Green Entrepreneurship and Environmental Performance: The Moderating Role of Institutional Pressure and the Mediating Effect of Eco-Innovation Capability
The Journal of Business, Management and Economics Engineering
Volume: 11 | Issue: 3 | DOI: 10.6432/jclp.202.04.2031

Green Entrepreneurship and Environmental Performance: The Moderating Role of Institutional Pressure and the Mediating Effect of Eco-Innovation Capability

Authors: Dr. Jiangwei Chen[1], Prof. Elena Marchetti-Russo[2], Dr. Rashid Al-Harthy[3]

[1]School of Management, Xi'an Jiaotong University, Xi'an, China [2]Department of Environmental Management, Ca' Foscari University of Venice, Venice, Italy [3]College of Business and Economics, Sultan Qaboos University, Muscat, Oman

Corresponding Author: Dr. Jiangwei Chen | jwchen@mail.xjtu.edu.cn

Abstract

Green entrepreneurship has emerged as a critical driver of environmental sustainability within contemporary innovation ecosystems, yet the organizational mechanisms through which green entrepreneurial orientation (GEO) translates into environmental performance remain inadequately theorized. Anchored in Institutional Theory and the Resource-Based View (RBV), this study investigates the mediating role of eco-innovation capability (EIC) in the GEO–environmental performance (EP) relationship, and the moderating effect of institutional pressure (regulatory, normative, and mimetic) on this mediated pathway. Drawing on multi-source survey data from 398 manufacturing and technology SMEs across China, Italy, and Oman, the study employs structural equation modeling (SEM) via AMOS 26. Findings indicate that GEO positively influences EP ($\beta = 0.341$, $p < .001$), with EIC partially mediating this relationship (indirect effect = 0.196, 95% CI [0.134, 0.264]). Regulatory institutional pressure significantly moderates both the GEO–EIC ($\beta = 0.213$, $p < .01$) and EIC–EP ($\beta = 0.178$, $p < .01$) relationships, while mimetic pressure exhibits a weaker but significant moderating effect on EIC–EP ($\beta = 0.134$, $p < .05$). Normative pressure does not yield a significant moderation effect. These findings advance the integration of Institutional Theory with RBV in green entrepreneurship contexts and provide guidance for environmental policy design and enterprise-level green strategy development.

Keywords: green entrepreneurship, eco-innovation, institutional pressure, environmental performance, SEM, RBV, institutional theory

1. Introduction

The accelerating ecological crisis—manifested through climate change, biodiversity collapse, resource depletion, and environmental degradation across industrial value chains—has elevated green

entrepreneurship from a peripheral niche to a mainstream strategic concern for enterprises, investors, and policymakers globally (Dean & McMullen, 2007; Schaltegger & Wagner, 2011). Green entrepreneurship, defined as the recognition and exploitation of market opportunities arising from environmental problems through innovative business models that simultaneously create economic and ecological value (Pastakia, 1998; Isaak, 2002), represents one of the most conceptually rich and empirically fertile domains in contemporary entrepreneurship research.

Despite growing scholarly attention, however, two fundamental questions about green entrepreneurship's performance dynamics remain inadequately resolved. First, through what specific organizational capability mechanisms does green entrepreneurial orientation generate measurable environmental performance improvements—and is this pathway empirically distinct from the general entrepreneurial orientation–performance relationship that has been extensively investigated in the mainstream entrepreneurship literature? Second, under what institutional conditions are these green capability–performance linkages most effectively activated, given that the returns to eco-innovation investment are theoretically conditioned by the regulatory incentives, social norms, and competitive imitation pressures that constitute enterprises' institutional environments?

These questions carry particular urgency in a period of rapid, heterogeneous global green policy development—from the European Union's Green Deal and China's carbon neutrality commitments to the Gulf Cooperation Council's nascent environmental regulatory frameworks—that creates dramatically divergent institutional environments for green entrepreneurial activity across the world's major economic regions. This study's three-country comparative design—spanning China, Italy, and Oman—reflects precisely this institutional diversity, providing empirical leverage for testing the institutional moderation argument across contexts that span developed, industrializing, and resource-economy environments.

The study is organized as follows: Sections 2–5 develop the theoretical framework, identify gaps, establish objectives, and develop hypotheses; Section 6 describes the research methodology; Section 7 presents data analysis and findings; Sections 8–11 discuss implications and conclusions.

2. Literature Review

2.1 Green Entrepreneurship: Theoretical Landscape

Green entrepreneurship scholarship has developed along two primary theoretical trajectories. The opportunity-based tradition (Dean & McMullen, 2007; Cohen & Winn, 2007) positions environmental problems as structural market failures that create entrepreneurial opportunity spaces for ventures capable of delivering superior environmental and economic value simultaneously. The institutional tradition (Hockerts & Wüstenhagen, 2010; Pacheco et al., 2010) emphasizes how formal and informal institutional conditions shape the entrepreneurial opportunities available within green markets and the incentive

structures that condition green innovation investment.

Green entrepreneurial orientation (GEO), the central independent variable of this study, extends the established entrepreneurial orientation construct (Miller, 1983; Lumpkin & Dess, 1996) to encompass the environmental dimension of strategic posture. Building on Aragón-Correa and Sharma (2003) and Schaltegger and Wagner (2011), GEO is conceptualized as a multi-dimensional construct encompassing proactive environmental opportunity recognition, green innovation risk-taking, environmental sustainability-driven first-mover positioning, and ecological value creation commitment.

2.2 Eco-Innovation Capability as a Mediating Resource

Eco-innovation capability (EIC), situated within the Resource-Based View (Barney, 1991) and the dynamic capabilities framework (Teece et al., 1997), refers to the firm's capacity to develop, deploy, and continuously improve products, processes, and business models that reduce environmental impacts while maintaining or enhancing economic value (Rennings, 2000; Kemp & Pearson, 2008). EIC encompasses product eco-innovation (developing environmentally superior products), process eco-innovation (reducing environmental footprints of production processes), and organizational eco-innovation (restructuring value chains and business models for ecological efficiency).

The theoretical argument for EIC as a mediator in the GEO–EP relationship rests on the resource-based logic of strategic capability: GEO functions as a strategic orientation that directs organizational attention and resource investment toward eco-innovation capability development, which in turn generates the tangible environmental performance improvements observable in reduced emissions, waste, energy consumption, and ecological impact metrics. This capability-mediated pathway is conceptually distinct from a direct orientation–performance pathway that would imply green intentions generate performance without organizational capability investment—a theoretically implausible mechanism in the context of complex, technically demanding environmental performance improvement.

2.3 Institutional Theory and Green Innovation Pressure

Scott's (1995) three-pillar institutional theory—distinguishing regulatory (coercive), normative, and cognitive (mimetic) institutional pressures—provides a comprehensive framework for analyzing how the institutional environment shapes enterprises' green innovation behavior. Regulatory pressure (government environmental regulation, carbon pricing, pollution standards) generates compliance-driven eco-innovation incentives. Normative pressure (industry association standards, professional norms, stakeholder environmental expectations) creates legitimacy-driven eco-innovation incentives. Mimetic pressure (competitive imitation of peer enterprises' green strategies) generates competitive parity-driven eco-innovation incentives.

Suchman's (1995) legitimacy theory predicts that enterprises subject to high institutional pressure will invest more intensively in eco-innovation to maintain organizational

legitimacy with regulatory authorities, industry peers, and environmentally conscious customers and investors—thereby strengthening the GEO–EIC relationship. Similarly, DiMaggio and Powell's (1983) isomorphism framework predicts that mimetic pressure will amplify the EIC–EP relationship by increasing the performance standards against which eco-innovation outcomes are evaluated.

2.4 Cross-National Institutional Contexts

China's dual carbon commitment (carbon peak by 2030, neutrality by 2060) has generated a rapidly intensifying regulatory pressure environment, including the world's largest carbon emissions trading system (launched 2021), mandatory corporate environmental disclosure requirements, and substantial green finance incentives (Ministry of Ecology and Environment, 2022). Italy's institutional environment combines EU-level regulatory pressure (EU Green Deal, Taxonomy Regulation, Carbon Border Adjustment Mechanism) with strong normative pressure from environmentally conscious consumer markets and active environmental NGO communities. Oman's emerging green institutional environment, anchored in Vision 2040's sustainability objectives, represents a lower-pressure but rapidly evolving context where regulatory and normative pressures are increasing but remain less developed than EU and Chinese contexts.

2.5 RBV and Institutional Theory Integration

The integration of RBV and Institutional Theory in green entrepreneurship research addresses a theoretical gap identified by Oliver (1997) and extended by Surroca et al. (2010): while RBV explains how organizational capabilities generate competitive advantages, it is relatively silent on how institutional environments shape the formation and performance value of those capabilities. Institutional Theory, conversely, provides a rich account of environmental conditioning but often lacks a micro-level organizational mechanism connecting institutional pressures to performance outcomes. Their integration in the present study—with EIC as the RBV-grounded mechanism and institutional pressure as the institutional-theory-grounded moderator—provides a more complete theoretical account of green entrepreneurship performance dynamics.

3. Research Gap

Despite growing scholarly attention to green entrepreneurship, the specific organizational capability mechanisms through which GEO generates environmental performance improvements remain empirically underdetermined. Eco-innovation capability has been theorized as a likely mediating mechanism but has not been formally tested as a mediator within an institutionally moderated framework. Furthermore, the differential performance effects of regulatory, normative, and mimetic institutional pressures on GEO–EIC and EIC–EP relationships have not been examined empirically in a multi-country comparative design capable of exploiting cross-national institutional variance. This study addresses these gaps through a multi-group SEM design applied to a three-country sample.

4. Research Objectives

1. To examine the direct effect of green entrepreneurial orientation on environmental performance across Chinese, Italian, and Omani SMEs.
2. To investigate eco-innovation capability as a mediating mechanism in the GEO–EP relationship.
3. To assess the differential moderating effects of regulatory, normative, and mimetic institutional pressures on the GEO–EIC and EIC–EP relationships.
4. To derive institutional policy and enterprise strategy implications from the comparative cross-national findings.

5. Hypotheses Development

H1: Green entrepreneurial orientation is positively associated with environmental performance.

H2: GEO is positively associated with eco-innovation capability development.

H3: Eco-innovation capability is positively associated with environmental performance.

H4: Eco-innovation capability mediates the positive relationship between GEO and environmental performance.

H5a: Regulatory institutional pressure positively moderates the GEO–EIC relationship.

H5b: Regulatory institutional pressure positively moderates the EIC–EP relationship.

H6: Mimetic institutional pressure positively moderates the EIC–EP relationship.

6. Research Methodology

6.1 Sample and Data Collection

A stratified random sample of 398 manufacturing and technology SMEs (10–250 employees) was collected across three countries: China (n = 148, predominantly Shaanxi and Zhejiang provinces), Italy (n = 132, predominantly Lombardia and Veneto regions), and Oman (n = 118). Data were collected through self-administered questionnaires distributed to owner-managers and senior sustainability officers through regional business associations, industry chambers, and government SME registries. A multi-wave data collection design was employed—GEO and EIC measured at Time 1; EP measured six months later at Time 2—to partially address temporal precedence in the mediation pathway.

6.2 Measures

GEO (16 items) was measured using scales adapted from Aragón-Correa and Sharma (2003) and Schaltegger and Wagner (2011). EIC (15 items) was measured using Kemp and Pearson's (2008) eco-innovation typology instrument covering product, process, and organizational eco-innovation dimensions. EP (10 items) was operationalized through objective environmental performance indicators (energy efficiency improvement, emission reduction, waste reduction) supplemented by subjective environmental performance

ratings relative to industry peers. Institutional pressures were assessed using Lai et al.'s (2006) three-pillar institutional pressure scale (regulatory: 5 items; normative: 5 items; mimetic: 5 items). All subjective items used seven-point Likert scales.

6.3 Analytical Approach

Structural equation modeling (SEM) was implemented in AMOS 26 using maximum likelihood estimation. Measurement model fit was assessed through standard fit indices (CFI, TLI, RMSEA, SRMR). Mediation was tested using bias-corrected bootstrapping with 5,000 replications. Moderation was tested through latent interaction modeling (Marsh et al., 2004). Multi-group invariance testing was conducted to assess cross-national measurement equivalence.

7. Data Analysis and Findings

7.1 Sample Profile

Table 1 *Sample Demographic Profile (N = 398 SMEs)*

Characteristic	Category	N	%
Country	China	148	37.2
	Italy	132	33.2
	Oman	118	29.6
Sector	Manufacturing	187	47.0
	Technology	119	29.9
	Agri-food	52	13.1
	Construction/Energy	40	10.1
Employees	10–49	168	42.2
	50–150	143	35.9
	151–250	87	21.9
Age (years)	<5	72	18.1
	5–10	147	36.9
	11–20	112	28.1
	>20	67	16.8
Green Certification	ISO 14001	134	33.7
	Other green cert.	89	22.4
	None	175	44.0

7.2 Measurement Model

Table 2 *Reliability and Validity Assessment*

Construct	Items	α	CR	AVE	Loading Range
GEO	16	0.938	0.949	0.627	0.689–0.861
EIC	15	0.931	0.943	0.618	0.682–0.854
EP	10	0.912	0.928	0.641	0.704–0.869
Reg. Pressure	5	0.874	0.902	0.648	0.712–0.841

Construct	Items	α	CR	AVE	Loading Range
Norm. Pressure	5	0.862	0.893	0.634	0.698–0.829
Mimetic Pressure	5	0.858	0.889	0.621	0.681–0.817

Model fit: $\chi^2(df=1,087) = 2,341.8$, CFI = 0.946, TLI = 0.942, RMSEA = 0.054 [90% CI: 0.049, 0.059], SRMR = 0.061. All indices meet recommended thresholds.

7.3 Structural Model Results

Table 3 *SEM Path Coefficients and Hypothesis Testing*

Hypothesis	Path	β	SE	t	p	Decision
H1	GEO → EP	0.341	0.052	6.558	<.001	Supported
H2	GEO → EIC	0.512	0.048	10.667	<.001	Supported
H3	EIC → EP	0.383	0.054	7.093	<.001	Supported
H5a	GEO × RegP → EIC	0.213	0.061	3.492	.001	Supported
H5b	EIC × RegP → EP	0.178	0.063	2.825	.005	Supported
H6	EIC × MimP → EP	0.134	0.059	2.271	.023	Supported
—	GEO × NormP → EIC	0.089	0.064	1.391	.164	Not supported
—	EIC × NormP → EP	0.071	0.061	1.164	.245	Not supported

Note. RegP = Regulatory Pressure; NormP = Normative Pressure; MimP = Mimetic Pressure. $R^2(EIC) = 0.421$; $R^2(EP) = 0.534$.

7.4 Mediation Analysis

Table 4 *Mediation Analysis: EIC as Mediator of GEO → EP*

Effect	Estimate	SE	95% CI LL	95% CI UL
Total effect	0.537	0.051	0.437	0.637
Direct effect	0.341	0.052	0.239	0.443
Indirect effect (via EIC)	0.196	0.033	0.134	0.264
Proportion mediated	36.5%	—	—	—

Note. Partial mediation confirmed. Indirect effect CI excludes zero. 36.5% of GEO's total effect on EP is transmitted through eco-innovation capability.

7.5 Multi-Group Invariance Analysis

Table 5 *Multi-Group SEM Invariance Tests and Country-Level Path Estimates*

Test	χ^2 Difference	df	p-value	Decision
Configural model	—	—	—	Baseline
Metric invariance	$\Delta\chi^2(18) = 24.3$	18	.142	Invariant
Scalar invariance	$\Delta\chi^2(18) = 31.7$	18	.023	Partial scalar

Path	China β	Italy β	Oman β
GEO → EIC	0.561***	0.497***	0.478***
EIC → EP	0.421***	0.376***	0.342***
GEO → EP (direct)	0.298***	0.374***	0.351***
RegP moderation	0.287***	0.198**	0.094 (ns)

Note. China exhibits the strongest regulatory pressure moderation effect, consistent with its more coercive green regulatory environment. Oman's regulatory moderation effect is non-significant, consistent with its less developed environmental regulatory framework. ***p < .001; **p < .01*.

8. Discussion

The study's findings provide multi-layered empirical support for the theoretical integration of RBV and Institutional Theory in green entrepreneurship contexts. The partial mediation of EIC (proportion = 36.5%) confirms that eco-innovation capability is an important but not exclusive mechanism through which GEO generates environmental performance improvements—a finding that nuances the purely capability-mediated story of green entrepreneurship with acknowledgment that strategic orientation may also directly influence performance through market positioning, reputation signaling, and stakeholder relationship management effects that operate independently of formal capability configurations.

The differential effects of institutional pressure types are theoretically revealing. Regulatory pressure's significant moderation of both GEO–EIC and EIC–EP—and its particularly strong effect in the Chinese context (β = 0.287)—validates the coercive institutional pressure argument that government-mandated environmental standards generate the most powerful incentive effects for eco-innovation investment and deployment. The absence of normative pressure moderation effects is conceptually noteworthy, suggesting that softer, legitimacy-based institutional pressures may be insufficient to generate the concentrated, sustained eco-innovation investments that environmental performance improvement requires—a finding with implications for the design of voluntary environmental standard programs.

9. Theoretical Implications

This study's primary theoretical contribution is the empirical validation of an integrated RBV-Institutional Theory model in the green entrepreneurship context, demonstrating that eco-innovation capability mediates the GEO–EP relationship while regulatory and mimetic institutional pressures moderate both the capability development and deployment pathways. This two-stage moderated mediation architecture—with institutional pressures operating at both the orientation-to-capability and capability-to-performance stages—provides a more granular theoretical account of green entrepreneurship performance dynamics than prior single-stage models. The cross-national multi-group findings further demonstrate that the strength of institutional moderation effects is systematically related to the institutional quality and regulatory intensity of country contexts, extending institutional theory's predictions about regulatory pressure effects to the green entrepreneurship domain.

10. Practical Implications

For green enterprise managers, the partial mediation finding implies that GEO-based competitive advantage requires explicit investment in eco-innovation capability development—firms cannot rely on green strategic orientation alone to drive environmental performance. Process eco-innovation, in particular, offers high returns in manufacturing contexts by simultaneously reducing environmental costs and operational costs. The regulatory moderation finding suggests that proactive engagement with evolving green regulatory frameworks —rather than purely reactive compliance— can be leveraged as a capability-building stimulus, with regulatory requirements functioning as a forcing mechanism that accelerates EIC development ahead of competitor firms. For policymakers, the stronger performance effects of regulatory relative to normative pressure provide evidence-based support for mandatory environmental standards over voluntary certification frameworks as instruments for driving eco-innovation and environmental performance improvement across SME populations.

11. Conclusion

This study has examined the mediating role of eco-innovation capability and the moderating effects of regulatory, normative, and mimetic institutional pressures in the GEO–environmental performance relationship across 398 SMEs in China, Italy, and Oman. EIC partially mediates the GEO–EP relationship, and regulatory pressure significantly amplifies both the GEO–EIC and EIC–EP pathways, particularly in China's highly regulated green economy context. These findings contribute to the integration of RBV and Institutional Theory in green entrepreneurship research and provide actionable guidance for enterprise managers and environmental policymakers. Future research should extend the framework to examine whether the capability mediation and institutional moderation patterns hold across service sector enterprises, larger corporations, and developing economy contexts with nascent regulatory frameworks.

References

Aragón-Correa, J. A., & Sharma, S. (2003). A contingent resource-based view of proactive corporate environmental strategy. *Academy of Management Review, 28*(1), 71–88. https://doi.org/10.2307/30040690

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Cohen, B., & Winn, M. I. (2007). Market imperfections, opportunity and sustainable entrepreneurship. *Journal of Business Venturing, 22*(1), 29–49. https://doi.org/10.1016/j.jbusvent.2004.12.001

Dean, T. J., & McMullen, J. S. (2007). Toward a theory of sustainable entrepreneurship: Reducing environmental degradation through entrepreneurial action. *Journal of Business Venturing, 22*(1), 50–76. https://doi.org/10.1016/j.jbusvent.2005.09.003

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited. *American Sociological Review, 48*(2), 147–160.

Hockerts, K., & Wüstenhagen, R. (2010). Greening Goliaths versus emerging Davids: Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship. *Journal of Business Venturing, 25*(5), 481–492. https://doi.org/10.1016/j.jbusvent.2009.07.005

Isaak, R. (2002). The making of the ecopreneur. *Greener Management International, 38*, 81–91.

Kemp, R., & Pearson, P. (2008). *Final report MEI project about measuring eco-innovation*. UNU-MERIT.

Lai, K. H., Cheng, T. C. E., & Tang, A. K. Y. (2006). An investigation of the relationship between institutional pressures and technological innovation in Chinese firms. *Technovation, 26*(7), 815–825.

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review, 21*(1), 135–172.

Marsh, H. W., Wen, Z., & Hau, K. T. (2004). Structural equation models of latent interactions: Evaluation of alternative estimation strategies and indicator construction. *Psychological Methods, 9*(3), 275–300.

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science, 29*(7), 770–791.

Ministry of Ecology and Environment, China. (2022). *China's national greenhouse gas emissions trading scheme (ETS): Annual report*. MEE.

North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.

Oliver, C. (1997). Sustainable competitive advantage: Combining institutional and resource-based views. *Strategic Management Journal, 18*(9), 697–713.

Pacheco, D. F., Dean, T. J., & Payne, D. S. (2010). Escaping the green prison: Entrepreneurship and the creation of opportunities for sustainable development. *Journal of Business Venturing, 25*(5), 464–480. https://doi.org/10.1016/j.jbusvent.2009.07.006

Pastakia, A. (1998). Grassroots ecopreneurs: Change agents for a sustainable society. *Journal of Organizational Change Management, 11*(2), 157–173.

Rennings, K. (2000). Redefining innovation: Eco-innovation research and the contribution from ecological economics. *Ecological Economics, 32*(2), 319–332. https://doi.org/10.1016/S0921-8009(99)00112-3

Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: Categories and interactions. *Business Strategy and the Environment, 20*(4), 222–237. https://doi.org/10.1002/bse.682

Scott, W. R. (1995). *Institutions and organizations*. Sage.

Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review, 20*(3), 571–610.

Surroca, J., Tribó, J. A., & Waddock, S. (2010). Corporate responsibility and financial performance: The role of intangible resources. *Strategic Management Journal, 31*(5), 463–490.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509–533.