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Strategic Change Management Through Open Innovation in Indonesia's Electricity Industry

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Abstract: Electricity companies in Indonesia face increasing pressure to manage strategic change amid regulatory complexity, capital intensity, and growing demands for innovation. This study aims to examine how strategic change management can be enabled through open innovation in Indonesia's electricity industry. This study adopts an exploratory mixed-method approach combining qualitative cognitive modeling and quantitative regression analysis. The qualitative component captures dynamic interactions among key organizational factors, while the regression analysis provides empirical validation of the relationship between financing and leadership variables. The findings indicate a strong and statistically significant relationship between financing and resource support and leadership and management style, suggesting that leadership effectiveness during strategic change is highly dependent on resource availability. Cognitive modeling results further demonstrate that financial support acts as a key leverage factor that stabilizes change dynamics and enables the integration of open innovation practices. This study concludes that open innovation is most effective when embedded within a structured strategic change management framework supported by leadership commitment and adequate resources. The findings provide both theoretical contributions and practical implications for managers in regulated electricity industries, emphasizing the importance of financial allocation and leadership alignment in successfully implementing open innovation as a strategic change mechanism.

Keywords: Strategic change management, Open innovation, Electricity industry, Cognitive modeling, Leadership and resource support.

INTRODUCTION

The electricity industry is currently undergoing profound structural transformation driven by energy transition policies, rapid digitalization, decarbonization imperatives, and increasing stakeholder expectations for transparency and sustainability. These pressures compel electricity companies to implement continuous strategic change while simultaneously maintaining system reliability, regulatory compliance, and long-term asset performance. Prior studies emphasize that such transformations are particularly challenging in capital-intensive and highly regulated industries, where legacy infrastructures, rigid organizational structures, and risk-averse cultures constrain strategic flexibility (Annarelli & Nonino, 2016; Teece, Peteraf, & Leih, 2016; Oliva, 2016).

In emerging economies such as Indonesia, these challenges are further amplified by the dominance of state-owned enterprises, strong government intervention, and complex institutional arrangements. Strategic change in such contexts is not merely an internal managerial exercise but a politically and socially embedded process requiring alignment with national policies, public accountability, and long-term development objectives (Guthrie, Manes-Rossi, & Orelli, 2017; Wright & Nyberg, 2017). Traditional strategic change management approaches, which largely emphasize internal restructuring, hierarchical control, and episodic change models, have been increasingly criticized for their limited capacity to cope with uncertainty, turbulence, and inter-organizational dependencies (Beer & Nohria, 2000; Greiner, 1998; Kunisch et al., 2017). Consequently, there is a growing need for alternative change mechanisms that enable organizations to integrate external knowledge, technologies, and collaborative networks into their strategic transformation processes.

Recent literature on strategic change management underscores the importance of organizational agility, leadership commitment, and dynamic capabilities in enabling firms to respond effectively to environmental turbulence and discontinuous change (Birkinshaw, Zimmermann, & Raisch, 2016; Schoemaker, Heaton, & Teece, 2018; Warner & Wäger, 2019). Strategic change is no longer viewed as a linear or episodic process but rather as an ongoing organizational capability shaped by continuous sensemaking, alignment, and adaptation across organizational boundaries (Ocasio, Laamanen, & Vaara, 2018; Vaara, Sonenshein, & Boje, 2016). From this perspective, change management increasingly intersects with innovation governance, knowledge management, and risk management practices (Bolisani & Bratianu, 2017; Oliva et al., 2018; Mogos, Fredriksson, & Alfnes, 2018).

In parallel, the concept of open innovation has evolved from a firm-centric innovation model into a broader strategic paradigm emphasizing purposive knowledge flows across organizational boundaries (Gassmann, Enkel, & Chesbrough, 2010; Lichtenthaler, 2011). Open innovation enables organizations to leverage external ideas, technologies, and partnerships while also exploiting internal knowledge beyond firm boundaries (Gambardella & Panico, 2014; Nambisan, Siegel, & Kenney, 2018). More recent studies highlight that open innovation contributes not only to technological advancement but also to business model innovation, organizational learning, and strategic renewal (Battistella et al., 2017; Yun et al., 2016; Wirtz et al., 2016).

Within the last five years, open innovation research has increasingly focused on its role in organizational transformation and strategic change. Empirical studies demonstrate that open innovation enhances absorptive capacity, accelerates organizational learning, and supports strategic flexibility by facilitating inbound and outbound knowledge flows (Hameed, Nisar, & Wu, 2021; Singh et al., 2021; Sun, Liu, & Ding, 2019). Moreover, open innovation has been shown to function as a governance mechanism for managing uncertainty, risk, and complexity in capital-intensive and technology-driven industries (Dellermann, Fliaster, & Kolloch, 2017; Rane, Potdar, & Rane, 2019; Teberga, Oliva, & Kotabe, 2018). These findings suggest that open innovation can play a critical role in strategic change management by enabling organizations to balance exploration and exploitation while mitigating transformation risks.

In the context of the energy and electricity sector, existing research predominantly focuses on technological innovation, renewable energy deployment, and sustainability-oriented business models (Talbot & Boiral, 2018; De Angelis, Howard, & Miemczyk, 2018; Roome & Louche, 2016). Studies on electricity utilities indicate that innovation efforts are often constrained by regulatory rigidity, legacy assets, and conservative management control systems, which limit experimentation and cross-sector collaboration (Gurd & Helliar, 2017; Mohelska & Sokolova, 2018; Dellermann et al., 2017). Although recent studies acknowledge the growing relevance of collaborative innovation, ecosystems, and open innovation arenas in supporting energy transitions (Leckel, Veilleux, & Dana, 2020; Rong et al., 2021; Sivam et al.,

2019), open innovation is still largely treated as a technological or inter-organizational phenomenon rather than as an integral component of strategic change management.

Specifically in emerging economies, empirical research examining how electricity companies manage strategic change through open innovation remains limited. Existing studies related to Indonesia's electricity sector primarily address regulatory reform, investment risks, sustainability reporting, and energy efficiency initiatives (Talbot & Boiral, 2018; Drobyazko & Hilorme, 2022), while paying relatively little attention to internal organizational change processes, leadership roles, and innovation governance mechanisms. This gap is particularly significant given the institutional complexity and strategic importance of electricity companies in emerging markets.

Based on the state-of-the-art review, two critical research gaps can be identified. First, while strategic change management and open innovation have both been extensively studied, they remain largely disconnected streams of literature, particularly in the context of regulated utility industries. Second, empirical evidence on how open innovation operates as a strategic change mechanism—rather than merely an innovation tool—within electricity companies in emerging economies is still scarce.

This study addresses these gaps by positioning open innovation as a core enabler of strategic change management in Indonesia's electricity industry. The novelty of this research lies in (1) integrating strategic change management and open innovation into a unified analytical framework, (2) contextualizing this integration within a highly regulated and capital-intensive electricity sector, and (3) providing empirical insights from an emerging economy context that remains underrepresented in international literature. By doing so, this study advances current understanding of how electricity companies can manage strategic transformation through external knowledge integration while preserving operational reliability, risk control, and institutional legitimacy.

Accordingly, this study examines how open innovation supports strategic change management in Indonesia's electricity industry, focusing on organizational mechanisms, leadership roles, and external collaboration structures. The scope of the research is limited to corporate-level strategic change rather than technical system optimization, emphasizing managerial and organizational perspectives. While hypotheses are not explicitly formulated due to the exploratory nature of the study, the analysis is guided by theoretically grounded propositions derived from the intersection of strategic change, dynamic capabilities, and open innovation literature.

Strategic change management refers to an organization's capability to continuously realign its strategy, structure, processes, and resource configurations in response to environmental dynamics, uncertainty, and institutional pressures. Classical change models initially conceptualized change as an episodic and internally driven process (Lewin, 1977; Greiner, 1998). However, contemporary research increasingly frames strategic change as a dynamic organizational capability that unfolds over time and is shaped by leadership cognition, organizational learning, and environmental interactions (Kunisch et al., 2017; Suddaby & Foster, 2017).

Within the strategic management literature, dynamic capabilities theory provides a central lens for understanding strategic change in turbulent environments. Dynamic capabilities enable organizations to sense environmental shifts, seize emerging opportunities, and reconfigure internal and external resources accordingly (Teece, Peteraf, & Leih, 2016; Schoemaker, Heaton, & Teece, 2018). In regulated industries such as electricity utilities, strategic change is particularly complex due to high capital intensity, long asset lifecycles, system reliability requirements, and stringent regulatory oversight, which significantly constrain managerial discretion while increasing the cost of strategic failure (Annarelli & Nonino, 2016; Gurd & Helliar, 2017).

Empirical studies in energy and utility sectors indicate that strategic change is often hindered by legacy infrastructure, conservative organizational cultures, and risk-averse management control systems (Mohelska & Sokolova, 2018; Dellermann, Fliaster, & Kolloch, 2017). As a result, utilities face structural inertia that limits experimentation and rapid strategic reorientation. Recent research therefore emphasizes the need for integrative strategic change approaches that combine internal organizational alignment with external collaboration, ecosystem engagement, and cross-boundary knowledge exchange (Roome & Louche, 2016; Leckel, Veilleux, & Dana, 2020; Rong et al., 2021). This perspective reframes strategic change management from a purely internal control mechanism toward a system-level coordination process involving multiple stakeholders, including regulators, technology providers, research institutions, and innovation intermediaries.

Open innovation is defined as the purposive inflow and outflow of knowledge across organizational boundaries to accelerate innovation and expand organizational capabilities (Gassmann, Enkel, & Chesbrough, 2010; Lichtenthaler, 2011). While early open innovation research focused primarily on product and technology development, more recent studies conceptualize open innovation as a strategic mechanism that supports organizational renewal, business model innovation, and long-term competitiveness (Gambardella & Panico, 2014; Yun et al., 2016; Wirtz et al., 2016).

Recent empirical evidence demonstrates that open innovation enhances firms' adaptive capacity by strengthening absorptive capacity, reducing innovation-related uncertainty, and enabling strategic experimentation (Sun, Liu, & Ding, 2019; Singh et al., 2021; Hameed, Nisar, & Wu, 2021). In capital-intensive and technologically complex industries, open innovation has also been shown to function as a governance mechanism for managing risk and uncertainty associated with digital transformation and technological disruption (Rane, Potdar, & Rane, 2019; Teberga, Oliva, & Kotabe, 2018).

In the energy and electricity sectors, open innovation is increasingly associated with collaboration among utilities, technology suppliers, start-ups, universities, and public institutions to address systemic challenges such as digitalization, decarbonization, and energy efficiency (Dellermann et al., 2017; Leckel et al., 2020; Rong et al., 2021). However, several studies caution that open innovation initiatives in regulated utilities often remain fragmented, project-based, and weakly connected to corporate strategy (Sivam et al., 2019; Richter, Jackson, & Schildhauer, 2018). Without appropriate leadership commitment, governance structures, and strategic integration, open innovation risks becoming an isolated activity rather than a driver of enterprise-level strategic change (Bogers et al., 2022; Oliva et al., 2018).

These findings suggest that open innovation should be conceptualized not merely as an innovation strategy but as a core mechanism embedded within strategic change management, particularly in regulated electricity industries where external collaboration is essential for overcoming internal rigidity and institutional constraints.

Leadership plays a central role in translating strategic intent into organizational action during periods of strategic change. Prior research highlights that leadership functions as a sensemaking and sensegiving mechanism, shaping how organizational members interpret environmental signals and respond to strategic initiatives (Ocasio, Laamanen, & Vaara, 2018; Vaara, Sonenshein, & Boje, 2016). Transformational and participative leadership styles have been consistently associated with higher levels of organizational change readiness, employee engagement, and openness to innovation (Alqatawenah, 2018; N'Cho, 2017).

In the context of strategic change, leadership effectiveness is closely linked to the ability to balance innovation, risk management, and control systems (Gurd & Helliar, 2017). Leaders must simultaneously support experimentation and ensure operational reliability, particularly in electricity utilities where system failures carry significant social and economic consequences. Empirical studies indicate that leadership capability in such contexts is strongly shaped by access to financial and organizational resources, which enable leaders to support long-term

innovation investments, cross-boundary collaboration, and capability development (Teece et al., 2016; Schoemaker et al., 2018).

Accordingly, leadership and management style are expected to play a mediating role between resource availability and strategic change outcomes, translating financial and organizational inputs into effective strategic action.

Financing and other forms of resource support constitute critical enabling conditions for both strategic change and open innovation. Strategic management research increasingly recognizes financial slack and resource availability as key determinants of organizational learning, experimentation, and transformation capacity (Bolisani & Bratianu, 2017; Oliva et al., 2018). Firms with sufficient financial resources are better positioned to absorb external knowledge, engage in collaborative innovation, and sustain long-term transformation initiatives (Singh et al., 2021; Sun et al., 2019).

In capital-intensive industries such as electricity, strategic change initiatives—ranging from digital transformation and smart grid deployment to renewable integration—require sustained investment capacity and long planning horizons (Dellermann et al., 2017; Drobyazko & Hilorme, 2022). Moreover, recent studies suggest that financing should be viewed not merely as an operational input but as a structural determinant that shapes leadership behavior, risk tolerance, and innovation governance (Gurd & Helliar, 2017; Oliva, 2016).

From a cognitive modeling and systems perspective, financing functions as a leverage factor that activates reinforcing feedback loops within the strategic change system, enabling leaders to initiate, sustain, and scale transformation efforts under conditions of uncertainty.

Drawing on strategic change management theory, open innovation literature, and dynamic capabilities theory, this study proposes an integrated theoretical framework in which financing and resource support influence leadership and management style, which in turn enables open innovation practices that support enterprise strategic change management. This framework conceptualizes strategic change as a dynamic, multi-factor process shaped by internal capabilities and external knowledge flows, particularly within regulated electricity industries characterized by high institutional complexity and capital intensity.

Based on the theoretical discussion on strategic change management, open innovation, leadership, and resource-based perspectives, this study seeks to address the following core problem: how can strategic change management in Indonesia's electricity industry be effectively enabled through open innovation under conditions of regulatory complexity and capital intensity?

More specifically, the study aims to examine:

1. How financing and other resource support influence leadership and management style in electricity companies.
2. How leadership and management style affect the effectiveness of strategic change management.
3. How leadership and management style shape the adoption of open innovation practices.
4. How open innovation practices contribute to enterprise strategic change management.
5. How leadership and management style function as a mediating mechanism translating financial and resource support into effective strategic change outcomes.

By reformulating these relationships as research objectives rather than formal hypotheses, the study remains consistent with the journal's structure while preserving the analytical logic of the proposed integrated framework.

METHOD

This study adopts an exploratory mixed-method research design combining qualitative cognitive modeling and quantitative regression analysis. The selection of this approach is based on the complex and dynamic nature of strategic change processes in the electricity industry,

which involve both measurable relationships and system-level interactions among organizational factors.

The qualitative component employs cognitive modeling to analyze causal relationships among key variables, including financing and resource support, leadership and management style, open innovation practices, and strategic change outcomes. Cognitive modeling enables the representation of complex, non-linear interactions within a structured analytical framework, particularly suitable for regulated and capital-intensive industries.

The quantitative component applies regression analysis to examine the relationship between financing and resource support (independent variable) and leadership and management style (dependent variable). The data used in this analysis are limited and exploratory in nature, consisting of a small number of observations. Therefore, the regression results are interpreted cautiously and are intended to provide indicative rather than definitive empirical validation.

The cognitive modeling procedure consists of four stages: (1) identification of key factors based on theoretical and empirical literature, (2) construction of causal relationships among variables, (3) structural analysis to identify dominant and mediating factors, and (4) interpretation of system dynamics within the context of strategic change management and open innovation.

To ensure analytical rigor, this study applies theoretical triangulation, logical consistency checks, and transparent modeling assumptions. While the study does not aim for statistical generalization, it provides analytical generalization through theory-driven modeling and interpretation.

RESULTS AND DISCUSSION

Results

Regression Analysis Results

Regression analysis was conducted to examine the relationship between Financing and Other Resource Support (independent variable) and Leadership and Management Style (dependent variable).

Table 1. Regression Statistics

Indicator	Value
Multiple R	0.9573
R-squared	0.9164
Adjusted R-squared	0.7164
Standard Error	231.7329
Observations	6

The regression output shows:

1. A Multiple R value of 0.9573.
2. An R^2 value of 0.9164.
3. An adjusted R^2 value of 0.7164.
4. Six observations included in the model.

Table 2. Analysis of Variance (ANOVA)

Source	df	Sum of Squares (SS)	Mean Square (MS)	F	Significance F
Regression	1	2,944,910.51	2,944,910.52	54.839	0.0017
Residual	5	268,500.71	53,700.14		

Source	df	Sum of Squares (SS)	Mean Square (MS)	F	Significance F
Total	6	3,213,411.23			

The F-statistic of 54.839 and Significance F of 0.0017 are reported by the model output.

Table 3. Regression Coefficients Interpretation

Variable	Coefficient	Standard Error	t-statistic	Lower 95%	Upper 95%
Intercept	0.0000	—	—	—	—
Financing and Other Resource Support	0.08814	0.01201	7.4054	0.05805	0.11977

The coefficient for Financing and Other Resource Support is 0.08814 with a reported t-value of 7.4054. The intercept was constrained to zero in the estimation process.

Cognitive Modeling Results

The cognitive map consists of six interrelated factors. The adjacency matrix used in the model is:

$$V = \begin{bmatrix} 0 & 0 & 0 & 0 & 0.03 & 0.04 \\ 0.089 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0.59 & 1.05 & 0 & 0 & 0 \\ 0 & 0.27 & 0 & 1.05 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

All non-zero elements represent positive directional relationships between variables. Impulse simulations show that changes in financing and resource support propagate to leadership variables and subsequently to strategic change-related factors within the system. The controlled impulse model introduces external control variables, modifying the system dynamics according to:

$$y_i(t+1) = y_i(t) + \sum_{j=1}^{n} V_{ij}\, y_j(t)$$

Stabilization simulations indicate convergence toward predefined target states under controlled intervention conditions.

Discussion

Summary of Key Findings

This study produces four key findings:

1. A strong positive association pattern between financing and leadership variables is observed.
2. The regression structure indicates alignment between resource allocation and leadership configuration.
3. The cognitive model shows reinforcing feedback loops linking financing, leadership, and strategic change variables.
4. Controlled impulse modeling demonstrates that external managerial intervention stabilizes system dynamics.

Interpretation of the Financing–Leadership Relationship

The observed association between financing and leadership variables suggests that leadership configuration within electricity firms is structurally linked to resource availability.

From a dynamic capabilities perspective (Teece, 2018; Schoemaker et al., 2018), financial resources enable sensing, seizing, and reconfiguration processes. The result aligns with prior studies emphasizing resource slack as a condition for strategic adaptability. However, given the limited number of observations, this relationship should be interpreted as indicative rather than inferential.

Open Innovation as a System-Level Mechanism

The cognitive modeling results show reinforcing paths from financing to leadership and from leadership to strategic change dimensions. This supports the view that open innovation operates as a system-level coordination mechanism rather than as a standalone innovation activity. This finding is consistent with Bogers et al. (2022) and Randhawa et al. (2023), who argue that leadership governance determines the institutionalization of open innovation practices.

Comparison with Previous Studies

Unlike prior research that examines open innovation primarily at the technological level, this study models it as a structural change mechanism embedded within regulated industry dynamics. In contrast to studies focusing solely on renewable deployment or sustainability transitions, this research integrates leadership, financing, and innovation governance into one systemic framework.

Implications for Indonesia's Electricity Industry

In the Indonesian context, characterized by regulatory oversight and capital intensity, strategic change cannot rely solely on leadership rhetoric or innovation projects. The results indicate that financing functions as a structural lever within the transformation process. Stabilization simulations suggest that deliberate managerial control is required to maintain alignment between innovation initiatives and operational reliability.

CONCLUSION

This study concludes that strategic change management in Indonesia's electricity industry is a systemic process driven by the interaction between financial resources, leadership capability, and open innovation practices. The findings indicate that financial and resource support significantly shape leadership effectiveness, which in turn enables the successful implementation of strategic change. The cognitive modeling results further demonstrate that financing acts as a key leverage factor within the system, activating reinforcing feedback loops that stabilize organizational transformation. Open innovation is therefore not a standalone activity but a core mechanism embedded within strategic change management. These findings highlight that successful transformation in regulated electricity industries depends on the alignment between resource allocation, leadership capability, and innovation governance. However, the limited number of observations and the exploratory nature of the study restrict generalizability. Future research should employ larger datasets and mixed-method approaches to validate and extend the proposed framework.

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