

The CORE of Value:Unpacking the Rational Logic of ESG Activities in Future Industrial Enterprises

xiaodong xi

Anhui University of Finance and Economics

juan chen

juanchen@aufe.edu.cn

Anhui University of Finance and Economics

Article

Keywords: Environment, Society and Governance (ESG), Future industries, Metaverse, Activity theory, Fuzzy Set Qualitative Comparative Analysis (fsQCA), Cluster analysis

Posted Date: October 8th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10602955/v1>

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

[Read Full License](#)

Additional Declarations: No competing interests reported.

**The CORE of Value:Unpacking the Rational Logic of ESG
Activities in Future Industrial Enterprises**

Xi Xiaodong¹

Chen Juan^{2*}

**1.School of Business Administration, Anhui University of
Finance and Economics, Bengbu, Anhui 233030**

**2.School of Business Administration, Anhui University of
Finance and Economics, Bengbu, Anhui 233030**

Xi Xiaodong: (+86) 18355526205; 3202400114@aufe.edu.cn

***Corresponding author:**

Chen Juan: (+86) 15236762939; juanchen@aufe.edu.cn

¹ Xi Xiaodong (2002 -), male, from Ma 'anshan, Anhui Province, is a postgraduate student at Anhui University of Finance and Economics.

² *Corresponding author: Chen yun (1985 -), female, suizhou in hubei, anhui finance and economics university associate professor, institute of business administration, master tutor

The CORE of Value: Unpacking the Rational Logic of ESG

Activities in Future Industrial Enterprises

Abstract: The rapid emergence of future industries, exemplified by metaverse enterprises, has heightened the tension between instrumental and value rationality in ESG practice—a persistent paradox unresolvable by conventional integration approaches. Drawing on institutional logics, paradox theory, and complex systems theory, this study develops a digital institutional hybridity framework to explain how future-industry firms navigate competing rationalities to create sustainable value. Grounded in activity theory, the CORE model (Commitment, Outreach, Resource, Efficiency) conceptualizes ESG activities as four interrelated dimensions embodying social welfare, community, market, and technocratic logics respectively. Using computational text clustering of 81 metaverse enterprises' ESG reports and fuzzy-set qualitative comparative analysis (fsQCA) of 80 cases, we identify eight equifinal configurations grouped under three paradox management strategies: Segmentation (logical separation), Assimilation (logic subordination), and Synthesis (digitally mediated hybrid practices). Our findings indicate that digital technologies enable institutional hybridity beyond traditional organizational constraints. Blockchain, artificial intelligence, and decentralized platforms facilitate digital institutional work—the creation, maintenance, and transformation of institutional arrangements through technological affordances. Superior enterprise value derives from strategic configuration of CORE dimensions aligned with contextual conditions, rather than “balancing” or “integrating” competing logics. A three-dimensional paradox management space visualizes these dynamics, confirming that value creation follows multiple distinct pathways. This study advances theory by conceptualizing digital institutional hybridity as a distinct construct, framing paradox management as a dynamic capability, and validating configurational emergence in the ESG–value relationship. For managerial practice, configurational agility—the capacity to

recognize and transition between hybridity strategies—outperforms static “best practice” approaches in technologically turbulent environments.

Keywords:Environment, Society and Governance (ESG); Future industries; Metaverse; Activity theory; Fuzzy Set Qualitative Comparative Analysis (fsQCA); Cluster analysis

1. Introduction

The rapid development of the metaverse and emerging industrial technologies has transformed corporate ESG practices from passive social responsibility into a strategic driver of long-term competitiveness[1,2] . This shift entails an underexplored fundamental tension: the coexistence of instrumental rationality (ESG as a financial tool) and value rationality (ESG as an inherent goal) creates persistent ESG paradoxes for future-industry firms[3,4]. Unlike traditional industries with mature ESG routines, metaverse enterprises operate in emerging, uncertain and contested technological and institutional contexts[5,6]. This complicates the “rationality” of ESG activities: what constitutes rational ESG conduct when success criteria evolve, technological possibilities are continuously reshaped, and stakeholders raise conflicting demands?

Existing research adopts two dominant theoretical lenses, both insufficient for interpreting future-industry ESG practices. The instrumental perspective treats ESG as a value-creation tool emphasizing risk management, operational efficiency and financial performance [7,8]. the normative perspective views ESG as a moral imperative focused on social legitimacy, ethical obligations and sustainability transitions[9,10]. Recent scholarship advocates integrating these two perspectives[11],

yet presumes reconcilable tensions between instrumental and value rationality. This study challenges such premise: the tension constitutes a persistent paradox to be managed rather than resolved[12]. Moreover, integration-oriented assumptions overlook institutional complexity, as ESG practices are governed by competing institutional logics delivering divergent cognitive frameworks, legitimacy criteria and action guidelines[13,14] . Future-industry enterprises face contradictory market, social-welfare and technocratic logics, which differ beyond mere divergence[15,16].

This institutional complexity generates equifinality, whereby diverse ESG configurations yield comparable enterprise value [17,18]. Traditional linear models seeking universal best-practice and symmetric causality cannot account for such complexity, whereas complex-systems thinking is necessary to unpack emergent, path-dependent, nonlinear ESG value creation[19,20]. This forms the core research questions: How do future industry enterprises integrate various ESG elements into coherent value-generating systems? What institutional hybridity strategies help firms address competing logics while maintaining legitimacy and performance? How do these configurations shape the management of the paradox between instrumental and value rationality?

To answer these questions, this study constructs an integrated theoretical framework drawing on institutional logics, paradox theory, and complex systems theory. Future-industry ESG practices constitute complex institutional hybrids, where coexisting, interacting and conflicting logics produce emergent outcomes irreducible to any single institutional logic[21,22]. Drawing on activity theory[23,24], this paper

proposes the CORE model (Commitment·Outreach·Resource·Efficiency), framing ESG practices as dynamic configurations of four interconnected dimensions. Commitment reflects social-welfare logic (value rationality), Efficiency reflects market logic (instrumental rationality), Resource mediates these logics via technological affordances, and Outreach builds relational infrastructure for institutional hybridity.

Combining computational text clustering on ESG reports from 81 Chinese metaverse enterprises and fuzzy-set qualitative comparative analysis (fsQCA), this study uncovers eight ESG configurations for enterprise value creation. These equifinal institutional-hybridity strategies resolve the rationality paradox via differentiated pathways. Findings show high enterprise value arises not from balancing or integrating competing logics, but from strategic compartmentalization, sequential attention and creative synthesis: paradox-embracing instead of paradox-resolving approaches[12,25]. Furthermore, digital affordances do not merely facilitate ESG activities but reshape the scope of institutional hybridity, generating novel “digital institutional work” [26] inaccessible to traditional enterprises.

This study makes three contributions to ESG, sustainability and future-industry research. First, it extends institutional theory by introducing digital institutional hybridity, a hybrid-organizing form where digital technologies mediate competing institutional logics. Metaverse firms develop original hybridity strategies underpinned by transparency, traceability and decentralized governance affordances[27,28]. Second, it advances paradox theory by demonstrating the dynamic-recursive nature of the ESG rationality paradox: strategic-configuration-level paradox resolutions generate new

operational-implementation tensions, forming a paradox spiral supporting organizational learning and adaptation[12]. Third, it supplies empirical evidence for configurational emergence within management complex-systems theory: enterprise value represents an emergent outcome of ESG combinations and sequences rather than their additive sum, as diverse configurations deliver value via distinct causal mechanisms[18,29].

For practice, future-industry enterprises should abandon the pursuit of “optimal” ESG strategies and cultivate configurational agility: the ability to identify context-fit institutional hybridity strategies and switch them amid changing technological and competitive conditions. For policymakers, uniform ESG rating standards can produce counter-productive effects for future industries. Given equifinality, diverse value-creation pathways ought to be acknowledged and incentivized instead of being penalized for departing from a single template.

2. Literature review

2.1 The paradox of rationalities in ESG: Beyond integration

Existing corporate ESG research has long debated its core rationality, namely whether ESG practices serve as instrumental tools for financial gains or intrinsic normative goals (value rationality)[4,30]. This debate originates from a fundamental organizational paradox involving inherent conflicts between economic efficiency and social legitimacy, shareholder benefits and stakeholder welfare, as well as short-term performance and long-term sustainability[12,31].

Paradox theory provides a robust perspective to interpret this tension. Unlike

negotiable trade-offs and solvable dilemmas, paradoxes represent enduring contradictions between interdependent elements[12,32]. The defining characteristic of a paradox is that both poles are simultaneously necessary and mutually exclusive—pursuing one undermines the other, yet abandoning either is impossible [33]. Within the ESG context, instrumental and value rationality form such a paradox. Exclusive emphasis on profit-oriented instrumental ESG practices weakens its moral legitimacy, while sole focus on value rationality may compromise corporate economic sustainability[15,34].

Most extant ESG studies ignore such paradoxical nature. Business-case research presumes win-win alignment between instrumental and value rationality[35], whereas moral-case literature prioritizes value rationality over instrumental considerations[36]. Recent scholarship advocates “integration” or “hybridization”[3,37], yet such approaches assume stabilizable, balance-able tensions. Paradox theory rejects this view: rationality-related tensions are constitutive features of modern organizing rather than transient anomalies [12]. The core issue is not paradox resolution, but maintaining productive engagement with competing demands, or “walking the razor’s edge” without yielding to either pole[38].

Future-industry enterprises face heightened paradox pressures. Their emerging technological bases produce unstable, contested ESG dimensional categories[6]. Network-centric ecosystem structures require coordination among stakeholders holding divergent value-creation expectations[39]. Meanwhile, rapid scaling demands force firms to deliver both financial viability and social responsibility to secure capital

and legitimacy[2]. These conditions make paradox management not a peripheral challenge but a core competence for future industry enterprises.

Scholarly work identifies four core organizational paradox-management approaches[12,25]. Four core paradox-management approaches are identified: acceptance acknowledges tensions by tolerating ambiguity; separation applies spatial-temporal compartmentalization; synthesis produces novel, temporary transcending solutions; transformation drives organizational change via tensions. This study explores how these strategies manifest in ESG configurations and their conditional effectiveness across varying contexts.

2.2 Institutional logics and hybrid organizing in future industries

While paradox theory explains why ESG activities are tension-filled, institutional logics perspective explains how these tensions are structured and navigated. Institutional logics are socially constructed, historical patterns of cultural symbols and material practices that constitute organizing principles guiding organizational behavior [14]. They provide actors with cognitive frames (what is thinkable), legitimacy criteria (what is defensible), and identity templates (who we are)[13].

Contemporary innovative-sector enterprises operate under multiple coexisting and conflicting institutional logics[13,15]. Future industry enterprises confront three dominant logics: (1) market logic prioritizing efficiency, competition and shareholder value; (2) social welfare logic prioritizing equity, community well-being and sustainability; (3) technocratic logic prioritizing innovation, disruption and technological progress[14]. These logics feature inherent contradictions: market logic

requires cost minimization, whereas social welfare logic entails cost externalization; technocratic logic advocates rapid experimentation, while social welfare logic emphasizes precaution and risk mitigation.

Institutional hybridity arises from the coexistence of multiple logics within organizations or industrial fields[16,21]. Hybrid organizations integrate diverse institutional elements to form novel organizational forms beyond traditional institutional categories[37]. However, hybridity is not a stable state but a dynamic process requiring continuous institutional work—the purposive action of individuals and organizations aimed at creating, maintaining, and disrupting institutions[26].

Hybrid-organizing research defines multiple strategies for addressing institutional complexity[16]. Segmented hybridity rigidly separates logics across organizational units or time periods. Assimilated hybridity subordinates one logic to another, with firms symbolically complying with the marginalized logic while enacting the dominant one. Blended hybridity creates innovative practices synthesizing multi-logic components for new solutions. Blocked hybridity occurs when conflicting logics paralyze organizational action and impair effective responses.

Future-industry firms constitute a distinctive hybrid-organizing research setting, as digital technologies reshape institutional-work possibilities[6]. Blockchain-driven transparency, algorithmic governance and decentralized autonomous organizations deliver previously unavailable mechanisms to enact, monitor and enforce institutional arrangements[27,28]. We term this digital institutional hybridity: a hybrid-organizing mode in which digital affordances yield new strategies for navigating competing logics,

such as automated compliance, real-time stakeholder engagement and programmable governance.

2.3 Complex systems and configurational thinking in ESG research

Paradox theory and institutional-logics perspective both highlight nonlinear, emergent, path-dependent dynamics contradicting conventional linear ESG-value-creation models. Complex-systems theory supplies conceptual and analytical tools for examining such dynamics[19,20]. with four core attributes: emergence denotes system-level properties irreducible to individual components; nonlinearity reflects disproportionate cause-effect relationships; path dependence means early organizational choices constrain subsequent development; equifinality indicates identical outcomes may stem from divergent initial conditions[40,41].

Traditional ESG research adopts correlational methods premised on linear, additive, symmetric causality[8]. These approaches estimate isolated effects of individual ESG dimensions on financial performance under confounder control, presuming context-invariant variable impacts. By contrast, configurational thinking rejects such conventional assumptions [17,18]. It advocates conjunctural, asymmetric, equifinal causality: outcomes arise from combined conditions instead of isolated factors; high- and low-performance outcomes follow distinct causal mechanisms; multiple configurations can produce equivalent results [29,42].

Qualitative Comparative Analysis (QCA) operationalizes configurational thinking via Boolean algebra and set-theoretic methods[18,43]. Unlike regression that estimates individual-variable net effects with other factors held constant, QCA detects condition

recipes or configurations sufficient and/or necessary for given outcomes[29,42]. For future-industry ESG research, this method uncovers heterogeneous value-creation pathways masked by case-averaging effects.

Recent complexity-leadership-theory advances indicate that in complex adaptive systems, leadership operates via emergence-enabling conditions rather than top-down control[20]. Translated to ESG, enterprise value is cultivated by fostering self-organization of beneficial configurations instead of deliberate strategic management[44]. This perspective refocuses inquiry from “what constitutes the optimal ESG strategy?” to “what enabling conditions facilitate diverse effective ESG strategies?”

2.4 Activity theory as a bridging framework

While paradox theory, institutional logics, and complex systems theory provide powerful lenses for understanding ESG challenges, they remain relatively abstract. Activity theory offers a practice-based framework that can ground these theories in the concrete activities through which ESG is enacted[23,24]. Activity theory analyzes human behavior through the activity system—a unit of analysis comprising subject (actor), object (goal), tools (mediating artifacts), rules (norms and conventions), community (social context), and division of labor (role differentiation)[23].

Activity theory fits future-industry ESG research for three reasons. First, it stresses mediation: human activity is mediated by physical, symbolic or digital tools[45]. digital technologies act as active mediators reshaping ESG practical possibilities rather than mere enablers in future industries[6]. Second, its

developmental orientation centered on learning, adaptation and transformation via expansive learning[46] matches the dynamic nature of ESG within emerging industries. Third, it links individual and collective layers to examine how individual actions form organizational patterns and how organizational structures constrain or empower individual agency[47].

In this study, we propose the CORE model (Commitment·Outreach·Resource·Efficiency) as an activity-theoretic framework for analyzing ESG in future industries. Each dimension corresponds to a distinct activity type and institutional logic: Commitment (governance activities, social welfare logic), Outreach (exchange activities, community logic), Resource (production activities, technocratic logic), and Efficiency (consumption activities, market logic). The model captures the interconnectedness of these activities: they do not operate in isolation but form a cycle where outputs of one activity become inputs to another, creating the possibility for both virtuous cycles (reinforcing value creation) and vicious cycles (paralyzing contradictions).

3. Research design

3.1 Case Selection

Metaverse enterprises are selected as typical future-industry ESG samples, not as the sole available option. ESG-oriented firms inherently integrate instrumental and value rationality by reconciling normative value goals and efficient operational approaches, and metaverse enterprises stand at the frontier of both rationality dimensions. As emerging organizations facing considerable developmental

uncertainties, they must clarify value-rationality fundamentals, i.e., orientations for digital development, to construct standardized responsibility frameworks. Their sophisticated, diversified technological systems support instrumental-rationality implementation, translating value goals into practical outputs efficiently. Moreover, metaverse firms realize value via networked ecosystems and thus require mutual-benefit mechanisms; broad linkages with heterogeneous social stakeholders secure operational sustainability and legitimacy.

Overall, metaverse enterprises' ESG practices fully validate the CORE model's cyclic operation. With value rationality as the fundamental orientation, firms acquire decision-making and strategic support from instrumental rationality to achieve value co-creation through value-rationality extension. Resulting mutual-benefit outcomes further consolidate corporate responsibility commitments and resource reserves.

3.2 Research Methods

This study employs cluster analysis and fuzzy-set qualitative comparative analysis (fsQCA) to address complex causal issues. Cluster analysis classifies continuous data into contextual types and identifies heterogeneous sample groups. Based on grouped samples, fsQCA examines causal complexity of condition-outcome configurations. This integrated design breaks the traditional sample homogeneity assumption, reveals configurational effects and equifinality, and achieves methodological synergy between classification and configuration, overcoming the limitations of single methods in addressing sample heterogeneity and causal complexity[48].

This study first adopts cluster analysis to identify dominant social and

environmental governance orientations of metaverse enterprises. Clustering results are mapped to the CORE model to identify critical elements driving superior ESG performance. Following necessary condition testing, fsQCA is applied to unpack the complex causal mechanisms linking social and environmental governance activities to corporate ESG scores.

FsQCA adopts a holistic cross-case comparative approach to identify complex causal patterns of effective and ineffective outcome configurations[18,29]. Unlike linear regression focusing on individual variable net effects or pairwise interactions, fsQCA captures conjunctive and multi-causal relationships among conditional factors[18,29] . Given that diverse ESG element combinations shape differentiated social and environmental governance practices and further affect ESG performance, fsQCA fits this research well. Additionally, fsQCA integrates qualitative and quantitative merits, enhancing the generalizability of qualitative case analysis and remedying large-sample quantitative methods' deficiencies in interpreting qualitative changes and complex phenomena[48], which adapts to the sample size of this study.

4. Cluster analysis

4.1 Data Sources

Samples were drawn from the June 2024 *Hurun China Metaverse Potential Companies List* released by Hurun Research Institute, covering the top 200 promising Chinese metaverse-focused firms for June 2023-June 2024. PDF-format ESG reports were retrieved from Sina Finance (<https://finance.sina.com.cn/>) and Green Data Network (<https://www.i-esg.com/>). Amid ongoing ESG disclosure reforms in China,

corporate disclosure documents adopt varied titles: Environmental, Social and Governance Reports, Sustainability Reports, or Corporate Social Responsibility Reports. Reports bearing these labels were collected for listed firms; Chinese-language versions were obtained for overseas-listed entities. In total, 81 corporate ESG report files were assembled.

4.2 Analysis process

Cluster analysis is an unsupervised machine learning method used to classify data and text—a process of automatically grouping similar objects into the same category and assigning dissimilar objects into different categories (REF). Unlike supervised and semi-supervised alternatives, it identifies latent patterns hidden within unstructured data, reduces researcher-subjective bias, and requires no pre-specified data distribution assumptions (REF). Accordingly, this study applies cluster analysis to capture textual features from ESG reports and detect empirically grounded patterns.

Optical Character Recognition (OCR) processed PDF documents, yielding over 9 million characters including more than 4.8 million Chinese characters. Text preprocessing followed five sequential steps: (1) conversion of traditional-Chinese segments to simplified Chinese; (2) removal of extraneous non-Chinese characters and numeric strings, retaining Chinese text plus ESG-relevant English terms; (3) word segmentation implemented via the jieba library; (4) stop-word filtering using a combined corpus integrating Baidu, Harbin Institute of Technology, Sichuan University stop-word lists alongside custom stop-words (firm names, abbreviations, and generic report template vocabulary); (5) word-vector extraction with the TF-IDF

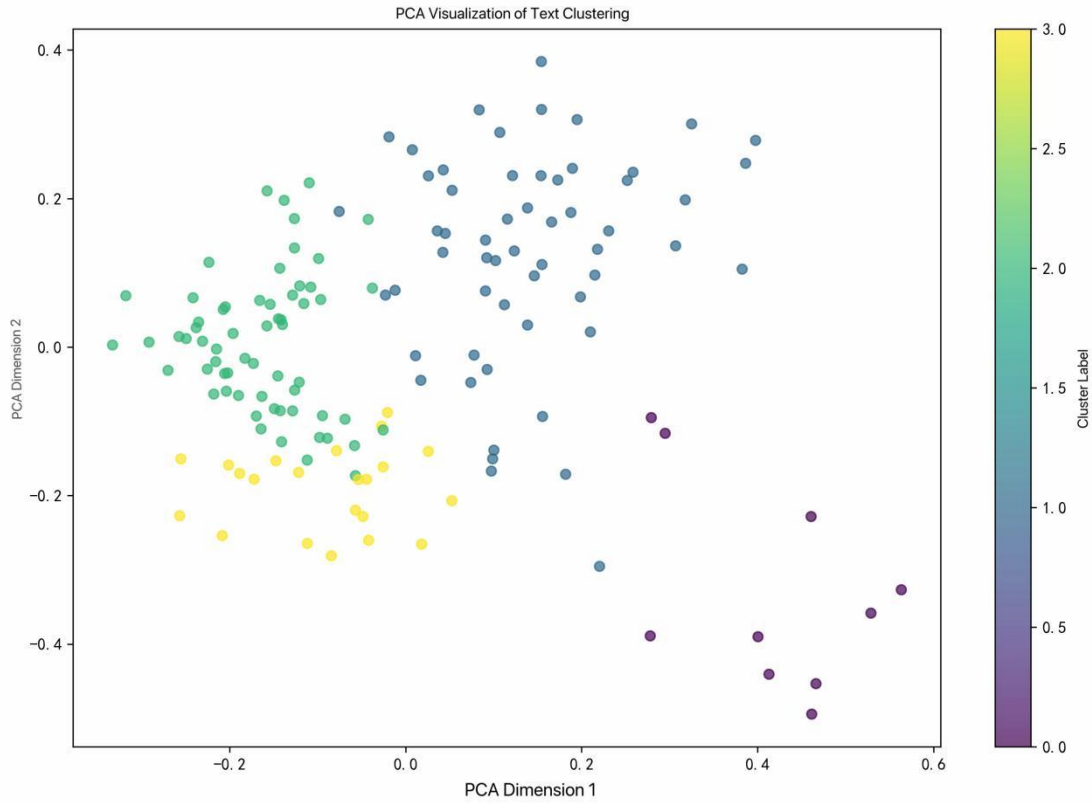
(Term Frequency-Inverse Document Frequency) model, which jointly accounts for term frequency and inverse-document frequency to better evaluate word discriminatory power, particularly for stylistically homogeneous corporate public reports (REF).

To avoid subjective or single-metric bias in clustering outputs, this study adopts the elbow rule combined with silhouette-coefficient diagnostics to determine the optimal cluster number (REF), yielding four clusters. Principal Component Analysis (PCA) visualized the clustering outcomes. Subsequent word-frequency analysis on each cluster extracted the top-10 most frequent terms per group.

4.3 Analysis results: Activity types and institutional logics

4.3.1 Cluster principal component analysis results

Figure 1 presents PCA visualization, where horizontal and vertical axes represent the first two principal components reduced from high-dimensional textual features. Four clusters show distinct spatial separation in two-dimensional space with notable intra-cluster similarity and inter-cluster divergence. PCA retains the intrinsic clustering structure of original textual features and visualizes cluster distribution differences. Color-coded clusters form concentrated, separable distributions in the principal-component space, confirming the rationality and robustness of text-clustering results.



Notes: a) These two principal components represent the two directions with the greatest variation in the original text features, which can preserve the distribution pattern of the original data to the greatest extent. b) The color bars on the right indicate the clustering labels: purple clusters represent clustering result 1, blue clusters represent clustering result 2, green clusters represent clustering result 3, and yellow clusters represent clustering result 4.

Figure 1. Clustering Results: Principal components of the text

4.3.2 Clustering keywords and the concept of clustering

Table 1 lists the keywords of the four clusters. The PCA-based text clustering results reflect not only empirical regularities but also distinct activity systems interpretable via activity theory. Activity theory classifies human activities into four qualitatively differentiated types: production, consumption, exchange, and distribution[23,47]. Each type presents unique relations among subjects, objects and communities, mediated by specific instruments and governed by distinct rules[45]. The clustering results indicate that the ESG activities of metaverse enterprises exactly match the four activity types, with each type forming a unique configuration of

instrumental and value rationality[60] and corresponding to an independent institutional logic[14].

Table 1 Clustering Results: Keywords for each category

No.	Top-10 keywords	Activity	Dimension name
1	Climate change, net zero, happy workplace, audit, occupational injury, diverse workplace, manager, response, water intake	<i>Exchange</i>	<i>Commitment</i>
2	Co-creating communities, integrity, underage, hearing impairment, rural industries, support, user personal information, community co-construction, professional ethics, young people	<i>Distribution</i>	<i>Outreach</i>
3	Power battery, harmonious community, hazard source, waste gas treatment, hazardous waste, R&D manufacturing, notebook computer, air pollution, waste gas, supply chain integration	<i>Production</i>	<i>Resource</i>
4	Credit policy, benefiting people, community climate change, enhancing well-being, key areas, industrial digitalization, practitioners, participation in training, knowledge popularization, digital transformation	<i>Consumption</i>	<i>Efficiency</i>

● *Exchange activity and the commitment dimension (Cluster 1)*

Exchange activities regulate community behaviors through formal norms, standards, and governance mechanisms to standardize social interactions[23]. Cluster 1 corresponds to this activity type. Its core keywords including “climate change”, “net zero”, “audit”, “diverse workplace”, and “happy workplace” denote an activity system centered on ESG rule-making, monitoring and compliance institutional infrastructure.

This configuration represents typical value rationality, in which firms treat ESG as normative commitments to responsible operation, stakeholder welfare and long-term sustainability rather than a profit-oriented instrument[3]. Its institutional logic is social-welfare logic that prioritizes legitimacy, trust and moral obligations above economic efficiency[14]. Nevertheless, it is not pure window dressing; from the

activity-theory perspective, rule-making is productive and builds transparent, predictable environments for complex coordination[49,50].

We conceptualize this activity type as the *Commitment (C)* dimension of the CORE model. “Commitment” highlights its binding property: via governance mechanisms, policy pledges and stakeholder engagement, firms establish credible obligations to curb short-term opportunism and facilitate long-term value creation[51]. The Commitment dimension thereby constitutes ESG’s governance foundation, aligning organizational behaviors with societal expectations and ethical standards.

- *Distribution activity and the outreach dimension (Cluster 2)*

Distribution activities entail subjects influencing communities through labor division and the allocation of social resources, roles and benefits[23]. Cluster 4 embodies this activity type. Its keywords including “co-creating communities”, “rural industries”, “hearing impairment”, “integrity”, and “user personal information” reflect an activity system centered on inclusion, equity and shared value creation, which constitutes the redistributive dimension of ESG.

This configuration fully reflects value rationality, with firms treating ESG as a moral mission to generate social value independent of immediate financial returns[10]. Its institutional logic is community logic, prioritizing solidarity, reciprocity and collective welfare over organizational interests[14]. Activity-theory perspectives suggest distribution is generative rather than zero-sum; including marginalized groups and broad-based value sharing expands overall social-economic resource pools[52].

We conceptualize this activity type as the *Outreach (O)* dimension of the CORE

model. “Outreach” denotes its relational and expansive attributes: firms cross organizational boundaries to engage communities, establish partnerships and co-create value with diverse stakeholders[53]. The Outreach dimension thereby forms ESG’s social foundation, fostering trust, legitimacy and social capital for corporate sustainability.

- *Production activity and the resource dimension (Cluster 3)*

Production activities use tools to convert raw materials into valuable outputs[23]. Within our dataset, this type corresponds to green manufacturing and supply-chain management, aiming to improve resource efficiency, reduce environmental externalities and boost operational performance. Keywords “power battery”, “waste gas treatment”, “R&D manufacturing”, and “supply chain integration” identify an activity system in which firms (subject) adopt green technologies (tools) to turn environmental challenges (object) into competitive advantages (outcome).

This configuration fully embodies instrumental rationality, wherein ESG serves as a tool for efficiency improvement, cost reduction and market differentiation, rather than an ultimate goal[54]. Such practices follow market logic that prioritizes economic efficiency, technological optimization and market competitiveness[14]. Nevertheless, instrumental actions are socially mediated; the applicable tools cover physical technologies, regulatory standards, industrial best practices and digital monitoring systems that quantify and standardize environmental performance[49].

We conceptualize this activity type as the *Resource (R)* dimension of the CORE model. “Resource” reflects its dual attributes, covering resource optimization in

materials, energy and labor, and resource mobilization via green technology acquisition, environmental certification and supplier capability cultivation. The Resource dimension constitutes ESG's technocratic foundation, delivering tangible and measurable outcomes through standardized management.[55].

- *Consumption activity and the efficiency dimension (Cluster 4)*

Broadly defined by activity theory, consumption activities satisfy needs and foster capabilities through interactions among subjects, objects and communities[57]. Beyond passive resource depletion, they represent active appropriation and self-development mediated by tools and communities[45]. Cluster 3 corresponds to this activity type. Keywords “industrial digitalization”, “knowledge popularization”, “enhancing well-being”, and “credit policy” reveal an activity system oriented toward human-social capability development instead of material production.

This configuration stands for a unique instrumental-rationality form that optimizes knowledge, skills and relational capital instead of physical resources[56]. Enterprises invest in employee training, community education and digital inclusion for strategic capability-building rather than pure philanthropy, constructing human and social infrastructure for long-term value creation[57]. Its hybrid institutional logic integrates market logic (human-capital investment for productivity growth) and partial social-welfare logic (advancing equity and inclusion).

We conceptualize this activity type as the *Efficiency (E)* dimension of the CORE model. “Efficiency” has dual connotations: operational efficiency (digital-driven resource savings) and adaptive efficiency (improving organizational learning,

innovation and environmental responsiveness)[58]. The Efficiency dimension therefore reflects ESG-oriented dynamic capability building by generating intangible assets for sustained competitive advantages[59].

4.4 The CORE model: An integrated framework of paradox of rationalities and cycle of value creation

The four dimensions—Commitment (C), Outreach (O), Resource (R), Efficiency (E)—do not operate in isolation. Activity theory emphasizes that activity systems are interconnected and mutually constitutive[23]. The CORE model captures this interconnection through two key mechanisms: the paradox of rationalities and the cycle of value creation.

From the rationality paradox perspective, the CORE model indicates that ESG activities are inherently contradictory, needing to satisfy instrumental demands (Resource, Efficiency) and normative commitments (Commitment, Outreach) simultaneously [12]. Such persistent tension requires active management rather than complete resolution. The Resource and Efficiency dimensions represent instrumental rationality that treats ESG as a means, whereas Commitment and Outreach reflect value rationality that regards ESG as an end [60].

Institutional-hybridity literature identifies three typical strategies for managing cross-logic tensions: segmentation, assimilation, and blending[16]. Our eight configurations (identified through fsQCA in the next section) represent equifinal solutions to this paradox—different ways of configuring the CORE dimensions to achieve high enterprise value[17,18].

Regarding value-creation cycles, the developmental view of activity theory posits activity systems evolve via expansive-learning loops[46]. The CORE model follows this cyclic mechanism: Commitment establishes value-rational normative orientations, Resource and Efficiency provide instrumental supports, and Outreach expands value-creation boundaries to regenerate commitments and resources (Figure 2).

This cycle relies on digital-technology mediation, a defining trait of emerging industries. Metaverse firms adopt blockchain for transparent governance (strengthening Commitment), AI for resource optimization (enhancing Resource), digital platforms for capability building (boosting Efficiency), and decentralized networks for community engagement (expanding Outreach)[2,27]. We define such practices as digital institutional work, namely leveraging technological affordances to construct, sustain and reshape institutional arrangements[26].

Accordingly, the CORE model forms a theoretically grounded and empirically supported analytical framework for future-industry ESG research. It moves past oversimplified integration assumptions and acknowledges ESG's intrinsic complexity, including competing institutional logics, paradox-based governance, and value generation driven by emergent configurational dynamics.

5. FsQCA analysis

5.1 FsQCA model establishment

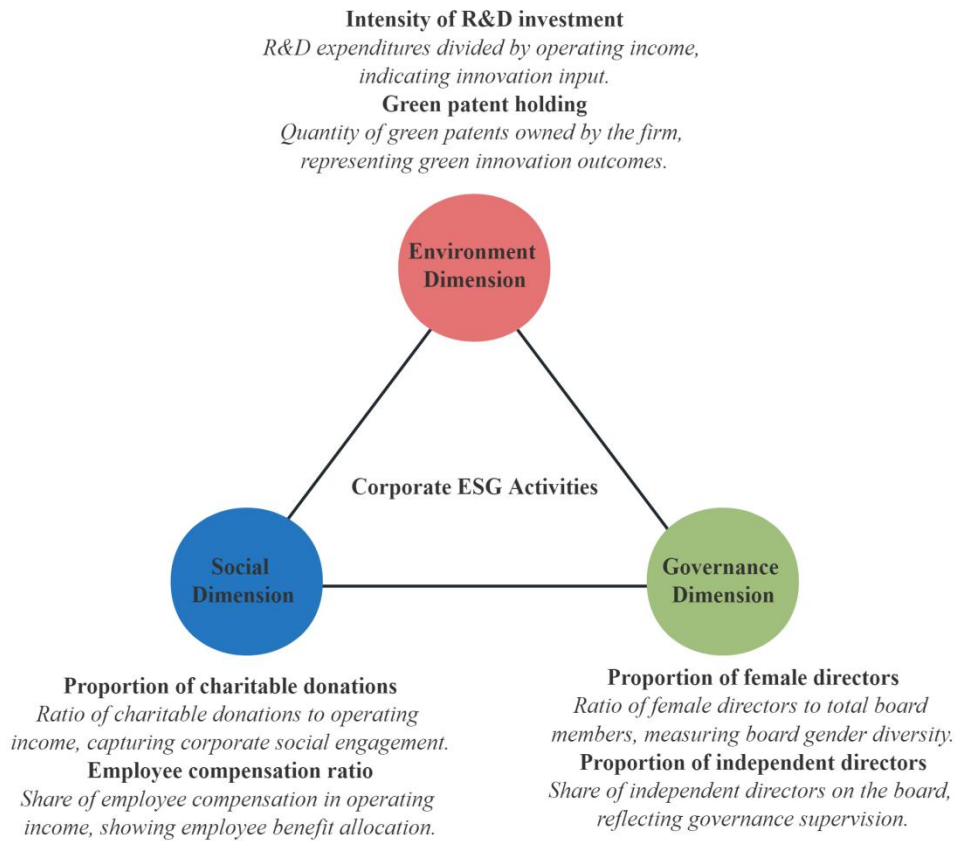


Figure 2 The CORE model: Activity types, institutional logics, and rationalities

The fsQCA causal variables are derived from corporate ESG report disclosure guidelines covering core ESG performance indicators. This study selects six indicators adapted to the metaverse industry’s ESG evaluation system: female director proportion, independent director proportion, charitable donation ratio, R&D investment intensity, green patent proportion, and employee compensation proportion.

5.2 Variable measurement, data source and calibration

Outcome variable. Enterprise value is measured based on the ranking of metaverse enterprise value potential in the *Hurun China Metaverse Potential Enterprises 2024*.

Causal variables. The proportion of female directors and independent directors

were sourced from corporate annual reports. The charitable donation proportion, calculated as the ratio of charitable donations to operating income, was collected from annual and ESG reports. R&D investment intensity, defined as the ratio of R&D expenditure to operating revenue, was extracted from annual report disclosures. The number of green patents was obtained from annual granting records published by *National Intellectual Property Administration* . Employee compensation ratio were also derived based on disclosures in the company's annual report, measured as employee compensation to revenue ratio. Companies lacking relevant data were excluded, resulting in 80 companies with complete data serving as research cases.

Variable calibration. In this study, variables were calibrated to fuzzy sets using the direct method, following established fsQCA methodology . The direct calibration method requires specifying three anchoring values: (1) the threshold for full membership in the target set (fuzzy score = 0.95), (2) the threshold for full non-membership in the target set (fuzzy score = 0.05), and (3) the cross-over point where values cannot be classified as high or low (fuzzy score = 0.50) . This calibration process transforms raw numerical data into membership scores ranging from 0 to 1, where 1 represents full membership, 0 represents no membership, and 0.5 represents the point of maximum ambiguity[18,29].

For continuous variables, percentile-based data-dependent anchor points were adopted[18,29]. The 25th, 50th, and 75th percentiles served as calibration anchors, following organizational-research conventions for non-normal data[18,29]. Table 2 reports variable-specific calibration schemes. Post-calibration, we checked for exact

0.50 fuzzy scores, which represent an ambiguous set-membership status[18,29]. To prevent configurations with crossover-point conditions from being discarded, 0.001 was added to 0.50 fuzzy scores per standard fsQCA procedures[18,29]. Table 2 provides further details on measurements, data, and calibration.

Table 2 Measurement, data sources, descriptive statistical and calibration

Variable	Measurement Indicator	Minimum	Maximum	Mean	Standard Deviation	Calibration method	Source
Corporate Potential Ranking	Collected according to ranking tiers: Top 20 most potential enterprises = 1; Top 50 most potential enterprises = 2; Top 100 most potential enterprises = 3; Top 250 most potential enterprises = 4	1	4	-	-	Assign fuzzy membership degrees of 0.95, 0.825, 0.625 and 0.25 to categories 1 to 4 respectively	2024 Hurun China Metaverse Potential Enterprises List
Proportion of female directors	Ratio of female directors to total directors(%)	0	0.444	0.141	0.108	Take the 25th, 50th and 75th percentiles of the proportion of female directors as three anchors, namely: Anchor 1 = 0.0702; Anchor 2 = 0.125; Anchor 3 = 0.2222	2023Annual Corporate Financial Reports
Proportion of independent directors	Ratio of independent directors to total directors (%)	0.3	0.571	0.396	0.064	Take the 25th, 50th and 75th percentiles of the	2023Annual Corporate Financial Reports and ESG Reports

Variable	Measurement Indicator	Minimum	Maximum	Mean	Standard Deviation	Calibration method	Source
Intensity of R&D investment	Ratio of R&D expenditure to operating revenue (%)	0.0017	0.781	0.093	0.107	proportion of independent directors as three anchors, namely: Anchor 1 = 0.3333; Anchor 2 = 0.4; Anchor 3 = 0.43145 Take the 25th, 50th and 75th percentiles of the charitable donation ratio as three anchors, namely: Anchor 1 = 0; Anchor 2 = 0.0002; Anchor 3 = 0.0005 Take the 25th, 50th and 75th percentiles of R&D investment intensity as three anchors, namely: Anchor 1 = 0.0362; Anchor 2 = 0.05665; Anchor 3 = 0.11945 Take the 25th, 50th and 75th percentiles of green patents as three anchors, namely:	2023 Annual Corporate Financial Reports
Green patent beholding	Quantity (units)	0	1005	63.375	146.424		National Intellectual Property Administration of China
Employee compensation ratio	Ratio of total employee compensation to operating revenue (%)	0.0023	0.896	0.198	0.172		2023 Annual Corporate Financial Reports

Variable	Measurement Indicator	Minimum	Maximum	Mean	Standard Deviation	Calibration method	Source
						Anchor 1 = 1; Anchor 2 = 11; Anchor 3 = 51.25	

5.3 Analysis process

This study adopts fsQCA 4.0 software to identify conditional configurations driving high corporate potential, where distinct configurations constitute heterogeneous environmental ecosystems for equivalent outcomes. The analytical procedures include necessary condition testing, truth table construction, and intermediate solution analysis [18,29]. All identified configurations are named following the configurational theorization process[18].

We conduct a necessary-condition analysis to detect single preconditions indispensable for the target outcome. In fsQCA, a condition qualifies as necessary when its consistency score exceeds 0.90, signifying its presence in at least 90 % of outcome-relevant cases[18]. Table 3 shows low necessity consistency (<0.9) for all individual conditions, implying no single necessary environmental condition yields high ESG scores. This aligns with the configurational logic of ESG value creation, which features multiple equifinal paths instead of standalone necessary conditions[18].

Table 3 Tests of necessity for individual conditions

Condition variables	Consistency
Proportion of female directors	0.588
~Proportion of female directors	0.619

Condition variables	Consistency
Proportion of independent directors	0.536
~Proportion of independent directors	0.651
Proportion of charitable donations	0.654
~Proportion of charitable donations	0.563
Intensity of R&D investment	0.572
~Intensity of R&D investment	0.628
Green patent beholding	0.618
~Green patent beholding	0.599
Employee compensation ratio	0.559
~Employee compensation ratio	0.659

We set the raw consistency threshold to 0.8 and case frequency threshold to 1. Core and peripheral conditions are differentiated by comparing intermediate and parsimonious solutions: conditions appearing in both solutions are core conditions, while those occurring only in the intermediate solution are peripheral conditions[18].

5.4 Analysis results

The QCA analysis results are shown in Table 4, where there are 8 configurations (S1–S8) that generate high enterprise potential. The specific interpretation of each configuration affecting the ESG assessment of enterprises is as follows:

Table 4 Configuration for achieving high ESG in fsQCA

Condition	High corporate value							
	S1	S2	S3	S4	S5	S6	S7	S8
Proportion of female directors	⊗	⊗	⊗	●	●	⊗	●	⊗
Proportion of independent directors	⊗	⊗	⊗	●	●	●	⊗	●
Proportion of charitable donations	●	●		●	●	⊗	⊗	⊗
Intensity of R&D investment	●		●	⊗	⊗	⊗	●	⊗
Green patent beholding		●	⊗	●		⊗	⊗	●
Employee compensation ratio			⊗		●	⊗	●	●
Consistency	0.933	0.916	0.950	0.939	0.927	0.941	0.943	1
Original Coverage Rate	0.235	0.217	0.133	0.157	0.108	0.085	0.081	0.092
Unique Coverage Ratio	0.046	0.047	0.025	0.049	0.012	0.033	0.033	0.016

Overall Consistency	0.901
Overall Coverage Ratio	0.534

Notes: ● = Core condition exists; ● = Edge condition exists; ⊗ = core condition missing; ⊗ = missing edge condition

● *S1: “The Strategic Philanthropist”*

Configuration S1 indicates high corporate potential can be achieved in ESG ecosystems characterized by intensive charitable donations and R&D investment, with low female-director and independent-director proportions as peripheral conditions. This configuration suggests firms with limited board gender diversity and independent-director representation may boost ESG performance and corporate potential mainly through charitable giving and R&D investment, while green patent share and employee compensation ratio produce no substantial effects. Representative firms include Dahua Technology, East Hua Software, Sany Heavy Industry and Interactive Fun Technology. Their annual reports, sustainability reports and auxiliary data confirm top-100 corporate-potential performance driven by robust charitable-donation and R&D outputs.

● *S2: “The Ecosystem Orchestrator”*

Configuration S2 yields high corporate potential under an ESG ecosystem with high charitable-donation ratio and green-patent proportion as core conditions, and non-high female-director and independent-director proportions as peripheral conditions. This configuration suggests firms with inadequate board diversity and independent directors can improve their ESG ecosystem and corporate potential primarily by expanding charitable contributions and green-patent outputs, whereas R&D-investment intensity and employee-compensation ratio exert no significant effects. Representative

firms include China Telecom, BOE and TCL Technology. Their annual reports, sustainability reports and supporting data verify robust charitable-donation and green-patent performance, with corporate-potential rankings within the top 50.

- S3: *“The Capability Architect”*

Configuration S3 shows ESG ecosystems taking high R&D-investment intensity as the core condition, with non-high proportions of female directors, independent directors, green patents and employee compensation as peripheral conditions, contribute to high corporate potential. This pathway implies firms with low peripheral indicators can improve ESG performance and corporate potential mainly through R&D investment, while charitable-donation ratio produces negligible effects. Will Semiconductor is a typical case; its annual and sustainability reports confirm the sample-leading R&D-investment proportion and a top-50 corporate-potential ranking.

- S4: *“The Legitimacy Seeker”*

Configuration S4 achieves high corporate potential in an ESG ecosystem where high proportions of female directors, independent directors and green patents function as core conditions, with high charitable-donation ratio and non-high R&D-investment intensity as peripheral conditions. This configuration suggests firms with constrained R&D spending can enhance their ESG ecosystem and corporate potential via charitable donations, green patents, board gender diversity and independent-director representation, while employee-compensation ratio has no substantial effect. Representative firms include China Unicom and GoerTek. Their annual reports, sustainability reports and supplementary data verify strong performance in

female-director ratio, independent-director ratio and green patents, alongside top-20 corporate-potential rankings.

- S5: *“The Stakeholder Capitalist”*

Configuration S5 indicates high corporate potential can be realized in an ESG ecosystem taking high female-director, independent-director and employee-compensation proportions as core conditions, with high charitable-donation ratio and non-high R&D-investment intensity as peripheral conditions. Firms lacking sufficient green-patent reserves can enhance corporate potential by optimizing charitable donations, employee compensation and board structure, while green-patent proportion produces no significant effect. Typical cases are Glodon, Leyard and Industrial Bank. Their annual reports, sustainability reports and relevant data demonstrate superior performance in female-director ratio, independent-director ratio and employee compensation, with corporate-potential rankings within the top 100.

- S6: *“The Compliance Professional”*

Configuration S6 shows an ESG ecosystem with high independent-director proportion as the core condition and non-high female-director, charitable-donation, green-patent, R&D-investment and employee-compensation proportions as peripheral conditions yields high corporate potential. This pathway indicates firms with weak peripheral-indicator performance can improve ESG governance and corporate potential mainly by raising independent-director ratios, with no interfering indicators. 37 Interactive Entertainment serves as a typical case. Its annual reports, sustainability reports and supporting data record the sample’s highest independent-director

proportion and a top-20 corporate-potential ranking.

- *S7: “The Distributed Innovator”*

Configuration S7 demonstrates high corporate potential stems from an ESG ecosystem with high female-director proportion, high R&D-investment intensity and high employee-compensation ratio as core conditions, and non-high independent-director, charitable-donation and green-patent proportions as peripheral conditions. This pathway suggests firms with poor peripheral-indicator performance can improve their ESG ecosystem and corporate potential by enhancing board gender diversity, R&D spending and employee compensation. Century Huatong is a typical case. Its annual reports, sustainability reports and supporting data show top-tier sample performance in female-director proportion, R&D investment and employee compensation, alongside a top-50 corporate-potential ranking.

- *S8: “The Risk-Adjusted Optimizer”*

Configuration S8 indicates high corporate potential can be achieved in an ESG ecosystem with high independent-director proportion, high green-patent proportion and high employee-compensation ratio as core conditions, and non-high female-director, charitable-donation and R&D-investment proportions as peripheral conditions. This configuration implies firms with weak peripheral-indicator performance can optimize their ESG ecosystem and corporate potential by improving independent-director representation, green-patent outputs and employee compensation. Bank of China is a typical case. Its annual reports, sustainability reports and relevant data confirm top-tier sample performance in independent-director proportion, green

patents and employee compensation, with a top-50 corporate-potential ranking.

5.5 Robustness Test

Outcome variable substitution, a standard QCA robustness method, was employed for robustness testing. The original corporate potential ranking outcome was replaced with ESG scores, with all antecedent conditions retained for fsQCA reanalysis. Per Schneider and Wagemann[42], results are robust when minor theoretically justified parameter adjustments induce marginal outcome variations.

Table 5 presents the test results. Configurations S4 and S5 (M1 and M4 in robustness outputs) still rely on high independent-director proportion, charitable donations and green patents. Robustness-derived S7 and S8 correspond to baseline S2, S3 and S5, characterized by employee compensation and green patent combinations. Consistent with baseline results, R&D investment intensity is unnecessary and maintains non-high values in S1, S4 and S5. The core finding that corporate value depends more on responsibility and shared-benefit factors than technological innovation remains stable. Overall solution consistency slightly decreased from 0.901 to 0.893, while coverage increased from 0.534 to 0.589, validating the robustness of baseline conclusions.

Table 5 Configuration for Achieving High ESG Scores in fsQCA (Robustness Test)

Condition	High ESG Score				
	S1	S2	S3	S4	S5
Proportion of female directors		⊗	⊗	●	●
Proportion of independent directors	●	●	⊗	●	⊗
Proportion of charitable donations	●	⊗	●	●	⊗
Intensity of R&D investment	⊗			⊗	⊗
Green patent beholding	●	●	●		●

Employee compensation ratio	⊗	●	●	●	●
Consistency	0.92	0.90	0.83	0.96	0.85
Original Coverage Rate	0.17	0.11	0.13	0.11	0.05
Unique Coverage Ratio	0.09	0.03	0.06	0.04	0.02
Overall Consistency			0.90		
Overall Coverage Ratio			0.34		

6. Discussions

6.1 Key Findings

This study delivers three interconnected findings for emerging industry ESG research. First, metaverse firms' ESG practices represent complex institutional hybrids instead of simplistic financial and social goal combinations. Computational text analysis of 81 ESG reports identifies four activity categories (production, consumption, exchange, distribution) matching CORE-model dimensions (Resource, Efficiency, Commitment, Outreach). Each category achieves distinct instrumental and value rationality balancing, verifying context-dependent rather than universal ESG rationality shaped by firm-level practices [14,60].

Second, fsQCA analysis of 80 metaverse-industry firms yields eight equifinal configurations for high corporate value. These pathways represent systematic institutional-hybridity strategies instead of random variations: segmentation (S6, S8) isolating competing logics, assimilation (S1, S3, S4) prioritizing one logic, and synthesis (S2, S5, S7) forming innovative cross-boundary hybrid practices[12,16]. This typology challenges the prevalent best-practice assumption in ESG research and verifies that divergent strategies can produce equivalent outcomes[18,29].

As shown in Table 6, the eight fsQCA-derived configurations constitute equifinal pathways for metaverse enterprises to deploy CORE dimensions toward high firm

value. Each configuration embodies a unique institutional-hybridity strategy that combines, sequences or compartmentalizes market logic (instrumental rationality) and social-welfare-community logic (value rationality)[16,21].From a paradox-theory perspective, these strategies fall into three rationality-paradox management approaches: segmentation (logic separation), assimilation (one-logic subordination), and synthesis (novel hybrid practices)[12,15].Table 6 summarizes all classified configurations and their corresponding paradox-management tactics.

Table 6 CORE Configurations, Institutional Hybridity Strategies, and

Paradox Management Approaches

Configuration	CORE Dimensions Present	Dominant Logic	Hybridity Strategy	Paradox Management	Value Creation Mechanism
S1 (Co-benefit Enable-Driven)	R + E (High C, O via donations)	Market → Social	Assimilation (instrumental dominance)	Temporal separation	Efficiency-driven social impact
S2 (Benefit-Green Leading)	R + O (High E via green patents)	Market + Community	Blended hybridity	Selective coupling	Green innovation ecosystem
S3 (Technology-Driven)	E (Extreme)	Technocratic	Assimilation (capability focus)	Defensive avoidance	Dynamic capability building
S4 (Governance Co-benefit Synergy)	C + O + R (E absent)	Social welfare → Market	Assimilation (value dominance)	Spatial separation	Legitimacy-based resource access
S5 (Governance Resource-Sharing)	C + O + E (R absent)	Social welfare + Community	Blended hybridity	Synthesis (shared value)	Stakeholder capitalism
S6 (Supervisory Type)	C (Extreme)	Governance	Segmentation	Compartmentalization	Monitoring and compliance
S7 (Inclusive Innovation Input)	E + R + O (C absent)	Technocratic + Community	Blended hybridity	Synthesis (inclusive innovation)	Distributed capability development
S8 (Supervision Resource Integration)	C + R + E (O absent)	Governance + Market	Segmentation	Sequential attention	Risk-adjusted efficiency

The Co-benefit Enable-Driven configuration (S1, the Value Empowerer) features intensive R&D investment, donation-supported operational efficiency, and low governance commitment from limited female-director, independent-director representation and insufficient external outreach. Following Pache and Santos'[16] instrumental-dominance assimilation framework, firms in this group regard

philanthropy as a strategic tool rather than discretionary charity. Consistent with Porter and Kramer's[35] strategic CSR perspective, corporate donations serve as long-term investments in human capital and community governance to sustain productivity growth. Restricted board diversity forms closed governance, allowing firms to prioritize strategic control and instrumentalize ESG practices instead of multi-stakeholder decision-making[61]. This configuration mitigates rationality tension via temporal separation[12], prioritizing R&D-driven technological-operational improvement before social-resource allocation. Such an approach defers rather than resolves institutional conflicts by subordinating social value to economic objectives. Value creation depends on efficiency-led social impact, in which operational gains finance targeted philanthropy to generate joint social-economic benefits without governance restructuring. Engineering manufacturers including Dahua Technology and Sany Heavy Industry commonly adopt this pathway, underpinned by sound technical systems for social contribution.

The Benefit-Green Leading configuration (S2, the Ecosystem Orchestrator) is characterized by sufficient green patent reserves, ecosystem-oriented charitable engagement, moderate operational efficiency, and low governance commitment. This blended hybridity integrates market and community institutional logics[21], beyond the traditional cost-oriented view of green technology development. Green patents act as cross-boundary coordination platforms to extend corporate influence via open technology sharing and industrial standard formulation[39]. Charitable donations function as ecosystem infrastructure investment, optimizing supplier and community

environments to promote large-scale green innovation diffusion. Firms adopt selective coupling strategies to reconcile conflicting institutional demands[16], through differentiated yet complementary practices for market and community stakeholders, with technical standards governing industrial collaboration and community initiatives legitimizing corporate green activities. Green technologies support grassroots engagement, and public participation further validates firm green practices. Value creation originates from cross-organizational network effects in green innovation ecosystems rather than individual operational efficiency. Ecosystem value increases with technology popularization and multi-stakeholder participation. Platform firms including China Telecom, BOE, and TCL leverage technological advantages to coordinate cross-boundary green collaboration ecosystems following this configuration.

The Technology-Driven configuration (S3, the Capability Architect) delivers high operational efficiency via intensive R&D investment, alongside limited governance commitment, external outreach and green patent accumulation. This configuration reflects defensive avoidance of conflicts between economic and social rationalities[33]. Firms prioritize technological capability upgrading through sustained R&D and human capital investment while downplaying board diversity, community engagement and environmental innovation[59]. Such resource allocation constitutes context-specific strategic adaptation rather than negligence, as technological leadership underpins the survival and competitiveness of emerging industries[5]. Firms weaken normative value rationality, simplify ESG governance as technocratic management, and regard stakeholder engagement and institutional diversity as obstacles to core innovation[12].

Its value creation relies on adaptive efficiency and dynamic capabilities, which support internal resource reconfiguration to accommodate technological changes[58]. These firms prioritize short-term technological superiority, with sustained innovation expected to achieve endogenous ESG compliance. High-speed technology ventures represented by Will Semiconductor follow this model, where iterative capability upgrading outweighs stakeholder governance in driving organizational development.

The Governance Co-benefit Synergy configuration (S4, the Legitimacy Seeker) achieves high governance commitment through diversified board structures, transforms green patents into public goods via extensive external outreach, and maintains moderate resource endowments with low operational efficiency. This configuration adopts value-dominant assimilation for hybrid institutional strategies, prioritizing governance legitimacy and community embeddedness over operational optimization[16]. Green patents are decoupled from cost-saving functions and repositioned as public welfare-oriented technological assets[10]. Higher female and independent director proportions construct open governance systems that incorporate multi-stakeholder perspectives into decision-making, with firms tolerating lower operational efficiency to consolidate social and institutional legitimacy[61]. This configuration resolves institutional paradoxes via spatial separation, dividing instrumental and value rationality into independent organizational units[12]. Specialized departments undertake legitimacy reform and community engagement, while operational departments pursue efficiency independently to mitigate institutional tension through structural differentiation. Its value creation depends on

legitimacy-oriented resource acquisition. Sound governance and close community ties accumulate reputational capital, guarantee operational legitimacy, reduce regulatory risks, and attract long-term capital support[62]. Regulated incumbent enterprises such as China Unicom and GoerTek adopt this configuration, where institutional legitimacy sustains stable resource acquisition and industrial development sustainability.

The Governance Resource-Sharing configuration (S5, the Stakeholder Capitalist) features high governance commitment, extensive external outreach and efficiency-oriented employee compensation, with limited green patent reserves. This configuration represents an advanced synthetic hybridity model that fully integrates instrumental and value rationalities at the organizational level[12,15]. Competitive employee compensation satisfies labor equity norms and improves human capital productivity, while diversified governance structures balance stakeholder participation and decision-making quality. Such firms pursue environmental sustainability through employee green behavior cultivation and community environmental campaigns rather than technological innovation. This synthetic framework turns the traditional trade-off between social welfare and economic performance into a mutually supportive relationship, wherein equitable talent incentives, inclusive governance and community engagement jointly enhance long-term corporate sustainability. Its value creation originates from relational rents of stakeholder partnerships, which facilitate cross-organizational knowledge exchange, risk sharing and collective learning to build sustainable competitive advantages[63]. Knowledge-intensive service firms including Glodon, Leyard and Industrial Bank typify this configuration, where human and social

capital override physical capital to drive corporate value growth.

The Supervisory Type configuration (S6), recognised as the Compliance Professional, is defined by dominant independent director participation and high governance commitment, with other ESG dimensions barely involved in routine operations. This typology adopts segmentation-based hybridity to separate ESG compliance from core commercial activities[16]. Independent directors focus solely on supervisory monitoring rather than strategic value creation, maintaining basic ESG compliance without interfering with operational and market priorities[61]. Strict compartmentalization isolates board-level oversight from daily business workflows to contain institutional conflicts[12]. Such arrangements achieve symbolic ESG implementation, meeting external institutional and social demands without substantive organizational reform[64]. Its value creation lies in defensive risk mitigation: independent board supervision reduces agency costs, restrains organizational misconduct, and avoids regulatory sanctions and reputational losses[65]. This configuration prioritizes operational stability over proactive value creation and is prevalent among growth-oriented ventures such as 37 Interactive Entertainment, which regard ESG governance as routine administrative compliance rather than a strategic competitive resource.

The Inclusive Innovation Input configuration (S7), termed the Distributed Innovator, integrates R&D-driven operational efficiency, generous employee compensation and extensive community outreach, with low formal governance commitment due to the absence of independent director oversight. Grounded in

distributed innovation theory, this typology realizes institutional synthesis through inclusive practical engagement rather than hierarchical governance arrangements[66]. Firms encourage employee participation in R&D activities, provide systematic vocational training, and build open community knowledge-sharing platforms to incorporate stakeholder welfare into innovation processes. The lack of independent oversight indicates network-based governance, where inter-organizational coordination depends on relational trust rather than formal supervision[67]. Different from hierarchical paradox resolution, rationality synthesis is formed through iterative practical implementation, embedding value rationality into routine innovation activities and producing endogenous inclusive stakeholder benefits[25]. Distributed capability cultivation and open innovation underpin value creation by expanding organizational knowledge reserves, accelerating organizational learning, and building shared innovation ownership among internal employees and external communities[68]. Platform enterprises represented by Century Huatong follow this model, leveraging network innovation externalities to generate inclusive and sustainable social and economic value.

The Supervision Resource Integration configuration (S8), the Risk-Adjusted Optimizer, features high governance commitment, rich green patent resources and efficiency-oriented employee compensation, with no strategic emphasis on external community outreach. Firms in this pathway apply sequential attention mechanisms to balance institutional tensions by iteratively optimizing governance supervision, green innovation and human capital investment across development stages[12]. They

dynamically reallocate resources to strengthen board oversight, improve green patent-based environmental efficiency, and optimize employee incentives to release human capital potential. Limited external outreach represents deliberate boundary stratification, prioritizing internal stakeholder value distribution over community public investment. This sequential design avoids synchronous institutional friction: improved supervision supports risky green technology exploration, and innovation benefits fund equitable employee welfare, forming a staged complementary development logic. Its value creation stems from risk-adjusted operational efficiency. Diversified governance and green innovation reduce systemic operational risks, and matched employee incentives enable high-risk, high-return investment[69]. Financial institutions such as Bank of China adopt this configuration, utilizing ESG governance as a core risk management tool to optimize governance, technology and human capital resources holistically.

According to the analysis results of the eight configurations, S1, S3, and S7 align with the Empowerment and Resources dimension of the CORE model, S4 and S5 align with the Responsibility and Co-benefit dimension, and S6 aligns with the Responsibility dimension.

The eight ESG configurations form a continuous rationality dominance spectrum based on instrumental and value rationality. The technology-driven (S3) and co-benefit enable-driven (S1) configurations anchor the instrumental rationality pole, prioritizing operational optimization and technological capability building for value creation. The supervisory (S6) and governance co-benefit synergy (S4) configurations occupy the

value rationality pole, focusing on normative governance and institutional legitimacy accumulation. By contrast, the governance resource-sharing (S5) and inclusive innovation input (S7) configurations lie in the intermediate zone and achieve effective integration of dual rational logics. This differentiated configuration distribution verifies configurational equifinality, indicating equivalent high-value organizational outcomes can be achieved through diverse strategic pathways. It also demonstrates that equifinal outcomes stem from heterogeneous operational mechanisms, with each configuration relying on distinct capability foundations and contextual conditions to realize sustainable value creation[29].

All ESG configurations exhibit a structural trade-off between governance diversification and technological development, reflecting inherent institutional tension between normative governance commitment and technical operational intensity. The governance co-benefit synergy (S4) and supervisory (S6) configurations present high governance inclusivity but low technological investment, while the co-benefit enable-driven (S1), technology-driven (S3) and inclusive innovation input (S7) configurations feature prominent technological advantages yet insufficient diversified governance. Only the benefit-green leading (S2), governance resource-sharing (S5), and supervision resource integration (S8) configurations realize a relative balance between the two dimensions. Such structural antagonism originates from conflicting institutional demands: legitimacy-oriented inclusive governance requires multi-stakeholder deliberation that weakens organizational responsiveness, whereas sustained technological breakthroughs demand rapid resource integration and

centralized strategic execution[70].

Digital mediation acts as a core contextual factor reshaping the institutional hybridity logic of metaverse enterprises and differentiating their ESG configurations from those of traditional firms. Conservative compliance-oriented configurations (S6, S8) employ digital tools to optimize internal governance monitoring and operational risk management, while ecosystem-focused innovative configurations (S2, S7) leverage digital platforms to realize cross-boundary resource integration and multi-stakeholder governance. Beyond traditional auxiliary functions, digital technologies exert a constitutive effect on institutional hybridity, constructing and restructuring hybrid institutional arrangements via unique technological advantages[6,26]. This finding indicates that metaverse enterprises represent innovative organizational forms rather than upgraded traditional industrial entities, and existing theories need refinement to interpret the unique hybrid governance and value creation mechanisms of digital economy organizations.

The three-dimensional paradox management space (Figure 3) visualizes the above findings, with the x-axis denoting instrumental-value integration, the y-axis denoting governance-technology balance, and the z-axis denoting digital mediation. Distinct configuration clustering confirms that hybridity strategies are structurally constrained by rationality paradoxes rather than randomly generated. The evolutionary transition from assimilation to synthesis further reveals that enterprises with mature digital capabilities can shift from single-logic dominance to multi-logic synthesis[12,59].

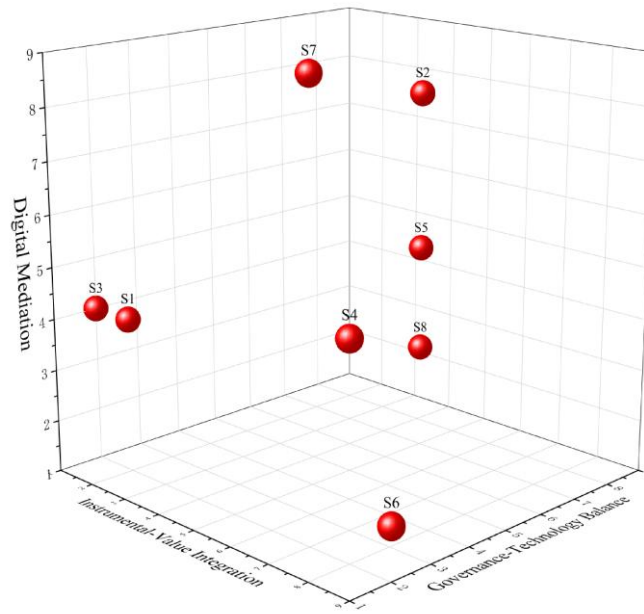


Figure 3. Three-dimensional Paradox Management Space of Eight fsQCA

Configurations

6.2 Theoretical Implications

This study proposes digital institutional hybridity to characterize emerging organizations, where digital technologies mediate and reconcile conflicting institutional logics. Institutional studies recognize three core hybridity strategies: segmentation, assimilation and blending, while existing frameworks explain institutional conflict management via traditional analog coordination[16,21]. This study extends prior research by demonstrating that digital technological affordances expand hybridity strategies for digital-era firms. Blockchain enables transparent normative governance through algorithms and strengthens organizational commitment via technological embedding rather than hierarchical supervision. AI analytics optimize internal resource allocation and stakeholder information, unifying resource

investment and external outreach goals. Decentralized digital infrastructures support inclusive community participation without rigid centralization, enabling firms to generate social value through algorithmic coordination instead of hierarchical operation[2,27].

This elaboration on digital institutional hybridity provides two key theoretical extensions to institutional theory. Digital infrastructure allows organizations to flexibly switch between competing institutional logics through sequential resource allocation and real-time hybrid governance monitoring, transforming hybrid organizing from fixed structural arrangements into dynamic, upgradable organizational capacity[59]. Digital tools further materialize abstract institutional logics by embedding normative and market logics into technical infrastructure, whose technological features constrain and facilitate context-specific organizational behaviors[71]. Future research may explore how core technological attributes, including transparency, programmability and decentralization, shape the formation and evolution of institutional hybridity across diverse industrial contexts.

This study redefines paradox management as a context-adaptive dynamic capability, addressing the static strategic limitation of prior paradox research. Classical paradox theory categorizes organizational coping strategies as acceptance, separation and synthesis and regards them as stable organizational traits[12,25]. By contrast, the configurational results reveal heterogeneous paradox responses across organizational domains. Firms adopting the co-benefit enable-driven pathway (S1) apply temporal separation to mitigate governance and technological conflicts while

integrating philanthropy with R&D activities through assimilation. Governance resource-sharing firms (S5) achieve comprehensive synthesis across operational dimensions, and supervisory-oriented enterprises (S6) adopt strict compartmentalization to isolate conflicting institutional pressures.

Heterogeneous paradox resolution across configurations indicates effective paradox governance depends on contextual adaptability rather than universal strategies. Organizational competitiveness stems from the alignment of targeted response strategies with situational demands and dynamic governance logic adjustment amid external changes. The four-dimensional CORE framework underpins such adaptive capacity, wherein the balanced development of commitment, outreach, resource endowment, and operational efficiency expands organizational strategic repertoires for customized ESG configurations. Future research may explore the micro-level mechanisms of this capacity, including how managers and teams identify paradoxical tensions, adopt targeted responses, and realize seamless transitions between alternative governance logics[72].

This study's third theoretical contribution lies in its empirical elaboration of configurational ESG value formation, which corrects the linear causality bias prevalent in existing ESG research. Most extant literature treats ESG factors as independent additive or interactive variables and assumes symmetric linear associations between ESG inputs and corporate value growth[8]. Differing from this linear paradigm, the configurational results verify asymmetric, conjunctural, and equifinal causality between ESG practices and firm value. High-value outcomes arise

from synergistic combinations of CORE dimensions rather than isolated single-factor improvements, with distinct equifinal pathways adapting to varied operational and institutional environments[18,29].

This configurational causal perspective refreshes theoretical interpretations of ESG performance and its economic implications. ESG performance is not a homogeneous, universally comparable indicator but a context-dependent configurational outcome. Firms can deliver superior value through technology-driven efficiency improvement (S3), legitimacy-oriented governance optimization (S4), or multi-stakeholder ecosystem development (S2), with each pathway requiring specific capabilities and environmental conditions. These results challenge mainstream universal ESG rating systems that apply unified criteria to structurally heterogeneous enterprises[4,73]. Furthermore, the ESG–value relationship exhibits evident path dependence. Early strategic prioritization of CORE dimensions produces configurational lock-in effects, which either consolidate differentiated competitive advantages or constrain long-term organizational adaptation.

Activity theory integrates institutional and paradox theories, constructing a unified practice framework linking institutional logics and paradox management. The framework anchors institutional logic enactment and tension resolution in production, exchange, distribution and consumption activities, consistent with the CORE model's multidimensional structure. Distinct from abstract analysis in traditional institutional research, this practice-oriented perspective reveals how organizations adopt tools, pursue practical goals and engage stakeholders for concrete ESG

implementation[23,45].

Expansive learning mechanisms embedded in activity theory further link iterative organisational learning with dynamic capability cultivation and paradox governance. Internal contradictions within organisational activity systems—such as conflicts between operational efficiency and community equity needs—trigger continuous expansive learning cycles and drive fundamental systemic transformation[46]. Institutional evolution in emerging digital industries thus follows bottom-up problem-solving logic instead of top-down institutional diffusion. Micro-level organisational responses to activity-based paradoxes accumulate continuously, reshaping field-level institutional logics and reconstructing industrial governance systems in digital contexts.

6.3 Practical Implications

This study advises metaverse firms to abandon single optimal ESG strategies and cultivate configurational agility to match institutional hybridity strategies with technological competition contexts and achieve dynamic strategic adjustment. Firms need diagnostic capabilities to assess CORE dimension strengths and weaknesses and identify dominant paradox management approaches. Assimilation-region enterprises (S1, S3, S4) shall evaluate instrumental dominance sustainability and the necessity of transitioning to synthesis. Firms can expand strategic repertoires by developing four CORE dimensions without full simultaneous deployment. Resource and efficiency-oriented firms (S3) may strengthen governance commitment and community outreach to support follow-up synthesis strategies. Digital tools enable

innovative hybridity practices: blockchain enhances governance commitment, AI optimizes resource allocation, digital talent systems boost operational efficiency, and decentralized protocols expand external outreach. Such digital-driven configurations are inaccessible to traditional firms. Repertoire development builds reserve capabilities across four CORE dimensions. Firms with prominent resource and efficiency advantages (S3) shall improve governance commitment and community outreach to underpin future synthesis-oriented strategic adjustments.

Unified ESG rating standards generate counterproductive effects on emerging industries. Equifinality justifies the recognition and promotion of diverse value creation pathways over single normative criteria, highlighting the need for differentiated regulation. Technology enterprises (S3, S7) sustain innovative development through R&D and human capital investment. Consumer-oriented enterprises (S2, S5) deliver shared value via ecosystem orchestration. Governance-intensive enterprises (S4, S6, S8) achieve legitimate value creation despite limited technological innovation. Governments should act as platform builders rather than uniform standard setters, adopting policies to support multi-path development. Relevant measures include optimizing digital infrastructure for ESG transparency, formulating green technology standards, launching skill training programs and building community participation mechanisms to strengthen governance commitment, resource development, operational efficiency and external outreach. ESG rating systems require temporal and configurational sensitivity, acknowledging dynamic CORE dimension priorities across firm life cycles and diverse configurations that yield

high corporate value.

Investors should abandon traditional aggregated ESG scoring and adopt configurational analysis focusing on internal coherence and contextual fit. Firms with moderately balanced yet well-aligned ESG dimensions under synthesis strategies generate more substantive value than those with isolated high-dimensional scores and unresolved paradoxical tensions. Investor valuation should focus on three core criteria: the adopted ESG configuration, its contextual compatibility with firms' technological and competitive conditions, and firms' capability adequacy for effective configuration implementation.

6.4 Limitations and Future Research

This study has several limitations for further exploration. Though qualitative data complement its QCA-based configurational findings, this large-sample QCA analysis cannot fully unpack causal mechanisms underlying statistical configurations, which can be addressed by future process tracing or in-depth case studies. Based on cross-sectional data, this study fails to capture temporal dynamics. With advanced diachronic QCA techniques, future panel data can support temporal dynamic QCA to reveal the co-evolution of corporate ESG practices and firm value. The integration of panel data and set-theoretic methods bridges qualitative and quantitative gaps to capture dynamic ESG-value interactions. This study focuses exclusively on metaverse enterprises with limited analytical scope. Future research can extend the CORE model to artificial intelligence, quantum computing, biotechnology and other emerging technological scenarios to verify its generalizability. Furthermore, enterprise value is

measured as a composite indicator in this study, concealing heterogeneous dimensional effects. Subsequent research can disaggregate enterprise value into financial performance, innovation capacity and market valuation to explore differentiated value creation mechanisms across distinct ESG configurations.

Funding:

This work was supported by Natural Science Foundation of Anhui province, China (grant no. 2508085MG185) and Anhui Provincial University Research Project (grant no. 2023AH050205).

Data Availability Statement

The raw panel dataset, cleaned-analysis dataset for fsQCA configurational analysis, variable-definition documentation including fsQCA calibration formulas, and complete analytical scripts generated in this study are available as Supplementary Materials accompanying this manuscript.

Ethics approval:

This study did not involve human participants or human-related data research, so ethical approval was not required.

Consent to participate:

This study did not involve research on human participants conducted by any of the authors, and informed consent was therefore not applicable.

References

- [1] Damaševičius R, Sidekerskienė T (2023) Virtual worlds for learning: A narrative

- review. Knowl Manag E-Learn 15:177 – 196.
<https://doi.org/10.34105/j.kmel.2023.15.012>
- [2] Kumar V, Shankar R (2024) Metaverse as the next digital transformation frontier: A review and research agenda. J Bus Res 167:114076.
<https://doi.org/10.1016/j.jbusres.2023.114076>
- [3] Aguilera RV, Aragón-Correa JA, Marano V, Tashman P (2021) The corporate governance of environmental sustainability: A review and proposal for more integrated research. J Manag 47:1468 – 1497.
<https://doi.org/10.1177/0149206320988068>
- [4] Christensen LJ, Serafeim G, Sikochi A (2022) Why is corporate virtue in the eye of the beholder? The case of ESG ratings. Account Rev 97:147 – 175.
<https://doi.org/10.2308/TAR-2019-0506>
- [5] Malerba F, McKelvey M (2020) Innovation and the Evolution of Industries: History-Friendly Models. Cambridge University Press, Cambridge
- [6] Nambisan S, Lyytinen K, Majchrzak A, Song M (2017) Digital innovation management: Reinventing innovation management research in a digital world. MIS Q 41:223 – 238. <https://doi.org/10.25300/MISQ/2017/41.1.11>
- [7] Edmans A (2011) Does the stock market fully value intangibles? Employee satisfaction and equity prices. J Financ Econ 101:621 – 640.
<https://doi.org/10.1016/j.jfineco.2011.03.008>
- [8] Friede G, Busch T, Bassen A (2015) ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. J Sustain Financ Invest 5:210 –

233. <https://doi.org/10.1080/20430795.2015.1118911>

- [9] Freeman RE, Harrison JS, Wicks AC (2010) *Managing for Stakeholders: Survival, Reputation, and Success*. Yale University Press, New Haven
- [10] Scherer AG, Palazzo G (2011) The new political role of business in a globalized world: A review of a new perspective on CSR and its implications for the firm, governance, and democracy. *J Manag Stud* 48:899 – 931.
<https://doi.org/10.1111/j.1467-6486.2010.00964.x>
- [11] Hart O, Zingales L (2017) Companies should maximize shareholder welfare not shareholder value. *J Law Financ Account* 2:247 – 274.
<https://doi.org/10.1561/108.000000072>
- [12] Smith WK, Lewis MW (2011) Toward a theory of paradox: A dynamic equilibrium model of organizing. *Acad Manag Rev* 36:381 – 403.
<https://doi.org/10.5465/amr.2009.0223>
- [13] Greenwood R, Raynard M, Kodeih F et al (2011) Institutional complexity and organizational responses. *Acad Manag Ann* 5:317 – 371.
<https://doi.org/10.5465/19416520.2011.595818>
- [14] Thornton PH, Ocasio W, Lounsbury M (2012) *The Institutional Logics Perspective: A New Approach to Culture, Structure and Process*. Oxford University Press, Oxford
- [15] Besharov ML, Smith WK (2014) Multiple institutional logics in organizations: Explaining their varied nature and implications. *Acad Manag Rev* 39:364 – 381.
<https://doi.org/10.5465/amr.2011.0431>

- [16]Pache AC, Santos F (2013) Inside the hybrid organization: Selective coupling as a response to competing institutional logics. *Acad Manag J* 56:972 – 1001. <https://doi.org/10.5465/amj.2012.0075>
- [17]Fiss PC (2007) A set-theoretic approach to organizational configurations. *Acad Manag Rev* 32:1180 – 1198. <https://doi.org/10.5465/amr.2007.26583076>
- [18]Ragin CC (2008) *Redesigning Social Inquiry: Fuzzy Sets and Beyond*. University of Chicago Press, Chicago
- [19]Lichtenstein BB, Plowman DA (2009) Nurturing emergent change in complex systems. *Emergence Complexity Organ* 11:1 – 18
- [20]Uhl-Bien M, Marion R (2009) Complexity leadership in organizations: Shifting leadership from the industrial age to the knowledge era. *Emergence Complexity Organ* 11:212 – 229
- [21]Battilana J, Dorado S (2010) Building sustainable hybrid organizations: The case of commercial microfinance organizations. *Acad Manag J* 53:1419 – 1440. <https://doi.org/10.5465/amj.2010.57318391>
- [22]Jay J (2013) Navigating paradox as a mechanism of change and innovation in hybrid organizations. *Acad Manag J* 56:137 – 159. <https://doi.org/10.5465/amj.2011.0333>
- [23]Engeström Y (1987) *Learning by Expanding: An Activity-Theoretical Approach to Developmental Research*. Orienta-Konsultit, Helsinki
- [24]Vygotsky LS (1978) *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press, Cambridge

- [25]Smith WK, Erez M, Lewis K et al (2017) Paradox as a meta-theoretical perspective: Shifting from being in the paradox to seeing the paradox. *Acad Manag Rev* 42:11 – 24. <https://doi.org/10.5465/amr.2016.0218>
- [26]Lawrence TB, Suddaby R, Leca B (2013) Institutional work: Refocusing institutional studies of organization. *J Manag Inq* 22:102 – 115. <https://doi.org/10.1177/1056492612470135>
- [27]Gehrmann T, Pelzer B, Teigland R (2020) Blockchain-enabled governance: How distributed ledger technology reshapes institutional logics. *Inf Polity* 25:347 – 363. <https://doi.org/10.3233/IP-200460>
- [28]Zuboff S (2019) *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. PublicAffairs, New York
- [29]Fiss PC (2011) Building better causal theories: A fuzzy set approach to typologies in organizational research. *Acad Manag J* 54:393 – 420. <https://doi.org/10.5465/amj.2010.60277395>
- [30]Margolis JD, Elfenbein HA, Walsh JP (2009) Does it pay to be good? A meta-analysis of the relationship between corporate social and financial performance. *Ann N Y Acad Sci* 1152:1 – 22. <https://doi.org/10.1111/j.1749-6632.2008.03730.x>
- [31]Stark D (2009) *The Sense of Dissonance: Accounts of Worth in Economic Life*. Princeton University Press, Princeton
- [32]Schad J, Lewis MW, Raisch S, Smith WK (2016) Paradox research in organization science: Looking back to move forward. *Acad Manag Ann* 10:5 – 64.

<https://doi.org/10.5465/19416520.2016.1158254>

- [33] Lewis MW (2000) Exploring paradox: Toward a more comprehensive guide. *Acad Manag Rev* 25:760 – 776. <https://doi.org/10.5465/amr.2000.3707718>
- [34] Hahn T, Figge F, Pinkse J, Preuss L (2018) Paradoxes and framing strategies: The case of corporate sustainability. *Acad Manag Rev* 43:443 – 465. <https://doi.org/10.5465/amr.2015.0239>
- [35] Porter ME, Kramer MR (2011) Creating shared value: How to reinvent capitalism—and unleash a wave of innovation and growth. *Harv Bus Rev* 89:62 – 77
- [36] Donaldson T, Preston LE (1995) The stakeholder theory of the corporation: Concepts, evidence, and implications. *Acad Manag Rev* 20:65 – 91. <https://doi.org/10.5465/amr.1995.9503271992>
- [37] Battilana J, Lee M (2014) Advancing research on hybrid organizing—Insights from the study of social enterprises. *Acad Manag Ann* 8:397 – 441. <https://doi.org/10.5465/19416520.2014.893615>
- [38] Andriopoulos C, Lewis MW (2009) Exploitation-exploration tensions and organizational ambidexterity: Managing paradoxes of innovation. *Organ Sci* 20:696 – 717. <https://doi.org/10.1287/orsc.1080.0403>
- [39] Adner R (2017) Ecosystem as structure: An actionable construct for strategy. *J Manag* 43:39 – 58. <https://doi.org/10.1177/0149206316678477>
- [40] Kauffman SA (1993) *The Origins of Order: Self-Organization and Selection in Evolution*. Oxford University Press, New York
- [41] Page SE (2006) *The Difference: How the Power of Diversity Creates Better*

- Groups, Firms, Schools, and Societies. Princeton University Press, Princeton
- [42]Schneider CQ, Wagemann C (2012) Set-Theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis. Cambridge University Press, Cambridge
- [43]Ragin CC (2000) Fuzzy-Set Social Science. University of Chicago Press, Chicago
- [44]Lichtenstein BB, Uhl-Bien M, Marion R et al (2006) Complexity leadership theory: An interactive perspective on leading in complex adaptive systems. Emergence Complexity Organ 8:2 – 12
- [45]Kaptelinin V, Nardi BA (2006) Acting with Technology: Activity Theory and Interaction Design. MIT Press, Cambridge
- [46]Engeström Y (1999) Activity theory and individual and social transformation. In: Engeström Y, Miettinen R, Punamäki RL (eds) Perspectives on Activity Theory. Cambridge University Press, Cambridge, p 19 – 38
- [47]Leont'ev AN (1981) Problems of the Development of the Mind. Progress Publishers, Moscow
- [48]Cangialosi N (2023) Fuzzy-set qualitative comparative analysis (fsQCA) in organizational psychology: Theoretical overview, research guidelines, and a step-by-step tutorial using R software. Span J Psychol 26:e21. <https://doi.org/10.1017/SJP.2023.18>
- [49]Power M (2007) The Audit Society: Rituals of Verification. Oxford University Press, Oxford

- [50]Suchman MC (1995) Managing legitimacy: Strategic and institutional approaches. *Acad Manag Rev* 20:571 – 610. <https://doi.org/10.5465/amr.1995.950807017>
- [51]Jensen MC (2002) Value maximization, stakeholder theory, and the corporate objective function. *Bus Ethics Q* 12:235 – 256. <https://doi.org/10.2307/3857812>
- [52]Putnam RD (2000) *Bowling Alone: The Collapse and Revival of American Community*. Simon & Schuster, New York
- [53]Jones C, Maoret M, Massa F, Grewal R (2018) Community strategy and organizational performance: The role of external outreach. *Acad Manag J* 61:2038 – 2062. <https://doi.org/10.5465/amj.2015.0721>
- [54]Porter ME, van der Linde C (1995) Toward a new conception of the environment-competitiveness relationship. *J Econ Perspect* 9:97 – 118. <https://doi.org/10.1257/jep.9.4.97>
- [55]Asif M, Searcy C, Zutshi A (2023) A systematic review of ESG performance measurement: Approaches, challenges, and opportunities. *Sustain Prod Consum* 35:441 – 458. <https://doi.org/10.1016/j.spc.2022.12.025>
- [56]Nahapiet J, Ghoshal S (1998) Social capital, intellectual capital, and the organizational advantage. *Acad Manag Rev* 23:242 – 266. <https://doi.org/10.5465/amr.1998.2003015>
- [57]López-Pérez MV, López-Gamero MD, Molina-Azorín JF (2017) Employee training and organizational performance: The role of human resource management flexibility. *Int J Hum Resour Manag* 28:2710 – 2734. <https://doi.org/10.1080/09585192.2016.1151428>

- [58]North DC (1990) Institutions, Institutional Change and Economic Performance.
Cambridge University Press, Cambridge
- [59]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-SMJ883>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ883>3.0.CO;2-Z)
- [60]Weber M (1922/1978) Economy and Society: An Outline of Interpretive Sociology. University of California Press, Berkeley
- [61]Westphal JD, Zajac EJ (2013) The symbolic management of stockholders: Corporate governance reforms and shareholder reactions. *Adm Sci Q* 58:1 – 40.
<https://doi.org/10.1177/0001839213496013>
- [62]Deephouse DL, Carter SM (2005) An examination of differences between organizational legitimacy and organizational reputation. *J Manag Stud* 42:329 – 360. <https://doi.org/10.1111/j.1467-6486.2005.00499.x>
- [63]Dyer JH, Singh H (1998) The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Acad Manag Rev* 23:660 – 679.
<https://doi.org/10.5465/amr.1998.1255680>
- [64]Bénabou R, Tirole J (2010) Individual and corporate social responsibility. *Economica* 77:1 – 19. <https://doi.org/10.1111/j.1468-0335.2009.00843.x>
- [65]Jensen MC, Meckling WH (1976) Theory of the firm: Managerial behavior, agency costs and ownership structure. *J Financ Econ* 3:305 – 360.
[https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)

- [66]von Hippel E (2005) Democratizing Innovation. MIT Press, Cambridge
- [67]Powell WW (1990) Neither market nor hierarchy: Network forms of organization. *Res Organ Behav* 12:295 – 336
- [68]Chesbrough HW (2003) Open Innovation: The New Imperative for Creating and Profiting from Technology. Harvard Business School Press, Boston
- [69]Markowitz H (1952) Portfolio selection. *J Finance* 7:77 – 91.
<https://doi.org/10.1111/j.1540-6261.1952.tb01525.x>
- [70]Adler PS, Borys B (1996) Two types of bureaucracy: Enabling and coercive. *Adm Sci Q* 41:61 – 89. <https://doi.org/10.2307/2393986>
- [71]Orlikowski WJ (2000) Using technology and constituting structures: A practice lens for studying technology in organizations. *Organ Sci* 11:404 – 428.
<https://doi.org/10.1287/orsc.11.4.404.14600>
- [72]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>
- [73]Berg F, Kölbel JF, Rigobon R (2022) Aggregate confusion: The divergence of ESG ratings. *Rev Finance* 26:1315 – 1344. <https://doi.org/10.1093/rof/rfac033>

Supplementary Files

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

- [SupplementaryCleaneddataset.csv](#)
- [SupplementaryCodeforClusterAnalysis.docx](#)
- [SupplementaryRawdataset.csv](#)
- [SupplementaryHITDiscontinuedTerms.txt](#)
- [SupplementaryVariableDocument.docx](#)
- [SupplementaryTextFilesforClusterAnalysis.zip](#)