

MANAGING CORPORATE INNOVATION IN RESPONSE TO LEGITIMACY PRESSURE: A MULTI-CASE STUDY OF HIGH-TECH FIRMS

ZHAO YAXUAN

School of Business, University of International Business and Economics, No.10 East Huixin Street, Chaoyang District, Beijing, China

Abstract: *Background:* A key strategy for achieving environmentally friendly development is green innovation. The majority of studies on the factors that influence business innovation activities have either prioritized internal/external causes. *Objective:* The empirical significance of the research relies on independently investigating the effects of a firm's profit and legitimacy pressure, as well as its relationship to innovation. *Methods:* The findings showed that legitimacy pressure by consumers had a considerably positive impact on both industrial item innovation as well as process innovation using datasets of high-tech firms. *Results:* The findings also showed that the profitability of a firm has a beneficial impact on item innovation, but that it has little to no effect on innovation in green processes. Furthermore, the association between legitimacy stress and the development of products is positively moderated by corporate profitability. *Conclusion:* The findings demonstrate that both the combination of the two factors—profitability (internal) and legitimacy pressure (external)—as well as their individual effects on firm innovation strategies. This is an integrative viewpoint on how firms might be more creative and responsible.

Keywords- Innovation, profitability, legitimacy pressure, internal/external causes

Introduction

In an emerging country, the comprehensive pattern has led to significant environmental degradation and ecological destruction, which have had a profound impact on people's day-to-day life. Firms are under intense pressure from a variety of interested parties to prove they are doing their part to protect the environment, as they are commonly seen as the primary cause of environmental issues [1]. Firms are compelled to take novel actions to better their environmental practices by the pressure of the media, users, and other partners. Researchers and practitioners have long argued that an economic, social, and ecologically harmonious development model may be achieved through a combination of green innovation and responsible business practices [2].

One of the basic ideas of institutionalism is "legitimacy," which can be thought of as the condition in which an entity's acts are deemed appropriate according to a set of standards, norms, ideas, and criteria established by society [3]. It is not sufficient for businesses to merely comply with legal demands or economic needs; rather, they must also be compatible with the prevalent standards and social norms. Investors, clients, communities, the public, and authorities are all examples of stakeholders who may form their own opinions about an organization's credibility [4]. When people don't believe something is legitimate, they react negatively. From a resource perspective, investing heavily in green innovation necessitates significant capital and a firm's reaction to legitimacy concerns is influenced by its internal capabilities, with profitability playing a crucial role in green. If a firm were more profitable, it could put those funds towards greener machinery and practices.

Yet, few investigations have looked at the interplay between the two major causes of green innovation legitimacy pressure from outside and corporate profitability from within [5]. Consequently, the purpose of this research is to investigate how legitimacy constraint and corporate profitability might encourage innovativeness by relying on concepts from institutionalism, resource-based approach, and innovation literature. We suggest that eco-friendly innovation is motivated by both corporate profitability and legitimacy stress and that the latter favorably moderates the former.



Related works

The research [6] evaluated the function of green innovation as a mediating mechanism between environmental legitimacy, an external informal process, and corporate carbon disclosure. The research [7] investigated the factors and internal workings of a company's choice to choose carbon transfers over carbon reduction. Using the use of a US sample and the legitimacy theory, they demonstrate that stringent environmental regulations are an external driver of pressure on businesses to shift their carbon emissions. They discovered a sizable positive association between environmental law enforcement and foreign capital as well as stated emissions reductions as a proxy for carbon emissions transfer. The research [8] employed multi-regression analysis to examine the connections between environmental legitimacy, organizational determinants of senior management cognition and green strategic orientation, green absorptive ability, and green innovation in 133 mining-related MEs in China. This study [9] analyzed the disparities in voluntary carbon disclosure practices that exist between developing nations and industrialized countries, as well as the role that resource availability plays in explaining these discrepancies. The research [10] examined the moderating influence of the organization's internal slack by fusing a conceptual framework with an asset perspective. The research also looks at the possibility that external institutional pressure (such as coercive pressure, social pressures, and mimic stress, though the latter was not extensively examined) encourages green innovation. In addition, the study investigated the modifying impact of external institutional pressure. The article [11] suggested that the reason for the differences in innovation intensity between privately owned businesses and those owned by local and central governments is that businesses with different ownership structures follow different institutional logics, experience different environmental and innovation pressures, and have varying endowments of innovative resources and capabilities. This research analyzed the impact of several institutional pillars on businesses' decisions to adopt green innovations and further assesses the relationship between institutional pillars and absorptive capacity. The study [12] compared the execution of programs focused on industrial democracy versus those focused on corporate social responsibility. Although CSR may promote efficient problem-solving in the near term, the paper emphasizes that Industrial Democracy is required to develop governance skills engaging employees in the long term. The research [13] investigated the effects of symbolic and substantive corporate environmental initiatives on customers' views of environmental legitimacy and consequent purchase intentions. The article [14] focused on the idea of responsible innovation and talk about the advantages and disadvantages of different types of corporate governance in this context. From the political sciences, we extrapolate theoretical and empirical insights into how different types of participatory and reflexive government might aid in solving society's socioeconomic and environmental problems. The paper [15] aimed at investigating this knowledge gap by conducting an empirical study of the corporate practices of 10 international corporations. They used several measurements that were connected to actors and operational activities methodically to capture the organizations' rationale in sustainability management practice, with an emphasis on the companies' ambition to pursue sustainability strategy, the connection of social sustainability to the main business, and the actual execution of associated procedures.

Hypothesis

H1: Legitimacy pressure and the development of green products are positively associated.

H2: Innovating green processes is favorably connected with legitimacy pressure.

Profitability of businesses and green innovation

As a better degree of efficiency is a need for managers to successfully govern company functions, profitability is a crucial resource for the future growth of businesses and a key sign of their autonomy. More profitable businesses would invest more in green innovation. For instance, financial resources provide businesses the opportunity to deploy cutting-edge pollution control technology and adhere to environmental standards.

The resource-based perspective claims that internal characteristics like profitability are crucial factors of green innovation. Enough resources are needed for green innovation, including money,

labor, materials, and technology, among others. Said that since green technology uses resources inefficiently and has unpredictable returns, investing in it carries some risk. Companies with bigger profits and more resources, on the other hand, may afford such costly expenditures and pursue them as a differentiating competitive edge and approach while rival corporations are cash-strapped. Also, more profitable companies may assemble more readily available funds to fund green technology development and commercialization, while less profitable companies may have managers with less discretion and the potential to halt investments in green innovation. Consequently, we suggest

H3: Business profitability and green product innovation are favorably associated.

H4: Business profitability and green product innovation are favorably associated.

Higher profitability provides businesses under regulatory pressure with the resources they need to implement green R&D initiatives, look for new environmental technology, use more eco-friendly manufacturing techniques, and create and market greener goods. The role of profitability in corporate green innovation is particularly crucial when a corporation is under more legitimacy strain because it helps to both ease the pressure and seize the opportunity it creates by using the firm's resources. The income and resources available to businesses with lesser profitability are, however, smaller. Some businesses are still unable to invest in the creation of green goods or the improvement of processes while being under intense legitimate pressure because of their low assets and profitability. This is particularly true for the "double externality dilemma" of green innovation, that is, Externalities of knowledge and beneficial ecological impacts. And hence, we propose

H5: Positively moderating the link between legitimacy pressure and innovation in green products is profitability.

H6: Legitimacy pressure and the development of environmentally friendly processes are favorably moderated by profitability.

The study design and the hypotheses are shown in Figure 1 below, which also shows how legitimacy stress and company revenues and profits affect green products and green process innovation.

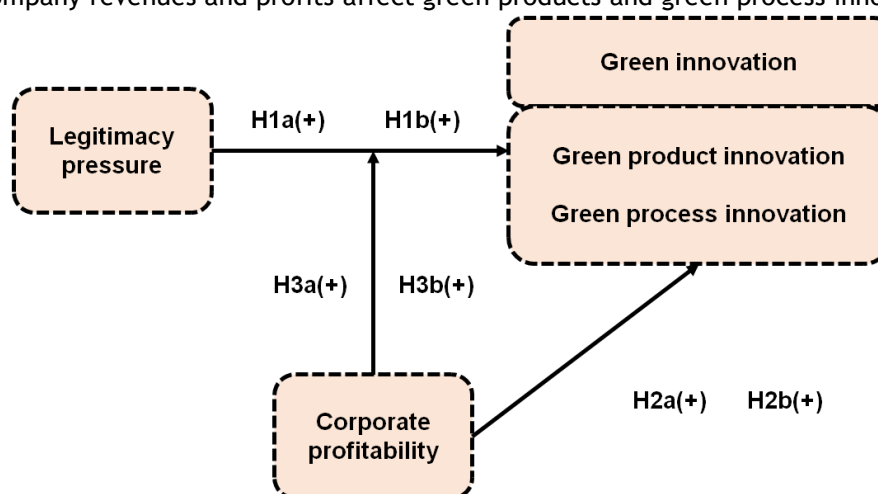


Figure 1: Research method

Study strategy

As these data are very consistent, reliable, and simple to acquire, this research chose an initial sample of 600 observations from the top 100 Chinese listed businesses between 2008 and 2012. The procedure for selecting the sample was as follows: Eight observations with less than a year on the Chinese stock market were also disregarded along with two observations that lacked annual reports. Finally, three special treatment (ST) observations were eliminated because they had consistently lost money for two years. Using the conservative set of criteria of three deviations from the mean, we also removed 36 observational data with extreme values, 31 findings for companies that issued B-shares and whose economic behavior and approvals regimes were separate, and a supplementary 32 findings whose legitimating value was zero. As a consequence, a total of 112 observations were eliminated, given a subset of 388 observations indicating 172 distinct businesses.

The RESET database, the Baiteng patent network, and the annual reports of all publicly traded corporations were the main sources of the research information needed. The sample distribution by industry is shown in Figure 2.

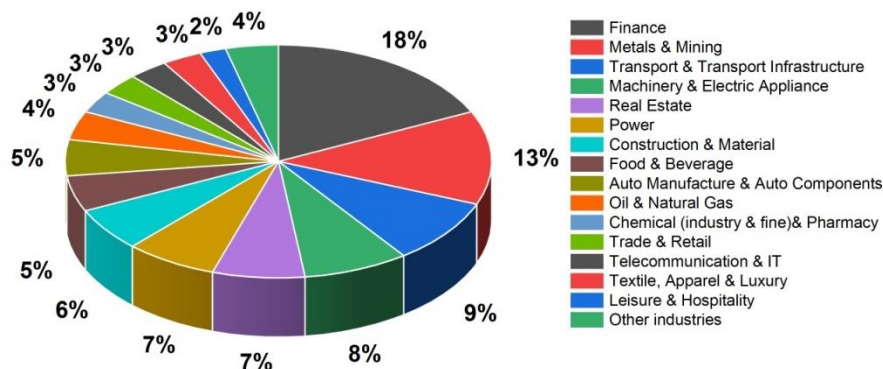


Figure 2: Whole observational sample distribution by economic sector.

With 71 and 50 observations, respectively, it shows that accounting Banking, Minerals, and Mines for the biggest percentage. With just 8 sample observations over five years, Hospitality and Leisure is the industry with the lowest representation.

Factors Measurements

The study's factors include corporate profitability, green innovation, and legitimacy pressure, as well as pertinent control factors like business size, ownership, and so on. The following is a description of these parameters' operational definitions and methods of measurement.

Green innovation

Most study breaks down green innovation into green product innovation and green process innovation, as was already mentioned. Indicators of green product innovation include eco-labeling product certification, green R&D, green patents, and more. We choose the fourth signal, as it is challenging to get the first two indicators for Chinese public companies, we will use green patents as our indication of innovation in green products. We started by looking through all three types of application patents (such as patents for innovation, utility models, and cosmetic improvements). Then, starting from the actuality of China's financial situation, Green trademarks for observations were chosen utilizing the following Chinese terms: "environmental," "green," "sustainable," "ecology," "clean," "cycling," "saving," "low carbon," "emission reduction," "energy saving," "environmental protection," and "environmental pollution." There were 239 observations in this investigation that lacked green patents. As a result, the samples were split into two groups: 0 for companies without green patents and 1 for businesses having one or more green patents. Although most studies use ISO 14001 as their indication of green process innovation, in our study it was also determined if the company had successfully attained ISO14001 certification.

Legitimacy Stress

The most relevant and visible source, public media coverage, is considered by academics to be an essential method for assessing environmental legitimacy. For instance, Kuo and Chen looked for and categorized stories regarding corporate environmental problems in the media (positive, negative, and neutral). As a result, this research used the volume of media exposure to evaluate ecological legitimacy and the reciprocity of ecological legitimacy to evaluate the strain of legitimacy. The 500 both regional and national newspapers are included in the Full-Text Archive of Major Chinese Newspapers, which is a reputable database in China. In this research, 29,795 articles that were relevant to the observations were chosen and programmed based on their content. Positive news stories for Environmental effects or actions of a corporation, such as a decrease in emissions of

greenhouse gases or an expenditure on infrastructure that will reduce energy consumption, are coded as positive, while negative stories are about the firm's environmental transgressions or unfavorable effects, and neutral stories reflect an activity without evaluating its beneficial or adverse effects on the environment.

For instance, the news that "BYD Company Limited won an international energy certification" is positive, while the news that "water inrush accident in China Shenhua's camel mountain coal mine" is bad, and the news that "Baotou Steel Rare-Earth Group brought 12 enterprises into its overall environmental development plan" is impartial. One of the writers evaluated and judged the articles first, followed by another evaluator, to guarantee inter-coder reliability. On 82% of the good, 88% of the negative, and 93% of the neutral news, the two coders were in agreement. Any disagreements about the assessment were settled by a third party. Eventually, it was discovered that from 2008 to 2012, the studied firms received good, neutral, and negative judgments in the amounts of 17,188, 10,695, and 1,911, respectively.

The Janis-Fadner coefficients were used to calculate the imbalance in the amount of media attention. The J-F coefficient has a value between -1 and 1, with a value closer to 1 indicating that the papers are more favorable and a value closer to -1 indicating that they are less favorable. The following equation is used to compute it.

$$I = LCoefficient = \begin{cases} \frac{a^2 - av}{d^2}, & \text{if } a > v \\ \frac{av - v^2}{d^2}, & \text{if } e < v \\ 0, & \text{if } a = v \end{cases}$$

When e is the value of good findings, c is the value of unfavorable reports, and d = a + v.

Profitability of a Corporation

A corporation is more expected to connect in green practices with the backing of several resources the greater its profitability is. The Net income assets ratio is used to calculate it.

Controlling Factors

Its investing behavior would be influenced by the company assets, internal structure, and degree of development. As a result, these seven variables have been controlled in this investigation, and their concluding measurement techniques are listed in Table 1.

Result and discussion

Descriptive statistics and correlation analysis

The quantitative descriptions and relationships involving the parameters are displayed in Table 2. It demonstrates that all of the matrix correlations are inferior to 0.626, indicating a tolerable level of multi-collinearity. The fact that business growth is unrelated to any other factors, however, is intriguing. Although the exact cause is uncertain, it is plausible that fast-growing companies receive more favorable and bad attention than their slower-growing rivals, with no discernible correlation to legality. Quickly companies may also place equal emphasis on Long-term green development and immediate financial gain, neutralizing any correlation between expansion and either of these factors. Growth is about the dynamic evolution of businesses, but other control variables are about current characteristics, hence there is no correlation between them in terms of interactions with other covariates. The fact that independent directors solely correlate with command structure is also noteworthy. This could be a result of the fact that only these two variables relate to corporate governance, while the others do.

The figures on legitimacy pressure are shown in Table 2. From 2008 to 2012, the sampled companies received 17,188 positive, 10,695 neutral, and 1,911 unfavorable judgments. For instance, the positive news that "over one hundred billion yuan's worth of green purchasing platform emerged in Suning" gave Suning Business Group a solid reputation, whereas the negative news that "Zhongjin Lingnan was caught in a smog scandal" put high pressure on Zhongjin Lingnan Nonfemet Industry's validity.

The typical technique bias

The size of the differences between what was seen and real relationships across constructs, known as common method bias, derives from popular methods variation caused by the same sources of information, measuring of surroundings, item context, or item-specific properties. In the item-level experimental design, if there is shared technique variability, a semi-factor would be released, and the unifying trait explains the majority of the variation. Harman's single factor test, in which scientists enter to conduct an exploratory factor analysis using all the variables to determine whether a single factor does appear, is one of the most popular methods for addressing the problem of typical technique bias. Moreover, our approach demonstrates that the prevalent technique bias is not a significant problem when one big general component dominates the covariance. The prevalence of methodological error was analyzed using Harman's one-factor test. because the authors manually gathered data on the number of green patents, ISO certification details, and media attention. All explanatory factors added up to 66.155%, and five components with an eigenvector larger than 1 were retrieved using non-rotating analysis. The typical technique bias in this research was not substantial, as evidenced by the eigenvalue of the first component being 2.414 and the total combined predictor variable of 20.118%.

Table 1: Variables utilized as controls in this study

Factors	Signifiers	Techniques of Measurement
Leverage	Lev	The ratio EBIT was used for measurement.
Authority	Own	Here, we use a dummy variable where 1 indicates state-owned businesses and 0 indicates private ones.
development	Gro	Current POR divided by historic POR is the metric for this indicator.
Category of Business Sector	Ind	The "Business Environmental Information Disclosure Handbook" recommended using a zero-one dummy variable, with 1 representing highly polluting industries and 0 representing those that did not.
Organizational Models	LS	The use of a dummy variable: One indicates a business where the CEO is not also the Board Chair, while zero indicates the opposite.
Governing body autonomy	Indep	The ratio of the number of independent directors to the total number of directors was employed as a metric.
The Size of a Company	size	To get a feel for how big an organization was, we took the logarithm of its total assets.

Table 2: Matrix of dependent and explanatory factors, as well as descriptive statistics.

	low	High	GPDI	GPCI	LP	Pro	Size	Own	Ind	
	Gro	Lev	LSGPDI	0.000	1.000					
GPCI	0.001	1.001	-0.055							
LP	-64.059	56.068	0.251***	0.111**						
Pro	-0.200	0.582	0.130**	0.100	0.053					
Size	9.362	13.245	0.001	-.203***	0.032	-.391***				
Own	0.001	1.001	0.022	-0.095	-0.015	-.169***	0.157**			
Ind	0.001	1.001	0.336***	0.042	-.093*	0.053	-.145***	0.124*		
Gro	-0.878	3.689	-0.047	-0.008	0.050	0.050	-0.018	-0.040	-0.015	



Lev	-16.063	28.811	-.194***	-0.045	-0.023	-.315***	0.627**	-0.025	-.257***	0.034
LS	0.001	1.001	-0.042	0.104**	0.037	-.176***	0.170**	0.063	0.047	0.001
	0.0119**									
Indep	0.715	3.364	0.002	-0.009	0.018	-0.022	-0.038	0.043	0.057	0.025
	0.065	-.205**								

Table 3: From 2008 to 2012, a sample of firms' environmental legitimacy ratings was compiled.

Decision	Years					Sum	Percentage (%)
	2008	2009	2010	2011	2012		
Positive	4012	4322	3519	2780	2560	17,189	0.5770
Neutral	1167	1764	2359	2562	2848	10,696	0.3591
Negative	455	305	409	380	367	1912	0.0642
Total	5632	6389	6285	5720	5773	29,795	2

Table 4: The outcomes of green product innovation and green process innovation generalization estimating equation analyses.

Equations of approximation in general				
Dependent variables	Green product innovation			
	Model 1	Model 2	Model 3	Model 4
Factors				
Size	-0.069	-0.005	0.130	0.150
Responsibility	-0.517	-0.482	-0.432	-0.438
Company	-0.796*	-0.792*	-0.725**	-0.695**
Development	0.002	0.012	0.066	0.070
Utilization	-0.121	-0.197	-0.455	0.473
Organizational framework	-0.086	0.044	0.223	0.229
Autonomy	-0.128**	-0.140*	-0.176*	-0.184*
2. Mediating variable and independent variables				
Legitimacy stress		0.251**	0.239**	0.191**
profit			0.514*	0.523*
3. Impact Reduction				
LP*Pro				1.412**
Equations of approximation in general				
Dependent variables	Green process innovation			
	Model 5	Model 6	Model 7	Model 8
Factors				



Size	0.040	0.055	0.084	0.164
Responsibility	-0.004	-0.242	0.292	0.349
Company	0.611*	0.568	-0.582	-0.604
Development	-0.009	0.009	0.066	0.101
Utilization	0.872*	0.719	-1.006*	-1.141**
Organizational framework	0.273	0.228	-0.381	-0.415
Autonomy	0.356	0.436	-0.566	-0.571
2. Mediating variable and independent variables				
Legitimacy stress		0.365***	0.285***	0.061
profit			0.023	0.057
3. Impact Reduction				
LP*Pro				0.059

Hypothesis testing

For instance, if responses are binary, the technique of Generalized Estimating Equations (GEE), which incorporates non-independent variables and derives maximum likelihood estimates observation, is frequently used to evaluate longitudinally and other linked received data. It was appropriate to use the GEE approach to evaluate the hypotheses since innovations in green products and innovation in green processes are categorical variables.

Legitimacy stress: An Important Factor

This section examined how legitimacy pressure affected green innovation. Models 1 and 5 are the associations between the regulating variables and the dependent variable, as indicated in Table 4. The independent variables are introduced in Models 2 and 6. "Model 2 reveals a substantial positive correlation between legitimacy stress and green product development ($B = 14\ 0.250$, $p < 0.05$), while Model 6 shows a significant positive correlation between legitimacy demand and innovation in green processes ($B = 14\ 0.364$, $p < 0.01$). "H1a and H1b were thus confirmed. This implied that a company's level of green innovation would increase in direct proportion to the strain on its legitimacy. For instance, in 2012, Baotou Steel Rare-earth Group was charged with "failure to finish the environmental effect assessment." Due to the intense demand for validity, the company's green batch number increased from 0 in 2011 to 3 in 2012.

The significance of companies' profits

The impact of business on the financial success of green innovation was examined in this section. "According to Table 4, Model 3 demonstrates a substantial positive correlation between profitability and green product development ($B = 14\ 0.513$, $p < 0.1$), while Model 7 suggests there is no clear evidence of a correlation between profitability and green process innovation ($B = 14\ 0.022$, $p > 0.1$). "H2a was therefore supported, whilst H2b was not. According to this, profitable businesses are more likely the act of investing in the development of organic goods. The segment also looked at how business success impacted how pressure for legality and innovativeness interacted.

"Model 3 showed that, even after accounting for company profitability, regulatory stress remained noticeably upbeat connected with the development of green products ($B = 14\ 0.238$, $p\ 0.05$). By including the dynamic strain on legitimacy and corporate profits, Model 4 was created based on Model 3. According to the findings, profits have a modifying influence on the association between legitimacy stress and the development of green products ($B = 14\ 1.411$, $p\ 0.05$).: Moreover, "Model 7 demonstrated that even with the introduction of corporate profitability, legitimacy pressure




remained strongly confidently connected with green process innovation ($\beta = 14.0284$, $p < 0.01$).” By adding the interaction item of legitimacy pressure and profitability, Model 8 was created based on Model 7. According to the findings, there is no moderating influence of profitability on the association between legitimacy pressure and green process innovation ($\beta = 14.0058$, $p > 0.1$). Because H6 was not supported, it can be concluded that profitability has a moderating influence on the connection between legitimacy pressure and the development of green products. H5 was therefore while H6 wasn't recognized, demonstrating this.

Conclusion

By taking into account the tempering impact of success, this study examined the effects of both inside profitability and external legality pressure on green innovation. Using a sampling of 388 observations from the top 100 Chinese listed businesses between 2008 and 2012, we discovered that legitimacy stress was highly connected with both innovative green products and advancement in green processes. Humans also discovered that there was a major beneficial effect on green product innovation but not on innovative green processes. Moreover, company profitability appeared to not affect the association between legitimacy pressure and green process innovation, but it did confidently moderate the relationship between legitimacy stress and green product development. The scientific value provided is that a novel paradigm incorporating both internal business profitability and external legitimacy demand is not only the sole driving element of technology practices but also their interplay. First, both green product development and green process innovation have a favorable correlation with legitimacy pressure. Instead, the outcome is consistent with those of. First, both green product innovation and innovative green processes have a favorable correlation with legitimacy pressure. This outcome is consistent with Dangelico's findings, which found that internal elements, such as green analyst estimates, rising profitability, enhanced company image, the environmental orientation of businesses or managers, and so on, drive innovation in green products rather than external legitimating pressure. The latter findings, which concur with those of the, demonstrated that businesses will expand green process innovation in response to pressure from the public. This may be because corporations need to find effective ways to deal with stakeholder pressure due to the importance of environmental legitimacy in the pollution era. Green patent applications and environmental management systems are among these and are viewed as important strategies for dealing with both short-term external pressures and long-term competitive advantages. In contrast, Zijin Mine, the biggest gold producer in China, was charged with serious river pollution in 2010 after it was claimed that it had leaked acidic wastewater that had been infused with copper into nearby water sources. The business was under pressure to implement an ecological organization system, and in 2012 they were eventually certified. Also, the company's green patent almost doubled, going from 6 in 2009 to 11 in 2010. “Second, to our surprise, profitability is substantially correlated with the development of green products ($\beta = 14.0513$, $p 0.1$), but not with the development of green processes ($\beta = 14.0022$, $p > 0.1$)”.

One of the explanations could be that innovation in green processes that calls for systematically enhancing the entire functioning and management process demands a greater investment than green product innovation, which does not. As opposed, the results of Green patents and green product innovation could immediately be incorporated into the creation of new goods introduced to the marketplace, and can Thus, it is simple to convert this knowledge into a technical advantage and economic advantage, while green process innovation takes more time to execute and has less immediate and noticeable results. So, Chinese companies are more likely to spend their profits on innovations in processes that are environmentally friendly. For instance, the profit of China State Building Engineering Corporation increased by 28.29% in 2012. Its green patent increased as a result from 28 in 2011 to 32 in 2012, but even without putting in place ecological management. Finally, increasing efficiency is the association between legitimacy stress and green product development in a considerably favorable way, but there is no moderating effect between the relationship between legitimacy pressure and green process innovation. The first finding indicates that, in the face of legitimacy pressure, businesses with increased profits keep enough liquid resources to assist the development of green products that will encourage sustainable development by creating



environmentally favorable patents and products. The latter findings suggest that enterprises, regardless of the degree of corporate profitability, will adopt a certain amount of green innovation process when faced with legitimacy pressure. The aforementioned findings have various real-world applications. First off, corporations should comply with stakeholder environmental criteria to increase external legitimacy since the pressure to be seen as legitimate directly affects corporate green innovation. Second, businesses should increase their profitability to raise funds for clean energy research and development, investments in cleaner manufacturing processes, and ecological systems that support green innovation and sustainable development. Lastly, given the lower levels of green product development currently present, the degree of this innovation should be increased. Second, businesses should increase their profitability to raise funds for clean energy research and development, investments in cleaner manufacturing processes, and environmental protection techniques that support green innovation and sustainability. Lastly, given the lowest level of green product development currently present (62% of the samples lacked any green patents); the degree of this innovation should be increased. There are certain restrictions, though. First, despite our efforts to investigate the factors that influence green initiatives from both internal and external viewpoints, we only examined corporate profit and legitimacy stress, leaving out several other factors that may have an impact on the relations, such as industrialization, companies' intellectual assets, and others. The results may be helpful for big enterprises in emerging economies, but they might not be related to small-scale businesses or businesses in industrialized nations because we primary attention to the top 100 listed Chinese companies. Future research should compare the results of this study with those from other companies, at various scales, in various nations.

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