Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

How digital transformation reshapes organisational governance for sustainability: a socio-technical case study of Haier Smart Home

Yin Linghu

linghuyin8@gmail.com

Shizhen College of Guizhou University of Traditional Chinese Medicine

Guangsheng Peng

Al-Farabi Kazakh National University

Yao Wang

Sichuan Business Vocational College

Chengyuan Yin

Yancheng Polytechnic College

Article

Keywords: digital transformation, socio-technical systems, organisational governance, RenDanHeYi, dynamic capabilities, platform governance, employee autonomy, qualitative case study

Posted Date: July 27th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10444660/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Digital transformation is widespread in manufacturing, but digital infrastructure does not by itself produce sustainable organisational outcomes. This study asks how digital infrastructures reshape authority, resource allocation, incentives and accountability, and under what conditions these changes support sustainable organisational governance. A mechanism-focused single-case study of Haier Smart Home analyses 35 semi-structured interviews conducted between November 2025 and March 2026, together with annual reports, environmental, social and governance reports, and public corporate materials covering 2021–2025. The findings identify four interdependent mechanisms: dynamic strategic alignment, dynamic resource reconfiguration, user-value-based incentives, and platform governance through chain-group collaboration. These mechanisms show how data visibility and connectivity become consequential only when organisational rules redistribute decision rights, make capabilities mobile, link rewards to attributable user value, and coordinate internal and external actors. The study develops a socio-technical governance explanation of RenDanHeYi, using dynamic capabilities and platform and incentive governance as supporting lenses. It also identifies boundary conditions involving data quality, measurable feedback, task divisibility, employee acceptance, fairness, privacy and accountable human oversight. The case indicates that sustainable digital transformation depends on the joint redesign of technology, organisational authority and employment safeguards rather than technology adoption alone.

1. Introduction

Digital transformation has become a central organisational challenge in manufacturing. It extends beyond installing enterprise systems, data dashboards, automated production lines or artificial intelligence tools. Research increasingly treats digital transformation as a change in how firms create value, coordinate resources, organise processes and interact with users (Vial 2019; Verhoef et al. 2021; Bharadwaj et al. 2013; Kane et al. 2015; Fitzgerald et al. 2013; Besson and Rowe 2012).

Substantial investment in platforms and intelligent technologies does not guarantee sustainable organisational value. A socio-technical explanation directs attention to the joint configuration of technologies, authority, roles, routines and employment relationships. Data may travel faster while decision rights remain rigid; dashboards may increase visibility while incentives remain detached from user value; and platforms may connect units without resolving disputes over responsibility or reward (Teece et al. 1997; Teece 2007; Eisenhardt and Martin 2000; Barney 1991; Leonardi 2011; Faraj and Azad 2012).

The human consequences of this reconfiguration are central. Strategic and digital human resource management research explains how capability data, analytics and employment systems can support strategy (Wright and McMahan 1992; Becker and Huselid 1998; Lepak and Snell 1999; Ulrich 1997; Bondarouk and Ruël 2009; Strohmeier 2007; Marler and Boudreau 2017; Kellogg et al. 2020), but it often separates technology adoption from changes in employee autonomy, control, fairness, accountability

and cross-boundary collaboration. This leaves a governance gap between digital infrastructure and sustainable organisational outcomes.

This study addresses that gap through Haier Smart Home and its RenDanHeYi model (literally, 'integration of people and orders'), a Haier-originated management philosophy that links employee entrepreneurship and organisational units to the creation of user value. During the 2021–2025 transformation period, digital platforms, flexible talent allocation, user-value-based incentives and chain groups (cross-functional, value-oriented teams that coordinate work across internal and ecosystem boundaries) became increasingly connected to the firm's governance arrangements (Haier Smart Home Co., Ltd. 2022, 2023, 2024, 2025, 2026a, 2026b).

The research question is: How do digital infrastructures reshape authority, resource allocation, incentives and accountability in manufacturing, and under what conditions do these changes support sustainable organisational governance? A mechanism-focused qualitative case study is used to explain how socio-technical arrangements connect digital infrastructure to employee behaviour, collaboration and long-term stakeholder value.

The study makes three contributions. First, it develops socio-technical systems and organisational governance as the core explanation for how digital infrastructure becomes actionable. Second, it uses dynamic capabilities and platform and incentive governance as supporting lenses to specify four mechanisms rather than presenting multiple parallel theoretical claims. Third, it translates RenDanHeYi into concepts that can be assessed internationally while foregrounding employee autonomy, digital control, incentive fairness and responsible data governance.

2. Theoretical background and research propositions

2.1. Digital transformation as socio-technical governance

Digital transformation is increasingly defined as strategic and organisational change enabled by digital technologies rather than the adoption of a single technology (Vial 2019; Verhoef et al. 2021; Leonardi 2011; Faraj and Azad 2012). Artificial intelligence, big data, cloud systems, the industrial internet, the Internet of Things and platform systems expand data connectivity and resource visibility. Their effects remain contingent on how technological affordances are combined with routines, roles, decision rights and material arrangements.

A socio-technical governance perspective therefore treats technology, organisational structure, human capabilities, incentives and accountability as an interdependent configuration. Platforms can increase transparency, but transparency creates value only when decision rights make data actionable, employees can challenge inaccurate measures and rules specify who bears responsibility for outcomes.

2.2. Sustainable organisational governance

Sustainable organisational governance is defined here as the set of decision rights, incentive rules, coordination arrangements and safeguards that enables a firm to sustain economic resilience, user value, employee agency, ecosystem collaboration and socio-environmental responsibility over time (Dyllick and Hockerts 2002; Bansal 2005; Porter and Kramer 2011; Elkington 1997). The concept shifts the analytical focus from a managerial label to the distribution and accountability of organisational authority.

For digitalised manufacturing firms, sustainability requires more than efficient information systems. It requires arrangements that can adjust strategic priorities, reconfigure capabilities, allocate rewards fairly and coordinate across organisational boundaries. Digital infrastructure makes contributions and feedback more visible, but its governance consequences depend on who defines value, who can contest measurements and how risks are distributed (Porter and Kramer 2011; Elkington 1997; Xu et al. 2023; Romagnoli et al. 2023).

2.3. Dynamic capabilities as a supporting lens

Dynamic capabilities explain how firms sense opportunities, seize them and reconfigure resources under changing conditions (Teece et al. 1997; Teece 2007; Eisenhardt and Martin 2000; Barney 1991; Dakhli et al. 2026). In the present framework, this is a supporting lens for examining how user signals, capability data and temporary teams make resource reconfiguration observable. It does not operate as a separate overarching theory.

Strategic human resource management helps identify the employment mechanisms through which capability development, talent mobility and motivation support strategic change (Wright and McMahan 1992; Becker and Huselid 1998; Lepak and Snell 1999; Ulrich 1997; Bondarouk and Ruël 2009; Strohmeier 2007; Marler and Boudreau 2017; Alqarni et al. 2023; Bag et al. 2022). These mechanisms are treated as components of socio-technical governance because their effects depend on authority, transparency, employee voice and safeguards, rather than on technical optimisation alone.

2.4. Platform and incentive governance as a supporting lens

Incentive-governance research draws attention to information asymmetry and the allocation of rewards. Digital records can incorporate user feedback, order value, process quality and contribution histories, but they can also intensify monitoring and perceived unfairness (Kellogg et al. 2020; Manroop et al. 2024). The relevant question is therefore not only whether incentives align behaviour, but also whether value attribution is transparent, contestable and accountable.

Platform governance explains how rules, interfaces, data standards and value-allocation arrangements coordinate diverse actors (Gawer 2014; Tiwana 2014; Parker et al. 2016). In manufacturing, this lens helps explain hybrid arrangements that combine hierarchy, quasi-market allocation around value orders and network collaboration with external partners. Together, platform and incentive governance clarify how decision rights and rewards are organised within the broader socio-technical system.

Table 1
Theoretical framework and analytical roles

Theory/perspective	Core proposition	Analytical role in this study
Socio-technical systems and organisational governance (core)	Technology, authority, people, routines and rules form an interdependent governance configuration.	Provides the primary explanation for how digital infrastructure reshapes decision rights, accountability and sustainable organisational outcomes.
Dynamic capabilities (supporting)	Firms adapt by sensing opportunities, seizing them and reconfiguring resources.	Explains capability visibility, value orders and temporary team formation.
Platform and incentive governance (supporting)	Rules, interfaces, data and value-allocation arrangements coordinate actors and structure rewards.	Explains chain-group collaboration, user-value-based incentives, fairness and accountability risks.
Sustainable organisational governance (outcome)	Long-term value requires economic resilience, employee agency, user value, ecosystem collaboration and responsible data use.	Defines the outcome conditions against which the four mechanisms are assessed.

2.5. Research propositions

P1. Digital transformation facilitates dynamic strategic alignment when digital platforms, decentralised authority and employment rules jointly translate user-oriented strategy into employee action.

P2. Digital human resource systems enable dynamic resource reconfiguration when capability data, value orders and flexible team formation allow human capital to move with user demand.

P3. User-value-based incentives reshape agency relationships when user feedback, market outcomes and contribution records inform rewards through transparent and contestable rules.

P4. Platform governance supports sustainable collaboration when digital platforms, contracts, contribution evaluation and value sharing coordinate internal and external actors around user scenarios.

3. Methods

3.1. Research design

This study adopts a qualitative single-case design, appropriate where a case is theoretically revealing and can expose mechanisms that are difficult to observe in large-sample data (Eisenhardt 1989; Yin 2018; Gioia et al. 2013; Miles et al. 2014; Eisenhardt and Graebner 2007). Haier Smart Home is selected because it combines a long-standing indigenous management model with sustained digital transformation. The evidence base includes interviews, annual reports, environmental, social and governance reports, and official public corporate materials.

The unit of analysis is the set of governance mechanisms through which digital infrastructure is connected to sustainable organisational outcomes. The process logic is: digital transformation triggers - governance mechanisms - employee and team behaviour - organisational outcomes. This design follows case-based theory building and qualitative rigour principles (Eisenhardt 1989; Yin 2018; Gioia et al. 2013; Miles et al. 2014; Eisenhardt and Graebner 2007).

3.2. Case selection and context

Haier Smart Home is a large manufacturing and smart-home enterprise operating in domestic and international markets. The case is theoretically relevant because it combines a traditional manufacturing base, digital ecosystem development and RenDanHeYi. The 2021–2025 period provides a longitudinal context for examining how platforms, user interaction, human resource systems and chain-group coordination evolved together.

Annual-report indicators show revenue and attributable net profit rising between 2021 and 2025. These trends are used only as contextual evidence and are not attributed causally to the governance mechanisms because market demand, brand strength, supply-chain capabilities, acquisitions and macroeconomic conditions also affect performance (Haier Smart Home Co., Ltd. 2022, 2023, 2024, 2025, 2026a).

Table 2
Data corpus and its functions in triangulation

Data Source	Document/Period and Scope	Analytical Function
Semi-Structured Interviews	35 coded participants (M: 7; T: 11; E: 17); Tencent Meeting; November 2025-March 2026; 65–112 min per sampling log (mean 80.1 min); approximately 0.65 million Chinese characters.	First-hand evidence on organisational interpretations, practices, tensions, and boundary conditions.
Annual Reports	Haier Smart Home Annual Reports 2021–2025, published 2022–2026 (Haier Smart Home Co., Ltd. 2022, 2023, 2024, 2025, 2026a).	Audited contextual evidence on strategy, performance, digital initiatives, and governance.
ESG Report	Haier Smart Home Environmental, Social and Governance Report 2025, published 2026 (Haier Smart Home Co., Ltd. 2026b).	Public evidence on environmental, employee, supplier, circularity, and user-side sustainability.
Official Public Corporate Materials	Haier Smart Home investor-relations and corporate-responsibility disclosure portals; specific items and access details are listed in Supplementary Table S5.	Source verification and triangulation of the documentary evidence; not treated as independent causal proof.

3.3. Research access and researcher positionality

Access was organised through purposive, role-based sampling to obtain accounts from management, chain-group and frontline positions. Interviews were conducted remotely, and participants were informed

of the academic purpose, the voluntary nature of participation, recording and transcription, anonymisation, use of anonymised excerpts, and their rights to decline questions or withdraw. Because access to a single organisation can privilege elite or corporate-success narratives, the analysis compared accounts across organisational levels, retained negative and disconfirming cases, and treated corporate reports only as contextual evidence rather than as independent validation of causal claims.

3.4. Interview data and coding

Using purposive, role-based sampling, the study included 35 participants interviewed remotely via Tencent Meeting from November 2025 to March 2026. The anonymised roster comprised seven management- and strategy-level informants (M1-M7), 11 chain-group, platform, regional and functional leaders (T1-T11), and 17 frontline creators, engineers, operations, sales and service personnel (E1-E17). Interviews lasted 65–112 min (mean 80.1 min; 2805 min in total). The consolidated Chinese-language archive contains one coded record per participant and approximately 0.65 million Chinese characters including metadata. Reporting uses coded identifiers, and no direct identifiers are disclosed.

Coding proceeded through first-order evidence in participants' practical language, second-order themes and aggregate dimensions. First-order evidence concerned user needs, value orders, platform support, capability matching, autonomy, contribution evaluation and value sharing. Second-order themes captured strategic alignment, resource reconfiguration, incentive governance and platform governance. Aggregate dimensions integrated these themes into a socio-technical account of sustainable organisational governance.

Four short quotations are retained in the findings, and twelve representative excerpts are reported in Supplementary Table S2. The source materials are in Chinese. English translations preserve meaning and use consistent renderings for RenDanHeYi, user-paid compensation, order-based assembly and disassembly, chain-group collaboration and chain-group contract.

A single primary coder analysed all 35 records in a structured matrix. Categories were compared across management, chain-group and frontline accounts and triangulated with annual reports, environmental, social and governance materials and public corporate sources. No numerically precise saturation point, inter-coder reliability coefficient or independent back-translation is claimed. Credibility instead rests on complete-corpus analysis, source triangulation, repeated transcript checking, negative-case analysis and a documented audit trail.

Use of artificial intelligence tools and figure preparation. During manuscript preparation, ChatGPT and OpenAI Codex (OpenAI; accessed July 2026) were used for Chinese-English translation, language restructuring and preliminary conceptual brainstorming. They were not used for data collection, independent coding, theme determination or empirical inference. Figures 1, 2, 4, 5 and 6 were redrawn by the authors as vector schematics using SVG-based drafting; Fig. 3 was generated from publicly reported annual-report data using Python and matplotlib. No generative-AI images are included. All text,

translations, numerical values and figure concepts were checked against the underlying evidence, and the authors retain responsibility for the submitted version.

4. Case context: digital transformation, 2021–2025

The transformation of Haier Smart Home from 2021 to 2025 was shaped by pandemic disruptions, fragmented user demand, supply-chain fluctuations, weak real-estate conditions, inflation, energy crises, and geopolitical uncertainty. Annual reports emphasised globalisation, scenario-based innovation, digital efficiency, smart-home ecosystems, direct-to-user operations, and sustainable development. The 2024 annual report described technological innovation, deeper digital transformation, global strategic optimisation, and digital inventory and marketing projects; it also reported a 13% improvement in the domestic order-response cycle (Haier Smart Home Co., Ltd. 2025).

The 2023 annual report provides evidence on links between digital tools and stakeholder experience. The digital dealer system supported inventory management, more transparent sales policies, and store operations. Supplier inbound-logistics systems improved delivery scheduling, while digital logistics and service dispatching reduced waiting times and supported installation efficiency (Haier Smart Home Co., Ltd. 2024).

The 2025 annual report described digital inventory reform across supply-chain order models, warehouse networks and dealer operations, together with AI-supported research and development applications (Haier Smart Home Co., Ltd. 2026a). These disclosures provide context; the paper's causal claims remain limited to mechanism-based qualitative interpretation.

To strengthen the sustainability dimension, the analysis triangulates organisational mechanism evidence with publicly disclosed environmental, social, and governance information. The ESG evidence is contextual rather than causal. It covers renewable electricity, product circularity, responsible supply-chain governance, employee development, and user-side environmental value. These dimensions extend the case beyond financial performance and show how digital coordination may support economic, social, and environmental sustainability simultaneously.

Table 3
Public environmental, social and governance evidence used for contextualisation

Sustainability Dimension	2025 Publicly Reported Evidence	Source	Analytical Relevance
Renewable electricity	Annual green-electricity consumption reached 216,802.05 MWh.	2025 ESG Report (Haier Smart Home Co., Ltd. 2026b), pp. 46–47	Contextual evidence of lower-carbon manufacturing operations.
Product circularity	More than 8 million end-of-life appliances were recovered in 2025; cumulative recovery approached 30 million.	2025 ESG Report (Haier Smart Home Co., Ltd. 2026b), p. 41	Links lifecycle management to ecosystem coordination.
Responsible supply chain	Social-responsibility audit or compliance coverage reached 95% of suppliers.	2025 ESG Report (Haier Smart Home Co., Ltd. 2026b), p. 17	Supports the ecosystem-governance and supplier-responsibility argument.
Employee development	All domestic employees received training, averaging 71.90 hours per person.	2025 ESG Report (Haier Smart Home Co., Ltd. 2026b), p. 83	Provides social-sustainability context for employee capability development.
User-side environmental value	In selected reported applications, integrated HVAC and high-efficiency plant-room solutions achieved energy savings of more than 50%.	2025 ESG Report (Haier Smart Home Co., Ltd. 2026b), p. 19	Case-specific evidence of user-side environmental value; it is not a company-wide product claim.

5. Findings

5.1. Dynamic strategic alignment

The first mechanism is dynamic strategic alignment. Alignment is dynamic because smart-home strategy, scenario-based services, user value and global operations continually reshape employment practices, while platforms and decentralised units feed information back into strategy. This redistributes authority: central platforms specify data and rules, whereas frontline units receive discretion to respond to user scenarios.

Human resource platformisation is central to this mechanism. It makes capabilities, task responsibilities, incentive calculations and coordination more visible, while decentralised units and chain groups gain discretion to respond to user needs. The same visibility can also strengthen digital control if employees cannot question data or appeal decisions.

“The essence of our reform is a shift from top-down control to bottom-up user-value creation.” (M1, senior executive, 12 November 2025)

The case evidence is consistent with P1. When technology-enabled visualisation is combined with decentralised authority and HRM rules, and together they direct employee behaviour towards user value, digital transformation facilitates dynamic strategic alignment. However, alignment does not occur automatically. If HR platforms are used only for administrative efficiency, they may fail to support strategic transformation.

5.2. Dynamic resource reconfiguration

The second mechanism is dynamic resource reconfiguration, expressed through 'assembly and disassembly by order': employees and micro-enterprises (small, relatively autonomous business units) form around a user or market order and may disperse after it is completed. Talent allocation therefore shifts from fixed positions towards tasks and opportunities.

Digital platforms record capability profiles, project experience, contribution histories and outcomes. A data middle platform (a shared internal layer that standardises and makes data reusable across applications) increases the visibility of human capital. Sensing occurs through user signals, seizing through order participation and reconfiguring through temporary team formation.

“Through the Haidayuan talent platform and the HR data middle platform, people and orders are matched in real time.” (M3, HR platform leader, 10 December 2025)

The case evidence is consistent with P2, but it also entails risks. Talent mobility may increase uncertainty, cross-unit coordination may become complex, and contribution evaluation may provoke disputes because value creation is often collective. Therefore, flexible resource reconfiguration requires reliable talent data, transparent contribution evaluation, and HR support for career development and psychological security.

5.3. User-value-based incentives

The third mechanism restructures incentives around user value. 'User-paid compensation' does not mean that users pay employees directly. It means that employee and team rewards are linked to user value and attributable market or service outcomes through rules set by the organisation.

Platforms allow user feedback, order value, service quality and contribution records to enter reward decisions. This can reduce dependence on supervisors' judgements, but it can also shift control to opaque metrics. A sustainable system therefore requires transparent value-attribution rules, team-level evidence, appeal routes and safeguards against income volatility or metric gaming.

“Without user value, there is no compensation return. This is an iron rule.” (M3, HR platform leader, 10 December 2025)

The Win-Win Value-Added Statement (a Haier accounting and governance device that links user value, ecosystem contribution, costs and shared returns) provides an operational mechanism for connecting participation, coordination, contribution evaluation and sustainability.

The case evidence is consistent with P3. However, it also entails ethical and sustainability risks. User value cannot always be precisely measured, particularly when outcomes are collective and long-term in nature. Overemphasising short-term market signals may lead to income uncertainty, pressure, or unfairness. A sustainable incentive design should integrate user satisfaction, market outcomes, team contributions, process quality, long-term capability building, and basic guarantees.

5.4. Platform governance and chain-group collaboration

The fourth mechanism is platform governance through chain-group collaboration. Chain groups are cross-functional, value-oriented teams that connect internal micro-enterprises, functional platforms, digital teams and ecosystem partners around a user scenario. Their purpose is to coordinate product, software, logistics, service, analytics, marketing and external capabilities that no single department can provide.

Platforms define tasks, responsibilities, process traces, contribution records and value-sharing rules. The resulting form combines hierarchy, quasi-market competition around orders and network collaboration. Coordination becomes less dependent on direct commands, but authority is not eliminated: it moves into platform rules, contracts, data standards and dispute-resolution procedures.

“Collaboration does not rely on administrative instructions; it relies on chain-group contracts.” (T2, chain-group leader, 14 November 2025)

The chain-group contract is the operating agreement behind this governance arrangement. It specifies shared goals, responsibilities and benefits before work begins, records delivery and contribution evidence, and supports peer review and value allocation.

The qualitative measurement dimensions for chain-group contract governance are documented in Supplementary Fig. S1. They make the governance process observable while avoiding unsupported internal performance claims.

The case evidence is consistent with P4. Within the focal case, participants reported that the arrangement reduced coordination burdens, supported resource integration and enabled knowledge recombination across boundaries. These benefits remain contingent on rule design, dispute resolution, trust and long-term ecosystem management. If rules are too rigid, collaboration can revert to bureaucracy; if rules are too vague, contribution disputes and opportunism can increase.

Negative-case analysis retained three recurrent tensions rather than treating them as outliers (Supplementary Table S4): income volatility during low-order periods (E9); cross-boundary coordination burdens when departments and partners followed different priorities and work rhythms (E17); and

digitally intensified work pressure created by continual attention to user signals and problem resolution (T1). These observations qualify the mechanism claims and inform the safeguards discussed in Section 7.4 and Table 5.

The Win-Win Value-Added Statement and the chain-group contract are complementary. The statement defines the value dimensions to be observed, while the contract translates those dimensions into accountable targets, responsibilities, contribution verification and value-sharing rules. Their combined logic is represented across Figs. 4 and 5 rather than as a separate diagram.

Table 4
Consolidated mechanism findings and case-based assessments

Mechanism	Case Evidence and Core Practices	Sustainable Management Function	Case-Based Assessment
Dynamic Strategic Alignment	HR platformisation, decentralised authority, user signals, and user-centric strategy execution.	Translates digital strategy into continuous adjustment of capabilities and employee behaviour.	Case evidence is consistent with P1.
Dynamic Resource Reconfiguration	Talent-capability data, value orders, and order-based assembly and disassembly.	Supports task- and opportunity-based human-capital mobility, agility, and innovation.	Case evidence is consistent with P2.
User-Value-Based Incentives	User feedback, market outcomes, contribution records, user-paid compensation, and value sharing.	Connects contribution and reward while reducing reliance on internally focused KPIs.	Qualified support for P3 within the focal case, subject to fairness and measurement conditions.
Platform Governance	Chain-group collaboration, platform rules, data traces, contracts, and contribution evaluation.	Coordinates internal and external actors around user scenarios and ecosystem value creation.	Contextually consistent with P4, subject to governance and accountability risks.

6. An integrated model of sustainable organisational governance

The four mechanisms form an interdependent governance configuration rather than a linear technology-to-performance chain. Strategic alignment redistributes direction-setting authority; resource reconfiguration changes how capabilities are mobilised; user-value-based incentives alter the allocation of rewards; and platform governance structures cross-boundary responsibility.

Digital infrastructure creates visibility and connectivity, while organisational rules translate these affordances into authority, capability mobility, incentive accountability and platform collaboration. Under appropriate boundary conditions, the configuration can support agility, innovation, user value, employee

agency, ecosystem collaboration and resilience. Without safeguards, the same infrastructure can intensify monitoring, pressure and unequal exposure to risk.

The operating layer comprises shared-value indicators, chain-group contracts and platform records. These artefacts connect the four mechanisms to observable routines without treating private dashboard values as independent causal evidence.

The model also clarifies what technology cannot settle. Data cannot decide which values deserve priority; platforms cannot guarantee fairness; and AI cannot replace contestable rules, human judgement or accountable oversight. Sustainable digital transformation therefore depends on employee voice, privacy protection, appeal mechanisms and institutional responsibility.

AI-assisted tools may support contract recommendation, risk warning, contribution analysis and service support (Zhao et al. 2026; Bar-Gil et al. 2024; Papagiannidis et al. 2025).

7. Discussion

7.1. Theoretical contributions

First, the study advances a socio-technical governance explanation of digital transformation. The case shows that platforms and data become consequential through changes in decision rights, employment rules, incentive accountability and cross-boundary coordination, rather than through technological capability alone.

Second, dynamic capabilities provide a supporting account of how capability tags, value orders and temporary team formation enact sensing, seizing and reconfiguration. This links firm-level adaptation to employee mobility, autonomy and safeguards (Bag et al. 2022).

Third, platform and incentive governance explain how user-value signals, chain-group contracts and contribution records coordinate actors while also producing fairness, privacy, monitoring and accountability risks (Kellogg et al. 2020; Manroop et al. 2024; Bar-Gil et al. 2024; Papagiannidis et al. 2025). This qualifies celebratory accounts of platform-enabled management.

7.2. Managerial implications

Managers should avoid equating digital transformation with system installation. Digital systems are a necessary but not sufficient condition. The critical managerial task is to redesign power structures, talent allocation, incentive mechanisms, and collaboration around user value. Firms need to ask: Are digital platforms actually supporting strategic alignment and resource reconfiguration, or are they merely automating existing bureaucratic processes?

Human resources departments should become strategic platform builders. In digital transformation, HR should not merely manage recruitment, training, appraisal, and compensation, but should provide

capability data, talent matching rules, incentive governance, collaboration support, and employee development mechanisms. This requires HR professionals to understand both business scenarios and data governance.

Firms should design user-value-based incentives prudently. Such incentives can reinforce user orientation and entrepreneurial behaviour, but only when value attribution is credible and fair. Managers should avoid compressing everyone's contributions into short-term numerical indicators. A sustainable incentive system should include user value, process quality, team contributions, long-term capability development, and basic employee guarantees.

Firms should also build platform governance capabilities before engaging in large-scale ecosystem collaboration. Cross-boundary collaboration requires task rules, responsibility allocation, contribution evaluation, value-sharing, and dispute resolution mechanisms. In the absence of governance capabilities, digital platforms may only increase information flows without resolving collaboration conflicts.

7.3. Sustainability implications

The four mechanisms have distinct sustainability implications. Dynamic strategic alignment can incorporate environmental, social, and governance priorities into operating goals and employee behaviour, while dynamic resource reconfiguration can mobilise green-technology, service, and cross-functional capabilities around changing sustainability problems (Xu et al. 2023; Romagnoli et al. 2023; Bag et al. 2022).

User-value-based incentives should reward long-term service quality, capability development, and user-side environmental value rather than short-term financial outcomes alone. Platform governance can support responsible suppliers, product recovery and circularity, and ecosystem collaboration by making roles, process evidence, and value-sharing rules visible (Haier Smart Home Co., Ltd. 2026b; Romagnoli et al. 2023).

Table 3 maps these implications to public evidence on renewable electricity, product circularity, supplier responsibility, employee development and user-side energy savings. These environmental, social and governance results remain contextual evidence and are not attributed causally to any single mechanism.

7.4. Boundary conditions and risks

The Haier case should not be regarded as a universal template. The model is more likely to function when several boundary conditions are simultaneously present. These conditions include reliable digital infrastructure, attributable user feedback, divisible business units, leadership commitment, sufficient organisational scale, a culture that embraces entrepreneurial responsibility, and governance rules that balance flexibility and fairness.

The model also contains risks. Dynamic resource reconfiguration may create employee uncertainty; inaccurate value attribution may produce unfair incentives; platform governance may become overly bureaucratic or vague; and AI-enabled systems may intensify surveillance, privacy risks, and algorithmic

bias; recent evidence also indicates that AI may create asymmetric supply-chain benefits and new labour, energy, and accountability costs (Kellogg et al. 2020; Zhao et al. 2026; Manroop et al. 2024; Bar-Gil et al. 2024; Papagiannidis et al. 2025). Sustainable implementation therefore requires employee voice, privacy protection, data-access controls, auditable decisions, appeal mechanisms, human oversight, training, and psychological safety.

Accordingly, Figs. 1 and 4–6 are schematic representations of qualitative constructs and publicly verifiable context; they do not present non-public metrics as independent causal evidence.

Table 5
Boundary conditions and risk-control measures

Boundary Condition	Importance	Risk if Absent	Recommended Control Measures
Digital Infrastructure	Strategic alignment, talent matching, and incentives require data visibility and process traceability.	Decisions rely on incomplete or inconsistent data.	Build integrated platforms and data-governance standards before automating incentives.
Attributable User Feedback	User value must be sufficiently measurable before it can enter reward mechanisms.	Employees perceive incentives as unfair or arbitrary.	Combine satisfaction, market outcomes, process quality, and peer/team contribution evidence.
Divisible Business Units and Tasks	Orders and responsibilities must be decomposable.	Order-based work becomes ambiguous and difficult to evaluate.	Clarify task boundaries, responsibility maps, and value-sharing contracts.
Leadership Commitment	Deep restructuring requires long-term support and tolerance of transformation costs.	Reform becomes fragmented or symbolic.	Establish transformation-governance mechanisms and continuous feedback reviews.
Employee Acceptance	Entrepreneurial mechanisms require employee participation and psychological safety.	Resistance, burnout, or excessive competition emerges.	Provide training, career support, basic safeguards, and employee voice channels.
Ethical Data Governance	Platforms and AI may intensify surveillance and bias.	Privacy risks, algorithmic unfairness, and declining trust.	Define data-access rules, audit trails, appeal mechanisms, and human oversight.

8. Conclusion

This study asked how digital infrastructures reshape authority, resource allocation, incentives and accountability, and under what conditions these changes support sustainable organisational governance. The Haier Smart Home case identifies four mechanisms: dynamic strategic alignment,

dynamic resource reconfiguration, user-value-based incentives and platform governance through chain-group contracts.

The findings show that digital infrastructure creates value only when organisational rules make data actionable, contestable and accountable. Socio-technical systems and organisational governance provide the core explanation, while dynamic capabilities and platform and incentive governance clarify how capabilities, rewards and collaboration are reconfigured.

Managerially, the model suggests that firms should sequence digital transformation around data quality, accountable decentralisation, credible value attribution, employee safeguards, and transparent ecosystem rules. AI can support these processes but cannot replace managerial judgement, ethical review, or human accountability.

This study has four limitations. First, a single case supports analytical rather than statistical generalisation. Second, contextual performance data cannot establish causal effects. Third, the analysis relies on a single primary coder and translated interview excerpts. Fourth, confidentiality limits access to full transcripts and internal records. Future research should compare multiple manufacturers, test the propositions quantitatively, examine employee-level outcomes, and evaluate privacy, fairness, and accountability in AI-enabled management systems.

Declarations

Author contributions

Author 1: conceptualisation, methodology, validation, resources and project administration. Author 2: formal analysis, investigation and data curation. Author 3: writing (original draft, review and editing). Author 4: data curation and visualisation. All authors approved the submitted version and agree to be accountable for the work. The complete author-identified statement is provided confidentially in the cover letter.

Funding

This research received no external funding.

Ethics declaration

The study protocol was approved before data collection by the authors' institutional ethics committee. The committee name, protocol code, approval date and signed documentation have been provided confidentially to the Editorial Office in accordance with double-anonymous review. The research was conducted in accordance with applicable institutional guidelines for low-risk organisational research.

Informed consent

Verbal informed consent was obtained from all participants before interview. Participants were informed of the study purpose, voluntary participation, academic use, recording and transcription, anonymisation, use of anonymised excerpts, and their rights to decline questions or withdraw. Only coded identifiers are reported.

Data availability

The annual reports and environmental, social and governance materials cited in this article are available through Haier Smart Home's public disclosure channels. Anonymised interview excerpts, the coding framework and the negative-case evidence reported in Supplementary Tables S2-S4 are provided in the Supplementary Information. Full transcripts and detailed organisational records are not public because of participant privacy, confidentiality commitments and the risk of role-based identification. Additional anonymised materials may be considered on reasonable request, subject to participant consent, institutional ethics requirements and confidentiality restrictions.

Acknowledgements

Redacted for double-anonymous peer review.

Competing interests

The authors declare no competing interests.

References

1. Alqarni K, Agina MF, Khairy HA, Al-Romeedy BS, Farrag DA, Abdallah RM (2023) The effect of electronic human resource management systems on sustainable competitive advantages: the roles of sustainable innovation and organizational agility. Sustainability 15:16382. https://doi.org/10.3390/su152316382
2. Bag S, Dhamija P, Pretorius JHC, Chowdhury AH, Giannakis M (2022) Sustainable electronic human resource management systems and firm performance: an empirical study. Int J Manpow 43:32-51. https://doi.org/10.1108/IJM-02-2021-0099
3. Bansal P (2005) Evolving sustainably: a longitudinal study of corporate sustainable development. Strateg Manag J 26:197-218. https://doi.org/10.1002/smj.441
4. Bar-Gil O, Ron T, Czerniak O (2024) AI for the people? Embedding AI ethics in HR and people analytics projects. Technol Soc 77:102527. https://doi.org/10.1016/j.techsoc.2024.102527

5. Barney JB (1991) Firm resources and sustained competitive advantage. J Manag 17:99-120. https://doi.org/10.1177/014920639101700108
6. Becker BE, Huselid MA (1998) High performance work systems and firm performance: a synthesis of research and managerial implications. Res Pers Hum Resour Manag 16:53-101
7. Besson P, Rowe F (2012) Strategizing information systems-enabled organizational transformation: a transdisciplinary review and new directions. J Strateg Inf Syst 21:103-124. https://doi.org/10.1016/j.jsis.2012.05.002
8. Bharadwaj A, El Sawy OA, Pavlou PA, Venkatraman N (2013) Digital business strategy: toward a next generation of insights. MIS Q 37:471-482. https://doi.org/10.25300/MISQ/2013/37.2.03
9. Bondarouk T, Ruël H (2009) Electronic human resource management: challenges in the digital era. Int J Hum Resour Manag 20:505-514. https://doi.org/10.1080/09585190802280633
10. Dakhli I, Sedqui A, Derrhi M (2026) Digital maturity and supply chain resilience in emerging markets: dynamic capabilities as mediators in the Industry 4.0 transition: evidence from Morocco. Logistics 10:133. https://doi.org/10.3390/logistics10060133
11. Dyllick T, Hockerts K (2002) Beyond the business case for corporate sustainability. Bus Strateg Environ 11:130-141. https://doi.org/10.1002/bse.323
12. Eisenhardt KM (1989) Building theories from case study research. Acad Manag Rev 14:532-550. https://doi.org/10.5465/amr.1989.4308385
13. Eisenhardt KM, Graebner ME (2007) Theory building from cases: opportunities and challenges. Acad Manag J 50:25-32. https://doi.org/10.5465/amj.2007.24160888
14. Eisenhardt KM, Martin JA (2000) Dynamic capabilities: what are they? Strateg Manag J 21:1105-1121. https://doi.org/10.1002/1097-0266(200010/11)21:10/11<1105::AID-SMJ133>3.0.CO;2-E
15. Elkington J (1997) Cannibals with forks: the triple bottom line of 21st century business. Capstone, Oxford
16. Faraj S, Azad B (2012) The materiality of technology: an affordance perspective. In: Leonardi PM, Nardi BA, Kallinikos J (eds) Materiality and organizing: social interaction in a technological world. Oxford University Press, Oxford, pp 237-258
17. Fitzgerald M, Kruschwitz N, Bonnet D, Welch M (2013) Embracing digital technology: a new strategic imperative. MIT Sloan Management Review and Capgemini Consulting, Cambridge, MA
18. Gawer A (2014) Bridging differing perspectives on technological platforms: toward an integrative framework. Res Policy 43:1239-1249. https://doi.org/10.1016/j.respol.2014.03.006
19. Gioia DA, Corley KG, Hamilton AL (2013) Seeking qualitative rigor in inductive research: notes on the Gioia methodology. Organ Res Methods 16:15-31. https://doi.org/10.1177/1094428112452151
20. Haier Smart Home Co., Ltd. (2022) Annual report 2021. Haier Smart Home Co., Ltd., Qingdao. https://smart-home.haier.com/en/investor-relations/#financial-reports. Accessed 18 Jul 2026
21. Haier Smart Home Co., Ltd. (2023) Annual report 2022. Haier Smart Home Co., Ltd., Qingdao. https://smart-home.haier.com/en/investor-relations/#financial-reports. Accessed 18 Jul 2026

22. Haier Smart Home Co., Ltd. (2024) Annual report 2023. Haier Smart Home Co., Ltd., Qingdao. https://smart-home.haier.com/en/investor-relations/#financial-reports. Accessed 18 Jul 2026
23. Haier Smart Home Co., Ltd. (2025) Annual report 2024. Haier Smart Home Co., Ltd., Qingdao. https://smart-home.haier.com/en/investor-relations/#financial-reports. Accessed 18 Jul 2026
24. Haier Smart Home Co., Ltd. (2026a) Annual report 2025. Haier Smart Home Co., Ltd., Qingdao. https://smart-home.haier.com/en/investor-relations/#financial-reports. Accessed 18 Jul 2026
25. Haier Smart Home Co., Ltd. (2026b) Environmental, social and governance report 2025. Haier Smart Home Co., Ltd., Qingdao. https://www.haier.com/global/csr/. Accessed 18 Jul 2026
26. Kane GC, Palmer D, Phillips AN, Kiron D, Buckley N (2015) Strategy, not technology, drives digital transformation. MIT Sloan Management Review and Deloitte University Press, Cambridge, MA. https://shop.sloanreview.mit.edu/store/strategy-not-technology-drives-digital-transformation. Accessed 18 Jul 2026
27. Kellogg KC, Valentine MA, Christin A (2020) Algorithms at work: the new contested terrain of control. Acad Manag Ann 14:366-410. https://doi.org/10.5465/annals.2018.0174
28. Leonardi PM (2011) When flexible routines meet flexible technologies: affordance, constraint, and the imbrication of human and material agencies. MIS Q 35:147-167. https://doi.org/10.2307/23043493
29. Lepak DP, Snell SA (1999) The human resource architecture: toward a theory of human capital allocation and development. Acad Manag Rev 24:31-48. https://doi.org/10.5465/amr.1999.1580439
30. Manroop L, Malik A, Milner M (2024) The ethical implications of big data in human resource management. Hum Resour Manag Rev 34:101012. https://doi.org/10.1016/j.hrmr.2024.101012
31. Marler JH, Boudreau JW (2017) An evidence-based review of HR analytics. Int J Hum Resour Manag 28:3-26. https://doi.org/10.1080/09585192.2016.1244699
32. Miles MB, Huberman AM, Saldaña J (2014) Qualitative data analysis: a methods sourcebook, 3rd edn. SAGE, Thousand Oaks, CA
33. Papagiannidis E, Mikalef P, Conboy K (2025) Responsible artificial intelligence governance: a review and research framework. J Strateg Inf Syst 34:101885. https://doi.org/10.1016/j.jsis.2024.101885
34. Parker GG, Van Alstyne MW, Choudary SP (2016) Platform revolution: how networked markets are transforming the economy and how to make them work for you. W. W. Norton & Company, New York
35. Porter ME, Kramer MR (2011) Creating shared value. Harv Bus Rev 89:62-77
36. Romagnoli S, Tarabu' C, Maleki Vishkaei B, De Giovanni P (2023) The impact of digital technologies and sustainable practices on circular supply chain management. Logistics 7:1. https://doi.org/10.3390/logistics7010001
37. Strohmeier S (2007) Research in e-HRM: review and implications. Hum Resour Manag Rev 17:19-37. https://doi.org/10.1016/j.hrmr.2006.11.002
38. Teece DJ (2007) Explicating dynamic capabilities: the nature and microfoundations of sustainable enterprise performance. Strateg Manag J 28:1319-1350. https://doi.org/10.1002/smj.640

39. Teece DJ, Pisano G, Shuen A (1997) Dynamic capabilities and strategic management. Strateg Manag J 18:509-533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z
40. Tiwana A (2014) Platform ecosystems: aligning architecture, governance, and strategy. Morgan Kaufmann, Waltham, MA
41. Ulrich D (1997) Human resource champions: the next agenda for adding value and delivering results. Harvard Business School Press, Boston, MA
42. Verhoef PC, Broekhuizen T, Bart Y, Bhattacharya A, Dong JQ, Fabian N, Haenlein M (2021) Digital transformation: a multidisciplinary reflection and research agenda. J Bus Res 122:889-901. https://doi.org/10.1016/j.jbusres.2019.09.022
43. Vial G (2019) Understanding digital transformation: a review and a research agenda. J Strateg Inf Syst 28:118-144. https://doi.org/10.1016/j.jsis.2019.01.003
44. Wright PM, McMahan GC (1992) Theoretical perspectives for strategic human resource management. J Manag 18:295-320. https://doi.org/10.1016/1053-4822(92)90023-M
45. Xu J, Yu Y, Zhang M, Zhang JZ (2023) Impacts of digital transformation on eco-innovation and sustainable performance: evidence from Chinese manufacturing companies. J Clean Prod 393:136278. https://doi.org/10.1016/j.jclepro.2023.136278
46. Yin RK (2018) Case study research and applications: design and methods, 6th edn. SAGE, Thousand Oaks, CA
47. Zhao Z, Wang B, He X, Huang J (2026) Can artificial intelligence enhance the stability of supply chain systems for sports enterprises? Insights from systems theory and supply chain management theory. Systems 14:299. https://doi.org/10.3390/systems14030299

Figures

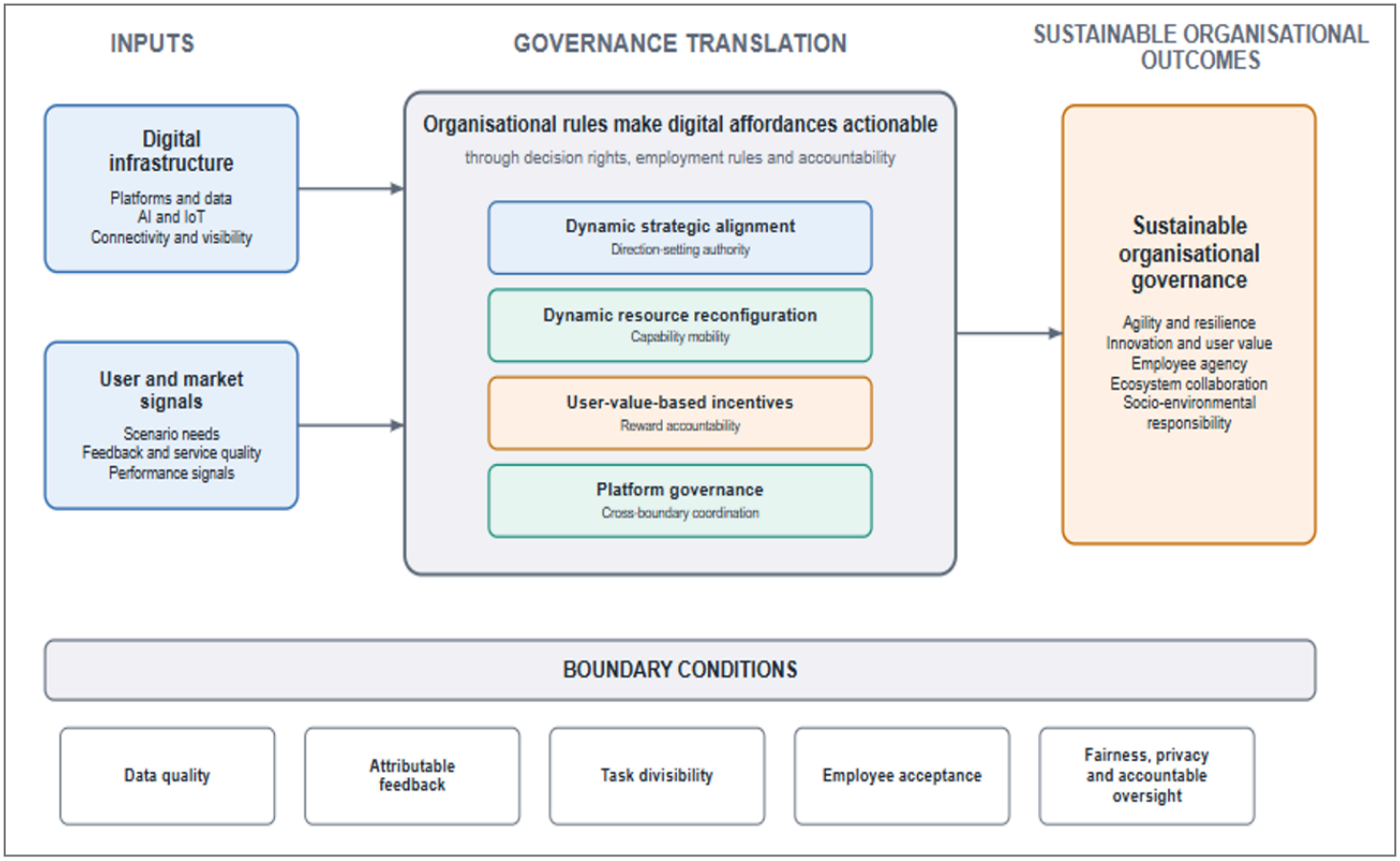


Figure 1

summarises the resulting analytical framework.

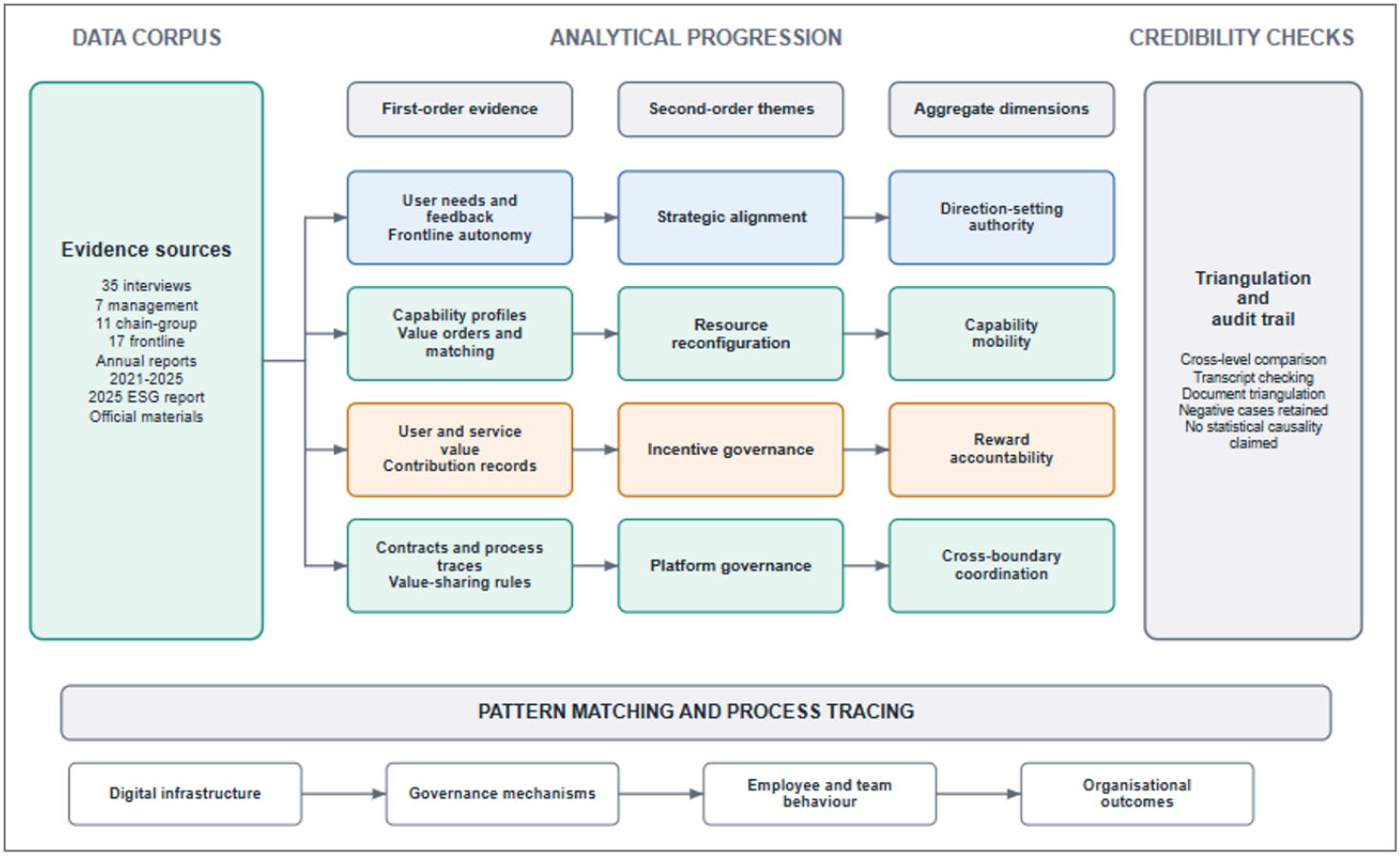


Figure 2

summarises the chain of evidence, analytical progression and credibility checks used in the study.

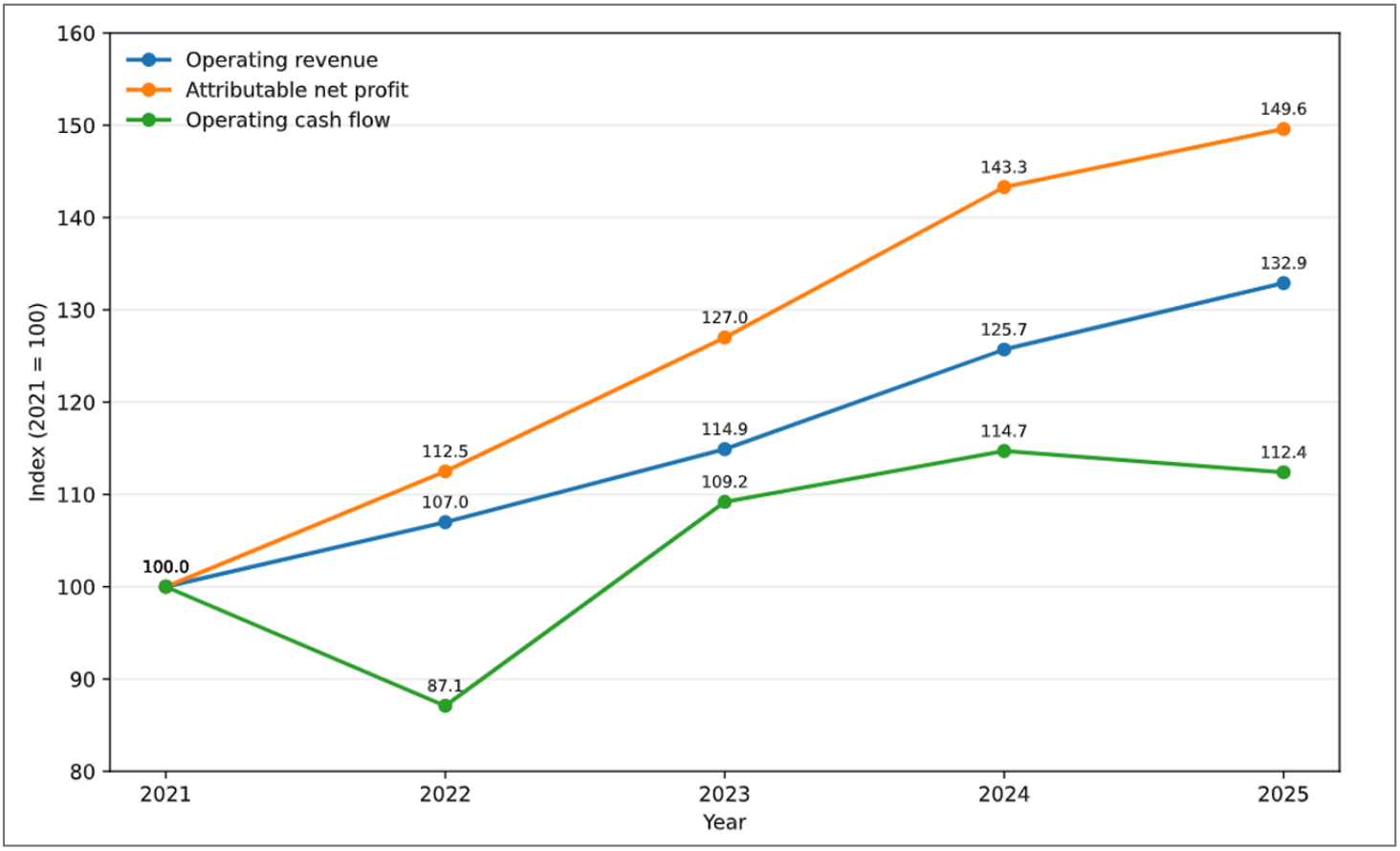


Figure 3

presents indexed trends in operating revenue, attributable net profit and operating cash flow from 2021 to 2025 as contextual evidence only.

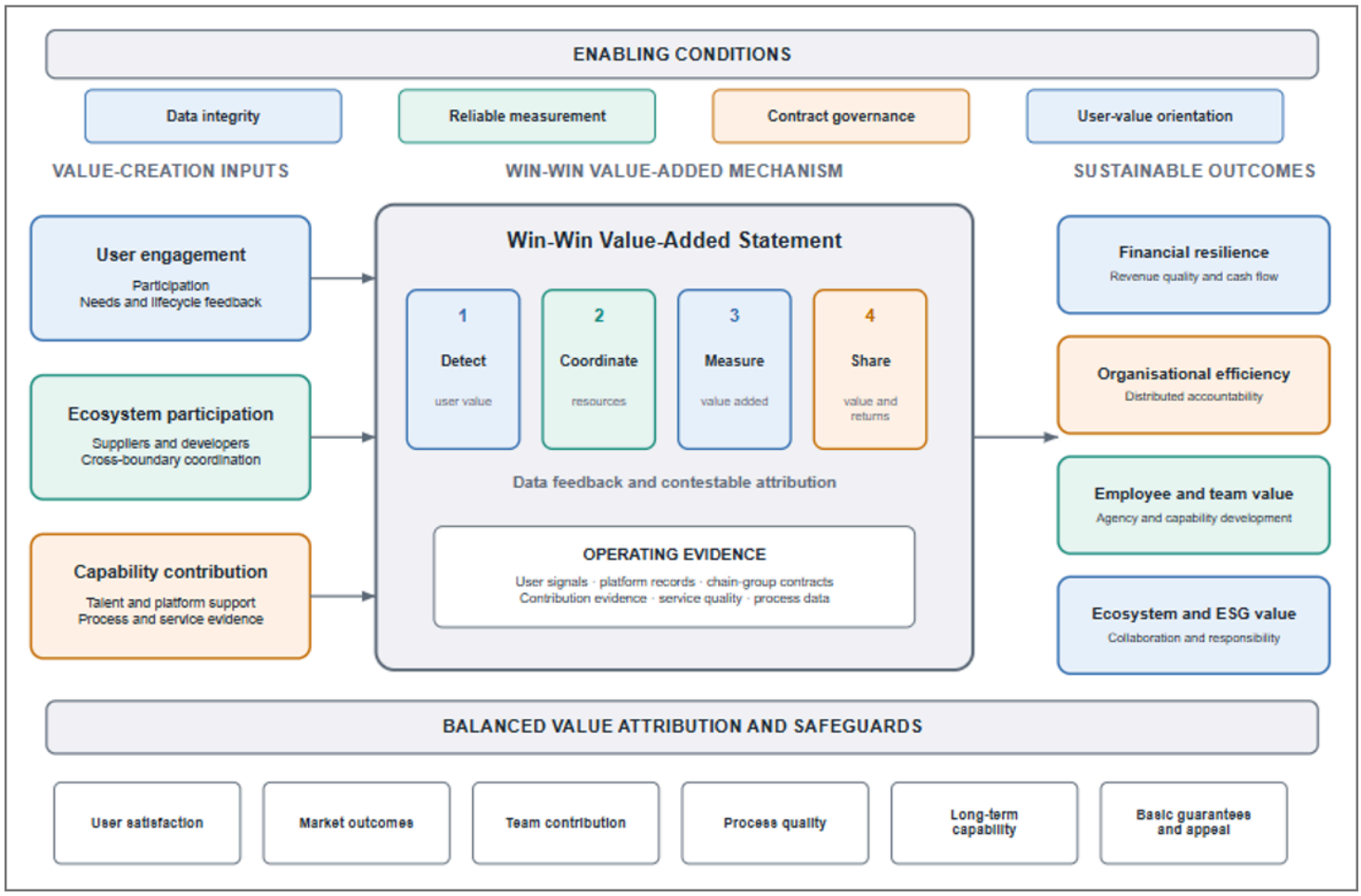


Figure 4

presents analytical constructs rather than verified causal effects.

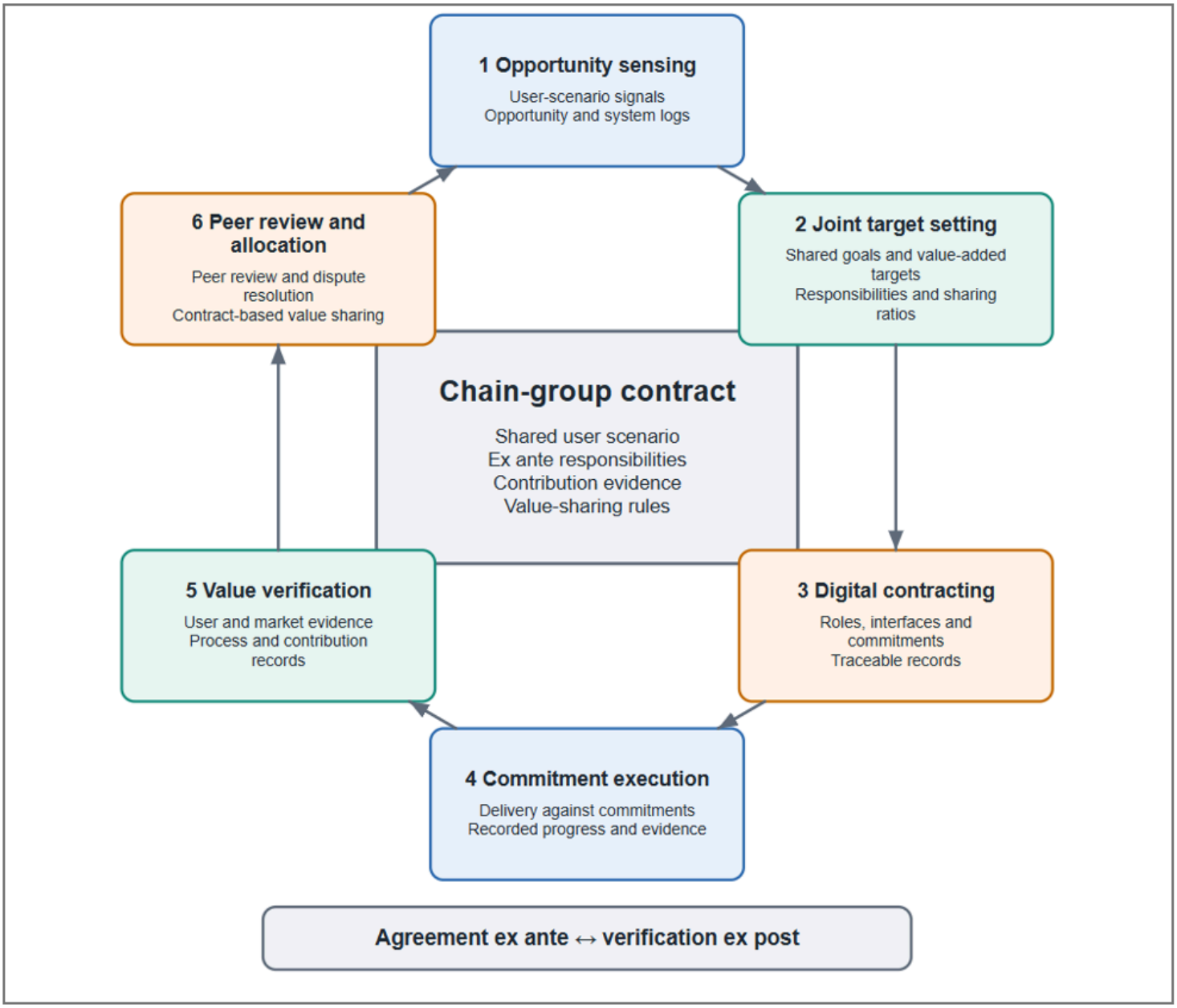


Figure 5

represents the six-step process of opportunity sensing, joint target setting, digital contracting, commitment execution, value verification, and peer review and allocation.

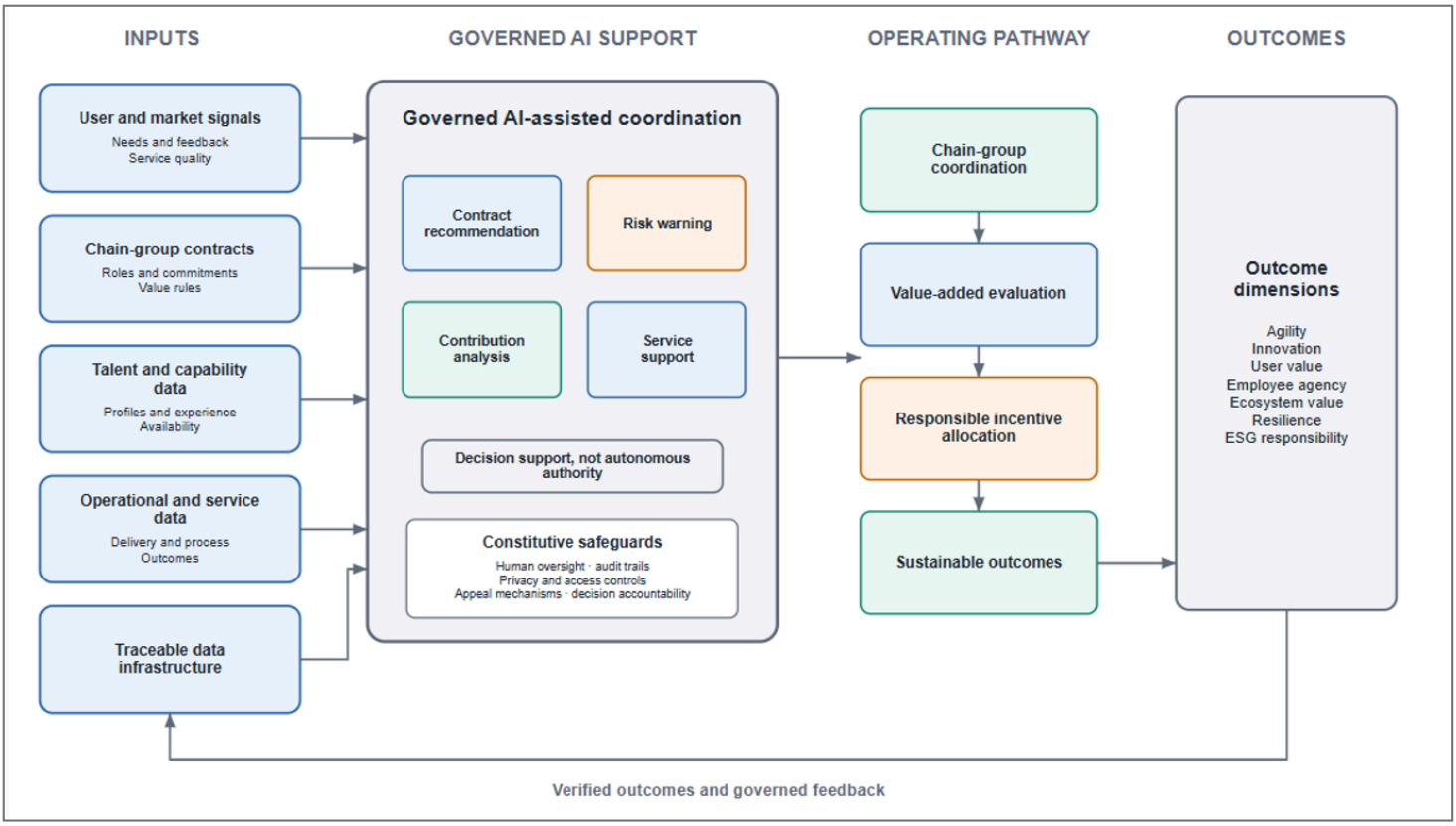


Figure 6

situates these functions within chain-group coordination, value-added evaluation, responsible incentive allocation and sustainable outcomes. Human oversight, audit trails, privacy and access controls, appeal mechanisms and decision accountability are constitutive safeguards.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryInformationAnonymous.docx
- SupplementaryFigS1chaingroupcontractgovernancedimensions.svg