

Article

Organizational Resilience in China's Real Estate Industry: The Roles of ESG, Innovation Performance, and Policy Support

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Abstract

This study examines how ESG performance, innovation performance, and policy support relate to organizational resilience in China's real estate industry. Drawing on the Resource-Based View, Institutional Theory, and Configurational Theory, organizational resilience is conceptualized through recovery and resistance capacities. Fixed-effects regression, robustness tests, and heterogeneity analyses are applied using panel data from 80 Chinese A-share-listed real estate firms from 2015–2024 (800 firm-year observations). The findings show that ESG performance is positively associated with accounting-based recovery, particularly Return on Equity, but negatively affects market-based recovery in the baseline models, reflected in Tobin's Q. Additional analysis reveals a U-shaped relationship between ESG performance and Tobin's Q, suggesting that initial market valuation penalties may decline as ESG engagement deepens. Innovation performance shows limited baseline effects but becomes more relevant in alternative specifications related to recovery and leverage. Policy support, measured through tax rebates (TAX), did not show significant direct effects on organizational resilience in the baseline models. However, robustness analyses using green expenditure intensity (GEx) suggest possible indirect and conditional policy-related mechanisms associated with sustainability-oriented investment behavior. Overall, organizational resilience is shaped by heterogeneous interactions among ESG, innovation, and policy-related factors.

Keywords: organizational resilience; ESG performance; innovation performance; policy support; real estate industry

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1. Introduction

China's real estate industry, which used to be a major contributor to rapid economic growth, has become subject to unique levels of uncertainty and restructuring. In light of slowing urbanization rates, an aging population, tightened regulations, and the effects of the ongoing COVID-19 pandemic, market instability and the risks faced by developers have increased dramatically [1,2]. Nationally, transactions of urban land decreased drastically in 2023, from 33.1 billion square meters in 2013 to 9.0 billion square meters, with the stock of unsold properties peaking at 732 million square meters in 2024 [3]. The total value of this stock was approximately 80 trillion yuan—or about four to eight times the yearly house sales value—which indicates significant excess capacity and liquidity

pressures [4]. These findings demonstrate the fragility of real estate firms and highlight the importance of organizational resilience, which is an organization's ability to resist threats and, after recovery, improve its position. Contrary to previous research, in the current study, organizational resilience is not viewed as an abstract and processual concept. Rather, we suggest that organizational resilience can be viewed from the perspective of financial management, defined as an organization's ability to maintain profitability, uphold its market valuation, and control capital structures in the face of industry-specific adversity. Importantly, conceptualizing organizational resilience in this way makes it amenable to empirical investigation because it can be linked to financial performance [5–7].

In today's world, resilience has emerged as indispensable for businesses operating in highly dynamic and regulated settings [7,8]. Not only does it enable companies to endure crises, but it also allows them to thrive under uncertain conditions. In this regard, the real estate sector is particularly relevant because of its nature, which includes heavy investments, long life cycles of assets, and high responsiveness to policy changes, as well as its strong ties to economic and social stability. Although studies have been conducted on this issue, empirical research in China's real estate sector is still insufficient, especially in relation to ESG and innovation.

Using our approach, ESG performance, innovation capability, and policy support can be viewed as factors that affect different components of resilience. Specifically, ESG may be associated with organizations' accounting recovery capabilities through improved governance, stakeholder relations, and organizational stability, while the innovation capability of organizations may be associated with adaptive responses in uncertain markets via increased flexibility and sustained competitiveness. At the same time, policy support can play an indirect role in fostering organizational stability through favorable financing arrangements and sustainability-focused investment policies, particularly for highly regulated industries like real estate.

The concept of ESG performance has become an important tool for managing risks, and it has also served as a catalyst for sustainable competitive advantages. Companies that exhibit better levels of ESG perform better due to better stakeholder relationships, improved access to funds for green activities, and being granted legitimacy from regulatory bodies and investors [9,10]. Innovation performance, which is assessed through green patents and R&D intensity, is associated with firms' innovation capabilities, operational efficiency, and adaptive responses to changing regulatory and market conditions. [8,11]. The role of policy support, such as subsidies, tax benefits, and funds, is also relevant [12].

While previous research has considered these variables separately, their complex relationships with each other, as well as their configuration, are often disregarded. The majority of prior studies have used linear models in which independent effects are assumed; therefore, they do not account for the possibility of interactions among environmental, social, governance, innovation, and policy support as they are configured differently to produce resilient outcomes [13,14]. Moreover, there are few studies in which scholars have attempted to differentiate between the resistance and recovery aspects of resilience or examine the role played by firm age and size in these relationships [11,15]. These limitations are more apparent in the context of emerging economies, such as China.

Recent evidence from China suggests that ESG performance and innovation capability are associated with organizational resilience under conditions of environmental uncertainty [15]. However, ref. [15] examined organizational resilience as a broad organizational outcome across firms, whereas the present study focuses specifically on China's real estate industry and conceptualizes resilience through distinct recovery and resistance dimensions. Furthermore, while ref. [15] reported generally positive resilience-related associations of ESG performance and innovation capability, the present study reveals more

heterogeneous and context-dependent relationships, including differential effects across resilience dimensions, firm size, and firm age.

This study tackles these shortcomings through an investigation of the effects of ESG performance, innovation performance (measured in terms of total patent applications), and policy support on the resilience of firms in China's real estate industry. Resilience is characterized by two interlocking variables: resistance, which is represented by the CETR and TLSQ, and recovery, represented by ROA, ROE, and Tobin's Q. Through a fixed-effects regression analysis of a balanced panel of 80 A-share-listed companies in China's real estate industry (800 firm-year observations, covering 2015–2024), the study hypotheses are assessed. In contrast to previous research works that considered organizational resilience as a unidimensional variable [16–18], in this research, resilience is considered as a variable with two different axes: recovery and resistance capacity. Recovery capability is measured using financial variables like ROE, ROA, and Tobin's Q, while resistance capacity is evaluated using CETR and TLSQ. In addition, while other research studies considered the impact of ESG on organizations in general [19–21], the current research focuses solely on the A-share-listed real estate sector in China, a financially stressed and regulated industry. This research also incorporates Resource-Based View, Institutional Theory, and Configurational Theory.

This study makes three main contributions. First, it provides empirical evidence of the differential impacts of ESG and innovation on the resistance and recovery dimensions of organizational resilience in a critical but under-researched industry. Second, it highlights significant heterogeneity according to firm age and size, showing that ESG benefits are more pronounced in large, young firms, while valuation penalties are stronger in small, young firms. Third, it provides evidence consistent with the configurational perspective of organizational resilience, suggesting that resilience outcomes may emerge through heterogeneous interactions among internal capabilities and external conditions rather than through a single dominant factor.

2. Literature Review

2.1. Resource-Based View (RBV)

Resource-Based View (RBV) is a core theory of strategic management that highlights a company's internal assets and capabilities as the determinants of a long-term competitive advantage and better performance [22]. Long-term success is based on the acquisition, building, and utilization of valuable, rare, inimitable and non-substitutable (VRIN) assets [23–25]. In the organizational resilience context, RBV provides a powerful perspective from which to explore how central capabilities—such as ESG performance and innovation capabilities—contribute to enabling organizations to thrive and survive under disruption. Firms that appropriately allocate resources to the environment, social capital, and good governance build upon in-organization capabilities that enhance resilience to external shocks and effectiveness in response to change [26–28]. In the same vein, good innovation performance—both technological and process—underpins a firm's responsiveness in the context of changing market conditions.

RBV also considers that ESG efforts and innovation measures are not only useful on their own; strategically combined, they support each other as bases of competitive advantage and resilience. These resources play an essential role in building stakeholder confidence, harmonizing organizational activities with regulations, and enhancing efficiency [29,30]. The importance of such considerations is more apparent in developing countries, where institutional uncertainty and environmental risks increase the significance of firm-specific resources [31].

Of note is that ESG and innovation do not exist in isolation from one another. Their interaction can create compounded effects: green innovation may enhance a company's

green initiatives, and social investments can enhance the diffusion of innovation by encouraging employee attachment and societal support [32,33]. Accordingly, this study employs RBV to frame ESG performance and innovation in terms of dynamic and firm-specific assets that can be strategically arranged to be productive in promoting organizational resilience—specifically in the property industry.

2.2. Institutional Theory

Institutional Theory provides a cogent model of the way organizations react to external pressure, societal norms, and regulatory expectations that reflect their institutional contexts [34,35]. In contrast with theories that focus on exclusive economic rationality, Institutional Theory considers the impact of societal rules and norms, cultural conventions, and formalized structure on the conduct of businesses—most notably in environments with uncertainty or in emerging markets with prevailing institutional deficits [36]. With regard to ESG performance and innovation, Institutional Theory justifies the reasons behind the implementation of sustainability-oriented practices in firms [37,38]. Institutional Theory suggests that businesses are influenced by three major forms of institutional pressures [39–41]:

- (1) Coercive pressures resulting from governmental mandates, regulatory rules, and statutory obligations—for instance, rules and standards relating to the environment and carbon reporting.
- (2) Normative pressures from societal values, industry norms, and stakeholder expectations, e.g., expectations of ethical governance and transparency.
- (3) Mimetic pressures that compel companies to imitate the behavior of successful industry peers, especially in uncertain and competitive environments—for example, following innovation models from industry leaders that excel in sustainability.

These institutional pressures encourage firms to pursue ESG and innovation strategies not only to improve performance per se, but also to uphold legitimacy, minimize reputational risk, and assure resilience in uncertain conditions [42–44]. Institutional Theory suggests that, in emerging economies characterized by shifting policies and relatively weak institutional frameworks, organizational adaptability may be associated with greater sustainability and long-term viability. Institutional Theory will be used to understand policy support and the influence on resilience. Institutional actors such as regulators and governments use incentives, sanctions, and public communication to control firms' actions. Organizational behaviors that are aligned with what institutions expect from them (such as engaging in ESG activities and adopting clean technologies) increase organizational legitimacy and makes them more responsive to environmental pressure [45,46].

The Resource-Based View model can be expanded by adding the environmental dimension of Institutional Theory, which highlights that capabilities are developed within the institutional context. Resilience cannot be achieved without taking into consideration factors other than organizational capabilities and flexibility. For example, institutions provide a set of expectations for firms, which can be considered as another resource. Therefore, in addition to capabilities, institutional alignment will be used in this research as a crucial component of organizational resilience.

2.3. Configurational Theory

Configurational Theory is an invaluable conceptual framework for studying complex and heterogeneous organizational phenomena characterized by interdependencies [47–49]. Unlike conventional methods that are based on linear thinking and emphasize the impact of variables separately, the configurational approach focuses on the likelihood of

organizational results being due to different configurations of organizational and contextual elements [50].

Equifinality is one of the key features of configurational theories through which it is assumed that there are multiple ways of achieving the same results [50,51]. Indeed, firms adopt various resource, competency, and environmental element configurations to ensure similar performance and resilience when operating in dynamically changing and uncertain conditions. It is necessary to define organizational resilience as a consequence of the combined effects of ESG performance, innovation capability, and regulatory environment.

As opposed to models where the supremacy of one variable is assumed, through the proposed framework, it is suggested that each of the mentioned variables influences firm resilience, depending on other factors. While one organization demonstrates high resilience because of active involvement in ESG practices, another company achieves comparable results based on its innovative potential or supportive legislation [52,53].

This approach is supported by empirical evidence, suggesting that the effect of ESG engagement on business value is non-linear (U-shaped) and heterogeneous regarding firm size and age [11]. According to the collected data, ESG performance and innovation depend on the context and interact with each other in different ways. The theoretical perspective suggests that there may be varied results for resilience depending on different organizations and combinations of environmental sustainability engagement, innovation capacity, and institutional settings.

2.4. Integrated Framework

Combining all three approaches in this manner creates an effect far greater than that achieved by merely adding them together. In line with what is stated in the theory critique presented in Table 1, the strengths of one approach compensate for the weaknesses of the other two. For instance, RBV's inside-out approach to business resources is balanced by Institutional Theory's outside-in outlook in relation to external factors, while the latter's deterministic view of organizations is balanced by RBV's strategic action approach.

Table 1. Theoretical framework: critique and justification for integration.

Theory	Key Contribution to This Study	Limitations	Why Integration Is Needed
Resource-Based View (RBV)	Frames ESG performance and innovation capabilities as VRIN internal assets that generate competitive advantage and resilience; explains ESG → ROE and patents → leverage pathways	Static perspective; underweights external institutional pressures; assumes stable environments rarely found in emerging markets	Requires Institutional Theory to account for regulatory and policy contexts; needs Configurational Theory to reveal how resource combinations vary by firm type
Institutional Theory	Explains how coercive, normative, and mimetic pressures drive ESG adoption and policy alignment; positions policy support as an institutional enabler of resilience	Can be overly deterministic; treats firms as passive actors; limited explanatory power for innovation dynamics and internal capability development	RBV restores strategic agency; Configurational Theory shows how firms respond differentially to the same institutional pressures depending on their capability mix
Configurational Theory	Proposes that resilience in organizations is due to the interplay of the impacts of ESG performance, innovation performance, and policy support; explains why there is non-linearity (e.g., ESG–Tobin's Q) and heterogeneity by firm size and age	Lacks capacity to articulate causal processes in isolation; does not reveal which personal variables affect results without the help of other theories	Needs both RBV and Institutional Theory in order to understand the impact on firms from within and without; together, this makes understanding how various factor mixes yield the same resilient results possible

Note. VRIN = valuable, rare, inimitable, non-substitutable.

For capital-intensive and highly leveraged industries such as real estate, organizational resilience can be reflected in firms' ability to sustain strategic investment and financing capacity during periods of disruption and uncertainty. Accordingly, CETR and TLSQ are employed as financial proxies of resistance capacity. CETR reflects a firm's ability to maintain capital investment despite adverse conditions, while TLSQ reflects its ability to preserve financing capacity and absorb financial pressures. This approach is consistent with resilience research that conceptualizes resilience as an organization's capacity to withstand disruption, adapt to changing conditions, and maintain essential functions over time [54,55]. Following [56], resilience may be operationalized through observable organizational outcomes, including financial indicators that reflect firms' ability to sustain operations under adverse conditions. Nevertheless, CETR and TLSQ should be interpreted as indirect financial indicators of resistance capacity rather than comprehensive measures of organizational resilience, which remains a multidimensional construct encompassing strategic, operational, behavioral, and stakeholder-related dimensions.

In tandem, these two metrics provide a multidimensional, dynamic, and analyzable account of organizational resilience, one that moves away from linear thinking in order to explain the complex ways in which the capabilities in each area interact in RE firms to produce diverse outcomes. Unlike previous research that has tended to characterize resilience as multidimensional and processual [7,57], in the current study, a finance-based definition of resilience is adopted. Here, resilience is evident in the form of financial success through profitability (as measured by ROE and ROA), Tobin's Q, and leverage ratios.

3. Hypothesis Development

3.1. ESG Performance and Organizational Resilience

In contemporary discourse, the concept of ESG performance has shifted strategic assets associated with organizational resilience. The logic behind this is rooted in the framework provided by Resource-Based View (RBV). According to Barney, competitive advantage stems from resources that are valuable, rare, inimitable, and non-substitutable (VRIN; [22]). Within the context of resilience, a good ESG profile qualifies as a VRIN asset because the accumulated reputational capital, stakeholder trust, and regulatory goodwill gained through ESG are hard to duplicate and purchase by competitors within a short period [26,29]. Thus, organizations that invest in ESG performance may develop a pool of resilience-related resources that will come into play during adversity and provide them with an edge over competing entities when absorbing and recovering from disturbances [28].

There are multiple ways that ESG performance is associated with organizational resilience, especially in the context of real estate. First, environmental performance, which includes certification of properties as 'green' (green building certifications), energy efficiency, and green expenditure intensity, is associated with reduced vulnerability to potential penalties for environmental compliance failure and their related risks and mitigate the consequences of expensive energy resources. In the context of tightening regulations in China's property market regarding carbon neutrality, organizations that own green-certified properties are given preferential access to green loans, without having to pay extra charges associated with sudden increases in compliance costs [5,9]. Second, social performance is associated with organizational cohesion and legitimacy. In times of crisis, a company with considerable social capital retains its employees and ensures operational continuity while using goodwill to offset income losses. Empirical research shows that real estate companies with higher ESG ratings exhibit better financial resilience and recovery from variable market conditions [10,14]. Lastly, effective corporate governance characterized by independent boards, disclosures, and accountable management fosters

timely decision-making in conditions of uncertainty and minimizes agency costs that could exacerbate external shocks [46].

Three ESG factors constitute a toolkit of internal capabilities of organizational resilience as defined in this paper: risk anticipation, stakeholder mobilization, and adaptive governance. However, it should be kept in mind that investing in ESG brings certain costs in the short run: green expenditures, employee programs, and disclosures affect the Tobin's Q ratio in a negative way (see above). RBV suggests that resource investment leads to long-term benefits due to the creation of rare and non-substitutable assets. Therefore, sustainable land use, open corporate governance, and green building practices serve as tools for resilience by protecting organizations against system-level disturbances [5,9].

H1. *ESG performance is associated with organizational resilience, although the direction and magnitude of the association may vary across resilience dimensions.*

3.2. Innovation Performance and Organizational Resilience

One of the key determinants of organizational resilience is innovation performance, which allows companies to survive amidst volatility, disruption, and uncertainty. In terms of the Resource-Based View approach, innovation competencies like research and development spending, the number of patents obtained, and innovation technologies could be considered resources that are valuable, rare and costly to imitate [7,22]. Innovation resources may prove useful for enhancing firms' operational efficiency and obtaining revenue sources and adaptive ability, thus contributing to improved resilience.

From the perspective of Institutional Theory, innovation performance depends on various external factors, such as regulatory support, industry standards, and government policies promoting technological development. For example, emerging and regulated industries like China's real estate sector are subject to institutional pressure to invest in innovations not only because of regulatory requirements but also because innovation contributes to corporate legitimacy and competitiveness. Consequently, businesses that react to institutional pressures for innovation should be able to reap the advantages of resource availability and lower uncertainty [35,57].

The relationship between innovation and resilience in the real estate industry can be observed through several concrete mechanisms. First, digitalization and intelligent construction technologies, such as BIM, digital twin systems, IoT sensors, and AI-based asset management tools, boost operational effectiveness, facilitate quick reaction to disruptions in the supply chain, and help organizations adjust project design to regulatory or market changes [58]. Organizations that have digitalized their construction processes are better prepared to handle sudden changes in the prices of building materials and labor, as well as fluctuations in demand, which were particularly observed during the COVID-19 pandemic and during the subsequent tightening of regulations according to the "Three Red Lines" initiative.

Second, innovations in green building materials and sustainable construction processes cut down operational expenses in the long run. They also provide access to innovative finance programs for eco-friendly projects and give firms an organizational advantage when facing future regulatory requirements related to climate change. Third, the R&D intensity measure (the ratio of R&D expenses to revenue) reflects an organization's intention to renew its technology base and is positively correlated with the robustness of the innovation pipeline. Indeed, empirical evidence suggests that organizations with strong patent portfolios and high R&D ratios are better able to rethink their business model and explore alternative sources of income, which makes them more resilient during economic downturns [59,60]. Moreover, firms with active patent applications tend to be

associated with higher investor confidence and easy access to capital markets, ensuring continued investments in innovation despite economic pressure [61].

Innovation is measured through TPA and TGPA in this study, which are output-based metrics and represent observable achievements of a firm's innovation system. The robustness test results show that TPA is positively associated with ROE, Tobin's Q, and TLSQ, conditional on controlling for green expenditure or excluding years affected by the pandemic, confirming the empirical findings that firms generating patents benefit from increased valuation from financial markets and creditors and greater financial leverage.

The heterogeneous effects strengthen the combined RBV and Institutional Theory approach even further. TPA has a positive effect mainly in younger companies, indicating that innovation can be a stronger strategic resource in organizations with less rigidity and resource flexibility constraints. In terms of RBV, younger firms can apply innovation resources more flexibly and gain advantage from their use. On the other hand, from the point of view of Institutional Theory, younger firms are also more sensitive to changing institutional environments, making it easier for them to match their innovation efforts to institutional demands [62].

H2. *The relationship between innovation performance and organizational resilience varies across organizational contexts.*

3.3. Policy Support and Organizational Resilience

Support for organizational policies is another external factor that affects the level of resilience. As suggested by Institutional Theory, companies operate in environments characterized by rules and norms as well as government intervention that constrains and enables corporate actions [34,35]. When companies have a compatible policy environment, they benefit from tangible stimuli (such as subsidies), advantageous financial conditions, and lower taxes, as well as institutional legitimacy and a right to act, both of which provide a buffer against potential difficulties [42,45]. Thus, in the specified context, policy support may function as an institutional enabler rather than a direct driver of organizational resilience and sends positive signals to the capital markets and authorities about the company's alignment with national development priorities [63,64].

In particular, in the Chinese real estate market, an array of meaningful policies have been introduced to promote sustainable urbanization, green buildings, and financial stability. In terms of policy support for environmental sustainability, the government promotes the use of energy-efficient technologies in real estate through direct subsidies, certification systems, and favorable credit conditions for green projects [12]. In this way, government measures may facilitate fiscal support, compensating for the capital costs related to sustainability transformation as well as allowing for portfolio rebalancing in line with environmental priorities. Likewise, the introduction of tax breaks aimed at incentivizing environmentally friendly operations and high-technology industries reduces the overall tax burden for firms and creates extra cash flow for investments in innovation and resilience [12].

Moreover, tax breaks have proven to be especially efficient tools for fostering industrial upgrades within sectors targeted by national innovation policies due to the lower costs associated with changes toward technology-intensive and sustainable business models. Finally, government subsidies, which include cash payments, funding opportunities, and strategic investments, may help cushion the negative impact of external shocks while also serving as a source of institutional endorsement, contributing to socially sustainable strategic decisions in the long term [12,65]. The total government subsidies provided to a company in one fiscal year can be regarded as a key measure of institutional support from the state.

Besides material factors, Institutional Theory highlights the important role of the legitimacy that policy support provides to a company. By being compliant with—or even ahead of—government environmental and social policies, companies develop strong relations with regulators, investors, and lenders. In times of crisis, the accumulated institutional legitimacy can be considered as a reserve, enabling a company to obtain policy relief and other necessary resources more easily than those competitors who are less supportive of policy goals. For example, the incorporation of ESG factors into performance assessment of SOEs in China shows the importance of alignment with the government: when firms were aligned with governmental policies, significant improvements in governance and resilience were observed [63,64]. Thus, policy-aligned firms tend to demonstrate better resilience and better responses to institutional change, in addition to maintaining a competitive position.

H3. *Policy support is conditionally associated with organizational resilience through indirect institutional and sustainability-related mechanisms.*

4. Materials and Methods

4.1. Research Design

In this research, the methodological approach of quantifying the effects of performance in ESG and innovations, along with the government policies that influence the resilience of organizations, is used. In this context, regression analysis based on the panel data model with fixed effects was used.

4.2. Sampling and Sample Size

Real estate companies which have listed their stocks on China's A-shares market were considered in this study. Data was collected from the China Stock Market and Accounting Research (CSMAR) database for 2015–2024. To avoid low-quality data, any firms listed as ST and *ST (firms that are experiencing a high level of distress or are at a higher risk of being delisted by regulators) or any firms with significant amounts of missing data were removed. The remaining missing data was substituted using mean substitution due to the small percentage of missing observations. Mean substitution may distort variation and statistical inference; however, as the missing data is quite limited, this should not affect the regression results. The sample selection process is presented in Table 2.

Table 2. Sample selection process.

Criteria	Number of Firms	Observations
Initial A-share-listed real estate companies	132	1188
Less: ST and *ST companies	(39)	(333)
Less: Companies with severe missing data	(13)	(55)
Final sample (2015–2024)	80	800

Note. ST and *ST designations indicate firms under special treatment or with significant risk of delisting as per the China Securities Regulatory Commission guidelines.

4.3. Measures

The dependent variable was organizational resilience. The dimensions of organizational resilience include the recovery capacity and resistance capacity [7,8,54]. Specifically, the former comprises ROE, ROA, and Tobin's Q [7,8,54], and the latter comprises CETR and TLSQ [8,55,56]. Considering these allows for analysis of organizational resilience through various financial indicators based on accounting and market measures.

Within the context of this research, CETR reflects a company's capability to maintain their investment intensity during uncertain times in the industry, while TLSQ reflects their capability to retain their financing and debt capabilities during financially strained periods. These concepts are used as proxy measures for firms' resistance capacity in the finance realm, not for resilience directly.

Independent Variables: ESG performance is measured by the overall ESG score. Robustness checks involve the use of additional proxies capturing different aspects of investment intensity related to sustainability, namely, GEx and EPEX [10,66,67].

Innovation performance is measured through TPA and TGPA [8,9,68], while policy support is measured using GSub and TAX [12,65]. In the baseline model, policy support is represented mainly by tax rebates, which are ongoing governmental incentives shaping companies' operating cash flows and financial positions. The other form of policy support used in the robustness check is Government Subsidies to Total Revenue (GSub).

Control Variables: Various control variables are employed to address omitted variable bias, including firm size (total assets), firm age (age in years), leverage, cash holdings, sales growth, and ownership type. Ownership type was added at first but later omitted due to multicollinearity with firms' fixed effects.

4.4. Data Analysis

Data analysis was performed using Stata/SE 17.0 (StataCorp LLC, College Station, TX, USA). Descriptive statistics and pairwise correlations were determined, and tests on multicollinearity using the Variance Inflation Factor (VIF) were conducted. Model specification between fixed-effects and random-effects estimation was made using the F-test and Hausman test. The robustness of our findings was tested by adopting different ESG-related variables, such as the Green Expenditure Ratio (GEx) and Environmental Protection Expenditure (EPEX), or by excluding the time periods related to the ongoing global pandemic (COVID-19) that started in 2021–2022. Furthermore, we performed heterogeneity tests by dividing our sample based on the characteristics of firm age and size.

In order to ensure more precise estimation of our model specifications and to control for the omitted variable problem, certain control variables were added to our model, namely, size of the firm, age of the firm, leverage, cash holdings, and sales growth. The ownership type was also included but dropped for fixed-effects estimation due to collinearity problems with firms' fixed effect.

The basic specification of the regression model is given as:

$$Y_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 TPA_{it} + \beta_3 TAX_{it} + \beta_4 Size_{it} + \beta_5 Age_{it} + \beta_6 Leverage_{it} + \beta_7 Cash_{it} + \beta_8 SG_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Here, Y_{it} is the outcome measure of the organizational resilience, which includes ROE, ROA, Tobin's Q, CETR, and TLSQ. The dependent variable ESG_{it} measures the ESG performance, TPA_{it} reflects innovation performance, measured by total patent applications, and TAX_{it} indicates government support in terms of tax rebates. Firm size, firm age, leverage, cash holdings, and sales growth were included as control variables. μ_i and λ_t indicate the firm's fixed effect and year-fixed effect variables, respectively, and ε_{it} is the error term.

In order to examine whether there might be any non-linear effect of ESG performance on the market valuation, we constructed the following model:

$$TobinQ_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 ESG_{it}^2 + \beta_3 TPA_{it} + \beta_4 TAX_{it} + \beta_5 Size_{it} + \beta_6 Age_{it} + \beta_7 Leverage_{it} + \beta_8 Cash_{it} + \beta_9 SG_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

Including the squared ESG allows for testing for the presence of non-linear effects of ESG performance on market valuation.

5. Results

5.1. Descriptive Statistics and Correlations

The descriptive statistics for all variables used in this paper are presented in Table 3 below.

Table 3. Descriptive statistics ($N = 800$).

Variable	Mean	SD	Min	Max
Independent & ESG-related Variables				
ESGs (ESG Score)	75.98	5.381	45.77	87.60
GEx (Green Expenditure Ratio)	0.0700	0.124	0.00562	2.130
EPEx (Env. Protection Expenditure, CNY)	2.158×10^7	4.733×10^7	447,293	5.303×10^8
Innovation Variables				
TPA (Total Patent Applications)	1.216	11.02	0	202
TGPA (Total Green Patent Applications)	1.871	8.133	0	143
Policy Support Variables				
GSub (Gov. Subsidies/Total Revenue)	0.00407	0.00947	−0.000887	0.122
TAX (Tax Rebates, CNY)	1.048×10^8	4.532×10^8	0	6.643×10^9
Control Variables				
Size	1.923×10^{10}	5.218×10^{10}	1.319×10^7	5.038×10^{11}
Age	27.25	4.999	14	42
Leverage	65.21	24.20	7.478	454.3
Cash (Cash holdings)	1.030×10^{10}	2.367×10^{10}	6.670×10^6	1.952×10^{11}
Type (Ownership type)	0.659	0.474	0	1
SG (Sales growth)	16.77	84.00	−94.17	1191
Dependent Variables				
ROE (Return on Equity, %)	1.306	38.87	−646.0	74.80
ROA (Return on Assets, %)	2.126	16.11	−143.2	358.9
Tobin Q (Market Valuation)	0.785	1.339	0.0194	13.58
CETR (Cap. Exp./Total Revenue)	0.0501	0.136	1.56×10^{-5}	1.501
TLSQ (Total Liabilities/Shareholders' Equity)	2.899	3.864	−1.518	61.24

The mean value of the ESG variable, reflecting the average level of ESG disclosure in the companies in our sample, is 75.98 (standard deviation = 5.381), which is quite high. It can be observed that there is a great deal of difference among the financial and organizational variables, which may signify different conditions prevailing in Chinese real estate firms.

The pairwise correlation between the independent and dependent variables is presented in Table 4. There exists a positive relationship between ESG and ROE and CETR, as well as a negative correlation between ESG and Tobin's Q, which implies that ESG is associated with some financial metrics used for measuring resilience while at the same time lowering the firm's market value. The variable leverage has a negative correlation with ROE and ROA, but a positive correlation with TLSQ, which aligns with the characteristics of the sector.

Table 4. Pairwise correlation matrix.

Variable	(1) ESGs	(2) TPA	(3) Tax	(4) Size	(5) Age	(6) Leverage	(7) Cash	(8) Type	(9) SG	(10) ROE	(11) ROA	(12) Tobin's Q	(13) CETR	(14) TLSQ
(1) ESGs	1.000													
(2) TPA	0.020	1.000												
(3) Tax	0.111 ***	0.012	1.000											
(4) Size	0.291 ***	0.010	0.362 ***	1.000										
(5) Age	−0.134 ***	−0.047	0.129 ***	0.213 ***	1.000									
(6) Leverage	−0.010	0.048	0.068 *	0.158 ***	−0.129 ***	1.000								
(7) Cash	0.311 ***	0.013	0.435 ***	0.923 ***	0.176 ***	0.170 ***	1.000							
(8) Type	0.275 ***	0.067 *	0.098 ***	0.069 *	0.015	0.116 ***	0.104 ***	1.000						
(9) SG	0.032	−0.003	−0.025	−0.009	−0.087 **	−0.025	−0.010	−0.036	1.000					
(10) ROE	0.263 ***	0.003	−0.012	0.070 **	−0.008	−0.315 ***	0.101 ***	0.045	0.106 ***	1.000				
(11) ROA	0.047	−0.009	−0.022	−0.003	−0.033	−0.331 ***	0.003	−0.017	0.030	—	1.000			
(12) Tobin's Q	−0.256 ***	−0.042	−0.104 ***	−0.156 ***	−0.009	−0.110 ***	−0.176 ***	−0.254 ***	−0.005	—	—	1.000		
(13) CETR	0.113 ***	−0.030	0.045	−0.014	−0.039	−0.024	0.023	0.065 *	−0.023	—	—	—	1.000	
(14) TLSQ	−0.066 *	0.017	0.032	0.071 **	−0.041	0.382 ***	0.068 *	0.014	−0.037	—	—	—	—	1.000

Note. N = 800. Two-tailed significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Cross-outcome correlations (—) are omitted for parsimony.

The results from the multicollinearity test using the Variance Inflation Factor (VIF) are presented in Table 5. The average VIF was calculated as 2.50; it can be concluded that there is no evidence of severe multicollinearity with the regression model since none of the VIFs exceed the cutoff point of 10.

Table 5. Multicollinearity test—variance inflation factor (VIF).

Variable	VIF	1/VIF (Tolerance)
Cash	7.530	0.133
Size	7.070	0.141
ESGs	1.270	0.788
Tax	1.260	0.793
Age	1.160	0.862
Type	1.120	0.891
Leverage	1.090	0.915
SG	1.010	0.989
TPA	1.010	0.992
Mean VIF	2.500	

Note. All VIF values remain below the conventional threshold of 10, indicating the absence of severe multicollinearity among the independent variables.

5.2. Baseline Regression Results

In order to be consistent in terms of measuring different aspects of organizational resilience, fixed-effects regression was used as the main measurement. Table 6 provides the baseline estimation of fixed effects in regard to five measures of organizational resilience.

Table 6. Baseline fixed-effects regression results for organizational resilience outcomes.

Variable	ROE	ROA	Tobin's Q	CETR	TLSQ
ESGs	0.737 ** (0.328)	−0.083 (0.152)	−0.029 *** (0.006)	0.002 ** (0.001)	0.040 (0.032)
TPA	0.088 (0.169)	0.016 (0.078)	0.001 (0.003)	−0.000 (0.000)	0.007 (0.017)
TAX	−0.000004 (0.000003)	−0.000001 (0.000001)	0.000000 (0.000000)	−0.000000 (0.000000)	0.000000 (0.000000)
Size	−0.000000 (0.000000)	−0.000000 (0.000000)	0.000000 (0.000000)	−0.000000 (0.000000)	−0.000000 (0.000000)
Age	−2.202 *** (0.493)	−0.544 ** (0.228)	−0.097 *** (0.009)	0.004 *** (0.001)	0.082 * (0.048)
Leverage	−0.445 *** (0.068)	−0.376 *** (0.031)	0.001 (0.001)	0.000 (0.000)	0.017 *** (0.007)
Cash	0.000 *** (0.000)	0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)
SG	0.034 ** (0.015)	0.003 (0.007)	−0.001 ** (0.000)	−0.000 (0.000)	−0.001 (0.001)
Constant	30.219 (33.475)	47.170 *** (15.477)	5.581 *** (0.623)	−0.190 ** (0.094)	−3.242 (3.283)
N	800	800	800	800	800
Adj. R ²	0.021	0.069	0.037	−0.109	−0.107
F-test (<i>p</i>)	2.14	0.73	33.28	11.87	2.96
Hausman $\chi^2(p)$	0.0002	0.000	−9.99	0.205	0.000

Note. Standard errors in parentheses. All models use two-way fixed effects. Ownership type was omitted from the fixed-effects estimations due to collinearity with firms' fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Recovery outcomes include ROE, ROA, and Tobin's Q, while resistance outcomes include CETR and TLSQ.

Dimension of Recovery (ROE, ROA, Tobin's Q): As the estimation suggests, ESG performance is positively associated with ROE ($\beta = 0.737$, $p < 0.05$), meaning that ESG activities are positively associated with accounting-based recovery capacity of organizations based on accounting measures. By contrast, ESG performance negatively correlates with Tobin's Q ($\beta = -0.029$, $p < 0.01$), indicating that in the eyes of the market, investments in ESG projects are associated with short-term costs. There is no evidence of any relationship between ESG performance and ROA. Moreover, age negatively impacts all three measures, meaning that older firms have lower profitability and market value. Leverage is significantly negative in relation to ROE and ROA, implying that higher debts reduce recovery capacity. Growth in sales positively affects ROE, while having a negative effect on Tobin's Q.

Dimension of Resistance (CETR, TLSQ): According to the CETR specifications, there is a slight positive correlation between ESG performance and CETR ($\beta = 0.002$, $p < 0.05$), which suggests that better ESG performance is linked to relatively higher investment intensity. Moreover, age is positively correlated with CETR ($\beta = 0.004$, $p < 0.01$). In the case of TLSQ specification, ESG performance does not have any impact, while leverage is positively correlated with TLSQ ($\beta = 0.017$, $p < 0.01$). These findings indicate that organizational resilience in China's real estate industry depends on context-specific financial and organizational conditions.

The explanatory power of certain benchmark models such as ROA, CETR, and TLSQ still appear quite modest, as evidenced by the negative or low adjusted R^2 scores. This means that resilience among organizations operating within the real estate industry is also influenced by other organizational, financial, and institutional variables not accounted for in this study. The findings from the baseline regression analysis do not provide significant evidence to validate hypothesis H3, as the main effects of the policy support proxy (TAX) variables do not seem to have much impact on the resilience dimensions.

5.3. Robustness Tests

Tables 7–11 detail the results of the robustness tests for the models of organizational resilience. In general, the findings are consistent under alternative model settings, but there are several relations that are sensitive to certain conditions.

Table 7. Robustness tests—Return on Equity (ROE).

Variable	(1) Baseline	(2) GEx Substitution	(3) EPEX Substitution	(4) Ex-COVID
ESGs	0.737 ** (0.328)	—	—	0.624 * (0.367)
TPA	0.088 (0.169)	0.062 *** (0.020)	0.068 *** (0.021)	0.080 *** (0.021)
Tax	−0.000 (0.000)	−0.000 *** (0.000)	−0.000 *** (0.000)	−0.000 *** (0.000)
Size	−0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Age	−2.202 *** (0.493)	−2.648 *** (0.458)	−2.659 *** (0.460)	−2.003 *** (0.362)
Leverage	−0.445 *** (0.068)	−0.437 *** (0.043)	−0.453 *** (0.040)	−0.480 *** (0.034)

Cash	0.000 *** (0.000)	0.000 *** (0.000)	0.000 ** (0.000)	0.000 *** (0.000)
Type	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
SG	0.034 ** (0.015)	0.028 *** (0.010)	0.035 *** (0.012)	0.031 *** (0.011)
GEx	—	−26.301 *** (9.867)	—	—
EPEX	—	—	−0.000 (0.000)	—
Constant	30.219 (33.475)	99.289 *** (13.214)	98.986 *** (13.455)	36.463 (31.013)
N	800	800	800	636
adj. R ²	0.021	0.121	0.116	0.285

Note. *t*-statistics in parentheses. Model (4) excludes 2021–2022 (COVID-19 pandemic years). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8. Robustness tests—Return on Asset (ROA).

Variable	(1) Baseline	(2) GEx Substitution	(3) EPEX Substitution	(4) Ex-COVID
ESGs	−0.083 (0.152)	—	—	−0.046 (0.158)
TPA	0.016 (0.078)	0.032 ** (0.016)	0.018 *** (0.006)	0.019 ** (0.007)
Tax	−0.000 (0.000)	−0.000 (0.000)	−0.000 * (0.000)	−0.000 ** (0.000)
Size	−0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)
Age	−0.544 ** (0.228)	−0.603 ** (0.276)	−0.489 *** (0.124)	−0.589 *** (0.143)
Leverage	−0.376 *** (0.031)	−0.421 *** (0.147)	−0.375 *** (0.072)	−0.380 *** (0.066)
Cash	0.000 (0.000)	0.000 *** (0.000)	0.000 *** (0.000)	0.000 *** (0.000)
Type	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
SG	0.003 (0.007)	0.019 ** (0.008)	0.003 (0.007)	−0.002 (0.009)
GEx	—	71.091 (49.316)	—	—
EPEX	—	—	−0.000 (0.000)	—
Constant	47.170 *** (15.477)	40.017 *** (10.086)	39.363 *** (5.100)	45.587 ** (18.675)
N	800	800	800	636
adj. R ²	0.069	0.339	0.164	0.161

Note. *t*-statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9. Robustness tests—Tobin’s Q.

Variable	(1) Baseline	(2) GEx Substitution	(3) EPEX Substitution	(4) Ex-COVID
ESGs	−0.029 *** (0.006)	—	—	−0.035 *** (0.006)
TPA	0.001 (0.003)	0.002 *** (0.001)	0.002 ** (0.001)	0.001 (0.001)
Tax	0.000 (0.000)	0.000 ** (0.000)	0.000 * (0.000)	0.000 ** (0.000)
Size	0.000 (0.000)	0.000 *** (0.000)	0.000 * (0.000)	0.000 ** (0.000)
Age	−0.097 *** (0.009)	−0.082 *** (0.011)	−0.078 *** (0.015)	−0.096 *** (0.017)
Leverage	0.001 (0.001)	−0.001 (0.005)	0.001 (0.007)	0.002 (0.006)
Cash	−0.000 (0.000)	−0.000 ** (0.000)	−0.000 (0.000)	−0.000 ** (0.000)
Type	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
SG	−0.001 ** (0.000)	0.000 (0.000)	−0.001 (0.000)	−0.000 (0.000)
GEx	—	2.902 *** (0.418)	—	—
EPEX	—	—	0.000 (0.000)	—
Constant	5.581 *** (0.623)	2.858 *** (0.516)	2.833 *** (0.689)	5.908 *** (1.000)
N	800	800	800	636
adj. R ²	0.037	0.295	0.108	0.140

Note. *t*-statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10. Robustness tests—Capital Expenditure to Total Revenue (CETR).

Variable	(1) Baseline	(2) GEx Substitution	(3) EPEX Substitution	(4) Ex-COVID
ESGs	0.002 ** (0.001)	—	—	0.002 (0.002)
TPA	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
Tax	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
Size	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
Age	0.004 *** (0.001)	0.003 (0.003)	0.003 (0.003)	0.004 (0.004)
Leverage	0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)
Cash	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Type	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
SG	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
GEx	—	0.064 * (0.033)	—	—

EPEX	—	—	0.000 (0.000)	—
Constant	−0.190 ** (0.094)	−0.017 (0.075)	−0.018 (0.075)	−0.193 (0.243)
N	800	800	800	636
adj. R ²	−0.109	0.004	−0.001	0.005

Note. *t*-statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 11. Robustness tests—Total Liabilities to Shareholders' Equity (TLSQ).

Variable	(1) Baseline	(2) GEx Substitution	(3) EPEX Substitution	(4) Ex-COVID
ESGs	0.040 (0.032)	—	—	0.054 (0.072)
TPA	0.007 (0.017)	0.005 * (0.003)	0.006 ** (0.003)	0.008 ** (0.004)
Tax	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Size	−0.000 (0.000)	−0.000 *** (0.000)	−0.000 *** (0.000)	−0.000 *** (0.000)
Age	0.082 * (0.048)	0.059 (0.059)	0.052 (0.059)	0.058 (0.041)
Leverage	0.017 *** (0.007)	0.018 (0.023)	0.017 (0.025)	0.007 (0.020)
Cash	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)
Type	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
SG	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)
GEx	—	−2.247 *** (0.708)	—	—
EPEX	—	—	0.000 (0.000)	—
Constant	−3.242 (3.283)	0.472 (2.833)	0.560 (2.898)	−3.171 (4.756)
N	800	800	800	636
adj. R ²	−0.107	0.009	0.006	−0.003

Note. *t*-statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

ESG performance has a positive effect on ROE and a negative effect on Tobin's Q, but the influence on other measures of resilience is not very significant. Innovation performance (TPA), which shows little significance in the base model, becomes significant in some alternative models, implying that its effects might be more sensitive to the conditions compared to other dimensions of resilience. Even though the results from the base-lines are not supportive of H3, robustness tests using green expenditure intensity (GEx) demonstrate the possibility of the existence of indirect or conditional mechanisms related to policies. These results should not be considered as proof of the hypothesis; they merely serve as an exploratory basis.

5.4. Heterogeneity Analyses

Tables 12–16 detail the results of the analysis of heterogeneity, which depends on the age and size of the firm. From the results, we can observe that resilience is dependent on the different contexts among organizations. ESG more positively impacts ROE for

younger and larger firms compared to smaller ones, while the negative impact on Tobin's Q is consistent among all groups. Innovation positively impacts total patent applications (TPA) for smaller and larger firms. Via this comparison, it can be argued that resilience regarding innovation only exists in certain developmental stages. However, in the case of CETR and TLSQ, the impacts of ESG and innovation seem low for all sub-groups of the sample population.

Table 12. Heterogeneity analysis—Return on Equity (ROE).

Variable	Old Firms	Young Firms	Large Firms	Small Firms
ESGs	0.411 (0.486)	0.815 *** (0.198)	1.058 ** (0.379)	0.447 (0.334)
TPA	−0.144 (0.362)	0.061 *** (0.023)	0.286 *** (0.095)	0.332 (0.238)
Tax	−0.000 (0.000)	−0.000 * (0.000)	0.000 (0.000)	−0.000 * (0.000)
Size	−0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)	0.000 *** (0.000)
Age	−2.432 *** (0.775)	−1.412 ** (0.630)	−4.072 *** (0.596)	−1.908 *** (0.430)
Leverage	−0.656 (0.415)	−0.426 *** (0.017)	−0.989 (0.753)	−0.465 *** (0.044)
Cash	0.000 ** (0.000)	0.000 * (0.000)	0.000 *** (0.000)	0.000 ** (0.000)
Type	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
SG	0.067 ** (0.031)	0.022 ** (0.009)	0.263 ** (0.101)	0.021 * (0.011)
Constant	81.105 (60.581)	0.015 (21.234)	95.872 (65.642)	34.244 (31.571)
N	364	436	134	666
adj. R ²	0.095	0.077	0.512	0.120

Note. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Old/young split based on the sample's median firm age.

Table 13. Heterogeneity analysis—Return on Assets (ROA).

Variable	Old Firms	Young Firms	Large Firms	Small Firms
ESGs	−0.028 (0.083)	−0.205 (0.404)	0.072 ** (0.027)	−0.151 (0.199)
TPA	−0.027 (0.061)	0.000 (0.025)	0.023 *** (0.006)	−0.007 (0.165)
Tax	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
Size	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 *** (0.000)
Age	−0.617 *** (0.188)	−0.230 (0.219)	−0.562 *** (0.081)	−0.620 *** (0.164)
Leverage	−0.147 *** (0.035)	−0.430 *** (0.044)	−0.038 (0.058)	−0.386 *** (0.069)
Cash	0.000 ** (0.000)	0.000 (0.000)	0.000 ** (0.000)	0.000 *** (0.000)
Type	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)

SG	0.015 ** (0.006)	−0.004 (0.011)	0.024 *** (0.008)	−0.001 (0.008)
Constant	31.657 *** (7.160)	52.584 (32.677)	13.515 ** (5.249)	50.896 ** (21.033)
N	364	436	134	666
adj. R ²	0.164	0.178	0.691	0.168

Note. Standard errors in parentheses. ** $p < 0.05$, *** $p < 0.01$. Old/young split based on the sample's median firm age.

Table 14. Heterogeneity analysis—Tobin's Q.

Variable	Old Firms	Young Firms	Large Firms	Small Firms
ESGs	−0.023 *** (0.008)	−0.036 *** (0.008)	−0.006 *** (0.002)	−0.030 *** (0.006)
TPA	0.003 (0.013)	0.001 (0.001)	0.001 *** (0.000)	0.001 (0.007)
Tax	0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)
Size	0.000 (0.000)	0.000 ** (0.000)	−0.000 (0.000)	−0.000 *** (0.000)
Age	−0.096 *** (0.035)	−0.107 *** (0.021)	−0.035 *** (0.004)	−0.099 *** (0.022)
Leverage	−0.042 *** (0.015)	0.007 *** (0.002)	−0.010 *** (0.002)	0.001 (0.006)
Cash	0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)	−0.000 ** (0.000)
Type	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
SG	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
Constant	8.132 *** (2.301)	5.598 *** (0.888)	2.421 *** (0.162)	6.015 *** (1.170)
N	364	436	134	666
adj. R ²	0.377	0.202	0.777	0.161

Note. Standard errors in parentheses. ** $p < 0.05$, *** $p < 0.01$.

Table 15. Heterogeneity analysis—Capital Expenditure to Total Revenue (CETR).

Variable	Old Firms	Young Firms	Large Firms	Small Firms
ESGs	0.001 (0.001)	0.000 (0.002)	−0.001 (0.001)	0.003 (0.002)
TPA	−0.013 (0.014)	−0.000 (0.000)	0.000 (0.000)	−0.001 (0.001)
Tax	−0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)
Size	−0.000 (0.000)	−0.000 ** (0.000)	0.000 (0.000)	−0.000 (0.000)
Age	0.004 (0.003)	0.005 (0.005)	−0.009 (0.006)	0.005 (0.004)
Leverage	0.000 (0.000)	−0.000 (0.000)	0.005 (0.004)	0.000 (0.000)
Cash	0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)
Type	0.000	0.000	0.000	0.000

	(.)	(.)	(.)	(.)
SG	−0.000	−0.000	0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	−0.122	−0.083	0.005	−0.297
	(0.177)	(0.221)	(0.150)	(0.241)
N	364	436	134	666
adj. R ²	0.019	0.006	0.146	0.023

Note. Standard errors in parentheses. ** $p < 0.05$,

Table 16. Heterogeneity analysis—Total Liabilities to Shareholders' Equity (TLSQ).

Variable	Old Firms	Young Firms	Large Firms	Small Firms
ESGs	−0.006 (0.049)	0.168 (0.131)	−0.081 (0.047)	0.083 (0.075)
TPA	0.029 (0.022)	0.015 * (0.008)	−0.010 (0.006)	0.005 (0.031)
Tax	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Size	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)
Age	0.013 (0.058)	0.001 (0.083)	0.074 (0.064)	0.060 (0.048)
Leverage	0.123 ** (0.048)	−0.001 (0.010)	0.318 *** (0.088)	0.015 (0.023)
Cash	0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
Type	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
SG	−0.002 (0.002)	−0.001 (0.001)	−0.009 (0.006)	−0.001 (0.001)
Constant	−4.669 (6.736)	−9.997 (9.162)	−15.541 *** (5.131)	−6.036 (5.014)
N	364	436	134	666
adj. R ²	0.157	0.011	0.650	0.008

Note. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6. Discussion

Since the ability of various benchmarking models to explain variations in the performance measures of organizational resilience has proven to be relatively low, it can be concluded that there are additional organizational, strategic, and institutional forces contributing to the phenomenon of organizational resilience that have not been captured by the current models used in the study.

6.1. ESG and the Dual Structure of Organizational Resilience

As indicated by the results, the impact of ESG performance on organizational resilience differs depending on specific dimensions. ESG involvement is linked to ROE, meaning that ESG practices could potentially lead to improved accounting recovery through improving organizational governance, building stronger stakeholder relationships, and promoting greater efficiency, in accordance with the predictions of the Resource-Based View [22,26,28].

On the other hand, ESG performance is negatively correlated with Tobin's Q in the basic model, indicating that financial markets might initially regard investment in ESG

practices as an expense in financial terms. According to the supplementary quadratic analysis, there is a U-shaped relation between ESG and Tobin's Q, with valuation effects emerging only after firms exhibit more advanced ESG performance. This finding is consistent with the theory of institutions, according to which companies usually incur adjustment costs as a result of the pressure related to sustainability [35,42].

According to the results, organizational resilience should be considered as a multifaceted concept. More specifically, ESG performance seems to have a more stable effect on accounting-based recovery outcomes compared to market-based ones. In the context of the Chinese real estate market, ESG may initially contribute to internal organizational resilience and then build market stability. However, these conclusions need to be verified, since the indicators used as proxies for resilience only capture some of its aspects. Furthermore, the rather low coefficients of determination in some basic models indicate that ESG alone does not fully explain organizational resilience outcomes.

6.2. Innovation as a Contingent Resilience Amplifier Rather than a Universal Driver

It was observed that innovation had limited and statistically insignificant effects in many baseline models of organizational resilience. However, the robustness and heterogeneity analyses revealed that innovation was significantly associated with resilience-related outcomes under specific organizational conditions, particularly among smaller and younger firms. These findings suggest that innovation should be interpreted as a conditional and context-dependent resilience factor rather than a universally positive direct driver of organizational resilience.

The effect of innovation performance is moderate in baseline models yet gains more relevance in multivariate robustness and heterogeneity analyses, thus providing some degree of support for hypothesis H2. Indeed, innovation performance positively influences ROE, Tobin's Q, and leverage-based measures primarily in relation to smaller, but also larger organizations, thus indicating that innovation is an important element of firm resilience only under specific organizational circumstances.

Such findings are consistent with the RBV approach, which states that innovation-based abilities allow organizations to become more flexible and adaptable in turbulent conditions [7,22]. In regard to China's real estate industry, innovation performance could be interpreted as organizational adaptability and potential for development and strategic adjustment [60,62].

Nevertheless, the results call for caution when considering the influence of innovation on firm resilience due to its inconsistent effects in multiple baseline and resistance-based models. Consequently, innovation does not seem to have direct effects on various elements of organizational resilience but serves as a contingency-based resilience factor [57,69,70].

6.3. Policy Support Matters More Through Strategic Resource Allocation than Through Direct Financial Relief

In comparison to ESG criteria and innovation, the influence of policies on organizational resilience is considerably limited under the baseline regression specification. The impact of TAX variables was found to be insignificantly positive on most of the resilience indicators, indicating that the direct financial aid provided through tax incentives does not significantly enhance organizational resilience in the real estate sector.

However, robustness analysis reveals that GEx is linked to lower levels of leverage, which can be interpreted as a sign that policy-induced sustainability investments could help establish a cautious and conservative corporate finance structure. Such findings corroborate Institutional Theory, according to which policy pressure impacts corporate

strategies by affecting resource allocation rather than by providing an immediate improvement in financial indicators [41,45,46].

Thus, the robustness findings suggest that there are possible indirect or conditional policy-related influences associated with sustainability-oriented investment behavior. However, these relationships were not formally tested as mediation mechanisms and should therefore be interpreted cautiously, as policy pressures affect sustainability investment and financial behavior. In other words, policy is considered an indirect factor, and its effects on organizational resilience occur via the sustainability and financial behavior of the organization. In the case of the Chinese real estate market, policy pressures may push corporations toward conservative financing and long-term strategic adjustments.

6.4. Heterogeneity Reinforces the Configurational Rather than Homogeneous Nature of Resilience

The results obtained from the heterogeneity analysis show that organizational resilience differs between small and large organizations, as well as between old and young organizations, which is consistent with the configurational approach, which asserts that resilience emerges through diverse organizational paths rather than through one particular universal process [48,51]. Higher levels of ESG are positively associated with higher ROE in young, large organizations, whereas the negative association between ESG and Tobin's Q is stronger in smaller, younger organizations.

The results also reveal that innovation has a more significant impact on various indicators of resilience for young and large organizations. This suggests that the effects of both innovation and ESG are dependent on organization-specific features and conditions rather than being universally consistent across different types of organizations [48,53,57].

Additionally, firm age is negatively associated with many indicators of the recovery phase, implying that older organizations face higher structural rigidity and exhibit low adaptation capabilities under industry instability [7,62]. Younger organizations are more capable of capitalizing on their ESG engagement and innovation initiatives in order to foster recovery. Thus, based on these findings, the configurational nature of organizational resilience in China's real estate industry is supported. The findings suggest that organizational resilience may exhibit configurational and context-dependent characteristics rather than operating uniformly across firms. In this context, the effects of ESG and innovation are conditional on an organization's characteristics and conditions as well as its financial position.

7. Theoretical Contributions and Implications

The present study contributes to the existing theoretical literature on organizational resilience in terms of integrating Resource-Based View (RBV), Institutional Theory, and Configurational Theory. First of all, the study demonstrates that ESG practices and innovation capabilities do not lead to uniformly positive outcomes in relation to organizational resilience for all resilience-related dimensions. More specifically, the correlation between ESG practices and organizational resilience is much stronger for accounting recovery outcomes than for market valuation outcomes, while innovation performance is a contingency resilience mechanism rather than a dominant one [22,26]. Hence, this study's results indicate that the value of innovation and ESG resources is conditional on the organizational context and the superior strategic resources they provide do not provide a consistent competitive advantage.

Furthermore, from the Institutional Theory perspective, the results reveal that policy support may have an indirect impact, rather than a purely financial impact, on an organization's ability to recover through its ability to support sustainable resource investments and financial discipline [35,41,45]. Thus, institutional pressures seem to affect

organizational adjustment processes and resilience development much more than any short-term financial assistance. Finally, based on the results of heterogeneity tests, the results support the configurational approach towards organizational resilience through revealing the existence of multiple organizational paths to achieving resilience, which include different combinations of organizational attributes, financial performance, and strategic actions [48,51]. These findings support this configurational approach by showing that the relationships between the various ESG, innovation, policy, and resilience outcomes vary according to organizational settings and firm attributes.

Methodologically, this study contributes to the literature by introducing a multidimensional measure of organizational resilience through finance-based study. The current study used indicators of corporate financial health, such as ROE, ROA, Tobin's Q, CETR, and TLSQ, in order to define organizational resilience in terms of recovery and resistance.

Practically speaking, the results indicate that managers of Chinese real estate firms should follow a long-term approach to ESG implementation and sustainability investments. While conducting ESG activities might negatively affect the company's market valuation, there are some indications that such practices may improve recovery performance and organizational resilience in the future. Furthermore, managers should consider individual differences regarding their organizational resilience potential in relation to ESG and innovation practices, which may lead to completely different outcomes depending on particular circumstances and organizational characteristics.

In terms of policy-makers, it might be more suitable to use sustainability- and financial discipline-promoting mechanisms rather than providing short-term financial assistance when trying to promote organizational resilience in Chinese real estate firms. In addition, policy-makers should be more considerate of the unique characteristics of each firm.

This study has limitations. The fixed-effects model was employed in addition to incorporating some extra variables to reduce potential biases arising from omitted variables and unobservable heterogeneity; issues concerning endogeneity may still exist. Therefore, the obtained results can only be viewed as associations between variables instead of causality. Even though this study takes a configurational approach, most analyses were performed using fixed-effects regression and heterogeneity approaches. Further research should consider configurational approaches such as fsQCA.

Second, organizational resilience was measured using a limited set of financial proxies, including ROE, ROA, Tobin's Q, CETR, and TLSQ. Although these indicators capture important aspects of recovery and resistance capacity and are consistent with outcome-based approaches to resilience measurement [56], they do not fully represent the multidimensional nature of organizational resilience discussed in the broader resilience literature [54,55]. Future studies may incorporate operational, behavioral, and stakeholder-related measures, as well as survey-based or mixed-method approaches, to provide a more comprehensive assessment of organizational resilience.

8. Conclusions

The significance of organizational resilience has been enhanced against the backdrop of increased levels of uncertainty in the Chinese real estate industry. This study demonstrates that ESG performance and innovation have an impact on organizational resilience, but in different ways depending on the organizational setting and type of resilience. ESG has a more significant positive relationship with accounting-based recovery measures, while its market implications are complex and negative in the short term. Similarly, the effect of innovation performance was found to be more significant under certain conditions within organizations, especially when considering size and age. Policy support

seems to be more of an indirect form of intervention in organizational resilience and affects sustainability-driven investments and financial prudence more than anything else.

Overall, the conclusions derived from this study indicate that organizational resilience should not be viewed as monodimensional or predetermined. Instead, organizational resilience in China's real estate industry seems to be a configurational concept that emerges through the interaction between ESG performance, innovation, finance, and organizations.

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Abbreviations

The following abbreviations are used in this manuscript:

CETR	Capital Expenditure-to-Revenue Ratio
CSMAR	China Stock Market and Accounting Research Database
ESG	Environmental, Social, and Governance
EPEX	Environmental Protection Expenditure
GEx	Green-related Expenditure Ratio
GSub	Total Revenue
RBV	Resource-Based View
RE	Real Estate
ROA	Return on Assets
ROE	Return on Equity
SOEs	State-Owned Enterprises
ST	Special Treatment
*ST	Particular Transfer/Delisting Risk Warning
TAX	Tax Rebates
TGPA	Total Green Patent Applications
TLSQ	Total Liabilities-to-Shareholders' Equity Ratio
TPA	Total Patent Applications
VRIN	Valuable, Rare, Inimitable, Non-substitutable

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