in Corporate Social Media Engagement [Internet]. ResearchGate; 2024. Available from: <https://www.researchgate.net/publication/391319733>
- [7] Tan KH. Digital Institutional Behavioral Design: Leveraging Cognitive Architecture to Overcome Development Traps in the Digital Age [Internet]. ResearchGate; 2026. Available from: <https://www.researchgate.net/publication/399420039>
- [8] Government of Singapore. Singapore Green Plan 2030: Our Targets [Internet]. Singapore: Government of Singapore; 2026. Available from: <https://www.greenplan.gov.sg/targets/>
- [9] Tan KH. Driving Sustainable Growth: ESG & CSR Excellence in Singapore - Navigating Regulatory Frameworks, Market Opportunities & Strategic Implementation [Internet]. ResearchGate; 2025. Available from: <https://www.researchgate.net/publication/397230919>