DRIVERS AND OUTCOMES OF GREEN ACQUISITIONS

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Lay Abstract

Increasingly, corporations are responding to green trends by engaging in various green strategies such as green acquisition and green innovation. With regard to green acquisition strategy, little is known about its financial impact and determinants. Secondly, drivers of green innovation and green acquisition strategies have not been sufficiently examined from secondary/archival data sources. I explore these issues in two studies. The first study examines how the stock market responds to green acquisitions. It finds that when companies announce green acquisitions, the stock market reacts positively. Additionally, companies that have strong marketing capability but limited innovation capability tend to have better stock market performance. However, the effect of those capabilities on the relationship between stock market return and green acquisition is affected by the environmental sensitivity of the industry.

The second study examines the major drivers of green strategies (i.e., green acquisition and green innovation). It shows how environmental regulation stringency and media attention affect those two green strategies differently with the presence of the top management team's sustainability commitment.

Abstract

Reporting on the growing number of green initiatives across various industries in media is at odds with only sporadic academic research on green acquisition strategy in the marketing discipline. This presents a unique opportunity for me to identify and empirically examine different factors that can impact a firm's value when adopting the green acquisition strategy and explore drivers of adopting green strategies, namely, green acquisition and green innovation. In this thesis, I explore these questions through two studies.

In the first study, I analyze 182 green acquisition announcements using the event study method to see how the stock market reacts. The study reveals that the stock market responds positively to announcements of green acquisitions. Additionally, acquirers with stronger marketing capability but limited innovation capability experience better stock performance. However, the stock market return−green acquisition relationship, influenced by the two capabilities mentioned above, is moderated by industry environmental sensitivity. The results enhance our understanding of how marketing and innovation capabilities impact investor behavior in the context of green acquisitions. These findings broaden our existing knowledge of the marketing−finance interface, green marketing, and corporate sustainability.

The second study examines external and internal drivers of corporate green strategies (i.e., green innovation and green acquisition). Using a sample of 1565 firm-year observations from the food and beverage industries, I show that firms under greater media

attention are more likely to adopt both green acquisition and green innovation strategies. However, with the presence of the top management team's commitment toward sustainability, media attention's positive effects on firms' likelihood of adopting green acquisition will be weakened. Moreover, firms with top management teams committed to sustainability are more likely to engage in green innovations under higher environmental regulation stringency. This study fills the gap in the green marketing literature by providing insights into why and how firms react to social and environmental challenges proactively. Notably, my findings show when and why firms adopt green acquisition or green innovation strategies.

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Chapter 1

Introduction

Corporate sustainability issues have been progressively emphasized in academia over the past twenty years. Particularly, since the pandemic of Covid-19, corporate sustainability issues have become more prominent than ever (Lee and Kim 2021). The similarities shared by pandemics and environmental crises in terms of the materialization of risks presented by rare disasters (Ramelli and Wagner 2020) force firms and investors to revise the possibility and consequences of environmental risk and, therefore, draw attention to the importance of firms' environmental responsibility (Garel and Petit-Romec 2021). Increasing evidence shows that environmentally responsible firms are less likely to suffer from systematic risks like the pandemic (Adams and Abhayawansa 2022; Garel and Petit-Romec 2021). Surprisingly, to my best knowledge, there is not a single study that integrates marketing and finance to explore how green acquisitions affect firm value and what drivers contribute to firms' green strategy decisions (i.e., green acquisition vs. green innovation). There is a significant disparity between the increasing number of green initiatives in various industries and the infrequent research on green acquisition strategy in marketing. This gap provides me opportunities to identify and empirically examine different factors that may have significant influences on firm value upon the adoption of green strategies, as well as determinants of such strategies. This thesis aims to address the following two sets of research questions:

1. How do green acquisitions affect acquirers' shareholder wealth? Additionally, what firm capabilities and industry-level characteristics moderate the impact of green acquisitions on shareholder value?

2. What external factors drive firms to adopt green acquisition and green innovation? How does the sustainability commitment of the top management team affect the likelihood of a firm adopting a green acquisition or green innovation strategy?

I explore these questions in two studies. In the first study, I explore the short-term financial performance of corporate sustainability strategies by examing the acquiring firms' short-term stock market reactions to the green acquisition announcements. I propose two firm capabilities and one environmental-related industry factor that may affect the magnitude of the stock market reaction. Drawing from signaling theory, resource-based view, and corporate sustainability literature, I argue that marketing and innovation capabilities act differently in the green acquisition – firm stock value relationship. I combined secondary data from multiple sources and built a sample of 182 green acquisition announcements from several consumer-related industries between 2000 and 2018. I use the event study method to analyze stock market responses to green acquisitions and employ regression analysis to examine the contingent effects. I find that the stock market reacts positively to the announcements of green acquisitions. The green acquisition-stock market return relationship varies under different moderators. Specifically, I find that firm marketing capability positively affects investors' favorable expectations in response to green acquisitions. In contrast, firm innovation capability

negatively affects investors' favorable expectations in response to green acquisitions. In addition, an industry-level factor – industry sensitivity to environmental regulations further discounts firm stock returns, which weakens marketing capability's positive effects and strengthens innovation capability's adverse effects on stock market return.

The second study discerns why firms adopt specific green strategies and how different external and internal drivers contribute to the decision on green strategies. I utilize institutional theory and stakeholder theory to examine the main drivers of two holistic and costly green strategies – green acquisition and green innovation. I propose and compare the effects of two critical external drivers on the propensity of adopting the two green strategies and argue the role of the top management team's committed to sustainability in moderating the driving effects. I compile and analyze a unique dataset with longitudinal data combined from multiple secondary sources. Green acquisition data is the same as in study 1. Green innovation (i.e., green patent data) is collected using web scraping techniques. My findings show that external factors of media attention drive firms to adopt green acquisition and green innovation strategies. Surprisingly, environmental regulation stringency does not contribute to the likelihood of a firm engaging in green innovation unless the top management team is committed to sustainability. Another interesting finding is that the driving effect of media attention on adopting green acquisition is weakened when the top management team is committed to sustainability. This finding suggests that a firm's top management team's commitment to sustainability plays a critical role in influencing the adoption of green acquisition strategy.

Contributions of this thesis mainly lie in several aspects. Firstly, to the best of my knowledge, this is the first study to explore the green acquisition – stock market value relationship. I provide strong evidence of the positive effect of investing in sustainability on shareholder value. The results of extant research on corporate sustainability strategies' impact on firm value are highly mixed. This thesis adds to this debate by demonstrating that as a holistic and investment-intensive strategy, green acquisition is an exceptional corporate sustainability strategy and can create high market returns. Secondly, findings from my study also contribute to a long-lasting discussion on whether firms from environmentally sensitive industries can benefit from green efforts. Thirdly, this thesis demonstrates how different motivations lead firms to adopt green acquisition or green innovation strategies. Notably, it explores how media attention and environmental regulation stringency affect firms' strategic decisions on green acquisition and green innovation adoption, as well as the moderating role of senior management committed to sustainability. Finally, this dissertation provides managerial implications for multiple stakeholders, such as shareholders, marketers, media press, and regulators.

The rest of the dissertation is organized as follows. In the next chapter, I provide a comprehensive literature review on the background of sustainability research in the marketing area, theories related to sustainability marketing issues, and research on particular corporate sustainability strategies. Then in study 1, I first briefly introduce the research. Then I develop the theoretical framework and hypotheses regarding how green acquisition announcements affect firm stock value and how firm marketing capability and innovation capability affect the green acquisition-stock value relationship. Next, I

describe and explain the methodology, analyze the results, and test the robustness of the results. Then I conclude study 1 with a discussion on theoretical and managerial implications, as well as limitations and future research directions. In study 2, I start with a short introduction. Then I provide the theoretical background and generate hypotheses with respect to the drivers of green acquisition and green innovation. I then provide the method, results, and discussion sections.

Chapter 2

Literature Review

2.1 Sustainability research in marketing

Although the press has extensively covered the trend of firms engaging in green acquisitions, there has been a dearth of academic research on this phenomenon, particularly within the marketing discipline. The scope of existing studies on green M&A in the environmental management field is limited, as they primarily focus on Chinese companies and examine the linkages between the macro-environmental policies of the government and green M&A (Huang and Yuan 2022; Sun and Liu 2022; Zhao and Jia 2022). To gain a comprehensive understanding of green acquisition strategy, it is imperative to contextualize it within the broader framework of sustainability research in the marketing discipline[1].

Research on sustainability issues has experienced exponential growth in the past two to three decades. Marketing scholars have been exploring sustainability issues and publishing extensively in marketing literature in the past decade. Among the diverse research on sustainability in marketing, three main streams of topics receive the most attention.

[1] In the literature, the terms "sustainable marketing" and "green marketing" are often used interchangeably, and in this thesis, they are also used to refer to the same concept.

The first stream pertains to specific green marketing mix programs that focus on the tactical level of marketing mix elements. Leonidou, Katsikeas, and Morgan (2013) conceptualize and classify green marketing programs with the four marketing mix elements – product, price, distribution channel, and promotion. They claim the four green marketing mix programs – green product, green pricing, green places, and green promotion– are specific actions that firms utilize to execute their broader green marketing strategies and are critical to greener their marketing efforts. The body of research on specific green marketing programs is growing rapidly. At a tactical level, green product programs refer to firms' actions on products that decrease negative environmental impact, including adopting green labels and certifications, using recycled material to make or package products, etc. Some of the efforts, such as applying for green certifications, are relatively minor, while others involve significant improvements in the new product development process. Marketers frequently use green labels or eco-labels to signal the environmentally-friendly aspect of their products. Through a conjoint analysis, Sammer and Wüstenhagen (2006) find that consumers are willing to pay a premium for energy-labeled home appliance products and perceive the eco-label as relatively more important than other product characteristics when making purchasing decisions. Testa et al. (2015) find that eco-labels provide consumers with awareness and knowledge of the environmental impact of products, which encourages eco-friendly consumption. Gosselt, van Rompay, and Haske (2019) differentiate between third-party certified eco-labels and firm self-claimed labels, demonstrating internal eco-labeling has no significant effect on consumer responses while external certified eco-labels significantly and positively affect

consumer attitude towards the CSR messages, the brand, and the company. With respect to green packaging, the food industry faces great environmental challenges, including excessive packaging and packaging waste disposal. To tackle environmental problems, food companies initiated various environmentally sustainable programs. For example, McDonald's set a baseline of 35% recyclable packaging materials used in coffee filters, napkins, and food wraps (Dogwood Alliance 2012). Torelli, Balluchi, and Lazzini (2020) find that stakeholders are more sensitive to environmental labels, advertising, and packaging communications from higher environmental impact industries because of greenwashing concerns.

Green promotion programs refer to firms' efforts to communicate their environmental commitment and achievements (Leonidou, Katsikeas, and Morgan 2013) through various activities such as green advertising and social media campaigns. Extant research finds mixed results regarding the effects of green promotion programs. Schuhwerk and Lefkoff-Hagius (1995) find that green claims have a more significant influence on purchasing attitudes and intention when adverting to less environmentally-conscious groups compared to environmentally-conscious ones. Phau and Ong (2007) document more favorable responses from fashion shoppers to product-related promotional messages than environmental-related messages. Leonidou, Katsikeas, and Morgan (2013) find a non-significant effect of green promotion programs on product market performance. Berrone, Fosfuri, and Gelabert (2017) also find that "cosmetic environmental tactics" such as employing environmental trademarks may not payoff with the presence of environmental NGOs. Contrarily, Olsen, Slotegraaf, and Chandukala (2014) find that

green message quality affects the degree to which new green products change brand attitude. Suppose an environmental promotion is perceived as superficial or hollow by stakeholders. In that case, it may be determined as greenwash (Polonsky and Rosenberger 2001) and, thus, backfire and harm the product, even the firm reputation. Other reasons behind the conflicts regarding the effect of green promotion efforts on performance may lie in the costs and visibility of different green promotion tactics, as well as industry heterogeneity.

Green distribution programs focus on greening the firms' supply chain systems. Buyers adopt green supply chain practices mainly aiming to lower environmental impact and enhance the environmental performance of purchased input from suppliers (Klassen and Vachon 2006). Such practices include requiring suppliers to meet specific environmental standards (e.g., imposing SA8000 certification), encouraging customers to be involved in product recycling or return for reuse, and developing a low carbon footprint supply chain with channel members. Walmart requires its supplier to follow a sustainability mandate, which turns out to benefit one-third of its suppliers (Gielens et al. 2018). Rao (2002) finds that greening suppliers enhance firms' environmental performance and lead to greater economic performance.

Similarly, Schliephake, Stevens, and Clay (2009) demonstrate that proactive engagement in environmental practice with suppliers can result in immediate and strong environmental efficiencies. Hoejmose, Brammer, and Millington (2012) find that consumer-centered firms are more likely to engage in green supply chain management than business-to-business firms since they are under higher pressure from institutional

stakeholders. Chen and Ho (2019) argue that suppliers' environmental practices do not necessarily increase sales. Instead, the impact on sales is influenced by the degree of environmental practices adopted by their clients. In a systematic review, Gimenez and Tachizawa (2012) identify that both supplier assessment and collaboration governance mechanisms play essential roles in improving environmental performance. They also note that the two approaches complement each other.

Green pricing programs refer to pricing strategies that incorporate not only economic costs but also environmental costs of products and charge differently from conventional products. One common practice is to charge consumers a premium for environmentally-friendly products. Kim (2017) finds that although consumers generally prefer lower prices, they are indifferent to prices when a firm practices green initiatives. Another action performed by firms is to charge a higher price for non-green products. For example, Canadian retailer Loblaws charges consumers for plastic bags and encourages people to bring their own shopping bags. Some other firms use rebate tactics to promote post-consumption recycling. For instance, Nespresso Singapore puts customers in a lucky draw every month for returning used coffee capsules[2]. However, environmentally friendly products do not always cost consumers more. For example, LED bulbs have a significantly longer lifetime than traditional ones. Thus, even if priced higher, LED bulbs are more cost-effective from a time-span perspective. A better tactic for this type of product is to heavily advertise the cost savings feature rather than the environmental

[2] More information about Nespresso Singapore recycle program can be found at https://www.nespresso.com/sg/en/recycling-one-pod-at-a-time

impact aspect (Polonsky and Rosenberger 2001). Some researchers compare the roles of different green marketing tactics in affecting green performance. Sarkar (2012) examines how green branding and eco-labeling affect green consumption and finds that eco-labeling can be complimented by green supply chain management programs, encouraging green consumerism. In their empirical study of all four green marketing mix programs, Leonidou, Katsikeas, and Morgan (2013) find that green product and distribution programs have higher efficiency in highlighting the value of firms' green offerings than the green pricing and promotion programs, which may be explained by the level of visibility and ease of imitation.

The second stream concerns the drivers of corporate engaging in sustainable marketing initiatives (e.g., Berrone et al. 2013; Menguc, Auh, and Ozanne 2010). Research approaches the motivations and antecedents of sustainable marketing initiatives differently. One group of studies looks into this question by treating different sustainable strategies as a whole and examining what factors motivate firms to involve in sustainability practices in general. For example, Banerjee, Iyer, and Kashyap (2003) find four significant antecedents to corporate environmental orientation and strategies – concern for the public, regulation forces, competitive advantage, and top management team's commitment. Leonidou et al. (2017) find that internal factors such as organizational resources and capabilities drive small firms to pursue green business strategies. Similarly, Schaltegger and Burritt (2018) identify four ethical (i.e., reactionary, reputational, responsible, and collaborative) motivations that urge firms to engage in

sustainability activities. This body of research provides knowledge of why firms go green in general but fails to differentiate between heterogeneous green strategies.

Another group of studies complements the first scholarship category by examining drivers of specific sustainable marketing strategies. Ample research explores drivers of green product and process innovations since the proposal of the Porter Hypothesis (Porter 1991), which examines how environmental regulations enhance firm competitiveness and promote green innovations. For example, Brunnermeier and Cohen (2003) find that pollution abatement expenditure impels firms to engage in environmental innovation in U.S. manufacturing industries. Chen et al. (2018) confirm Porter Hypothesis that both coercive pressure and normative pressure significantly and positively affect firm green innovation by using a sample of China's top 100 companies. Galbreath (2019) finds that export intensity positively affects green innovations within Australian firms. A systematic review of green innovation drivers reveals that the key determinants of green innovation for manufacturing SMEs include policy support, resource availability, strategic relevance, network cooperation, and partnerships, among others (Pacheco et al. 2017).

Compared to green innovation motivations, research on drivers of other sustainable strategies are relatively sporadic, including corporate social responsibility reporting adoption, green cooperation, greening product development, socially responsible acquisitions, and others. For example, Nikolaeva and Bicho (2011) find that competition pressure, media pressure, as well as firms' CSR media visibility and publicity are the crucial stimulus of voluntary CSR reporting adoption. Katsikeas, Leonidou, and Zeriti (2016) find that the top management team's commitment and the firms' internal

supportive policy can lead to eco-friendly product development. Wickert, Vaccaro, and Cornelissen (2017) propose that the difference in organizational identity orientations between acquirers and targets fosters firms to acquire socially oriented targets. Guo et al. (2021) suggest that internal green process innovation and learning from customers can stimulate green cooperation between manufactures and their customers. These studies show that there are similar determinants of different sustainable strategies and idiosyncratic determinants that are unique to particular sustainable strategies.

The third issue pertains to the outcomes of sustainable strategies, as well as different evaluation matrixes of sustainable strategy performances. Research that examines sustainable initiatives and performance reports mixed results. Katsikeas, Leonidou, and Zeriti (2016) find that an eco-friendly product development strategy positively affects firms' product development effectiveness. Pujari, Wright, and Peattie (2003) examine greening of the product development process and green product design and find environmental new product development positively affect performance. Fisher-Vanden and Thorburn (2011) find a negative effect of firms' voluntary environmental initiatives on shareholder value. Sadovnikova and Pujari (2017) find stock markets react significantly and negatively to announcements of green technology partnerships. On the other hand, some researchers argue that sustainable corporate strategies may not result in immediate revenue generation, but they can lead to increased customer satisfaction (Luo and Donthu 2006), lower risks for the firm (Luo and Bhattacharya 2009), and improved firm reputation (Mcwilliams and Siegel 2001). Since extant research primarily tests how a single sustainable strategy affects firm performance (Peloza and Shang 2011), results

from these tests of different sustainable strategy-performance relationships cannot be compared directly. Through a mega-analysis based on 42 studies of corporate social responsibility and corporate financial performance relationship, Wang, Dou, and Jia (2016) add to this long-lasting debate and support the argument that overall CSR activities improve firm performance.

2.2 The concept of sustainable marketing

In the 1980s, the awareness of consumerism's environmental impact continuously grew among government departments and the general public (Leonidou and Leonidou 2011). Correspondingly, academia drew attention to the environmental aspect of marketing, and several influential concepts were introduced in the 1990s. Green marketing is defined as a comprehensive management approach that aims to identify, predict, and fulfill the needs of both customers and society in a manner that is profitable and sustainable (Peattie 2001, p. 141). Similarly, Fuller (1999) refers to sustainable marketing as the process of strategically planning, executing, and managing the development, promotion, distribution, and pricing of products in a way that simultaneously fulfills three critical criteria: (1) meets customer needs, (2) achieves organizational objectives, and (3) aligns with the sustainability of eco-systems. Both definitions describe green marketing as a holistic and strategic process and consider beyond customer and corporate benefits. These early definitions set an anchor for the evolution of green marketing concepts. Many related but moderately different concepts emerge, which enrich the sustainability concept in marketing. Enviropreneurial marketing concept (Menon and Menon 1997) incorporates environmental concerns into marketing strategy and practice development. Belz and

Peattie (2009) propose an updated explanation of sustainability marketing, which involves the strategic planning, organizing, implementation, and control of marketing inputs to meet consumers' needs and wants while taking into account social and environmental factors, as well as achieving corporate goals. In the past two decades, academic research on sustainability has soared as a mixed result of increasing public concerns on environmental issues such as climate change and growing competition and globalization, and improved quality of life (Leonidou and Leonidou 2011). Mitchell, Wooliscroft, and Higham (2010) incorporate sustainability into the market orientation concept and propose a sustainable market orientation (SMO) concept, which requires firms to set economic, social, and ecological sustainability goals when developing the marketing strategy. Echoing the SMO concept, Crittenden et al. (2011) propose the market-oriented sustainability concept, which illustrates that firms can achieve competitive advantages by integrating sustainability into market orientation. Particularly, they focus on the environmental aspect of sustainability. In his editorial article for the Journal of the Academy of Marketing Science special issue on sustainability, Hult (2011) proposes the market-focused sustainability concept, which argues that corporate sustainability efforts should build on good stakeholder management as organizations' long-term development and competitiveness depend on not only primary stakeholders such as customers but also a broader set of stakeholders. The development of the explanations of sustainability in marketing demonstrates a change from merely addressing environmental requirements and being responsive to customer needs into a responsible strategic choice that promotes sustainable products and services (Sheth and Parvatiyar

2020), creates value (Dean and Pacheco 2014), and builds sustainable environment and society.

Due to the accelerating amount of research on sustainability marketing, there is neither consensus on the definition of sustainable marketing nor consistent use of the term. Based on a systematic review of sustainability marketing research, Lunde (2018) finds various definitions of sustainability are used in papers from the top 25 marketing journals, while more than half of the research defines sustainability in a narrow, environmental-focused way. Through reviewing more than 200 inconsistent definitions, Lunde (2018, p. 94) proposes a holistic definition: "Sustainable marketing is the strategic creation, communication, delivery, and exchange of offerings that produce value through consumption behaviors, business practices, and the marketplace while lowering harm to the environment and ethically and equitably increasing the quality of life (QOL) and well-being of consumers and global stakeholders, presently and for future generations." According to this comprehensive definition of sustainability in the marketing discipline, green marketing strategies such as green acquisition and green innovation are practical, sustainable marketing strategies that create, communicate, and deliver green offerings that generate profits while concerning the environment and stakeholder well-being.

Therefore, under the more holistic definition of sustainable marketing, green marketing falls into the range of sustainable marketing but frames the concept with a heavy focus on environmental issues. While under a narrow and more environmental-focused definition of sustainability, sustainable marketing, green marketing, and environmental marketing essentially share the same meaning and can be used interchangeably. Since this research

mainly focused on the environmental aspects of sustainability, I adopted a narrow version of the sustainability definition in marketing and used terms such as green and sustainable interchangeably.

2.3 Theoretical foundations of research in sustainability marketing

Empirical studies draw on various organizational and marketing theories when exploring sustainable marketing issues. For example, drawing on signaling theory, Berrone, Fosfuri, and Gelabert (2017) demonstrate that a firm can attain environmental legitimacy by engaging in environmental practices. Based on the natural resource-based view, Norheim-Hansen (2018) finds that green alliance satisfaction perceived by the focal firm is positively associated with the partner firm's proactivity. Nikolaeva and Bicho (2011) address firms' voluntary disclosure in the form of adopting the Global Reporting Initiative reporting standard from an institutional theory perspective. Nidumolu, Prahalad, and Rangaswami (2009) draw on transaction cost economics, stressing that sustainable practices can reduce costs and benefit firms.

In addition to the enormous body of empirical studies, extant research has made a substantial contribution with respect to summarizing the theory development and mapping the theoretical framework of sustainable marketing strategies. Hunt (2011) explores the intersection between resource-advantage theory and sustainable marketing, arguing that sustainable marketing is closely related to "economic freedom and resource-advantage competition." Chabowski, Mena, and Gonzalez-Padron (2011) investigate over one thousand sustainability-related articles and contend that stakeholder theory is

massively referred to issues on corporate financial performance and CSR performance. Zerbini (2017) offers a systematic framework that utilizes signaling theory to evaluate diverse CSR practices. Connelly, Ketchen, and Slater (2011) offer a theoretical toolbox for sustainability study in the marketing area. They discuss how different theories and the integration of those theories can help scholars to build a deeper understanding of the sustainable marketing activities that firms initiate while trying to generate profits. They summarize nine mainstream theories that are particularly important for sustainability research: agency theory, institutional theory, resource-based view, transaction cost economics, resource dependence theory, signaling theory, upper echelons theory, and social network theory. Lunde (2018) reviews 228 articles between 1997 and 2016 and summarizes thirteen salient theories adopted in sustainability studies in marketing literature, including stakeholder theory, regulatory focus theory, institutional theories, resource-based view, and socio-psychological theories, among others.

In study 1, I utilize resource-based view and signaling theory as two fundamental theory pillars to obtain insights on how and to what extent green acquisitions affect firm market value. In study 2, based on institutional theory and stakeholder theory, I examine and explain the main drivers of green acquisition and green innovation. Therefore, I will focus on the four theories mentioned above and demonstrate how they help understand firms' sustainable marketing strategies.

2.3.1 Resource-based view

Wernerfelt (1984) first examines firms from the resource perspective, which suggests that a firm is a collection of heterogeneous resources that enable the firm to hold a position

that is difficult for others to catch up with. He also argues that firm strategies that address resources and capabilities are critical to profitability. Barney (1991) delineates the overall firm resource-based framework and core resources related to firm competitive advantages. RBV has two assumptions. One is that firms possess heterogeneous resources, which suggests that some firms are more capable of completing specific tasks (Peteraf and Barney 2003). Another assumption is that the resources firms have can be immobile and stable over time, implying the benefits generated from heterogeneous resources be stable in the long term. Firm resource differences in the degree of valuable, rare, and inimitable resources contribute to firms' sustained competitive advantage (Barney 1991). Valuable resources have the ability to make firms implement strategies that improve firm efficiency and effectiveness (Barney 1991). However, valuable resources possessed by many firms cannot be a competitive advantage as each firm can apply similar strategies to exploit resources in the same manner. In other words, a valuable resource possessed by a firm must be rare enough to enable the firm to obtain a competitive advantage. Moreover, sustainable competitive advantage is more likely to be achieved when the valuable and rare resource cannot be easily obtained and imitated by competitors and can persist over time (Kozlenkova, Samaha, and Palmatier 2014).

A firm achieves a sustained competitive advantage when it generates greater economic value than its industry's marginal firm and when rival firms are incapable of replicating the advantages offered by its strategy (Barney and Clark 2007). This view can also be applied to cross-organizational contexts. Dyer and Singh (1998) suggest that resources may not be limited within firm boundaries. Thus firms can gain a competitive advantage

by combining resources over those unable to do so. By partnering or acquiring other entities, firms can access valuable, rare, and unique resources they do not possess.

Resource-based view has been applied excessively in marketing and strategy literature. Drawing on the RBV, Das and Teng (2000) argue that firms are forming alliances to locate the optimal resource configuration in which their resource value is maximized relative to other possible combinations. Building on the resource-based view, Narasimhan, Rajiv, and Dutta (2006) suggests firms' ability differ in acquiring and employing external technological knowledge. A great body of marketing research explores marketing resources through the lens of RBV. Marketing-related resources, such as brand and relational assets, customer equity, and marketing communications, are substantially intangible. The intangible nature of marketing resources makes them difficult to be followed and imitated by rivals (Kozlenkova, Samaha, and Palmatier 2014). Marketing researchers contend that marketing capability is the critical market-based resource that transfers firms' marketing inputs into revenues (Dutta, Narasimhan, and Rajiv 1999; Xiong and Bharadwaj 2013).

Substantial research addresses corporate acquisition strategy from the RBV perspective. For example, Capron and Hulland (1999) explain how firms redeploy marketing resources after horizontal acquisitions with an RBV framework. Grounded on RBV, Uhlenbruck, Hitt, and Semadeni (2006) examine how acquisitions of internet firms affect the transfer and redeployment of scarce resources.

An extension of RBV is frequently employed in sustainability research. Hart (1995) proposes the natural-resource-based view (NRBV), which builds on RBV and encompasses the firm's interaction with the natural environment into the theoretical framework. Hart (1995) argues that environmental conditions could limit firms' capability to achieve sustainable advantage. NRBV proposes three crucial capabilities that firms should develop so as to "facilitate environmentally sustainable economic activity": pollution prevention, product stewardship, and sustainable development (Hart and Dowell 2011). The natural-resource-based perspective is increasingly employed in empirical studies as the growing attention to environmental issues such as climate change and water pollution. Drawing on NRBV, Norheim-Hansen (2018) finds that the degree of the focal firm's environmental reactiveness positively affects its alliance satisfaction. Rahman, Rodríguez-Serrano, and Faroque (2021) use NRBV as the theoretical pillar, noting that industrial firms' engagement in corporate environmentalism enhances their brand value.

Echoing the perspective of NRBV, Connelly, Ketchen, and Slater (2011) provide insight into how RBV works in sustainability studies. They argue that sustainability efforts can provide firm sustainability-focused capabilities to generate competitive advantage since sustainability initiatives that lie at the crossroads of social/environmental concerns and market opportunities may have the highest likelihood of succeeding. Brulhart, Gherra, and Quelin (2019) explore the relationships between stakeholder orientation, environmental proactivity, and profit from the perspective of RBV. In a systematic review

of green innovation studies, Oduro, Maccario, and De (2021) find that RBV is the second most popular theory to explore green innovation drivers and performance.

2.3.2 Signaling theory

Signaling theory originates from the economics discipline. The basic premise of signaling theory is information asymmetry. Spence (1973) first proposed the signaling concept in the job market context. He describes how job searchers try to decrease information asymmetry by using their education degree to signal their fitness for the job to potential employers. Stiglitz (2000) underlines two essential sets of information asymmetry: information about quality and intention. To reduce information asymmetry between the focal firm (signal sender) and outsiders (signal receivers), the focal firm needs to send out signals about their quality and/or intention so that outsiders can have more accurate knowledge about the focal firm (Connelly et al. 2011). Valid signals must be "observable and costly to imitate" to differentiate themselves from entities that seek to signal false information without substantial cost (Connelly, Ketchen, and Slater 2011). The job market example illustrates an effective signal sent by job applicants about their qualifications, as higher education credentials are hard to obtain and expensive.

A pervasive adoption of signaling theory in marketing research is on marketing products and services. For example, consumers' decision to buy the selling firm's product or service largely depends on the perceived quality of the product or service. Thus, the selling firm has the intention to send out creditable signals of quality through, for example, a brand ally (Rao, Qu, and Ruekert 1999). Similarly, scholars explore different signals that selling firms employ to communicate the unobservable quality of their

product offerings. For example, Basuroy, Desai, and Talukdar (2006) find that the two signals – advertising and sequels – improve box office revenues. Furthermore, ample research examines how firms use different cues, including collaboration with channel members, network structure, and top management team characteristics, to signal their firm value, brand image, and innovativeness, among others (Afuah 2013; Chu and Chu 1994; You et al. 2020).

In the meantime, research that utilizes signaling theory has increasingly grown in the sustainable marketing area. Stakeholders such as consumers, suppliers, and investors are usually uncertain about to what extent a firm commits to sustainability (Connelly, Ketchen, and Slater 2011). Therefore, firms adopt various green practices as signals to communicate their sustainable efforts to different stakeholders. Xu, Zeng, and Chen (2018) examine Chinese firms' energy conservation and emission reduction efforts, concluding that such efforts can be used as desirable signals when expanding to the international market. Epure (2022) demonstrates that firms' socially responsible practices can act as insurance signals and aid firms in hardship. Contradictorily, Heras-Saizarbitoria et al. (2020) find that environmental certificates such as Eco-Management and Audit Scheme do not help signal firms' environmental performance in the hospitality industry. Zerbini (2017) provides insight into the divergence in the outcomes of firms' communication of sustainability efforts through signaling mechanisms. In his systematic review paper, Zerbini (2017) identifies four dimensions of CSR signals based on the signal sender types and properties: direct and indirect signals and dissipative and penalty

signals. A direct signal implies that the sender directly makes a claim. An indirect signal is often credentials endorsed by a third party (e.g., ISO 14000 certificates).

In contrast, a dissipative signal suggests "high upfront costs regardless of the truth of a claim," and a penalty signal may lead to a toll if proven to be dishonest (Zerbini 2017). Therefore, different types of signals may lead to conflicting results under varying circumstances. He also summarizes that the most commonly discussed signals: dissipative and direct signals include voluntary corporate disclosure, press reports on firm sustainability, and training programs; dissipative and indirect signals comprise environmental certifications and ratings; penalty and direct signals include firm ethic or sustainability committees and code of ethics; penalty and indirect signals include memberships and reputations.

2.3.3 Institutional theory

Institutional theory originates from sociology and politics area. Sociological scholars explain how institutional rules create an environment where organizations operate accordingly (Meyer and Rowan 1977). Building on the contemporary theories of institutionalism, March and Olsen (1984) propose a new institutional perspective, which stresses organizations' autonomy in abiding by institutional norms. Institutional theory suggests that firms' decisions depend not merely on rational economic calculations but are also influenced by social norms, values, and rules. Under social pressures, firms tend to conform to critical institutional norms in order to gain social acceptance and legitimacy (Oliver 1997). This collective proneness towards complying with the institutional environment results in firms' homogeneous behaviors. DiMaggio and Powell (1983)

suggest three main mechanisms contributing to the compliance process: coercive, mimetic, and normative isomorphism. Coercive isomorphism is induced by political and regulatory pressure as a way to search for legitimacy; mimetic isomorphism is about the imitation of other firms as a response to cognitive uncertainty; normative isomorphism stems from social pressures exerted by social and professional sectors, such as industry associations and NGOs. Suchman (1995, p. 574) summarizes organizational literature on legitimacy and defines it as a widely accepted belief or assumption that "the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions."

Jennings and Zandbergen (1995) broaden institutional theory by incorporating sustainability concerns into the framework and argue that institutional theory can be an efficient tool in explaining organizations' tendency towards sustainability. They suggest that firms seek legitimacy and build ecologically sustainable organizations by engaging in sustainable activities (Jennings and Zandbergen 1995). Using institutional theory as the theoretical pillar, Bansal and Clelland (2004, p. 94) follow Suchman's (1995) definition of legitimacy and define environmental legitimacy as "the generalized perception or assumption that a firm's corporate environmental performance is desirable, proper, or appropriate." Environmental legitimacy can be achieved when firms follow and commit to the natural environmental norms that stakeholders appreciate (Bansal and Clelland 2004).

Institutional theory has been widely used to explain firms' sustainable strategies and the role of institutional factors in promoting sustainability. Campbell (2007) offers multiple

theoretical propositions regarding the motivations behind firms' socially responsible behaviors. He suggests that several institutional conditions mediate the links between corporate actions and financial results, which include public and private regulations, the existence of independent organizations that oversee corporate conduct, established norms regarding suitable corporate behavior, collaborative behavior among corporations, and structured dialogues between corporations and their stakeholders (Campbell 2007). Drawing on an institutional perspective, Nikolaeva and Bicho (2011) find that normative pressures from, for example, media play a critical role in encouraging firms' volunteer adoption of CSR reporting. Building on institutional theory, Berrone et al. (2013) argue that stricter environmental regulations and normative pressures related to environmental issues positively affect firms' likelihood of being involved in environmental innovation. Testa, Boiral, and Iraldo (2018) find that different institutional pressures spur different corporate environmental practices. Specifically, institutional pressures from suppliers and investors prompt substantial corporate greening efforts, while pressures from customers and industry associations are more likely to stimulate greenwashing. Berrone, Fosfuri, and Gelabert (2017) adopt the concept of environmental legitimacy, arguing that firms can gain environmental legitimacy through committing to environmental efforts, but not necessarily for firms with low environmental credibility.

2.3.4 Stakeholder theory

Freeman (1984) initially proposes a stakeholder approach to strategic management with the intention of offering a more comprehensive perspective of corporate strategy as opposed to shareholder-centered theories. Fundamentally, stakeholder theory questions

the primary objective of business, which is profit and shareholders' wealth maximization, and addresses the relationship between firms and multiple stakeholders (e.g., employees, the natural environment, and society at large) (Laplume, Sonpar, and Litz 2008). Stakeholders refer to all the groups and individuals who can influence, or who are influenced by, the success of a business enterprise (Freeman 1984). Stakeholders can be internal groups (e.g., employees, board members, and suppliers) and external parties (e.g., regulators, competitors, NGOs, and the media). Mitchell, Agle, and Wood (1997) review dozens of studies and summarize three primary attributes that contribute to stakeholder salience: power, legitimacy, and urgency. Another widely adopted typology categorizes stakeholders into primary and secondary stakeholders (Clarkson 1995). Primary stakeholders have formal relationships with the firm and affect the firm's success to a great extent, including customers, investors, and employees, among others; while secondary stakeholders refer to groups who have limited influence on the firms or have informal contracts with the firms, for example, NGOs and the media (Buysse and Verbeke 2003; Clarkson 1995). Parmar et al. (2010) review literature across a great range of disciplines, such as strategy, finance, business ethics, and marketing, and argue that stakeholder theory can be a "practically useful and morally rich" tool to impact various disciplines in business.

Notably, the sustainable marketing area has emphasized the importance of including a broader set of stakeholders in corporate strategy since marketing plays a key role in spotting and communicating with external stakeholders (Parmar et al. 2010). Stakeholder theory provides a managerial model for firms to incorporate social and environmental

responsibility into marketing strategy (Maignan, Ferrell, and Ferrell 2005). Cronin et al. (2011) apply stakeholder thinking to identify stakeholders that may be affected by firms' environmentally friendly actions and examine the role of green marketing strategies in firm success. The three main categories of green marketing strategies are green innovation, greening the organization (e.g., green champions and green process), and green alliances (Cronin et al. 2011).

Abundant research examines firm responses and performance under stakeholder scrutiny. Polonsky and Ottman (1998) examine the potential outcomes of involving stakeholders in the green product development process. Buysse and Verbeke (2003) show that stakeholder coverage in depth and breadth positively affects firms' proactive environmental strategies. Similarly, Brower and Mahajan (2013) find stakeholder characteristics such as diversity affect firms' corporate social performance breadth. More recently, Svensson et al. (2016) identify five main stakeholder groups that influence corporate sustainability efforts (i.e., the focal company, downstream and upstream stakeholders, societal stakeholders, and finally, market stakeholders). Romestant (2020) offers a dynamic perspective of stakeholder involvement in industrial marketing concerning sustainability issues.

Furthermore, the relationship between a group of stakeholders, i.e., environmental regulators and firm strategy, has been extensively studied, particularly regarding how strict environmental regulations can drive green innovation and enhance firm competitiveness in international markets. This idea was first introduced by Porter (1991), which is also known as the 'Porter Hypothesis'. Porter Hypothesis argues that

environmental protection and firm competitiveness are not two sides of a coin, as environmental regulations may initially increase costs but ultimately incentivize firms to redesign their processes and technologies to decrease pollutants emissions, recycle waste, improve efficiency and quality, and finally, enhance competitiveness (Porter 1991). As a further elaboration of the Porter Hypothesis, Porter and Linde (1995) argue that well-designed environmental regulations can urge firms to innovate. The cost of complying with the regulations may be partly or even out by the benefit generated from innovation later since environmental innovations such as developing green processes, improving energy efficiency, and reusing by-products usually not only reduce pollution but also improve efficiency and enhance productivity (Porter and Linde 1995).

Over the past thirty years, extensive attention has been drawn to testing the Porter Hypothesis in different disciplines, including innovation, strategic management, marketing, and sustainability. With contradictory pieces of evidence, there is still no consensus on the positive relationship between environmental regulation and firm competitiveness. However, the weak version of the Porter Hypothesis, which argues that appropriate environmental regulations spur green innovation, has been greatly supported by research. For instance, Lanoie et al. (2011) surveyed more than four thousand facilities in OECD countries and only found solid supportive evidence for the weak version of the Porter Hypothesis but not for the strong version that indicates the cost-offsetting mechanism of the innovation. Ford, Steen, and Verreynne (2014) find that both environmental regulatory force and competitive advantage stimulate innovation in Australia's oil and gas industry.

Conversely, Cai and Li (2018) find evidence from Chinese firms supporting the strong version of the Porter Hypothesis and contend that eco-innovation positively affects a firm's economic performance by improving a firm's environmental performance. In a meta-analysis study, Hang, Geyer-Klingeberg, and Rathgeber (2019) find evidence consistent with Porter Hypothesis, demonstrating that corporate environmental performance has no significant effect on a firm's economic performance immediately but financially benefits a firm in the long term. Through a systematic review of 293 peer-reviewed papers, Oduro, Maccario, and De (2021) show that Porter Hypothesis plays a dominant role in examining green innovation as the most frequently employed theory.

2.4 Sustainable marketing strategies

2.4.1 Green acquisition strategy

Although corporates increasingly engage in green acquisition strategy, research on this sustainable marketing strategy is fragmented. There is no established definition for this sustainable marketing strategy. In the strategic management field, acquisition is defined as the act of purchasing and absorbing a target entity, such as a plant, specific asset, or an entire company (Sherman 2010). In this thesis, I adapt this definition to focus on green resources. Specifically, green acquisition refers to acquiring target firms possessing green brands, green product or service lines, or green business units to obtain and develop competitive advantages (Liang et al. 2022; Lu 2022; Sun and Liu 2022).

In the finance literature, a small number of researchers examine how the CSR performances of acquiring firms and target firms affect acquisition outcomes. Aktas et al.

(2011) examine how the target firm's social and environmental performance affects the acquirer's stock return. Gomes and Marsat (2018) find that acquiring firms take target firms' CSR credentials into consideration and are likely to pay a premium. On the other hand, Gomes (2019) examines the issue from the targets' perspective, examining whether target firms' CSR performance can affect their possibility of being acquired. In sustainability literature, scant research explores green acquisition strategy. In a theoretical study, Wickert, Vaccaro, and Cornelissen (2017) propose the critical determinant of socially responsible acquisitions, which is the fit between acquirers and targets concerning organizational identity orientation. Kwon, Lim, and Lee (2018) investigate acquisitions of start-ups in the energy industry, which target eco-friendly technology and related tangible assets. Unruh and Ettenson (2010) propose three approaches to sustainable product development, one of which is green acquisitions. However, there is still limited empirical research on green acquisition strategy in marketing literature.

2.4.2 Green innovation strategy

Green innovation, eco-innovation, sustainable innovation, and environmental innovation are used interchangeably in the literature. Schiederig et al. (2012) find that these terms have trivial differences regarding descriptive accuracy by comparing those significant definitions adopted in different studies. For example, Kemp and Pearson (2007) define eco-innovation as the creation, adoption, or utilization of a novel product, production process, service, or business management method that reduces environmental risks, pollution, and other adverse effects of resource use (including energy consumption) across its life cycle, in comparison to relevant alternatives. While the Organization for

Economic Co-operation and Development characterizes green innovation as the creation or introduction of new or notably enhanced "products (goods and services), processes, marketing methods, organizational structures, and institutional arrangements" that either intentionally or unintentionally result in environmental improvements when compared to other relevant options (OECD 2009).

Since the proposal of the famous Porter Hypothesis (Porter 1991), academia has increasingly drawn attention to green innovation as a strategy to firm competitiveness, as well as the determinants of green innovation (e.g., Wijethilake, Munir, and Appuhami 2018; Zhang et al. 2020). Research on green innovation strategy involves multi-discipline, and results are inconsistent. In a recent systematic review, Oduro, Maccario, and De (2021) find that surveys dominate the empirical green innovation research method; while research themes are multi-dimensional, mainly involving drivers of strategy adoption, green innovation collaboration, and partnerships, financial and non-financial performance, among others. Moreover, there are abundant review studies regarding each of the topics mentioned in the review study above. For example, Tariq et al. (2017) identify significant drivers (i.e., market factors, stakeholders' pressure, technological factors, collaboration and networking factors, organizational level factors, and social, cultural, and ethical factors) and consequences in terms of financial performance, market performance, competitive advantage, environmental performance and employee performance of green innovation. Through a meta-analytic review, Hizarci-Payne, İpek, and Gümüş (2021) demonstrate organizational eco-innovation has the most

significant positive effect on firm performance compared to process, product, and marketing eco-innovation types.

2.4.3 Other green strategies

Although not empirically explored in this thesis, some other green strategies are also widely adopted by corporates and draw substantial attention in academia. Green alliance strategy has also been extensively examined by scholars during the past thirty years. Mendleson and Polonsky (1995) describe how engaging in a strategic alliance with an environmental group can help a firm builds credible green marketing. Crane (1998) examines green alliances between firms and their suppliers and competitors through a case study. Alliances between firms and environmental groups are considered effective in achieving green marketing goals as environmental groups have the expertise, resources, and reputation regarding environmental issues (Polonsky and Rosenberger 2001). Shah (2011) finds that multinational corporations can lower investment risks by allying with environmental non-governmental institutions when operating in emerging markets. Regarding green alliances between firms, Norheim-Hansen (2015) finds that firms with strong environmental reputations are more likely to attract alliance partners.

Various research explores sustainable strategies from a more comprehensive perspective. For example, some researchers examine firms' sustainable business models (e.g., Wagner and Svensson 2015; Press, Robert, and Maillefert 2020); others investigate sustainable strategies from an organizational perspective (e.g., Chen et al. 2015). Papadas, Avlonitis, and Carrigan (2017) conceptualize and develop three facets of green marketing orientation: strategic green marketing orientation, tactical green marketing orientation,

and internal green marketing orientation. Similarly, Sinčić Ćorić et al. (2020) examine how startups implement sustainable marketing orientation strategy.

In this thesis, I address the sustainable issue from a corporate strategy perspective and explore potential motivations, financial outcomes, and contingent effects of sustainable marketing strategies.

Chapter 3

Study 1

Green Acquisitions: Are They Just Low-Hanging Green Fruits?

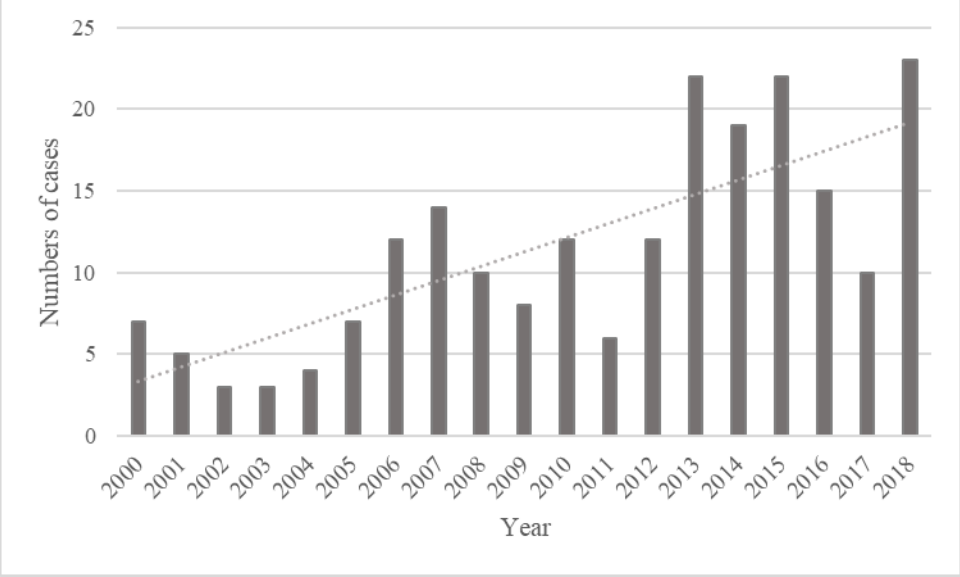
3.1 Introduction

Accelerating sustainability trends are driving organizations to develop green marketing strategies. Increasingly, firms are acquiring green brands or firms to expand their green business portfolio; however, this green marketing strategy has received little academic attention. For example, Unilever began acquiring popular green brands as early as 2000 and has since acquired environmentally friendly firms such as Seventh Generation and REN. Some other famous green acquisitions include The Clorox Company's purchase of Burt's Bees in 2007. PepsiCo acquired Bare Foods and multiple other natural food companies, while Coca-Cola acquired Organic & Raw Trading and Kraft Heinz acquired Ethical Bean Coffee and Primal Kitchen in 2018.

In response to green consumerism and pressures from various stakeholders, many multinational corporations create various green strategies and acquire environmentally friendly firms to broaden their green business portfolios, enter new markets, obtain sustainable advantages, and improve firm value. When making purchasing decisions, consumers consider not only practical factors like quality, price, and packaging but also intangible and symbolic attributes (Fine, Gleason, and Budeva 2016). Those may include environmentally friendly product characteristics that impact consumers' lifestyles

(Khojastehpour and Johns 2014). As a result, many firms have responded proactively to this trend by growing their green product portfolios by merging with or acquiring green firms and brands. Green acquisition refers to acquiring green resources and developing green competitive advantages, including green technologies, green brands, green products, and services (Liang et al. 2022; Lu 2022). Histograms of the number of green acquisitions identified from the SDC Merger & Acquisition Database in this study are presented in Figure 1. It is clear that firms have increasingly engaged in green acquisitions over the past two decades, which motivates us to explore the underlying mechanism behind this prevailing phenomenon.

Figure 1 Study 1. Green acquisition trend



Sharma (2020) pointed to the research gap and called for research on the impact of sustainability strategies on firm profitability in the business-to-business (B2B) domain. Cronin et al. (2011) identify research opportunities in green marketing and call for

research on how firms are affected by their green product acquisitions. In light of the limited research on green acquisitions, the primary objective of the current study is to bridge this scholarly gap by examining how green acquisitions impact firm stock value in the marketing-finance domain, and how these effects may differ under various conditions in a developed market such as North America. In response to the call for more research by Cronin et al. (2011), this study explores the effects of green acquisitions on firm market value. The main objective of this study is to understand how green acquisition announcements affect the firm market value and how various factors moderate this relationship. To answer these questions, I propose a model with a set of factors that help link green acquisitions and firm stock market returns. I identify two main factors (i.e., firm marketing capability and innovation capability) and one moderator (i.e., industry environmental sensitivity to environmental regulations) that shape the relationships between firm green acquisition announcements and investor responses. I then build my hypotheses based on the literature on sustainability marketing, strategic merger and acquisition (M&A), and organizational capabilities.

To explore the hypotheses, I construct a unique dataset of 182 green acquisition announcements made by 53 firms in consumer-related industries over a 19-year period. I employ the event study method to obtain firm stock returns. Then I use a regression analysis of abnormal returns as a function of firm marketing capability, innovation capability, industry environmental sensitivity, and other control variables. The model controls for selection bias and endogeneity, firm heterogeneity, and intra-group correlations. The results show that the stock market reacts positively to firms' green

acquisition announcements. Next, regarding firm-specific characteristics, the findings demonstrate opposing effects. Specifically, I find that firm marketing capability positively affects investor expectations in response to green acquisitions, while firm innovation capability negatively affects investor expectations in response to green acquisitions. In addition, industry environmental sensitivity further discounts firm stock returns, which weakens marketing capability's positive effects and strengthens innovation capability's adverse effects on stock market returns.

This study contributes to the extant literature in multiple ways. First, I add to the literature on the marketing−finance interface by identifying how firm marketing capability and innovation capability impact stock market outcomes in response to a particular corporate green initiative–green acquisition. Second, this study contributes to the sustainability marketing literature (Kotler 2011). I investigate how firms confront sustainability challenges and integrate sustainability strategies to remain viable in the marketplace. Notably, the findings show that shareholders perceive green acquisition as a promising green strategy. This finding also provides managers with salient evidence to justify their choices of the green acquisition strategy. Third, I identify the opposing roles of firm marketing capability and innovation capability when firms adopt green acquisition strategies. Finally, my findings can serve to alert publicly traded firms that investors' optimistic valuations of green acquisitions may be compromised for firms in an environmentally sensitive industry. This finding has crucial implications for firms with different levels of marketing capability and innovation capability in industries sensitive to

environmental regulation. Table 1 presents key findings from relevant literature and the contributions of this study. Appendix 1 provides more information on related studies.

The remainder of the paper is organized as follows. The next section presents my theoretical framework and develops hypotheses concerning the stock market response to firm green acquisitions. I then describe the data, methods, and model and present the empirical findings. In the last section, I discuss my findings, theoretical and managerial implications, and the limitations of this study.

Table 1 Study 1. Relevant research and contributions of the current study

Key Issues and Findings	Extant Research	Contributions to Key Issues 1 and 2
Key issue 1: How do firms' sustainable marketing strategies affect their financial performance? Key findings:		• My study draws attention to the impact of a substantial and costly sustainable strategy–green acquisitions–on firm value. Extant research finds mixed results on the sustainable strategy-firm performance relationship, and I demonstrate green acquisition announcements positively affect stock market value. • My study investigates how acquirers' marketing and innovation capabilities impact the green acquisitions—firm value relationship while underlining the critical role of industry environmental sensitivity in moderating the relationships mentioned above.
• Announcements of green products, recycling efforts, and appointments of environmental managers generate insignificant stock returns, while green promotion announcements generate significantly negative stock returns.	Mathur and Mathur (2000) examine 63 green marketing announcements between 1989 – 1995	
• Green product and green distribution programs have a positive impact on a firm's market outcomes, while green pricing and promotion projects have a favorable effect on a firm's return on assets. The role of marketing capability in the CSR efforts—stock return relationship differs conditioning on the specific CSR types.	Leonidou et al. (2013) examine 183 British manufacturers Mishra and Modi (2016) investigate 1725 firms between 2000–2009	
• Announcements of green marketing partnerships positively affect stock market value, while green technology partnership announcements generate negative results. The investor valuation of green partnerships is contingent on firms' past green performance.	Sadovnikova and Pujari (2017) study 190 green partnerships announced between 2005 – 2007	

• Corporate environmental commitment (CEC) can improve both short-term and long-term firm values with strong marketing capability, while operations capability moderates the effect of CEC on short-term performance.	Hirunyawipada and Xiong (2018) examine 376 S&P 500 firms listed in the Carbon Disclosure Project between 2008 – 2012
Key issue 2: Sustainability/CSR issues in mergers and acquisitions	
Key findings:	
• The target firm's social and environmental performance positively affects the acquirer's stock return.	Aktas, Boda, and Cousin (2011) examine 106 M&A announcements between 1997 – 2007
• The main determinants of socially responsible acquisitions are variance in organizational identity orientation between acquirers and target firms.	Wickert, Vaccaro, and Cornelissen (2017)
• Acquirers value target firms' environmental performance and are willing to pay a premium.	Gomes and Marsat (2018) examine 588 international deals between 2003–2014

Chapter 4

Study 1 Hypotheses Development

Scholars in the field of strategic management have extensively studied M&A strategies. A few review articles and meta-analysis studies have attempted to explore factors that affect M&A success. Relationships between M&A strategies and firm performance have been extensively explored over the last two decades, with prior research showing mixed results on how M&A announcements impact firm stock market performance. Both short- and long-term financial outcomes have suggested a positive relationship (Hayward 2002), negative relationship (Fine et al. 2016), contingent relationship (Capron 1999), or no relationship (King et al. 2004). King et al. (2004) discovered that frequently studied moderators (e.g., relatedness and payment method) do not have a significant effect on post-acquisition performance. This suggests that there could be other variables that have been overlooked and could provide an explanation for the relationship. Two crucial drivers are used to explain positive financial performance related to strategic acquisitions: cost-based synergies and revenue-based synergies. Cost-based synergies emphasize cost savings through the economics of scale and scope. In contrast, revenue-based synergies highlight increased market coverage and distribution networks and redeployment of marketing capabilities through accessing complementary resources (Capron 1999).

Studies in the sustainable marketing field have significantly increased over the past two decades. Main research streams include green marketing mix strategies (e.g., Crittenden et al. 2011; Hult 2011; Leonidou et al. 2013), green product innovation (e.g., Dangelico et

al. 2017; Paparoidamis et al. 2019), green alliances (e.g., Sadovnikova and Pujari 2017), sustainability certifications (e.g., Heras-Saizarbitoria et al. 2020), and more general Corporate Social Responsibility (CSR) efforts and environmental initiatives (Hirunyawipada and Xiong 2018; Mishra and Modi 2016). While previous studies have greatly contributed to the sustainable marketing field, the impact of green acquisitions on an acquirer's value has not been investigated. To the best of my knowledge, no single study has utilized the marketing-finance interface to explore how green acquisitions affect firm value and how these effects vary under different conditions.

Research on socially responsible M&A can be found sporadically in the finance literature. For instance, Aktas et al. (2011) examined 106 M&A deals and found that a target firm's social and environmental performance positively affects an acquirer's stock return. Gomes and Marsat (2018) found that acquirers value target firms' CSR credentials and are willing to pay a premium. Gomes (2019) also examined the issue from the targets' perspective, contending that higher CSR performance can increase firms' propensity to become an M&A target. The significant gap between the increasing number of green initiatives in various industries and the lack of research on green acquisitions presents an opportunity to identify and explore various factors that may significantly impact a firm's value upon adopting the green acquisition strategy. Additionally, exploring this green strategy is essential for practitioners. As stakeholders' environmental concerns and demands continue to grow, eco-friendly practices are becoming more relevant for companies seeking to align themselves with these trends. For example, a recent study on the COVID-19 stock market collapse shows that firms with more substantial

environmental and social commitments have outperformed others and shown more resilience during the pandemic (Albuquerque et al. 2020).

4.1 Differences between conventional acquisitions and green acquisitions

Conventional acquisitions are usually driven by a firm's desire to achieve cost and revenue synergies (Wang and Zajac 2007), which are strategic decisions primarily based on internal drivers and market considerations. However, the drivers of green acquisitions could be more complicated. Green acquisitions are often due to external pressures from environmental regulations, NGOs, media press, consumers, as well as market considerations. Firms seek to mitigate external pressures and improve corporate legitimacy through environmentally responsible initiatives. First, government bodies frequently enforce environmental regulations to alleviate the impact of economic activities on the natural environment. Under pressure from environmental regulations, firms actively engage in green acquisitions to comply with regulations and reduce environmental concerns by utilizing the acquired firms' environmental capabilities (Berchicci, Dowell, and King 2012) and cleaner technologies (Fikru and Insall 2016). However, conventional acquisitions face regulatory scrutiny (e.g., antitrust laws in the United States) and are sometimes discouraged to prevent anti-competitive M&A and ensure fair competition. Second, normative pressures from environmental NGOs and public media outlets may also stimulate firms to take environmental initiatives, including green acquisitions. As experts in environmental knowledge, environmental NGOs play a vital role in promoting sustainability by not only developing voluntary standards that encourage firms to exceed minimum regulatory requirements but also by mobilizing

resources, using their voices, and facilitating communication and collaboration among activist groups and social movements (Berrone et al. 2013, p. 894). Thus, environmental NGOs will likely push firms to commit to long-term, high-investment strategies such as green acquisitions to sustain environmental legitimacy.

Similarly, public media is crucial for improving transparency and legitimacy to facilitate environmental governance (Castka and Corbett 2016). Media pressure impels firms to communicate their commitment to sustainability through investment-intensive and easily observable green strategies, such as green acquisitions. Finally, consumers are becoming increasingly sensitive to environmental issues and prefer environmentally responsible firms and products. Consequently, firms are pushed to provide environmentally friendly goods and services to meet the needs of environmentally conscious consumers (Cronin et al. 2011) by acquiring green brands. Overall, green acquisitions are proactive strategic decisions and remarkably different from conventional acquisitions regarding motivations and drivers, and are driven not only by consumer preference and market demands but also by pressures from external stakeholders such as regulators, NGOs, and the media. Therefore, green acquisitions are expected to generate distinctive outcomes among stakeholders, and it is crucial to examine how green acquisition strategy works under varying contingencies.

4.2 Green acquisition and firm performance

Environmentally and socially sustainable strategies are a top priority for companies that strive to cope with increasing competitive pressure and growing sustainable consumption

awareness among consumers. From a signaling theory viewpoint, organizations utilize distinct signals to communicate their efforts to stakeholders so as to reduce information asymmetry. For instance, choosing reputational brands as branding partners help firms to communicate unobservable product quality (Rao, Qu, and Ruekert 1999). As McDonald and Oates (2006) noted, investors, buyers, and other stakeholders often possess a vague image of a firm's sustainability efforts. Hence, firms use various signals to convey their commitment to sustainability. For instance, firms may use green product labels or social media advertisements to communicate their green concepts. However, these signaling efforts may be futile if firms are under "greenwashing" suspicion (Harrison and Freeman 1999), which refers to the act of "making unsubstantiated or misleading claims about a firm's environmental impact" (Berrone et al. 2017, p. 363).

A plausible signal is "highly observable and costly to imitate" (Connelly et al. 2011). Acquisition of green entities involves substantive investment and provides information to a wide range of stakeholders, so it fits into this category. Green acquisitions lower stakeholders' suspicions of greenwashing because, instead of merely providing lip service to green issues, green acquisitions involve substantial changes in acquirers' business structures and practices. Specifically, green acquisitions force acquirers to reassign resources and redesign operations and activities. Green firms acquired are companies that produce environmentally friendly products, own eco-friendly technologies, or market sustainable brands. These companies can be seen as a "green blood" injection into the acquirers' current business portfolios. Similar to green partnerships that are "long-term investments related to growing or transforming a business" (Cronin et al. 2011, p. 167)

and demonstrate firms' determination to seek continuous green efforts, green acquisitions represent firms with similar, if not greater, opportunities to demonstrate their commitment to managing environmental risks (Aktas, de Bodt, and Cousin 2011).

According to the resource-based view, utilizing and exploring market-based assets (e.g., new market segments and foreign-market knowledge) from target firms allows acquirers to gain competitive advantages, thereby enhancing performance (Kozlenkova, Samaha, and Palmatier 2014). Capron and Hulland (1999) examined post-acquisition marketing resource redeployment and found it significantly impacts revenue-based synergies and organization performance. Furthermore, green acquisitions may enhance acquiring firms' green reputation and customer trustworthiness. Acquiring green firms and brands provides companies with specialized knowledge and expertise in environmentally friendly operations and sustainable production, as well as access to a loyal customer base. These green acquisitions also send a positive message to customers, shareholders, and other stakeholders about the company's long-term commitment to sustainability, which distinguishes them from less-sustainable competitors. Sustainability advocates also argue that environmentally conscious strategies will lead to competitive advantages and superior firm performance (Sharma et al. 2010).

In contrast, the literature also shows that acquisitions do not improve acquirers' short-term performance (Haleblian et al. 2009). For example, in the United States, Faccio et al. (2006) found that acquirers' shareholders continuously experience zero or significant negative cumulative abnormal returns (CARs) around the acquisition announcement

period. One mainstream explanation is that the stock market may perceive acquisitions as coming with enormous costs and potentially high risks since severe competition tends to drive acquirers to bid aggressively and pay substantive premiums to the targets (Alexandridis, Petmezas, and Travlos 2010). However, this may not necessarily be true in the green acquisition context. Acquiring green entities could ameliorate some common concerns related to negative stock market responses. Green targets bring acquiring firms valuable and unique resource sets, such as experts, intelligence properties, and well-known brands, which send strong positive signals to shareholders regarding a deal's substantial profitability. Overall, green acquisitions are financially favorable for shareholders, as they have a positive influence on consumers and other key stakeholders. Thus, I hypothesize the following:

H1. Green acquisition announcements favorably affect acquirers' stock market value.

4.3 The effect of marketing capability

Firm capabilities are important indicators of a firm's quality with respect to performance and competitive advantage (Najafi-Tavani et al. 2018). Marketing capability plays a pivotal role in helping firms realize positive market value and buffering negative results (Edeling, Srinivasan, and Hanssens 2021). Marketing capability represents a firm's ability to exploit and explore firm resources to achieve desired marketing goals (Xiong and Bharadwaj 2013). Mishra and Modi (2016) find that marketing capability positively affects the relationship between certain CSR efforts and stock returns. Mariadoss et al. (2011) contend that marketing capability plays a crucial role in promoting sustainable

consumption in a B2B environment. Likewise, Gupta and Kumar (2013) proposed that incorporating sustainability efforts into a firm's marketing function can significantly boost its overall performance. Echoing these statements, I believe marketing capability serves a critical role in a green acquisition's value appreciation and commercialization.

Generally, marketing capability refers to a firm's "ability to more efficiently convert available marketing inputs into outputs relative to the competition" (Mishra and Modi 2016). Particularly, marketing capability allows companies to establish and maintain strong relationships with stakeholders (Hillebrand et al. 2015) and to connect with customers, understand their needs, and anticipate changes in consumer behavior (Day 1994). Research also delineates various aspects of marketing capability, including marketing information management, integrated marketing communication, market sensing, and managing customer relationship, which contribute significantly to firm performance. I argue that stronger marketing capability enables a firm to recognize opportunities, respond to changes in the market, as well as generate greater cash flows in the future.

Firstly, as acquirers develop superior marketing capabilities, they are better equipped to engage with various stakeholders regarding their green practices and communicate their non-price value, such as their green commitments, to a wider audience (Morgan et al. 2009). Effective marketing communication helps firms to showcase their green initiatives, thereby enhancing their reputation as good corporate citizens and highlighting their value proposition towards sustainability (Du et al. 2010). Secondly, acquirers with strong

marketing capabilities can effectively leverage a target's brands to optimize their green brand portfolio and compete against rival brands that may fail to meet consumer needs (Mishra et al. 2022). Thirdly, strong market knowledge enables firms to better understand evolving market demands, particularly how the green trend influences consumer preferences, allowing them to adopt sustainable strategies that meet consumer desires (Mishra et al. 2022). Thus, acquirers with high marketing capability can make better green acquisition decisions as they possess market intelligence on green trends in the target market. Additionally, with stronger marketing capabilities, firms can estimate and predict the profitability and associated risks of green marketing strategies more accurately, instilling shareholder confidence in the prospects of green acquisition.

In summary, acquirers with strong marketing capability have a greater chance of communicating their green efforts to establish their green credentials. Moreover, firms with strong marketing capability are able to develop suitable green brand extensions and optimize green product portfolios by acquiring green brands and firms that cater to consumers' needs for green offerings, ultimately enhancing their market share. Therefore, I hypothesize the following:

H2. The positive impact of green acquisition on firm market value is strengthened with increasing levels of marketing capability.

4.4 The effect of innovation capability

The second influencing factor I focus on is firm innovation capability. I consider innovation capability to be the main factor impacting the relationship between green acquisitions and stock market returns. The importance of firm innovation capability has been highlighted extensively in the literature. Yang et al. (2019) suggested that firms with superior innovation capabilities are more likely to develop and implement effective environmental sustainability strategies, which can have a positive impact on their overall performance. Similarly, Saboo et al. (2017) found that firms with strong innovation capabilities are more successful in acquiring high-technology companies. In eco-innovation projects, firms with superior innovation capabilities are more likely to develop innovative solutions that meet evolving environmental regulations and consumer demands, thereby creating value for both investors and stakeholders. Nevertheless, how investors value firm innovation capability in the context of green acquisitions remains unclear.

Innovation capability refers to a firm's ability to offer innovative products, services, processes, and technologies. Literature shows innovation contributes to the development of new products and processes, which can improve productivity and create value (Artz et al. 2010; Doha et al. 2018). For instance, innovation projects can generate positive stock market returns (Sood and Tellis 2009). Nevertheless, this may differ substantially in the context of green acquisition. Acquisition of green entities often involves securing eco-friendly technologies and related green knowledge. If the acquirer has strong innovation

capability, there may be a higher likelihood that innovation resources will overlap between the acquirers and their target, which may result in fewer and lower quality recombination of innovation resources (Makri et al. 2010), thereby creating innovation "resource redundancy" (Sears and Hoetker 2014). Consequently, investors' perception of redundancy could undermine their valuation of green acquisitions.

Moreover, when firms have a high innovation capability, implementing green acquisitions could distract managers from the exploitation of key competencies (Luo and Bhattacharya 2009), including developing new products. Despite their ability to utilize obtained green technologies efficiently, innovative firms have the potential to invent green technologies, such as pollution-prevention technologies (Khanna, Deltas, and Harrington 2009), to alleviate stakeholders' concerns and preserve the environment (Lin et al. 2020). Shareholders may perceive a misallocation or overextension of firm resources since innovative firms are expected to prioritize investment in developing new green products or designing green processes instead of engaging in green acquisitions at relatively high costs and risks. Namely, stakeholders would view green product development as a better strategy for innovative companies because they have the required R&D competencies and could generate a continuous profit stream. Consequently, shareholders may suspect a firm's motivation for engaging in green acquisitions and react cautiously. In contrast, investors will likely reward firms with inferior innovation capability to acquire rather than make green.

Lastly, agency theory also provides insights into the investors' unfavorable valuations of innovative firms' green acquisition announcements. Firms' managers may have a short-term personal agenda, which is to obtain more control and higher compensation in the short term rather than maximize firm profitability in the long run (Piesse et al. 2013). In this case, they tend to be less aggressive in exploring investments that align with firms' core innovation competency and allocate resources to equivocal projects such as irrelevant acquisitions (Leyva-de la Hiz, Ferron-Vilchez, and Aragon-Correa 2019). When firm core competencies differ from managers' strategy choices, shareholders may doubt senior executives' motivation, generating wariness and, eventually, reducing positive market responses. Thus, I hypothesize the following:

H3. The positive impact of green acquisition on firm market value is weakened with increasing levels of innovation capability.

4.5 Moderating effect of industry environmental sensitivity

The effectiveness of signaling can also be influenced by the signaling environment, as signalers operating in the same industry may collectively impact the reliability of the signal (Connelly et al. 2011). The literature suggests that industry characteristics may affect how the market values corporate green activity (Huang et al. 2016; Sadovnikova and Pujari 2017). A particularly interesting attribute that varies among industries in the green context is industry environmental sensitivity, which suggests to what extent an industry is sensitive to environmental regulations. Extant research suggests that the impact of green efforts on firm value may vary depending on industry environmental

sensitivity (Qureshi et al. 2020). Environmental sensitive industries face strict regulations and laws (Sadovnikova and Pujari 2017), as well as whopping institutional pressures.

Firms in environmentally sensitive sectors face tremendous pressure from customers, investors, NGOs, and other stakeholders. Environmental regulations force them to look for environmental strategies to mitigate costs. Therefore, green initiatives in environmentally sensitive industries may be viewed by the market as passive reactions to stakeholder pressure. According to Palazzo and Richter (2005), industries with controversial business practices, such as tobacco, may use CSR efforts as a strategic decision to cover up their unethical behavior or harmful products that negatively impact consumer well-being. Similarly, Cai et al. (2012) have noted contradictions in environmentally sensitive industries, where firms attempt to offset their actions through carbon credits without actually reducing their carbon production or pollution. As Polonsky et al. (2010) argue, these firms may purchase carbon credits as a temporary solution to offset the cost of pollution treatment rather than adopting a genuine commitment to sustainability.

From a signaling theory perspective, the effectiveness of a signal also depends on the signal sender's quality, which implies how trustworthy, credible, and reliable the signaler is (Connelly et al. 2011). For example, if a firm (signal-sender) is from an environmentally sensitive industry with high pollution potential, the stakeholders (signal-receivers) will view the firm's green efforts as merely passive compliance (Hirunyawipada and Pan 2020) and, thus, lacking credibility. As a result, the firm will be

subject to being perceived as untrustworthy, unreliable, and opportunistic, which will weaken a firm's signaling power (Berrone, Fosfuri, and Gelabert 2017).

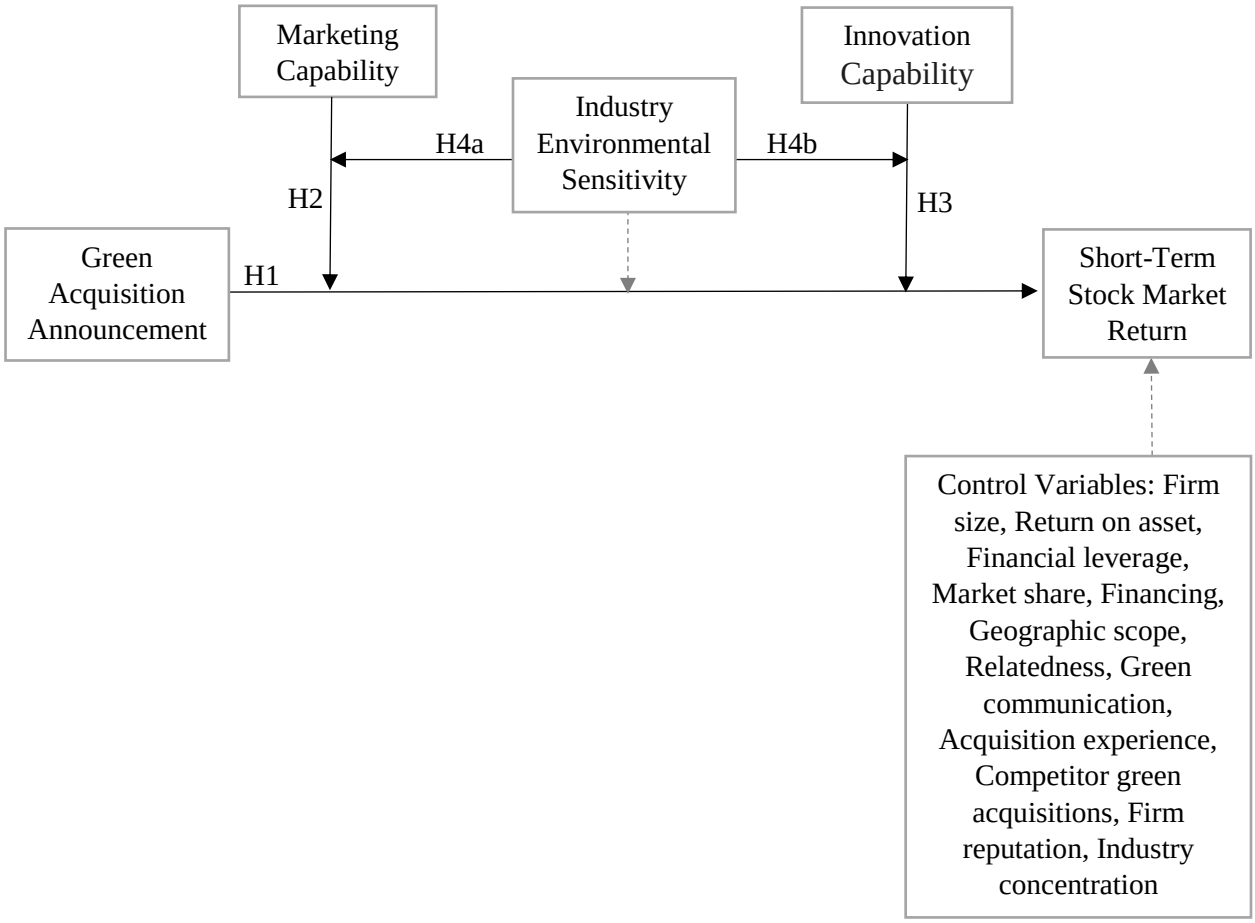
Superior marketing capability gives firms a greater chance of effectively communicating their green commitments to stakeholders. However, when firms in environment-sensitive sectors engage in green activities, stakeholders may see their efforts as futile or, worse, intentional attempts at greenwashing. Fikru and Insall (2016) found that environmentally sensitive firms face adverse effects when acquiring cleaner firms, as the green efficiency of the target firms can be destroyed by their inefficient acquirers (Kwoka and Pollitt 2010). In this case, despite using marketing power to build and signal green credentials, firms' motivations may be explained by management ambition and opportunism, limiting their efforts to develop a green public image (Kwoka and Pollitt 2010). Their messages might be seen as superficial or even misleading. Moreover, in sensitive industries, when acquirers with great innovation capability engage in green acquisitions, their green messages will be viewed as having a greater level of suspicion, thereby enhancing the adverse effect. Thus, for acquirers in environmentally sensitive industries, the effects of both marketing capability and innovation capability on stock market return will worsen. Hence, I hypothesize the following:

H4a. As industry environmental sensitivity increases, the positive effect of marketing capability on the relationship between green acquisition announcements and stock market return weakens.

H4b. As industry environmental sensitivity increases, the negative effect of innovation capability on the relationship between green acquisition announcements and stock market return strengthens.

Figure 2 illustrates the theoretical model of the relationship between green acquisition and short-term stock market return. Simultaneously, the relationship is impacted by the proposed moderators.

Figure 2 Study 1. Theoretical model



Notes: Continuous lines indicate focal relationships and dashed lines indicate relationships involving control variables.

Chapter 5

Study 1 Research Methodology

5.1 Event study specification

To test the study's hypotheses, I employed the event study method and regression analysis. Event study is a widely adopted method in the finance and marketing fields and is frequently used to evaluate acquisition valuations (e.g., Cao and Sorescu 2013; Wiles et al. 2012). Assuming the market is efficient, the event study method argues that the stock market captures all information and responds to an event instantly. Therefore, the event study method provides me with a good opportunity to capture the causal effect between a particular event and stock value. I used a 255-day period before the event date as the estimation period. I calculated the abnormal returns using the market model and equally weighted returns. The market model has been suggested as one of the best models for studying stock returns for acquisitions (Saboo et al. 2017; Sears and Hoetker 2014). I estimate the expected returns as follows:

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} + \varepsilon_{it},$$

where $E(R_{it})$ denotes the expected daily returns for firm i on day t if the event had not happened, R_{mt} denotes the equally weighted daily returns of the market index, α_i and β_i are firm-specific estimates, and ε_{it} is the independent, identically, and normally distributed error term. I then calculated the daily abnormal returns for each firm as follows:

$$AR_{it} = R_{it} - E(R_{it}) = R_{it} - (\alpha_i + \beta_i R_{mt} + \varepsilon_{it}),$$

where AR_{it} is the abnormal return for firm i on day t, R_{it} is the actual daily returns for firm i on day t. Next, I summed the daily abnormal returns for different event periods to calculate cumulative abnormal returns (CARs):

$$CAR_i[t_1, t_2] = \sum_{t_1}^{t_2} AR_{it} .$$

I calculated the cumulative abnormal returns for various event windows with different beginning and ending dates (beginning up to three days before and ending up to three days after the event day). I assessed the significance of the cumulative abnormal returns using multiple tests, both parametric and nonparametric, including Patel Z, Generalized Sign Z, Portfolio Time-Series (CDA), Jackknife, and Rank Test. I chose the three-day event window, which has the most significant t-statistics (Cao and Sorescu 2013; Warren and Sorescu 2017) one day before and after the announcement date. This event window is appropriate as an event window should be sufficiently short (McWillams and Siegel 1997), and it is consistent with extant event studies in marketing (Homburg, Vollmayr, and Hahn 2014). I use the Eventus software provided by Wharton Research Data Services to calculate the abnormal returns of each event.

5.2 Sample data

Methodologically, a green acquisition event refers to a public acquisition announcement between a publicly listed acquiring firm and a green public or private acquired firm. The green target could be a public or private firm with a green reputation, eco-friendly

technologies, sustainable processes, or a green brand that a firm wants to divest. Examples of green acquisition announcements are provided in Table 2. I collected acquisition announcements reported by U.S. public acquirers over 19 years (2000−2018) from the SDC Platinum. Environmental sustainability may be emphasized by companies whose products are more accessible to end users (Vaaland, Heide, and Grønhaug 2008). Thus, I focused on home/personal care and food industries and included 18 categories at the four-digit standard industrial classification (SIC) level (e.g., 2032 – canned specialties; 2844 – perfumes, cosmetics, and other toilet preparations). I excluded withdrawn or rumored deals and screened the data by applying keywords such as "environment-friendly," "organic," "natural," "renewable," "recycling," and "sustainable" to separate acquisition announcements with a green feature from their non-green counterparts. Then I analyzed the identified announcement synopses and descriptions of target firms to verify whether each was an actual green acquisition. Some target firms did not include green features in their business descriptions or announcement synopses; therefore, I complimented keyword identification by cross-matching target firms in SDC M&A announcements with firm data in the United States Department of Agriculture (USDA) organic integrity database, which includes all the certified organic farms and businesses in the United States.

I followed previous finance literature (e.g., Fee et al. 2012) and only included acquisition announcements that involved significant stakes (i.e., above 50%). Following standard procedure, I excluded announcements that included other significant events in the three-day [-1, +1] window surrounding the announcement date, such as a new product launch,

major executive changes, or earnings releases. I also excluded deals with stock price and accounting data that were unavailable during the acquisition period. Finally, I searched all the so far identified announcements in LexisNexis to verify whether each was indeed a green acquisition and that the announcement date was correct. I used the earliest date if the announcement date was inconsistent in different sources and excluded two announcements for which I could not identify dates. The final dataset included 182 announcements from U.S. public acquirers with stock prices available on CRSP. I obtained firm- and industry-level data from multiple resources, such as Standard and Poor's Compustat, Hoover's, and SDC Platinum. All the accounting data were derived from the fiscal year prior to the announcements.

Table 2 Study 1. Examples of green acquisitions

Acquisition strategy	Acquirer	Target	Goals	Announcement source and date
Entire firm	Colgate-Palmolive	Tom's of Maine	To establish the market leader position in the natural oral care category	P.R. Newswire, Lexis-Nexis, 21-Mar-2006
Entire firm	Procter & Gamble	Natura Pet Products Inc.	To strengthen its position in the holistic and natural pet food segment	Lexis-Nexis, 6-May-2010
Entire firm	General Mills	Food Should Taste Good	To further strengthen its natural and organic business	Businesswire, Lexis-Nexis, 29-Feb-2012
Poultry rendering asset	Tyson Foods	American Proteins Inc.	To recycle more animal products and expand its animal feed business footprint	Talk Business, Lexis-Nexis, 15-May-2018

5.3 Dependent variable

Short-term cumulative abnormal returns. I used three-day CARs calculated from the event study method as the dependent variable, starting one day before the announcement and ending one day after (Cao and Sorescu 2013).

5.4 Independent variables

Firm marketing capability. Many studies suggest that investors perceive firms' marketing capability through publicly disclosed information such as sales data (e.g., Dutta et al. 1999; Xiong and Bharadwaj 2013). Therefore, firms that generate more sales than competitors possessing similar marketing resources and inputs tend to have stronger marketing capabilities (Xiong and Bharadwaj 2013). I followed this input-output logic and used stochastic frontier analysis to calculate marketing capability, which "estimates a firm's marketing capability by measuring how close its realized sales are to the sales frontier given a certain level of input resources" (Mishra and Modi 2016). I followed Narasimhan et al. (2006) and included input resources such as selling, general administrative (SGA) expenses, and accounts receivable. SGA is a proxy for the financial resources a firm devotes to marketing and related activities, while receivables represent a firm's resources for client relationship management. I derived the inverse of the inefficiency term η_{it} to capture marketing capability. I estimated the frontier equation as follows:

$$\ln(\text{Sales}_{\text{it}}) = \delta_0 + \delta_1 \times \ln(\text{SGA}_{\text{it}}) + \delta_2 \times \ln(\text{Receivables}_{it}) + \varepsilon_{it} - \eta_{it}$$

Firm innovation capability. Firm patenting activity is highly correlated with firm innovation capability (You et al. 2020). Patent counts indicate the level of a firm's knowledge stock and innovation activities and have been widely used in the marketing and innovation literature to measure a firm's innovation output (Doha et al. 2018; Kang and Montoya 2014). I collected firm patent data from the U.S. Patent and Trademark Office (USPTO). Consistent with prior research (Mishra and Modi 2016; Moorman and Slotegraaf 1999), I used a Koyck lag function, where Patent Stock = $\sum_{k=1}^{t} \Psi^{t-k} \, (Patent\ Count)_{\,k}$, to calculate a firm's patent stock in the past five years before the acquisition event and also take into account the value depreciation contributed by a patent. Here, ψ denotes the weight of previous patent values. Here ψ denotes the weight of previous patent values. In line with existing research (Mishra and Modi 2016), I assigned a weight value of 0.4 to ψ when estimating the patent stock. I accumulated firm yearly patent counts based on patent issue date to address potential endogeneity issue. It may take years for a patent to be issued successfully from application; thus, a natural time lag can be created.

Industry environmental sensitivity. Industries with a stronger negative impact on the environment (releasing more toxic substances) face greater scrutiny (Sadovnikova and Pujari 2017; Varadarajan 2017) and are more sensitive to environmental regulations. I measured industry environmental sensitivity by applying the Toxic Release Inventory (TRI) data published by the United States Environmental Protection Agency (EPA). TRI data is widely used in research on businesses' environmental impact (e.g., Berrone et al. 2013; Russo and Harrison 2005). For example, Berrone et al. (2017) employed TRI data

to identify environmentally sensitive industries. The EPA requires firm facilities that have ten or more employees to report the types and amounts of toxic releases if exceeding the minimum thresholds. I utilize TRI data to obtain the yearly release amount for each facility at the industry level. The data were logarithmically transferred before entering the regression model.

Control variables. I also controlled for factors affecting a firm's green acquisition valuation at the firm-, industry-, and transaction-level. With respect to firm-level variables, I included acquirers' previous acquisition experience and competitors' green acquisitions as firms are prone to follow the same strategy adopted before or imitate their competitors' actions, which may affect investors' confidence in firms' acquisition implementation and future outcomes (Borah and Tellis 2014). Likewise, I controlled acquiring firms' reputations and prior green practices because they may influence investors' expectations of the current event. I also controlled for firm leverage and financing conditions since financial considerations can affect the stock returns of acquisition events (Wiles, Morgan, and Rego 2012). I included firm size, return on assets (ROA), and market share to control potential economies of scale and scope (Feng, Morgan, and Rego 2017).

At the transaction level, I controlled the geographic scope and the industry relatedness between the acquirer and target because they may affect the investors' perception of integration synergies (Homberg, Rost, and Osterloh 2009; Wiles, Morgan, and Rego 2012). At the industry level, I controlled for industry competitive intensity as it may affect acquisition payoff (Borah and Tellis 2014). Control variables were measured prior

to the announcements to control for potential endogeneity (Borah and Tellis 2014). Lastly, I controlled time- and industry-invariant heterogeneities. Table 3 provides details on all variables, operationalizations, and data sources.

Table 3 Study 1. Variables, measure operationalization and data sources

Variable	Operational Measure	Data Source
Dependent variable		
Short-term cumulative abnormal returns (CARs)	Three-day CARs [-1,+1] windows	CRSP and Eventus from Wharton Research Data Service
Independent variables		
Firm marketing capability	The inverse of the inefficiency term derived from an input-out approach based on stochastic frontier estimation	Compustat
Firm innovation capability	Firm Koyck lagged patent stock in the last five years prior to the announcement, adjusted by firm total assets	USPTO patent data
Industry environmental sensitivity	Natural logarithm of industry yearly toxic substance release	Toxic Release Inventory data
Competitor green acquisition	Competitors' green acquisition counts one year preceding the focal firm's announcement	SDC Platinum database
Prior acquisition experience	Number of acquisitions the focal firm engaged in one year preceding the announcement	SDC Platinum database
Green communication	Dummy variable: equals 1 if a firm released CSR/sustainability report	EPA voluntary partnership program data

Firm reputation	Dummy variable: equals 1 if a firm is listed on the Fortune Reputation index	Fortune's 500 Companies Ranking
Firm size	Natural logarithm of a firm's employee number	Compustat
Leverage	The ratio of a firm's long-term debt to total assets	Compustat
Financing	The ratio of a firm's free cash flow (operating cash flow minus capital expenditures) to its total assets	Compustat
Return on assets	The ratio of a firm's net income to total assets	Compustat
Market share	The ratio of firm sales to industry sales	Compustat
Geographic scope	Dummy variable: equals 1 if it is a within-boarder acquisition	SDC Platinum database
Relatedness	Dummy variable: equals 1 if the acquirer and target's three-digit SIC codes are the same	Compustat
Industry Concentration	Herfindahl Index (Sum of the squares of the market shares of all firms in the industry)	Compustat
Industry	Industry SIC dummy variables	Compustat
Year	Acquisition year dummy variables	SDC Platinum database, LexisNexis

5.5 Model specification

I used a two-stage Heckman (1979) selection model to control for selection bias or endogeneity caused by potential systematic differences between green acquisition-engaged and non-engaged firms. In stage one, I applied a probit selection model (to both the green acquirers and non-green counterparts) to find the likelihood that a firm would conduct green acquisitions. I compared green firms in the sample with firms that did not have green acquisitions in the same year or industry. I selected firms without green acquisitions with total assets (+/-20%) similar to the focal firms (Homburg, Vollmayr, and Hahn 2014; Sadovnikova and Pujari 2017) in the three-digit SIC category. The value of the dependent variable was coded as 1 if the firm conducted a green acquisition; otherwise, it was coded as 0. Following extant research (Saboo et al. 2017; Wiles, Morgan, and Rego 2012), I included acquirers' financial considerations, which to some extent, influence firm acquisition returns. I accounted for firm-specific features, such as market share, firm size, and sales. I also addressed market concentrations for different industries and included dummy variables regarding industry-specific effects. Finally, I included year dummy variables to control for any year-specific variance in the marketplace that may influence firms' green strategic choices.

Additionally, to satisfy the exclusion restriction, I include firm slack and cost of goods sold to account for firms' private information in the first-stage models but not the second-stage regression model to serve as exclusion variables (Sorescu, Warren, and Ertekin 2017). I derived the inverse Mills lambda from the resulting parameters to account for

unobserved elements that might affect firms' decisions on green acquisition. The first stage selection model is specified below. The details of the first stage selection model results can be found in Appendix 2.

Stage 1 Heckman selection equation:

Decision to engage in green acquisition = f (firm total assets, firm financial leverage, firm financing, slack resource, firm sales, cost of goods sold, market share, ROA, industry competitive intensity, industry effects, time effects)

In the second stage, I estimated a least-squares regression model on CARs, with the hypothesized independent and control variables and the inverse Mills lambda obtained in stage one. I used robust standard errors clustered by firms to control for heteroscedasticity and intra-group correlations. I mean-centered the relevant independent variables before adding the interaction terms. The model is specified below:

$$
\begin{aligned}
\mathrm{CAR}_{(-1,+1)} = \ & \beta_0 + \beta_1 \text{Marketing capability} + \beta_2 \text{Innovation capability} \\
& + \beta_3 \text{Industry environmental sensitivity} \\
& + \beta_4 (\text{Marketing capability} \times \text{Industry environmental sensitivity}) \\
& + \beta_5 (\text{Innovation capability} \times \text{Industry environmental sensitivity}) \\
& + \beta_6 \text{Firm size} + \beta_7 \text{ROA} + \beta_8 \text{Financial leverage} + \beta_9 \text{Market share} \\
& + \beta_{10} \text{Financing} + \beta_{11} \text{Geographic scope} + \beta_{12} \text{Relatedness} \\
& + \beta_{13} \text{ Prior green practices} + \beta_{14} \text{Prior green communication} \\
& + \beta_{15} \text{Prior acquisition experience} \\
& + \beta_{16} \text{Competitor green acquisitions} + \beta_{17} \text{Firm reputation} \\
& + \beta_{18} \text{Industry concentration} + \beta_{19} \text{Industry dummy} \\
& + \beta_{20} \text{Year dummy} + \beta_{21} \text{Inverse Mills lambda} + \varepsilon
\end{aligned}
$$

Chapter 6

Study 1 Results and Analysis

6.1 Descriptive statistics and correlations

Table 4 shows descriptive statistics and correlations. Some correlations among the variables are relatively high. To address this concern, I ran a multicollinearity diagnostic by testing the variance inflation factors (VIF). All the VIF statistics were below 5, and the mean VIF was 1.66, indicating the results are not affected by potential multicollinearity. Additionally, a negative correlation was found between CARs [-1, +1] and firm innovation capability, providing preliminary evidence of the findings.

Table 4 Study 1. Descriptive statistics and correlations

		Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	CARs [-1, +1]	0.01	0.04	1.00															
2	Marketing capability	4.36	1.96	0.12	1.00														
3	Innovation capability	0.002	0.005	-0.2*	-0.27*	1.00													
4	Industry environmental sensitivity	15.78	1.45	-0.10	0.31*	-0.19	1.00												
5	Green communication	0.49	0.50	-0.29*	0.05	0.19	0.11	1.00											
6	Acquisition experiences	3.23	2.87	-0.10	-0.10	0.20*	0.05	0.26*	1.00										
7	Competitor green acquisitions	1.04	1.26	-0.00	0.31*	-0.13	0.10	0.10	-0.08	1.00									
8	Relatedness	0.30	0.46	0.02	-0.05	0.02	-0.06	-0.07	-0.29*	-0.00	1.00								
9	Market share	0.20	0.26	-0.22*	0.27*	-0.03	0.22*	0.47*	0.20*	0.07	-0.06	1.00							
10	Industry concentration	0.43	0.23	0.13	0.21*	-0.20*	0.26*	-0.13	0.07	-0.04	0.01	0.18	1.00						
11	Financial leverage	0.24	0.14	-0.10	0.10	-0.06	-0.02	0.06	-0.05	0.11	-0.07	0.11	-0.21*	1.00					
12	Financing	0.19	0.10	-0.16	-0.12	0.26*	-0.02	0.34*	0.09	-0.03	0.05	0.46*	-0.11	-0.10	1.00				
13	Firm size	8.87	1.88	-0.24*	0.11	0.23*	0.08	0.67*	0.32*	0.10	-0.03	0.61*	-0.12	0.15	0.42*	1.00			
14	ROA	0.06	0.06	-0.04	-0.01	0.14	0.11	0.27*	0.05	-0.01	0.11	0.13	-0.02	-0.19	0.18	0.42*	1.00		
15	Reputation	0.56	0.50	-0.25*	0.07	0.25*	0.03	-0.59*	0.18	0.15	-0.01	0.59*	-0.14	0.10	0.48*	0.78*	0.33*	1.00	
16	Geographic scope	0.80	0.40	0.10	0.19	-0.18	0.03	-0.14	-0.13	0.12	0.05	-0.06	-0.00	-0.03	-0.08	-0.08	0.09	-0.02	1.00

*$p < 0.01$.

6.2 Stock market reactions to green acquisition announcements

Table 5 presents CARs at various event windows. Table 6 presents cumulative abnormal returns at different event windows. I employed several test statistics to verify the significance and robustness of the results. As shown in Table 6, the CARs on various event windows are significantly above zero, including the abnormal return on the event day (day 0). Specifically, the mean abnormal return on the event day is 0.45% ($p < 0.01$), and the mean CARs at [-1, 1] three-day windows is 1.07% ($p < 0.01$). Additionally, the mean CARs are significantly positive at various widows, with 0.94% ($p < 0.005$) at [0, +1] two-day windows, 1.04% ($p < 0.005$) at [-2, +2] five-day windows, etc. Therefore, H1 is supported, which shows a green announcement acquisition generates favorable stock returns for the acquirer. Figure 3 presents the daily returns for the [-10, +10] event window (e.g., Swaminathan and Moorman 2009). Overall, the CARs are significantly positive for various event windows. These positive net returns to investors confirm that green acquisitions are valued by investors, which may unfold the reasons behind firms' green acquisitions even though their costs are high.

Table 5 Study 1. Green acquisition announcements, equally-weighted returns over the estimation period of 255 days ending ten days before the event day, market model estimation

Permno	Event Date	Mean Total Return	% of Raw Returns >0	Alpha	Beta	MM Residuals >0	Total Return Variance	Residual S.D.	Autoco-rrelation
80006	2/2/00	0.0002	37.48%	-0.0010	0.73	47.84%	0.0016	0.0400	-0.1463
86267	6/1/00	-0.0009	44.71%	-0.0016	0.59	49.02%	0.0021	0.0461	-0.0355
84325	6/8/00	0.0027	34.29%	0.0017	1.02	42.35%	0.0038	0.0607	-0.3083
26825	6/29/00	0.0000	44.84%	0.0004	-0.25	46.67%	0.0008	0.0306	-0.0413
62042	8/29/00	0.0011	42.50%	0.0008	0.27	43.53%	0.0008	0.0292	-0.2107
88031	9/20/00	0.0007	41.74%	0.0000	0.42	48.24%	0.0010	0.0314	-0.2045
18163	5/21/01	0.0006	48.40%	0.0007	-0.32	47.06%	0.0004	0.0262	-0.0174
79588	6/5/01	0.0064	52.32%	0.0057	1.22	49.80%	0.0030	0.0530	0.2908
80167	6/11/01	0.0006	47.25%	0.0001	0.65	50.20%	0.0016	0.0393	-0.0288
11308	10/30/01	-0.0009	47.26%	-0.0009	0.05	49.02%	0.0003	0.0222	0.0647
80023	8/26/02	0.0014	48.42%	0.0014	0.75	46.27%	0.0009	0.0293	-0.0190
70578	9/23/02	0.0006	51.56%	0.0004	1.23	48.63%	0.0004	0.0164	0.0915
80167	12/2/02	-0.0019	43.72%	-0.0023	1.00	45.88%	0.0009	0.0278	0.0249
83421	6/5/03	0.0008	51.18%	0.0005	0.59	46.67%	0.0003	0.0162	0.0941
80167	6/17/03	0.0004	45.66%	-0.0005	1.18	43.14%	0.0011	0.0299	0.0347
80023	1/28/04	0.0002	47.65%	-0.0014	0.68	47.06%	0.0011	0.0331	0.0872
85645	4/8/04	0.0012	55.87%	-0.0012	0.96	48.24%	0.0001	0.0094	-0.1747
80167	5/20/04	0.0006	50.38%	-0.0015	1.02	48.63%	0.0006	0.0236	-0.0733
80167	6/3/04	0.0003	49.61%	-0.0013	1.00	48.24%	0.0006	0.0233	-0.1012
70578	1/4/05	0.0010	49.63%	0.0004	0.77	48.63%	0.0001	0.0098	-0.1555
80167	4/5/05	-0.0006	48.04%	-0.0012	1.15	47.45%	0.0003	0.0167	-0.0174
80167	8/23/05	0.0008	49.21%	-0.0007	1.48	49.02%	0.0003	0.0142	-0.0306
88924	10/21/05	0.0021	56.64%	0.0010	1.65	46.27%	0.0003	0.0155	-0.1073
13856	11/21/05	0.0007	53.93%	0.0004	0.48	46.27%	0.0001	0.0080	0.0188
80928	12/20/05	-0.0007	41.37%	-0.0012	1.12	47.84%	0.0004	0.0174	-0.2819
26825	12/27/05	0.0002	51.57%	0.0000	0.37	52.16%	0.0001	0.0083	-0.1009

Table 5 Study 1. Green acquisition announcements, equally-weighted returns over the estimation period of 255 days ending ten days before the event day, market model estimation

Permno	Event Date	Mean Total Return	% of Raw Returns >0	Alpha	Beta	MM Residuals >0	Total Return Variance	Residual S.D.	Autoco-rrelation
90775	3/2/06	-0.0018	43.46%	-0.0023	0.57	52.50%	0.0004	0.0205	0.3059
80167	3/3/06	0.0011	49.23%	0.0003	1.2	46.67%	0.0002	0.0141	-0.1349
18729	3/21/06	0.0003	49.21%	-0.0001	0.59	49.41%	0.0001	0.0090	-0.1914
10516	4/4/06	0.0018	52.35%	0.0011	0.89	49.02%	0.0005	0.0212	-0.1617
52090	6/8/06	0.0001	52.71%	-0.0003	0.48	54.51%	0.0002	0.0125	0.0824
12209	7/31/06	-0.0001	46.48%	-0.0003	0.33	45.49%	0.0011	0.0336	-0.0979
13856	9/26/06	0.0007	51.95%	0.0007	0.19	48.24%	0.0001	0.0088	-0.0643
13856	11/21/06	0.0004	50.01%	0.0002	0.19	49.80%	0.0000	0.0084	-0.1038
80167	12/11/06	0.0014	54.71%	0.0007	0.97	48.63%	0.0003	0.0174	0.0102
80167	12/18/06	0.0016	55.90%	0.0008	0.99	48.63%	0.0003	0.0174	0.0141
11308	2/1/07	0.0007	50.81%	0.0005	0.44	45.49%	0.0001	0.0071	0.1875
84584	3/5/07	0.0019	51.18%	0.0013	0.82	41.57%	0.0002	0.0147	0.0387
70578	3/16/07	0.0006	47.26%	0.0003	0.69	48.63%	0.0001	0.0103	-0.1163
90775	4/23/07	0.0007	49.99%	0.0003	0.88	44.71%	0.0004	0.0182	-0.0563
34367	4/30/07	0.0008	53.54%	0.0001	1.18	49.02%	0.0003	0.0164	-0.1967
84325	5/17/07	0.0004	45.29%	0.0004	0.15	47.84%	0.0008	0.0285	-0.1264
80167	5/30/07	0.0005	51.94%	0.0001	1.02	51.37%	0.0003	0.0158	0.0278
70578	7/9/07	0.0005	50.40%	-0.0003	0.9	49.41%	0.0001	0.0094	-0.1178
82642	7/9/07	0.0008	51.58%	0.0001	0.91	44.31%	0.0003	0.0152	-0.0819
56274	7/23/07	0.0010	48.43%	0.0006	0.47	47.84%	0.0001	0.0094	0.0449
80167	8/6/07	0.0006	52.35%	-0.0003	0.94	52.16%	0.0003	0.0157	0.0448
11308	2/1/08	0.0011	56.67%	0.0013	0.54	47.06%	0.0001	0.0088	0.0857
70578	2/4/08	0.0004	51.59%	0.0008	0.98	45.49%	0.0002	0.0096	0.0047
52090	2/20/08	-0.0004	46.48%	-0.0002	0.75	44.71%	0.0002	0.0126	0.0185
56274	2/25/08	-0.0006	43.34%	-0.0003	0.69	47.84%	0.0002	0.0113	0.0170
42585	3/4/08	0.0003	51.93%	0.0005	0.75	45.88%	0.0002	0.0142	-0.0913

Table 5 Study 1. Green acquisition announcements, equally-weighted returns over the estimation period of 255 days ending ten days before the event day, market model estimation

Permno	Event Date	Mean Total Return	% of Raw Returns >0	Alpha	Beta	MM Residuals >0	Total Return Variance	Residual S.D.	Autoco-rrelation
80167	3/6/08	-0.0003	49.20%	0.0002	1.11	50.59%	0.0003	0.0149	-0.0590
17144	6/10/08	0.0003	50.39%	0.0005	0.59	49.80%	0.0001	0.0105	-0.0181
25320	7/1/08	-0.0004	49.61%	-0.0001	0.63	47.84%	0.0002	0.0131	-0.0968
90807	8/13/08	0.0021	53.91%	0.0025	0.86	47.45%	0.0008	0.0257	-0.0471
80928	8/25/08	0.0018	53.92%	0.0022	1.07	51.76%	0.0010	0.0298	-0.0703
10516	1/23/09	-0.0011	48.84%	0.0001	1.15	47.45%	0.0016	0.0314	0.0323
12209	2/9/09	-0.0001	50.78%	0.0011	1	49.41%	0.0015	0.0319	-0.0291
83421	4/2/09	0.0006	49.22%	0.0016	0.84	48.63%	0.0012	0.0276	-0.0028
88924	5/15/09	0.0000	48.05%	0.0002	0.49	49.80%	0.0008	0.0278	-0.0056
83421	6/15/09	0.0000	49.22%	0.0000	0.76	49.41%	0.0012	0.0297	0.0076
13856	8/12/09	-0.0004	50.00%	-0.0007	0.53	51.37%	0.0005	0.0206	0.0287
92449	10/23/09	0.0025	43.73%	0.0011	0.7	45.88%	0.0055	0.0723	-0.2505
90775	12/21/09	0.0019	52.35%	0.0009	0.37	43.92%	0.0005	0.0234	0.0370
80928	1/4/10	0.0027	50.40%	-0.0015	1.6	47.06%	0.0021	0.0363	0.0279
40416	3/25/10	0.0031	55.47%	-0.0006	1.03	50.20%	0.0005	0.0167	0.0240
18163	5/5/10	0.0011	55.10%	0.0000	0.47	45.49%	0.0001	0.0119	-0.0864
80928	6/1/10	0.0016	52.37%	-0.0009	1.39	50.59%	0.0007	0.0216	-0.1131
12209	9/23/10	-0.0004	47.27%	-0.0012	0.99	50.20%	0.0005	0.0179	-0.0123
17144	11/19/10	0.0006	51.95%	0.0001	0.4	47.06%	0.0001	0.0111	0.0012
91977	11/19/10	0.0024	55.11%	0.0013	0.86	46.67%	0.0003	0.0148	-0.0282
13856	12/8/10	0.0003	50.80%	-0.0002	0.49	49.80%	0.0001	0.0099	-0.0620
85951	12/16/10	0.0028	48.04%	0.0014	1.23	47.84%	0.0011	0.0309	-0.1090
80167	1/28/11	0.0018	51.95%	0.0008	1.09	47.06%	0.0004	0.0156	-0.0019
70578	7/20/11	0.0010	57.46%	0.0001	0.78	49.80%	0.0001	0.0097	-0.1752
80167	10/25/11	0.0012	51.60%	0.0012	1.16	43.92%	0.0004	0.0146	0.0029
17144	2/29/12	0.0006	53.93%	0.0005	0.34	48.63%	0.0001	0.0126	0.0125

Table 5 Study 1. Green acquisition announcements, equally-weighted returns over the estimation period of 255 days ending ten days before the event day, market model estimation

Permno	Event Date	Mean Total Return	% of Raw Returns >0	Alpha	Beta	MM Residuals >0	Total Return Variance	Residual S.D.	Autoco-rrelation
18163	3/15/12	0.0004	53.15%	0.0004	0.42	49.80%	0.0001	0.0110	0.1424
88924	5/31/12	0.0002	52.36%	0.0002	0.54	49.41%	0.0002	0.0137	-0.0253
92227	5/31/12	0.0009	44.52%	0.0011	1.21	47.06%	0.0012	0.0308	0.0268
80928	6/8/12	-0.0005	49.62%	-0.0003	1.67	52.94%	0.0009	0.0196	-0.0724
10026	6/8/12	0.0006	52.74%	0.0007	1.15	42.75%	0.0005	0.0144	-0.1153
25320	7/9/12	-0.0001	48.05%	-0.0001	0.41	47.45%	0.0001	0.0124	-0.0094
48531	9/5/12	0.0007	49.59%	0.0002	0.98	51.37%	0.0003	0.0126	0.0832
70578	9/27/12	0.0011	55.10%	0.0004	0.84	48.63%	0.0002	0.0087	-0.0457
32870	1/3/13	0.0004	56.29%	0.0001	0.54	51.37%	0.0001	0.0080	-0.0216
13188	1/10/13	0.0013	50.89%	0.0011	0.92	46.64%	0.0004	0.0178	0.0928
88924	1/11/13	0.0010	49.63%	0.0008	0.4	43.92%	0.0002	0.0148	0.1192
85951	2/27/13	-0.0002	45.68%	-0.0009	1.32	46.27%	0.0006	0.0224	-0.0949
84325	4/25/13	0.0018	49.22%	0.0015	0.62	46.27%	0.0005	0.0225	0.1112
91977	5/7/13	0.0016	58.62%	0.0010	1.04	49.41%	0.0002	0.0135	0.0744
13188	5/9/13	0.0014	53.56%	0.0008	1	47.06%	0.0003	0.0159	0.0198
25320	5/23/13	0.0014	54.72%	0.0011	0.5	47.45%	0.0001	0.0083	0.1728
91977	6/10/13	0.0014	57.04%	0.0004	1.04	49.41%	0.0002	0.0134	0.0537
90775	6/24/13	0.0008	52.38%	0.0001	0.68	48.24%	0.0002	0.0145	0.0661
88924	7/29/13	0.0018	51.99%	0.0011	0.71	42.75%	0.0002	0.0150	0.1019
80928	8/6/13	0.0010	54.72%	-0.0003	1.28	50.98%	0.0002	0.0119	0.0213
22840	9/3/13	0.0011	53.93%	0.0003	0.96	52.55%	0.0001	0.0101	-0.0544
13188	9/16/13	0.0015	55.90%	0.0005	1.17	46.67%	0.0002	0.0133	-0.0311
84325	9/24/13	0.0019	49.62%	0.0009	1.08	48.24%	0.0003	0.0168	-0.0042
91977	10/7/13	0.0009	54.31%	-0.0001	1.27	47.45%	0.0003	0.0136	0.0900
80928	10/7/13	0.0009	54.72%	-0.0002	1.38	48.24%	0.0002	0.0128	0.0527
13627	12/9/13	0.0016	53.94%	0.0005	0.93	49.80%	0.0003	0.0166	0.0307

Table 5 Study 1. Green acquisition announcements, equally-weighted returns over the estimation period of 255 days ending ten days before the event day, market model estimation

Permno	Event Date	Mean Total Return	% of Raw Returns >0	Alpha	Beta	MM Residuals >0	Total Return Variance	Residual S.D.	Autoco-rrelation
92227	12/23/13	0.0013	44.53%	-0.0010	2.01	48.63%	0.0010	0.0298	0.0293
13188	2/3/14	0.0017	58.61%	0.0004	1.2	46.27%	0.0002	0.0132	0.0571
13188	4/17/14	0.0011	56.70%	-0.0001	1.18	49.80%	0.0003	0.0147	0.0527
22840	4/21/14	0.0004	50.82%	-0.0003	0.79	49.41%	0.0001	0.0101	-0.1567
90775	4/21/14	0.0005	53.92%	-0.0004	0.92	51.37%	0.0002	0.0116	0.0860
80167	4/28/14	0.0014	53.54%	0.0002	1.4	49.02%	0.0003	0.0145	0.0291
10026	5/1/14	0.0011	52.76%	0.0002	1.05	50.20%	0.0002	0.0106	-0.0844
77730	5/29/14	0.0020	57.86%	0.0016	0.64	50.59%	0.0003	0.0154	-0.0193
90775	6/30/14	0.0007	54.32%	-0.0002	1.02	52.55%	0.0002	0.0118	-0.0078
32870	6/30/14	0.0009	55.90%	0.0002	0.81	45.88%	0.0001	0.0095	-0.0231
10516	7/7/14	0.0013	55.11%	0.0006	0.76	49.41%	0.0002	0.0116	-0.0625
42585	8/6/14	0.0001	50.81%	-0.0005	0.76	52.55%	0.0001	0.0095	-0.1062
17144	9/8/14	0.0004	54.73%	0.0000	0.55	53.73%	0.0001	0.0083	-0.0686
85951	9/8/14	0.0025	50.40%	0.0016	1.2	46.67%	0.0010	0.0302	-0.0120
13627	9/17/14	0.0025	52.76%	0.0016	1.12	40.39%	0.0004	0.0178	0.0103
80928	10/1/14	-0.0004	45.70%	-0.0010	1.04	44.71%	0.0002	0.0123	-0.1218
10516	10/13/14	0.0015	54.30%	0.0011	0.7	47.84%	0.0001	0.0111	-0.0032
85645	10/14/14	0.0007	53.94%	0.0003	0.98	44.71%	0.0002	0.0117	-0.1466
70578	12/19/14	0.0002	55.11%	-0.0001	1.01	47.84%	0.0001	0.0076	0.1747
16600	1/29/15	0.0005	51.98%	0.0004	0.53	49.41%	0.0001	0.0094	-0.0542
42585	2/3/15	0.0003	49.61%	0.0003	0.66	48.24%	0.0001	0.0087	-0.0358
90807	2/4/15	0.0004	48.44%	0.0004	1.05	47.45%	0.0004	0.0195	0.0893
89006	2/17/15	0.0004	51.56%	0.0003	0.67	48.63%	0.0001	0.0105	0.0279
80167	2/20/15	0.0011	49.61%	0.0008	1.07	46.67%	0.0003	0.0146	-0.0551
52090	2/20/15	0.0007	48.82%	0.0005	0.64	46.67%	0.0001	0.0085	0.0006
52090	3/9/15	0.0006	48.82%	0.0005	0.64	45.10%	0.0001	0.0085	-0.0201

Table 5 Study 1. Green acquisition announcements, equally-weighted returns over the estimation period of 255 days ending ten days before the event day, market model estimation

Permno	Event Date	Mean Total Return	% of Raw Returns >0	Alpha	Beta	MM Residuals >0	Total Return Variance	Residual S.D.	Autoco-rrelation
56274	5/12/15	0.0009	51.17%	0.0008	0.46	48.24%	0.0001	0.0120	0.0776
32870	5/26/15	0.0008	53.53%	0.0006	0.64	49.80%	0.0001	0.0104	0.0692
13627	6/9/15	0.0019	52.76%	0.0016	1.11	43.14%	0.0003	0.0157	-0.1655
25320	6/9/15	0.0005	51.58%	0.0003	0.62	49.02%	0.0001	0.0088	-0.0208
85645	7/8/15	0.0004	52.75%	0.0002	0.92	45.49%	0.0001	0.0084	-0.0179
80167	7/24/15	0.0016	52.76%	0.0016	0.89	49.02%	0.0002	0.0140	-0.1161
70578	8/13/15	0.0003	53.14%	0.0003	1.27	50.59%	0.0001	0.0084	0.1131
88924	9/9/15	0.0007	52.36%	0.0011	0.93	45.10%	0.0002	0.0128	-0.0592
13188	9/23/15	0.0026	47.66%	0.0030	1.33	43.14%	0.0006	0.0227	0.0804
10516	10/1/15	-0.0003	53.13%	-0.0002	1.1	50.98%	0.0002	0.0111	-0.0132
13818	11/24/15	0.0010	53.15%	0.0010	0.62	47.45%	0.0002	0.0122	-0.0414
17144	1/6/16	0.0006	52.37%	0.0007	0.74	47.84%	0.0001	0.0090	-0.0443
10516	2/2/16	-0.0016	49.62%	-0.0009	1.2	52.94%	0.0002	0.0117	-0.0956
88031	2/23/16	0.0003	49.61%	0.0007	0.72	47.06%	0.0005	0.0204	-0.0805
52090	4/19/16	0.0011	53.92%	0.0013	0.62	46.67%	0.0001	0.0103	0.0255
26825	6/16/16	0.0008	55.11%	0.0009	0.43	49.02%	0.0001	0.0112	-0.1004
26825	9/19/16	0.0010	56.29%	0.0009	0.36	50.59%	0.0001	0.0127	-0.1146
56274	9/26/16	0.0004	53.93%	0.0001	0.68	48.63%	0.0002	0.0122	-0.0684
13856	11/22/16	0.0005	52.77%	0.0004	0.4	52.94%	0.0001	0.0093	-0.1642
93179	11/29/16	0.0005	47.27%	0.0002	0.67	48.63%	0.0005	0.0210	-0.0151
91977	12/2/16	0.0010	50.77%	0.0007	0.44	42.35%	0.0006	0.0236	0.0643
85645	12/20/16	0.0010	54.71%	0.0007	0.49	52.94%	0.0002	0.0145	0.1174
83148	3/2/17	0.0008	44.53%	-0.0008	1.01	50.98%	0.0004	0.0178	0.0340
16593	3/29/17	0.0061	57.70%	0.0062	0.22	50.00%	0.0015	0.0393	0.2244
13188	4/18/17	0.0010	53.17%	0.0003	0.82	48.63%	0.0002	0.0128	-0.0440
83421	6/22/17	0.0001	48.80%	-0.0004	0.68	48.63%	0.0003	0.0166	0.0176

Table 5 Study 1. Green acquisition announcements, equally-weighted returns over the estimation period of 255 days ending ten days before the event day, market model estimation

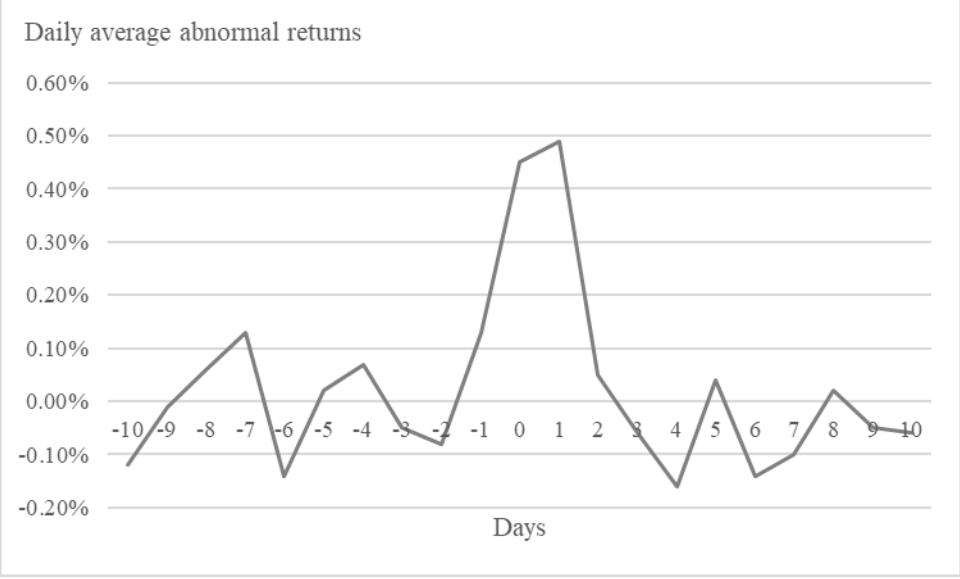
Permno	Event Date	Mean Total Return	% of Raw Returns >0	Alpha	Beta	MM Residuals >0	Total Return Variance	Residual S.D.	Autoco-rrelation
25320	7/6/17	-0.0004	51.56%	-0.0006	0.29	54.12%	0.0001	0.0125	-0.0418
91977	8/21/17	-0.0014	50.01%	-0.0020	0.94	57.25%	0.0003	0.0164	-0.0525
32870	10/31/17	-0.0006	52.75%	-0.0010	0.56	56.08%	0.0002	0.0123	0.0576
18163	11/15/17	0.0002	50.80%	0.0001	0.15	50.20%	0.0001	0.0086	0.0058
80167	12/4/17	0.0007	50.40%	0.0002	0.73	46.67%	0.0003	0.0172	0.0507
25320	12/18/17	-0.0003	54.71%	-0.0005	0.2	57.65%	0.0002	0.0148	-0.0639
70578	1/2/18	0.0005	55.11%	0.0002	0.57	54.90%	0.0000	0.0064	-0.1719
15785	2/1/18	0.0004	51.59%	-0.0003	0.89	50.98%	0.0004	0.0191	-0.0110
82279	2/2/18	-0.0005	51.18%	-0.0018	1.76	53.33%	0.0005	0.0214	-0.1823
18163	2/6/18	0.0003	50.79%	0.0002	0.11	49.02%	0.0001	0.0083	-0.0065
77730	2/14/18	0.0010	54.32%	0.0006	0.59	51.76%	0.0002	0.0123	0.0119
17144	2/23/18	-0.0004	47.66%	-0.0006	0.58	49.80%	0.0001	0.0115	-0.0253
46578	3/12/18	0.0000	57.44%	-0.0002	0.38	56.08%	0.0001	0.0107	0.0418
23393	3/13/18	0.0001	50.81%	0.0000	0.23	50.20%	0.0001	0.0108	0.0552
42585	4/4/18	-0.0002	50.00%	-0.0006	0.66	50.98%	0.0002	0.0135	0.0433
77730	5/15/18	0.0004	53.92%	0.0001	0.77	50.20%	0.0002	0.0122	0.0238
80928	5/21/18	0.0007	52.76%	-0.0001	1.47	53.33%	0.0003	0.0153	0.0227
13856	5/25/18	-0.0004	53.93%	-0.0007	0.42	58.04%	0.0001	0.0088	0.0612
77730	6/4/18	0.0008	54.33%	0.0003	0.78	50.20%	0.0002	0.0117	-0.0044
10516	7/23/18	0.0007	53.55%	0.0002	0.84	48.24%	0.0001	0.0100	-0.0009
11308	8/31/18	0.0002	53.15%	-0.0001	0.53	49.02%	0.0001	0.0080	0.0455
16600	9/12/18	-0.0002	51.58%	-0.0005	0.44	51.76%	0.0002	0.0125	-0.0887
11308	9/18/18	0.0001	52.36%	-0.0003	0.53	50.98%	0.0001	0.0081	0.0588
15408	9/24/18	-0.0011	44.91%	-0.0017	0.98	51.76%	0.0002	0.0120	0.0575
13856	10/31/18	0.0000	54.69%	-0.0001	0.43	54.12%	0.0001	0.0104	-0.0071
15408	11/29/18	-0.0013	46.10%	-0.0014	0.85	49.41%	0.0002	0.0144	-0.0445
Mean		0.0007	51.11%	0.0002	0.8	48.68%	0.0004	0.0168	-0.0172
Median		0.0006	51.58%	0.0002	0.77	48.63%	0.0002	0.0140	-0.0115

Table 6 Study 1. Event study analysis of short-term abnormal returns

Event Windows	Mean Return	Positive: Negative	Patel Z	Generalized Sign Z	Portfolio Time-Series (CDA)
0	0.45%	104:78	2.987***	2.284**	3.167***
(-1, 0)	0.58%	97:85	2.614***	1.246	2.857***
(0, +1)	0.94%	104:78	4.800***	2.284**	4.646***
(-1, +1)	1.07%	106:76	4.329***	2.581***	4.298***
(-2, +2)	1.04%	100:82	2.796***	1.691**	3.238***
(-3, +3)	0.93%	100:82	2.148**	1.691**	2.443***
(-4, +4)	0.84%	100:82	1.600*	1.690**	1.950**
(-5, +5)	0.90%	97:85	1.807**	1.245	1.890**

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Figure 3 Study 1. Average abnormal returns before and after green acquisition announcements



6.3 Effects of marketing and innovation capabilities

I tested the main and moderating effects proposed in H2−H4 with CARs in the three-day event window as the dependent variable since the event study results at the [-1, +1] window

generate the highest abnormal returns (Table 7). It also shows that both the main and full models have strong explanatory power, with 24.15% and 28.76% of the variance explained by the main model and full model, respectively. Additionally, the inverse Mills lambda has no significant effects in the two models (main effects model: β_{21} = -0.0114, p = 0.407; full model: β_{21} = -0.0139, p = 0.387), indicating that the likelihood a firm will announce green acquisitions is unlikely to bias market reactions.

Regarding the effects of marketing capability, the estimates show that marketing capability has a positive impact on positive market reactions to green acquisitions (main effects model: β_1 = 0.004, p<0.05; full model: β_1 = 0.004, p<0.05). This result indicates that firms with superior marketing capability would strengthen positive abnormal stock returns to green acquisitions. This supports H2, indicating that increasing levels of marketing capability will enhance the positive effect of green acquisitions on firm stock returns. The findings are consistent with extant literature on the critical role of firm marketing capability in enhancing financial performance through socially and environmentally responsible efforts. For example, Mishra and Modi (2016) identify the powerful role of marketing capability in increasing shareholder wealth from CSR. The supportive evidence for H2 highlights that signaling efficacy can be enhanced through strong marketing capability.

Regarding the effects of innovation capability, the results show that acquirers' innovation capability level has a significant negative effect on positive stock reactions to green acquisitions (main effects model: β_2= -1.922, p < 0.1; full model: β_2= -2.472, p < 0.01). Thus, H3 is supported. As predicted, increasing levels of innovation capability will dampen the positive effect of green acquisition on firm stock returns. The results show that although

high innovation capability may enable firms to utilize acquired green expertise more efficiently at a later date, green acquisitions by highly innovative firms appear to be more likely to raise concerns among investors at the time of announcements regarding resource misallocation or redundancy when firms decide to buy instead of make.

6.4 Moderating effect of industry environmental sensitivity

Regarding the moderating effect of industry environmental sensitivity, the results show a negative coefficient of the interaction term between marketing capability and industry environmental sensitivity (β_4 = = -0.002, p < 0.05). Furthermore, the interaction term between innovation capability and industry sensitivity also adversely affects stock returns (β_5 = -1.762, p<0.01). Therefore, H4a and H4b are supported, confirming that with increasing industry environmental sensitivity, marketing capability and stock market return relationship are less positive, while innovation capability and the stock market return relationship are more negative. These findings indicate that shareholders draw attention to not only acquiring firms' marketing and innovation capabilities but also how sensitive the acquirers' operating industries are to environmental regulations when assessing firms' green acquisition decisions. Firms in more sensitive industries face stricter scrutiny. Shareholders may consider them opportunistic and less reliable; therefore, firms with superior marketing capability in less environmentally sensitive industries have a better chance of communicating their green efforts and are more likely to build green credentials when announcing green acquisitions. Investors would value their green acquisitions more favorably. In contrast, firms with high innovation capability in more sensitive industries tend to dilute favorable investor valuation on their green acquisitions.

Table 7 Study1. Results of the cumulative abnormal return model

Dependent Variable: CARs (-1, +1)	Expected sign	Main effect model	Full model
		Estimate	Estimate
Intercept		0.0135	-0.0008
Main effects:			
H2: Marketing capability	+	**0.0038****	**0.0045****
H3: Innovation capability	-	**-1.9223***	**-2.4716*****
Moderating effects			
H4a: Marketing capability × Industry environmental sensitivity	-		**-0.0022****
H4b: Innovation capability × Industry environmental sensitivity	-		**-1.7616*****
Controls:			
Industry environmental sensitivity		-0.0030	-0.0055*
Prior acquisition experience		0.0002	0.0000
Green communication		-0.0044	-0.0049
ROA		0.0192	0.0162
Competitor green acquisitions		0.0012	0.0023
Market share		-0.0438**	-0.0368*
Industry concentration		0.0158	0.0095
Financial leverage		0.0025	-0.0032
Firm size		0.0005	0.0016
Financing		0.0323	0.0336
Relatedness		-0.0004	0.0022
Geographic scope		0.0001	-0.0021
Firm reputation		-0.0028	-0.0080
Inverse mills lambda		-0.0114	-0.0139
Year effect		Yes	Yes
Industry effect		Yes	Yes
F-value (p-value)		9.56***	7.81***
R-square		0.2415	0.2876

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$; N =182.

6.5 Robustness check

I conducted multiple additional analyses to confirm the robustness of the results.

Variation standardization. To address potential issues with the variation of the standard deviation of the variables, I standardized all variables and re-ran the regression analysis. The significance of the parameters did not change, thus indicating the robustness of the results (Table 8).

Alternative market portfolios and expectation model. I re-examined the findings from the event study using different market portfolios and expectation models. Specifically, besides equally-weighted market returns, I used market value-weighted market returns to calculate abnormal returns. The resulting CARs are significantly positive, which is in line with CARs in the original results. Furthermore, market-adjusted and Fama-French four-factor models were employed to assess the significance of CARs and the AR in different windows. Again, the results are highly consistent with those reported using the market model. In addition, I used additional nonparametric tests to examine the significance of CARs—Jackknife and Rank Test—which returned results similar to those of the parametric significance tests. The robustness check results of the event study can be found in Tables 9–11.

Table 8 Study 1. Regression with standardized predictors

Dependent Variable: CAR (-1, +1)	Expected sign	Main Model Estimate	Full model Estimate
Intercept		0.1071	-0.2166
H2: Marketing capability	+	0.2075**	0.2401**
H3: Innovation capability	-	-0.2573*	-0.3410***
H4a: Marketing capability × Industry environmental sensitivity	-		-0.1733**
H4b: Innovation capability × Industry environmental sensitivity	-		-0.3420***
Industry environmental sensitivity		-0.1194	-0.1759
Prior acquisition experience		0.0171	0.0052
Green communication		-0.0601	-0.0677
ROA		0.0317	0.0267
Competitor green acquisition		0.0425	0.0795
Market share		-0.3085**	-0.2588*
Industry concentration		0.1011	0.0602
Financial leverage		0.0093	-0.0128
Firm size		0.0253	0.0819
Financing		0.0891	0.0924
Relatedness		-0.0044	0.0278
Geographic scope		0.0002	-0.0234
Firm reputation		-0.0392	-0.1108
Inverse mills lambda		-0.0875	-0.1064
Year effect		Yes	Yes
Industry effect		Yes	Yes
F-value (p-value)		9.54***	8.01***
R-square		0.2416	0.2875

***$p < 0.01$;**$p < 0.05$; *$p < 0.1$; $N = 182$.

Table 9 Study 1. Event study results from market value-weighted market returns

Event Windows	Mean Return	Positive: Negative	Patel Z	Generalized Sign Z	Portfolio Time-Series (CDA)
0	0.44%	102:80	2.719***	1.947**	3.045***
(-1, 0)	0.56%	96:86	2.382***	1.057	2.790***
(0, +1)	0.95%	102:80	4.729***	1.947**	4.701***
(-1, +1)	1.08%	107:75	4.236***	2.688***	4.359***
(-2, +2)	1.02%	101:81	2.656***	1.798**	3.193***
(-3, +3)	0.89%	96:86	1.940**	1.057	2.357***

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 10 Study 1. Event study results from Fama-French four-factor model

Event Windows	Mean Return	Positive: Negative	StdCsect Z	Generalized Sign Z	Portfolio Time-Series (CDA)
0	0.44%	100:82	1.623*	1.688**	3.158***
(-1, 0)	0.55%	99:83	1.612*	1.540*	2.776***
(0, +1)	0.94%	102:80	2.862***	1.984**	4.726***
(-1, +1)	1.04%	103:79	2.935***	2.133**	4.302***
(-2, +2)	1.08%	97:85	2.199**	1.243	3.434***
(-3, +3)	0.90%	96:86	1.676**	1.095	2.424***

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Table 11 Study 1. Event study result: additional nonparametric test of significance

Event Windows	Mean Return	Positive: Negative	Rank Test Z	Jackknife Z
0	0.45%	104:78	2.818***	2.106**
(-1, 0)	0.58%	97:85	2.268**	2.300**
(0, +1)	0.94%	104:78	3.085***	2.992***
(-1, +1)	1.07%	106:76	2.743***	3.152***
(-2, +2)	1.04%	100:82	1.559*	1.916**
(-3, +3)	0.93%	100:82	1.101	1.349*

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Endogeneity and selection bias. As described in the methodology, I used a two-stage Heckman (1979) selection model to control for potential selection bias, owing to the possibility of systematic differences between firms that do and do not participate in green acquisitions. To examine the robustness of the selection model, I used an alternative match group to calculate the inverse Mills lambda. Specifically, I included all public firms that did not have green acquisitions in the same industry (four-digit SIC level) with the sample firms in the same year. I included the inverse Mills lambda from the resulting parameters in the regression model, which showed no significance. The rest of the results are consistent with the main findings. Further, I employ a one-year window before the announcement day to calculate explanatory variables when applicable. Otherwise, I use the fiscal year data before the announcement date (Borah and Tellis 2014).

Alternative model specification and other benchmark models. I included additional independent control variables in the regression to examine the stability of the results. Specifically, I included firm age, firm free cash flow, and Tobin's Q. Including these variables provided quite similar results. Additionally, I removed one of the two key independent variables each time and compared the three benchmark models (i.e., Model 1 includes only marketing capability and controls, Model 2 includes only innovation capability and controls, and Model 3 includes only control variables) with the proposed model. I compared R^2 and Akaike's Information Criterion (AIC), which adds a penalty when including additional variables. The results show worse performance when removing marketing capability, innovation capability, or both, indicating the hypothesized model performs best (Table 12).

Table 12 Study 1. Model comparison

	Model 1 Controls + Marketing effects	Model 2 Controls + Innovation effects	Model 3 Controls only	Proposed Model Controls + Marketing & Innovation effects
R-squared	0.2344	0.2401	0.1834	0.2876
AIC	-669.7467	-671.1037	-663.9975	-678.8478

Chapter 7

Study 1 Discussion, Limitations, and Future Research

In this study, I examined how green acquisitions affect firm value. Results from this research reveal how the stock market responds to green acquisition announcements. The effects of green acquisitions on firm value were investigated under different conditions. In particular, I observed that investors value green acquisitions favorably, as green acquisition announcements generate positive stock market returns. In addition, for firms with stronger marketing capability and weaker innovation capability, green acquisitions have a stronger positive effect on firm value. Moreover, the findings emphasize that industry environmental sensitivity buffers the role of marketing capability and catalyzes the role of innovation capability in the green acquisition−stock market return relationship. Overall, the results enable me to provide both theoretical and practical implications.

7.1 Theoretical implications

First, this study advances research on sustainability marketing and the marketing-finance interface. I extend the knowledge of stock market responses to a critical sustainability marketing strategy: green acquisition. It is the first study to examine the relationship between green acquisition and stock market return. Although researchers in other business fields have begun to draw attention to the CSR aspect of acquisitions (e.g., Aktas et al. 2011), marketing research is still silent on this topic. However, recent research examining relationships between sustainability initiatives and financial performance has

not always yielded positive results. A recent review study on the marketing-finance interface also finds that the impact of CSR investments on shareholder value is extremely mixed (Edeling, Srinivasan, and Hanssens 2021). For instance, Fisher-Vanden and Thorburn (2011) found a negative effect of firms' voluntary environmental initiatives on shareholder value, while Sadovnikova and Pujari (2017) found that the stock markets show a significantly negative reaction to green technology partnership announcements. However, some researchers have indicated that sustainability marketing strategies may not generate revenues overnight. Still, they can improve customer satisfaction (Luo and Donthu 2006), limit risks to the firm (Luo and Bhattacharya 2009), and enhance reputation of the firm in the long run (Mcwilliams and Siegel 2001). I found that the stock market responds favorably to green acquisition announcements. This research adds to this conversation in the literature, demonstrating that as a holistic and investment-intensive strategy, green acquisition is a remarkable corporate sustainability strategy and can generate great market returns in the short term. Furthermore, this study's findings call on marketing researchers to explore the subject of green acquisition since it has primarily been examined in other fields, such as finance and accounting. However, it is innately a sustainable marketing strategy.

Second, this study contributes to research on signaling through a broad set of CSR initiatives. Through a systematic review, Zerbini (2017) categorized CSR initiative signals into four types based on sender types (direct and indirect) and signal properties (dissipative and penalty). He found that corporate disclosure is the most often addressed dissipative and direct signal type. Meanwhile, many other signals have not been examined

in the literature. Dissipative signals suggest “high upfront costs regardless of the truth of a claim” (Zerbini 2017), while a direct signal implies the sender makes a claim directly. A green acquisition announcement is regarded as a direct and dissipative signal as it is a CSR initiative directly claimed by the sender and primitively involves enormous investment. This study fills this gap by examining the unexplored dissipative and direct signal of green acquisition and shows that it helps reduce information asymmetries and communicate signalers’ commitments. Thus, it is a salient CSR signal that prompts shareholder value.

Third, this study contributes to the research of marketing capability. I explored the effects of an acquiring firm’s marketing capability on the stock market response to green acquisition announcements. The results show that marketing capability significantly and favorably impacts the relationship between green acquisition and stock market returns. Although extant research has highlighted the salient role of marketing capability in the context of general CSR (e.g., Hirunyawipada and Xiong 2018; Mishra and Modi 2016), it has not considered marketing capability in the context of green acquisition. As Wiles et al. (2012) have argued, stronger marketing capability enables firms to generate greater cash flow from acquired assets. My findings echo this argument, confirming a strong positive link between marketing capability and green acquisition strategy.

Fourth, by investigating the role of firm innovation capability in green acquisitions, this study adds value to the literature on innovation and M&A. Extant studies have examined the relationship between firm innovation and acquisition strategy from different

perspectives. Saboo et al. (2017) found that innovation overlap positively affects acquisition performance. Prabhu et al. (2005) found that acquisitions can enhance acquiring firms' subsequent innovation. Moreover, Ahuja and Katila (2001) have posited that acquisitions could have mixed effects on firms' future innovation performance. Surprisingly, little research has examined the role of the acquirer's innovation capability in affecting market reactions to acquisition announcements. I extend this stream of research to a green acquisition context, documenting the negative impact of firm innovation capability on shareholder valuation of the green acquisition announcement. This finding provides researchers with a fresh viewpoint on understanding the complicated role of innovation capability in green initiatives. I demonstrate that firms with superior innovation capability may not be perceived as genuine green acquirers since acquisitions could lead to innovation resource redundancy or misallocation (Sears and Hoetker 2014) for firms with rich innovation resources. Thus, although innovation capability may boost firm performance in conventional acquisition relationships, the opposite may occur in a green acquisition context.

Finally, to my knowledge, this study is the first to find that different levels of industry environmental sensitivity to environmental regulations can impact the effects of marketing and innovation capabilities on firm market value. My findings show that industry environmental sensitivity may decrease favorable firm stock responses to green acquisitions. This buffers the marketing capability's positive effect and amplifies the innovation capability's adverse effect on stock returns. I contribute to a long-standing discussion on whether firms from environmentally sensitive industries can benefit from

green efforts. Berrone et al. (2017) have argued that firms in environmentally sensitive fields are more likely to be accused of low credibility in their environmental actions. Lenz et al. (2017) found that a firm's previous socially irresponsible behavior would make stakeholders perceive that firm's current socially responsible efforts as insincere, which makes CSR efforts less effective and can even undermine firm value. I add important evidence to this debate, highlighting the critical role of industry environmental sensitivity in building firm credibility in the eyes of investors.

7.2 Managerial implications

This study also offers practitioners valuable insights and practical implications. In the last few decades, firms have demonstrated a growing interest in environmentally sustainable strategies. In spite of this, managers still lack confidence in green investments' financial returns. The possibility of stakeholders' suspicion of greenwashing may impede firms' green efforts in making market performance stronger. This study offers compelling evidence that investors respond positively to green acquisition announcements. As involving considerable investments and risks, green acquisitions could convey a strong signal of green credentials to stakeholders. Thus, financially sufficient firms can prioritize green acquisition as an effective sustainability strategy. Furthermore, researchers have found that firms with stronger environmental and social commitments have shown better stock market performance during the COVID-19 pandemic (Albuquerque et al. 2020). This study provides solid evidence that green acquisitions will likely create a win-win

situation, which can help managers justify their choice of such an investment-intensive strategy.

Furthermore, the findings provide managers with suggestions regarding particular green strategies they should consider. The analysis indicates that firms with strong marketing capability have a better chance of reaping the benefits of green acquisition strategies. Meanwhile, firms with inferior innovation capabilities could rely on green acquisitions rather than internal innovation for green growth. On the contrary, firms with superior innovation capability could pursue other green strategies, such as developing their own green products instead of buying other green entities. This finding also responds to top management who question marketing function in value creation and reinforces the importance of marketing in organizations' functional hierarchy.

Finally, my research shows that industry environmental sensitivity buffers the positive influence of firm marketing capability and strengthens the negative effect of firm innovation capability on the green acquisition–stock value relationship. This finding has important implications for firms in environmental regulation-sensitive industries. Companies in sensitive industries should be aware that investors can become prudent and may not easily be convinced when confronted with green strategies (Sadovnikova and Pujari 2017). It is advisable to be aware of the potential limitations of the effects of organizational capabilities on green acquisition outcomes and conduct green practices with caution. More specifically, a firm with strong innovation capability in a sensitive industry should be the most alert if planning to engage in green acquisitions. However,

firms in less sensitive industries with low innovation capability or strong marketing capability are encouraged to proactively engage in green acquisitions because of the predominantly positive effect of green acquisition on firm stock value.

7.3 Limitations and future research

The study has a few limitations. First, I focused on consumer-oriented manufacturing industries, so the findings may not be generalizable to other industries. There is potential for future research to examine whether the findings of this study apply to other industries, such as the services industry. Second, limited by data availability, I only focused on the characteristics and performance of the acquirers in green acquisitions; I could not examine the target firms in this research on many characteristics. Future research could consider the impact of green acquisitions on target firms/brands compared to acquiring firms and how characteristics of target firms/brands may impact investors' valuation. For example, do target firms' carbon credits or third-party certification retard or heighten the genuineness of green acquisitions in investors' valuation? Third, rather than addressing the actual implementation of green acquisitions following announcements, this study examines how the stock market reacts to green acquisition announcements. It is unclear, however, whether this short-term positive stock market value is long-lasting or not. There is a need for future research to explore the long-term relationship between acquisition strategy implementation and post-green acquisition performance. Long-term oriented research can address the following questions: Could the acquiring firm continuously benefit from green acquisition? How do past green acquisitions shape stakeholders' future expectations for firms' efforts

to address green issues? Finally, I did not compare and evaluate how different green strategies (acquisitions vs. in-house innovation) work regarding building green portfolios and creating firm value. Future research could evaluate the effectiveness of different green strategies in affecting firm value, such as acquiring green products or brands, developing new green products in-house, upgrading conventional products with green attributes, and employing sustainable management systems.

Chapter 8

Study 2

Drivers of Green Innovation and Green Acquisition: Empirical Evidence from Food and Beverage Industries

8.1 Introduction

More than a decade ago, Lubin and Esty (2010) predicted that sustainability would become a megatrend in the business world, affecting all business functions and every employee. Nowadays, more and more corporations are embracing sustainability strategies. Firms in various industries have increasingly prioritized green innovation and green acquisition strategies. For instance, one of the critical roles of Nike's corporate responsibility committee is to stimulate sustainability-oriented innovation (Paine 2014). Nestle introduced new plant-based products (Kerencheva 2021), and Danone introduced plant-based baby formula (Borella 2022) to reduce its carbon footprint. Meanwhile, numerous firms go green by buying other green brands or firms. For instance, Coca-Cola acquired Organics & Raw Trading in 2018, and PepsiCo took over Bare foods in 2018. Food companies regularly acquire green food and beverage brands to expand their green product portfolios.

This study examines the drivers of green acquisition and green innovation strategies adopted by firms in response to growing sustainability trends. By examining the drivers of both green acquisition and green innovation, this research aims to compare how these

two main green strategies are affected by different external and internal factors. This comparison can shed light on the decisions behind each strategy and help firms determine which approach is best suited for their specific circumstances.

In the marketing discipline, extant research on corporate sustainability strategies mainly lies in two streams: responses to sustainability imperative manifested in the green marketing mix (Leonidou, Katsikeas, and Morgan 2013) and determinants and outcomes of corporate social and environmental responsibility efforts. Research on green marketing mix examines specific marketing practices related to sustainability, such as Corporate Social Responsibility (CSR)-related product pricing (e.g., Kim 2017), green promotional messages (e.g., Phau and Ong 2007), and eco-labeling (e.g., Sigurdsson et al. 2022). The latter stream of research focuses on organization-level sustainability strategies. For instance, Hoejmose et al. (2012) find that partner trust and top management team support are two key drivers of firms' engagement with green supply chain management. Longoni et al. (2018) argue that green human resource management and green supply chain management jointly affect firm environmental and financial performance. Additionally, there is a plethora of research that explores drivers and performance of firm strategies such as sustainability reporting and disclosure (e.g., Gonçalves et al. 2020; Herremans et al. 2016), green innovation, and green new product development (e.g., Claudy et al. 2016; Paparoidamis et al. 2019).

However, one of the areas in sustainability research in the marketing discipline that has remained unexplored is understanding the drivers of green acquisition strategy. Green acquisition strategy, an alternative to developing firms' own green technology and/or

marketing their own sustainable product offerings, is increasingly becoming prevalent. Thus, it is crucial to disentangle the underlying reasons that drive firms to engage in this strategy. Furthermore, there is a lack of research that compares firms' decisions behind green innovation and green acquisition strategies, despite the fact that both strategies involve significant investments and carry high levels of risk.

Though there is more research on green innovation than green acquisition, extant research regarding green innovation drivers primarily employs survey and case study methods (Oduro, Maccario, and De 2021). These methodological approaches may provide an in-depth understanding of the phenomena but suffer from social desirability bias of primary data and common method bias, and lack of generalization. To tackle these issues, I use a unique dataset combined from multiple secondary data sources to examine and compare the significant drivers of green acquisition and green innovation strategies.

This study makes several contributions in the fields of green innovation and green acquisition. With regard to green innovation, I contribute to the debate about the relationship between environmental regulation and green innovation (Odour, Maccario, and De 2021). Extant research acknowledges environmental regulations' critical role in encouraging green innovation behaviors (Berrone et al. 2013; Jiang, Wang, and Zeng 2020). I add to this long-lasting discussion by providing empirical evidence that the strictness of environmental rules may not stimulate firms to eco-innovate if the top management team's commitment towards sustainability is absent. Additionally, this study sheds light on our understanding of how media attention influences firms' decision-making on green innovation and green acquisition. Previous research is unclear

concerning the salient power of media in affecting firms' investments in green efforts. I demonstrate the positive relationship between media attention and green innovations (acquisitions). I also offer insights on the moderating role of the top management team's sustainability commitment in affecting green acquisition engagement when facing media attention. Finally, I provide practical implications for environmental regulators and firm managers.

Specifically, this study aims to answer two key questions. First, what external factors motivate firms to adopt specific green approaches (i.e., green innovation and green acquisition)? Second, how do internal factors moderate the external driving effects in firms' strategic decisions with regard to green acquisition and green innovation? The rest of this study is organized as follows. I first develop a theoretical framework and hypotheses in the next section. I then present the methodology and results. Finally, I discuss theoretical and practical contributions and limitations.

Chapter 9

Study 2 Hypotheses Development

9.1 Green innovation vs. green acquisition

Several terminologies, such as green innovation, eco-innovation, and environmental innovation, are used interchangeably in the literature. By comparing those definitions of eco-innovation, environmental innovation, and green innovation, Schiederig et al. (2012) find "minor differences in their descriptive precision." I adopt the green innovation terminology in this study. While green innovation can be further defined with respect to products, processes, and organizations, this study draws the green innovation concept from Kemp and Pearson (2007), who describe it as developing or adopting new products, services, production processes, or business methods that reduce environmental risks, pollution, and negative impacts of resource use, including energy consumption, compared to other alternatives. This definition stresses the integrated efforts of a firm's innovation in products and production processes to decrease negative environmental impacts (Lee and Min 2015). I do not further differentiate subtypes of green innovation because, by nature, one type of innovation (e.g., green product innovation) may comprise other types (e.g., green process innovation, packaging innovation, or organizational innovation). For example, conducting a new green product innovation project may involve re-arranging production activities and reassigning R&D team members. This definition also echoes Chen et al. (2012), who describe green innovation as the enhancement of products or processes that promote energy efficiency, pollution reduction, waste recycling, eco-

friendly product designs, and environmental management practices. With aims to reduce pollution and save energy, green innovation has a pivotal feature – dual externality. Dual externality refers to the idea that green innovation can not only provide firms with commonly expected innovation benefits such as advanced technologies and systems but also benefit stakeholders in terms of a cleaner and safer natural environment (Chen et al. 2018).

Because of the sporadic research on green acquisition, there is no established definition for this corporate green strategy. As defined in the literature review chapter, green acquisition means acquiring target firms possessing green brands, green product or service lines, or green business units to obtain and develop competitive advantages (Liang et al. 2022; Lu 2022; Sun and Liu 2022). A prominent phenomenon of green acquisition is that consumer goods companies such as General Mills and Hain Celestial have been acquiring natural and organic product brands since the 21st century.

A significant amount of research has explored the relationship between corporate green strategies and firm performance. Growing evidence shows that firms' green initiatives positively affect a firm's financial and market performance, such as positive stock returns and improved brand attitudes (e.g., Olsen et al. 2014; Sadovnikova and Pujari 2017). However, little attention has been given to the decisions of different green strategies. Making or buying are the two most salient corporate strategies for broadening business portfolios and strengthening competitive advantages. PwC reports 50368 mergers and acquisitions worldwide, valuing more than $3.24 trillion in 2020 despite the influence of Covid-19, and witnesses continuing growth in 2021 (PwC Global 2021). Statista (2021)

reports approximately 2.23 trillion U.S. dollars were spent on research and development (R&D) globally in 2018. Similarly, in the green context, green acquisition and green innovation require considerable resource inputs, including investment in specialized employees and substantial cash flow. Constrained by limited resources, it is crucial for firms to decide what strategy they should pursue and when they should make a move.

Overall, it is critical to address and compare drivers of green acquisition and green innovation strategies. Both strategies are increasingly popular among firms to achieve sustainability goals, and thus it is important to understand the factors that motivate firms to choose these strategies. Moreover, comparing drivers of green acquisition and green innovation strategies can shed light on how firms make strategic decisions. Finally, this study fills a gap in the literature by exploring the drivers of green acquisition, which have received little attention compared to the extensive research on green innovation.

9.2 Corporate environmental legitimacy

Institutional theory suggests that firms operate within a larger societal context, and their legitimacy is established by stakeholders' perception of the firm within that context (Press, Robert, and Maillefert 2020). Those stakeholders include customers, the media, competitors, and regulators, among others. Building on institutional theory, the legitimacy-oriented perspective stresses the prominence of legitimacy for firms' survival and long-term competitiveness (Schaltegger and Hörisch 2017). Sustainable practices have been increasingly recognized as valuable instruments to enable firms to strengthen their ability to survive and improve corporate legitimacy (Bansal 2000; Campbell 2007;

Lyon and Montgomery 2013; Press, Robert, and Maillefert 2020). Specifically, firms with environmental legitimacy are less likely to encounter unsystematic risks (Bansal and Clelland 2004). Corporate environmental legitimacy means that a company's environmental performance is perceived or assumed to be desirable, proper, or appropriate (Bansal and Clelland 2004). Firms seek to achieve environmental legitimacy through various socially and environmentally responsible activities. External stakeholders force pressure on firms and influence firms' sustainable decisions in terms of extent and scope (Lyon and Montgomery 2013). Stakeholder pressure is considered the vital driver of firms' socially and environmentally responsible efforts (Singh et al. 2022). This study examines two prominent external drivers – environmental regulation stringency and media attention and disentangles how those drivers operate in varying circumstances, particularly whether firms have top management teams' commitment toward sustainability.

9.3 The effect of environmental regulation stringency

Managers consider regulators critical stakeholders as they can significantly influence the firm behaviors, for example, by implementing strict tax policy (Kassinis and Vafeas 2006). In traditional economics, "command and control" regulation is a prominent policy instrument to stimulate corporate investments in specific processes and strategies to mitigate environmental impact and achieve environmental goals (Ford, Steen, and Verreynne 2014; Hojnik and Ruzzier 2016). Mandatory environmental regulations force tremendous enforcement pressure regarding frequent inspections, substantial penalties, and compliance costs. In addition, rigorous and frequent regulatory enforcements also

harm firms' public reputation, which impels firms to take initiatives to reduce negative impacts (Khanna, Deltas, and Harrington 2009).

Michael Porter proposed the well-known Porter Hypothesis thirty years ago, which explains how environmental regulations enhance firm competitiveness and drive green innovation (Porter 1991). Over the past three decades, great attention has been drawn to examining the Porter Hypothesis in various disciplines, such as innovation, strategic management, and sustainability. With conflicting pieces of evidence, there is still no consensus on how environmental regulation impacts green innovation. However, the weak version of the Porter Hypothesis has been widely acknowledged among researchers, which states that well-designed regulations may motivate innovation. An early and prominent study on regulatory cases concludes that a high regulation stringency evokes more innovative compliance responses (Ashford, Ayers, and Stone 1985). Further, in a review paper, Leitner et al. (2010) summarize that substantial research has confirmed the pivotal role of strict regulation in stimulating eco-innovations by drawing from various theories such as agency theory and boundary rationality.

Additionally, Lanoie et al. (2011) use firm survey data from OECD nations and show a significantly positive relationship between the level of environmental regulation stringency and environmental innovation. Using secondary data from China, Zhao and Sun (2016) also find that environmental regulation significantly affects corporate innovation. In a systematic review paper, Bossle et al. (2016) also conclude from twenty studies that perceived regulation pressure and rigorous regulations could promote eco-innovation. More importantly, environmental regulation is considered a multidimensional

construct, including but not limited to strictness, predictability, and the combination of different policies. In a meta-analysis, Ghisetti and Pontoni (2015) find that regulation stringency is a salient determinant of environmental innovation among different elements of environmental policy. Sometimes, merely the prediction of potentially stringent environmental regulations can provide sufficient motivation for firm green innovation (Khanna et al. 2009). For example, in the 1990s, sensing that lead might be banned by government regulations as a toxic material, Hewlett-Packard experimented and developed alternative materials and innovated environmental-friendly solders, which complied with hazardous substance regulations of the European Union enacted in 2006 (Nidumolu, Prahalad, and Rangaswami 2009). Therefore, I argue that firms subject to more substantial pressure from stricter regulations are more willing to participate in green innovation activities.

Firms can comply with strict regulations and reduce environmental pressure not only through conducting green innovations but also through acquiring a green firm to utilize its environmental capabilities (Berchicci et al. 2012) and cleaner technology (Fikru and Insall 2016). Green target firms can reduce the risk perceived by potential acquirers as they possess valuable intangible assets which meet governance standards (Gomes 2019). For example, to comply with a state regulation that bans manufacturers from using a particular type of plastic package, some firms may innovate recyclable materials as substitutes; others may acquire a green firm that provides the required eco-friendly materials. Strong environmental features of targets lower the potentially detrimental environmental outcomes (Gomes 2019), thereby alleviating firms' future compliance

costs and reinforcing firms' environmental legitimacy. Additionally, sufficient extant research finds a positive relationship between firms' environmental initiatives and regulation stringency (see, for example, Lee et al. 2018; Lin and Ho 2011; Walker et al. 2014). Berrone et al. (2013) also find that regulatory pressure is the main driver for firms to engage in green initiatives. Therefore, I propose that firms are more likely to engage in green acquisition in response to stringent environmental regulations.

H1a. Firms are more likely to engage in green innovations when facing stringent environmental regulation pressure.

H1b. Firms are more likely to engage in green acquisitions when facing stringent environmental regulations.

9.4 The effect of media attention

Along with the increasing public awareness of environmental and sustainability issues, stakeholders have started drawing attention to corporations' roles in developing a sustainable society. Public attention exerts notable influence on firm behaviors by providing liable and actionable criteria (Yao et al. 2019), which drives firms to deal with environmental challenges in a proactive manner. Although classified as a secondary stakeholder, the media can be given greater attention than primary stakeholders, such as customers, due to its high visibility (Maignan, Ferrell, and Ferrell 2005). A 2019 Deloitte survey of global leaders finds that 13% of leaders pursue business social responsibility due to media attention (Deloitte 2020). Increasingly, firms commit to green investments to sustain their social license, which is the demands and expectations placed on a business

by its surrounding civil society, including neighborhoods, environmental groups, and communities (Gunningham, Kagan, and Thornton 2004), and prolong their viability even under some unprofitable circumstances (Ford, Steen, and Verreynne 2014). Firms' environmental investments bring greater social approval, allowing firms to benefit from differentiated products, positive green reputations, and superior profits (Aguilera-Caracuel and Ortiz-de-Mandojana 2013).

Firms assess the social acceptance of their brands or products and proactively respond to the intense public attention by committing to various sustainable activities (Gunningham, Kagan, and Thornton 2004). Yang et al. (2019) find a positive relationship between perceived social pressure and firms' proactive environmental strategy. Specifically, media attention is increasingly considered an essential driver of firms' socially responsible endeavors (El Ghoul et al. 2019; Nikolaeva and Bicho 2011; Zyglidopoulos et al. 2012). The mass media plays a pivotal role in improving transparency and legitimacy to facilitate environmental governance (Castka and Corbett 2016) and build corporate image (Maignan, Ferrell, and Ferrell 2005). Intensive media attention regarding environmental issues pushes firms to seek cognitive legitimacy (Yang et al. 2019) through increasing consonance between environmental practices and social expectations of corporate stewardship (Yao et al. 2019). Firms whose sustainable activities have more media attention are more likely to make their green efforts visible to different stakeholders. For those firms under a high level of media scrutiny, investment-intensive green strategies such as green acquisition and green innovation allow firms to communicate their sustainable commitment in a genuine manner. Green acquisition involves significant

publicly visible processes such as bidding and intended offering and, thus, guarantees acquirers more opportunities to signal their green efforts.

Moreover, acquired green targets are usually appreciated for their green brands or technologies, which provide acquirers legitimacy for building an authentic green image. Meanwhile, massive media exposure and education make consumers willing to pay premiums for eco-friendly products. Therefore, firms are motivated to eco-innovate and conduct more green innovation projects (Doran and Ryan 2012). Guoyou et al. (2013) find a positive relationship between stakeholder pressure and firms' green innovation strategy. Kesidou and Demirel (2012) also stress the power of public calls for corporate social/environmental responsibility and consumer demand for eco-friendly products and processes to facilitate firms' investments in environmental innovation. Therefore, firms are more likely to engage in noticeable and costly green strategies under massive media attention. Thus, I propose the following:

H2a. Firms are more likely to engage in green innovations when facing more media attention.

H2b. Firms are more likely to engage in green acquisitions when facing more media attention.

9.5 The effect of environmental regulation stringency with the presence of the Top Management Team's sustainability commitment

Top Management Team's (TMT) sustainability commitment refers to "the extent of senior-level managerial commitment, support, and leadership in the pursuit of corporate

environmental preservation and deployment of corporate environmental practices" (Katsikeas, Leonidou, and Zeriti 2016). Huang and Wu (2010) note that TMT sustainability commitment plays a vital role in developing proactive environmental strategies since the top management team views environmental investments as a source of competitive advantage rather than an inevitable environmental cost (Huang and Wu 2010). Similarly, such environmental awareness could enable the top management team to motivate employees to embrace green values (Katsikeas, Leonidou, and Zeriti 2016) and favorably affect the organization's response to environmental issues with respect to scope and speed (Tseng et al. 2013). Echoing this thinking, Pujari et al. (2003) and Katsikeas et al. (2016) also argue that the environmental commitment of the top management team positively affects firms' eco-friendly product development strategy.

Under a high level of environmental regulation stringency, firms' top management teams committed to sustainability have more power to justify their consideration of the interests of broader stakeholders through environmental efforts (Kanashiro and Rivera 2019). Firms are pressured to seek environmental legitimacy through appropriate environmental practices. In order to achieve a certain degree of legitimacy, firms' decisions of green strategy have to meet several criteria. First, the strategy is highly visible and easily evaluated by the general public. Both green innovation and green acquisition meet this standard as they will be communicated by the firm or a third party at some point in the process.

Second, the strategy decision cannot be seen as an opportunistic behavior, from which the TMT can benefit in the short term and neglect the long-term consequences. Based on

agency theory, the top management team may have myopic goals to get more control power and higher compensation than considering firms' long-term performance (Ho, Kim, and Reza 2022; Piesse et al. 2013). Green innovation usually involves considerable research and development time and is long-term targeted. Additionally, the public can only observe and evaluate the green innovation effort when the invention is patented or commercialized. While green acquisition may show firms' green commitment at the time of the announcement, its long-term outcome is uncertain as the entire acquisition process can be complicated and takes years to complete. Therefore, green innovation is usually long-term oriented and provides TMT significant legitimacy. Thus, it is more likely to be legitimized by stakeholders among different environmental efforts and enhance firm accountability. In contrast, it is more difficult for TMT to rationalize its decision to engage in the green acquisition strategy.

Last, the chosen strategy should strengthen firms' competitive advantages. Compared to green acquisition, green innovation strategy is more difficult for rivals to imitate as it involves investing in or reconfiguring various resources and capabilities. Overall, I argue that a firm with TMT committed to sustainability is more likely to engage in strategies that improve a firm's environmental legitimacy and strengthen competitive advantages under a high level of environmental regulation stringency. Therefore, I propose the following:

H3a. Under a high level of environmental regulation stringency, firms with TMT committed to sustainability are more likely to engage in green innovations.

H3b. Under a high level of environmental regulation stringency, the presence of TMT committed to sustainability does not affect the likelihood of engaging in green acquisitions.

9.6 The effect of media attention with the presence of the Top Management Team's sustainability commitment

One crucial goal of a sustainability-committed firm is to develop the firm's green capabilities, which can be achieved by engaging in green initiatives such as green innovations (Huang et al. 2016). Through innovating green products and developing green manufacturing processes, firms can demonstrate their genuine commitment to environmental sustainability to the strict scrutiny of the media. Therefore, senior management with environmental concerns in mind has a stronger willingness to invest in environmental innovations when facing greater media attention (Hojnik and Ruzzier 2016; Pujari, Peattie, and Wright 2004).

To achieve sustainable development, firms with TMT sustainability commitment may employ long-term strategies, such as green innovations. On the other hand, green acquisition announcements may raise concerns about greenwashing among stakeholders**.** Although green acquisitions address considerable public attention at the moment of the announcement, the corresponding implementations are not always satisfactory. Sometimes cultural conflict can be exacerbated in the green acquisition context since the acquired green firms likely have idealistic founders and employees (Unruh and Ettenson

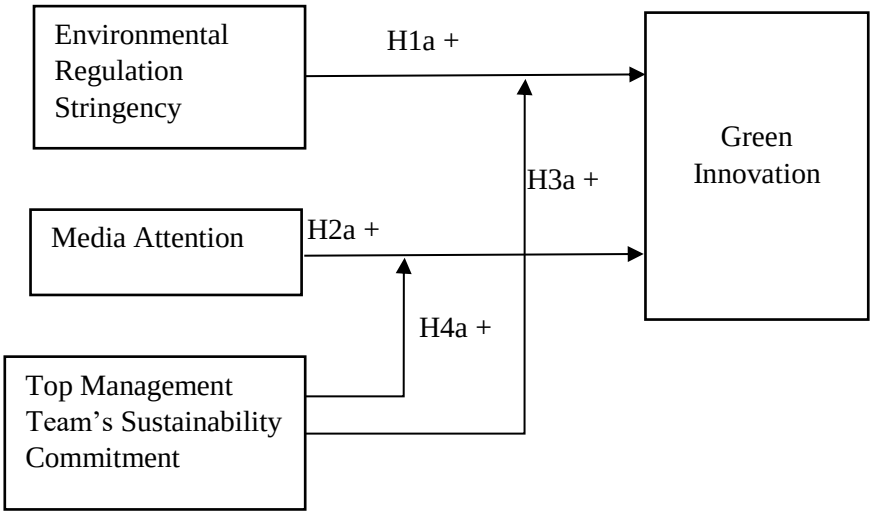
2010). The potential misfit between the two organizations may raise critical concerns about the acquirers' green credentials in the media.

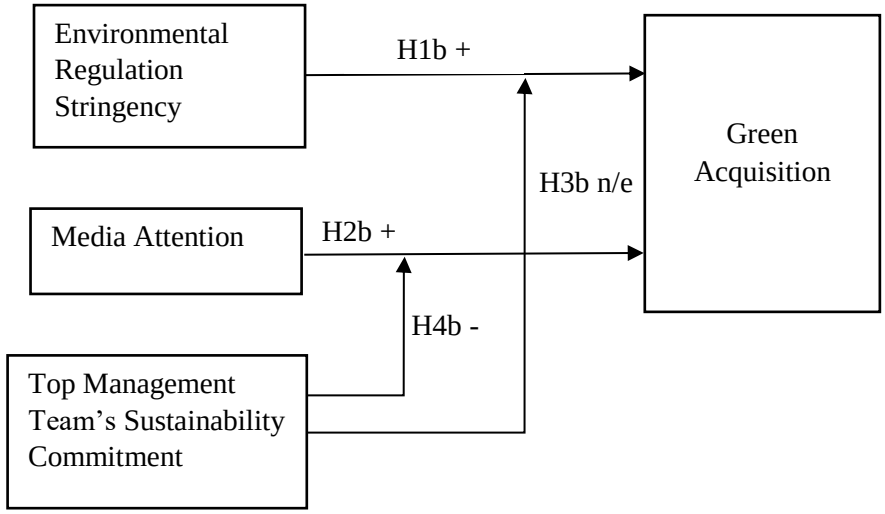
Moreover, green target brands' customers and community may ask sharp questions about the new owner in terms of whether the acquirer can maintain the green spirit of the brand. If the acquired brands or products' sales worsen after the acquisition, the acquirer may be questioned about his motivation and endanger its reputation (Unruh and Ettenson 2010). Drawing from upper echelons theory, which suggests a company's strategic decisions are influenced by the values and characteristics of its TMT (Hambrick and Mason 1984), I argue that TMT with a commitment to sustainability may be more risk-averse when it comes to making acquisitions, especially if there is increased media attention on environmental issues. They may view green acquisitions as riskier, as they may face more scrutiny and negative publicity if the acquisition is not seen as environmentally friendly or sustainable. Overall, the sustainability-committed top management team is more sensitive to possible unexpected results of the acquisition implementation. Therefore, when facing intensive media attention, sustainability-committed TMT may be more cautious when deciding whether to acquire a green firm or brand. Hence, firms' strong willingness to engage in green acquisitions may be softened with TMT commitment to sustainability. Overall, I propose the following:

H4a. Under more media attention, firms with TMT committed to sustainability are more likely to engage in green innovations.

H4b. Under more media attention, firms' likelihood of engaging in green acquisitions will be weakened with TMT committed to sustainability.

Figure 4 Study 2. Theoretical Model





Chapter 10

Study 2 Research Methodology

10.1 Sample data and measures

I test the hypotheses by assembling data from the food and beverage industry (two-digit SIC: 20) from 2001 to 2018. The food and beverage industry has been facing escalating pressures to fulfill sustainability expectations (Brulhart, Gherra, and Quelin 2019), which makes it an appropriate research subject. The sample data are identified and collected from multiple sources, including the SDC Platinum database, the United States Patent and Trademark Office (USPTO) database, Compustat, and Lexis-Nexis. The final sample includes 1565 firm-year observations.

10.1.1 Dependent variables

There are two dependent variables since I have two green strategies under study. The first dependent variable equals one when a firm engages in green innovation in a specific year. The second dependent variable equals one when a firm has a green acquisition in a particular year. In line with prior literature, I identify the successfully granted green patents (i.e., green innovations) from the USPTO database. I contend that the green patent is an adequate proxy for firm green innovation efforts since patent innovations demand substantial investments of time, effort, and capital for the research, and their environmental impacts may take a long time to materialize for the firm (Berrone, Fosfuri, and Gelabert 2017). I systematically collect a list of keywords for the green patents search. I initially ran a literature review and compiled a list of green-related terms (e.g.,

recyclable, reusable, energy-saving, etc.) often adopted in green innovation literature (e.g., Li et al. 2018; Watson et al. 2018). I combined the list of green keywords with the names of some big food firms in the sample and manually searched in the USPTO database, which generates hundreds of patents. I then examined these patents' titles and abstracts and listed dozens of additional terms repeatedly used to describe these patents' environmental-related characteristics (e.g., biodegradable and low-carbon). I combined the newly identified terms with the original keyword list as a finalized search list. I applied a truncation wildcard ("$") on the right side of each search term to retrieve words that begin with a certain string. For example, words such as "recycle," "recyclable," "recycled," and "recycling" can be retrieved by using "recycl$." A whole list of truncated search keywords can be found in Appendix 2. I then used Python software to apply the web-scraping technique to collect potential green patents of the sample firms from the USPTO database website. I read through each firm's patent abstracts and descriptions and disregarded those non-qualified ones. I assigned the green innovation variable a value of one if a firm has at least one green patent in a year. Examples of green patents can be found in Appendix 4.

I use green acquisition events collected in study 1 to assemble the green acquisition variable. Confounding events disregarded in study 1 are included as valid green acquisitions in study 2 since the stock market value is not the research focus in this study. I assigned the green acquisition variable a value of one if a firm has at least one green acquisition announcement in a year.

10.1.2 Independent variables

Environmental regulation stringency. Government monitoring and enforcement coerce firms to comply with environmental regulations. I contend that industries with greater incidences of enforcement activities are a reflection of more stringent environmental regulations in those industries. I captured the environmental regulation stringency using the case enforcement data provided by the Enforcement and Compliance History Online (ECHO) data sets. ECHO is a public database run by the United States Environmental Protection Agency (EPA), which provides data detailing enforcement activities related to federal environmental laws. I accumulated the yearly case enforcement counts by industry at the 3-digit SIC level. Following Ho-Dac et al. (2020), I then normalized the count data using natural log transformation.

Media attention. I used the total count of media mention as a proxy for sustainability issue-related attention from the media press. Following Nikolaeva and Bicho (2011), I used LexisNexis to search for sustainability topic-related news. I created a list of relevant green keywords by conducting a literature review and collected commonly adopted searching terms (e.g., sustainability and environmental-friendly). To ensure the keyword list is as exhaustive as possible, I searched news using the keyword list combined with various food companies such as General Mills and PepsiCo. I then identified dozens of frequently -used terms to describe environmental issues (e.g., environmental stewardship and environmental footprint) to complement my list from the literature. Finally, I searched the finalized keyword list together with each focal firm and summed the total

number of news in the aggregate news sources, news transcripts, and newspaper categories. A complete list of search keywords can be found in Appendix 3.

Top management team's sustainability commitment. I use the presence of a Chief Sustainability Officer (CSO) as a proxy for the firm's TMT sustainability commitment. The appointment of a CSO is "an administrative mechanism firms may use to improve information flow and strengthen the link between its environmental strategy and implementation" (Dixon-Fowler, Ellstrand, and Johnson 2017), which shows firms' attention to environmental protection issues (Kanashiro and Rivera 2019), thus, provides strong evidence of firms' TMT commitment to sustainability. A senior management role responsible for environmental matters uses different names, including but not limited to CSO, VP of Sustainability, Director of Environmental Sustainability, etc. I collect appointment announcements of chief sustainability positions from various sources, including LexisNexis, Google News, and firm websites.

10.1.3 Control variables

Following extant literature on green strategy determinants, I control for firm-specific characteristics that may affect strategic decisions, such as previous innovation and acquisition experience, firm size, slack resources, financial leverage, R&D inputs, and marketing inputs. Firm previous innovation experience and acquisition experience may increase firms' propensity to engage in similar activities (Warren and Sorescu 2017); larger firms and firms with more capital may have more resources to devote to green strategies (Galbreath 2019b); firms with rich slack resources may adapt fast and effectively to new strategic choices (Huang and Chen 2022). Finally, firm research and

development and marketing can influence firms' strategic emphasis. I also control industry concentration and include year-fixed effect and industry-fixed effect.

I use the data from the year before the green acquisition (innovation) events to operationalize the independent variables so as to create a natural time lag to control potential endogeneity. Table 13 presents the variables, operational measures, and data sources.

Table 13 Study 2. Variables, measure operationalization and data sources

Variable	Operational Measure	Data Source
Dependent Variable		
Green acquisition	Dummy variable: equals 1 if the firm has engaged in green acquisition in year t	SDC Platinum database
Green innovation	Dummy variable: equals 1 if the firm has engaged in green innovation in year t	USPTO database
Independent Variables		
Environmental regulation stringency	Natural logarithm of the total case enforcement counts by industry in year t-1	Enforcement and Compliance History Online datasets
Media attention	Natural logarithm of the number of total news of the focal firm together with green-related keywords in year t-1	LexisNexis
Top management sustainability commitment	Dummy variable: equals 1 if the firm has a Chief Sustainability Officer	LexisNexis, Google news, and firm websites
Control Variables		
Prior acquisition experience	Dummy variable: equals 1 if the firm has green acquisitions in the prior year	SDC Platinum database

Prior innovation experience	Dummy variable: equals 1 if the firm has green innovations in the prior year	USPTO database
Industry concentration	Herfindahl Index (Sum of the squares of the market shares of all firms in the industry)	Compustat
Firm R&D inputs	Firm research and development expenses to total assets	Compustat
Firm marketing inputs	Firm selling, general and administrative expenses to total assets	Compustat
Firm size	Natural logarithm of a firm's sales	Compustat
Slack resource	The ratio of a firm's current assets to its current liabilities	Compustat
Financial leverage	The ratio of a firm's long-term debt to its total assets	Compustat
Industry effect	Industry SIC dummies	Compustat
Year effect	Acquisition (innovation) year dummies	LexisNexis, USPTO

10.2 Decision model using two-stage control function approach

Sustainability committed TMT affects a firm's green strategies and may make these decisions strategically. TMT decisions may be affected by various factors, leading their decisions endogenous. Thus, a control function approach is employed to address potential endogeneity issues (Chen, Yan, and Smith 2023). The control function approach also takes account of endogenous variables in interaction terms (Rutz and Watson 2019).

In the first stage of the control function approach, an auxiliary estimation is conducted where the endogenous variable – TMT sustainability commitment – serves as the dependent variable. Peers' strategy of the dependent variable is used as the main instrumental variable that could satisfy the exclusion restriction by correlating with TMT sustainability commitment but not with the unobserved drivers of green strategy decisions (Chen, Yan, and Smith 2023). The use of peer strategy as an instrumental variable is a common approach (Sridhar et al. 2016; Chen, Yan, and Smith 2023). I anticipate a strong correlation between a focal firm's TMT commitment and the average commitment made by other firms in their peer group (i.e., firms in the same industrial sector). This correlation is expected because firms are likely to look to their peers for guidance in their decision-making (Chen, Yan, and Smith 2023). The significance of the identified instruments as the driver of TMT's strategic decisions is crucial for establishing the validity of the control function approach (Sridhar et al. 2016). Auxiliary estimation results are presented in Table 14.

Table 14 Study 2. Auxiliary regression

Dependent variable: TMT sustainability commitment	Estimate
Instrumental variable:	
Peers' average TMT sustainability commitment	0.217***
Prior innovation experiences	0.091***
Prior acquisition experiences	-0.005
Industry concentration	0.081***
Firm size	0.018***
Financial leverage	-0.004
Current slack	-0.005
R&D inputs	0.176
Marketing inputs	0.012*
Constant	-0.112**

* $p < .1$; ** $p < .05$; *** $p < .01$

Due to the binary nature of the dependent variables, I employ the random effect probit model in the second stage to capture the persistent unobservable firm-specific heterogeneity (e.g., organizational structure) in panel data. The predicted residuals obtained from the auxiliary regression are then utilized as a control function correction in the main estimation model in the second stage. Unobservable differences across firms may influence firms' decisions to engage in green strategies. Firm i decides whether to adopt green acquisition (green innovation) in year t ($Y_{it}= 1$), or not ($Y_{it}= 0$) while X_{it} is a series of independent factors that may affect the decision. I include the alternative green strategy on the right-hand side of each model to control the potential correlation between the two green strategic decisions. The general specification of the equations are:

$$\Pr(Y_{it}|X_{it}) = \phi(\beta X_{it} + \varepsilon_i),$$

Where ϕ denotes the standard normal cumulative distribution function. Specifically, the equations can be expressed as follows:

Green innovation

$$= \beta_0 + \beta_1 \text{ green acquisition} + \beta_2 \text{ environmental regulation stringency}$$
$$+ \beta_3 \text{ media attention} + \beta_4 \text{ TMT sustainability commitment}$$
$$+ \beta_5(\text{TMT sustainability commitment}$$
$$\times \text{ environmental regulation stringency})$$
$$+ \beta_6(\text{TMT sustainability commitment} \times \text{media attention})$$
$$+ \beta_7 \text{ prior innovation experiences} + \beta_8 \text{ firm} - \text{level controls}$$
$$+ \beta_9 \text{ industry concentration} + \beta_{10} \text{ year effect} + \beta_{11} \text{ industry effect}$$
$$+ \beta_{12} \text{ TMT sustainability commitment residuals} + \varepsilon$$

Green acquisition

$$= \beta_0 + \beta_1 \text{ green innovation} + \beta_2 \text{ environmental regulation stringency}$$
$$+ \beta_3 \text{ media attention} + \beta_4 \text{ TMT sustainability commitment}$$
$$+ \beta_5(\text{TMT sustainability commitment}$$
$$\times \text{ environmental regulation stringency})$$
$$+ \beta_6(\text{TMT sustainability commitment} \times \text{media attention})$$
$$+ \beta_7 \text{ prior acquisition experiences} + \beta_8 \text{firm} - \text{level controls}$$
$$+ \beta_9 \text{ industry concentration} + \beta_{10} \text{ year effect} + \beta_{11} \text{ industry effect}$$
$$+ \beta_{12} \text{ TMT sustainability commitment residuals} + \varepsilon$$

Chapter 11

Study 2 Results and Analysis

11.1 Results

Descriptive statistics and correlations between the variables are presented in Table 15. To address the potential issue of high correlations among the variables, I conducted a multicollinearity diagnostic by examining the variance inflation statistics (VIF). The findings indicate that multicollinearity is not a significant concern, as all the VIF statistics were below 5, and the mean VIF was 1.46. I employ two probit models to explain firms' green acquisitions (green innovations) adoption. I provide unstandardized coefficients from the probit regression in Table 16. As shown in Table 16, both probit regression models show that environmental regulation stringency has a non-significant effect on the adoption of green acquisition (β= 0.116, p = 0.496) and green innovation (β= -0.162, p = 0.398). These results do not support Hypotheses 1a and 1b, indicating that strictness of environmental regulation does not directly affect firms' choice of green strategies. In contrast, both probit regression models show that media attention has a significantly positive effect on the adoption of green acquisition (β= 0.218, p < 0.01) and green innovation (β= 0.280, p < 0.01). These results support Hypotheses H2a and H2b.

The interaction term between TMT sustainability commitment and environmental regulation stringency is significantly positive for green innovation (β= 0.666, p < 0.05) and not significant for green acquisition (β= 0.124, p > 0.1), indicating that stricter environmental regulation is positively related to firms' engagement in green innovations

when firms' top management team committed to sustainability. In contrast, firms with TMT committed to sustainability have no significant effect on the likelihood of engaging in green acquisitions under strict regulations. Therefore, H3a and H3b are supported. Furthermore, the coefficient of the interaction term between TMT sustainability commitment and media attention is insignificant for green innovation ($\beta = .053$, $p > 0.1$) and significantly negative for green acquisition ($\beta = -0.293$, $p < .05$). These results are in support of H4b, but not H4a. These results suggest that the positive effect of media attention on motivating firms to engage in green acquisitions will be weakened with TMT committed to sustainability, while the positive effect of media attention on motivating firms to engage in green innovations is not affected by TMT sustainability commitment.

Table 15 Study 2. Descriptive statistics and correlations

		Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Green acquisition*	0.10	0.30	1.00												
2	Green innovation*	0.09	0.29	0.12	1.00											
3	Top management team's sustainability commitment	1.24	1.52	0.11	0.23	1.00										
4	Prior acquisition experience	1.96	0.75	0.22	0.17	0.11	1.00									
5	Prior innovation experience	0.05	0.23	0.15	0.51	0.28	0.19	1.00								
6	Media attention	0.25	0.43	0.25	0.48	0.37	0.38	0.58	1.00							
7	Environmental regulation stringency	0.27	0.44	-0.08	-0.05	-0.10	-0.06	-0.05	-0.10	1.00						
8	Industry concentration	0.36	0.20	0.16	0.10	0.09	0.09	-0.02	0.07	-0.17	1.00					
9	Firm size	6.18	2.60	0.21	0.37	0.29	0.39	0.51	0.73	-0.02	0.04	1.00				
10	Financial leverage	0.35	2.04	-0.02	-0.02	-0.01	-0.02	-0.02	-0.03	0.03	-0.03	-0.09	1.00			
11	Slack resource	2.00	1.53	0.00	-0.13	-0.10	-0.05	-0.17	-0.17	0.00	-0.20	-0.06	1.00			
12	R&D inputs	0.01	0.05	-0.02	-0.01	0.00	-0.05	-0.01	-0.04	0.03	-0.03	-0.13	0.35	-0.04	1.00	
13	Marketing inputs	0.44	1.11	-0.06	-0.07	-0.04	-0.11	-0.11	-0.15	-0.03	0.00	-0.34	0.54	-0.13	0.05	1.00

*Variables in period t; all the other variables are in period t-1.

Table 16 Study 2. Random effect probit model of green innovation and green acquisition

		Dependent Variable		Dependent Variable	
Independent Variables:	Expected sign	Green Innovation	S.E.	Green Acquisition	S.E.
H1 Environmental regulation stringency	+	-0.162	0.191	0.116	0.170
H2: Media attention	+	0.280***	0.094	0.218***	0.081
H3: TMT sustainability commitment × Environmental regulation stringency	+/n/e	0.666**	0.322	0.124	0.285
H4: TMT sustainability commitment × Media attention	+/-	0.053	0.171	-0.293**	0.140
Control Variables:					
Green acquisition (innovation)		-0.046	0.208	0.016	0.205
Prior Innovation (acquisition) experience		1.898***	0.353	0.269**	0.133
Top Management Sustainability Commitment		-7.446**	0.346	2.656	1.672
Firm R&D inputs		2.640	4.725	-17.436	12.054
Firm marketing inputs		-0.590	0.541	0.018	0.141
Current slack resource		-0.118	0.098	0.053	0.045
Firm size		0.191**	0.094	0.006	0.072
Financial leverage		-0.161	0.492	-0.666*	0.396
Industry concentration		2.094**	0.874	0.868	0.670
TMT sustainability commitment residuals		7.260**	3.259	-2.157	1.614
Year effect		Yes		Yes	
Industry effect		Yes		Yes	
Constant		-4.279***	0.951	-2.410***	0.767
Log likelihood		-252.476		-348.193	
Wald chi-square		148.61***		107.86***	

*p<0.1; **p<0.05; ***p<0.01. N=1565.

11.2 Robustness checks

I conduct multiple tests to examine the robustness of the results. Firstly, I operationalize the main variables using alternative measures. In the proposed model, I use a relatively conservative approach to accumulate the sum of news as the indicator of media attention. This measure helps avoid over-estimated coefficients. Alternatively, I operationalize the media attention measure by incorporating more types of news to present a broader range of media sources (e.g., blogs and magazines). In addition, instead of using firm sales as a proxy (e.g., Claudy, Peterson, and Pagell 2016; Doha et al. 2018), I operationalize firm size using log-transformed employees, which is also commonly adopted in the literature (e.g., Guo et al. 2021). Again, I obtain qualitatively and directionally consistent results using the alternative variables.

Secondly, I winsorize firm-level variables at the 1% level to minimize the biasing effects of extreme observations in the dataset. The results are consistent with my original findings, proving extreme data values do not impact the findings.

Chapter 12

Study 2 Discussion, Limitations, and Future Research

This study examines the drivers of green innovation and green acquisition strategies. I propose and find a positive relationship between media attention and the adoption of both green innovation and green acquisition strategies. However, my hypotheses regarding the direct impacts of environmental regulation stringency on the two green strategies are not supported. I further proposed the moderating role of firms' TMT sustainability commitment in these primary relationships. I found that the moderating effects of firms' TMT sustainability commitment exist on the relationship between environmental regulation stringency and the adoption of green innovation, as well as between media attention and the adoption of green acquisition.

To the best of my knowledge, this is the first study that examines drivers of two main green strategies (i.e., green innovation and green acquisition) using archival data. This study fills the gap in the corporate sustainability literature by providing insights into when firms respond to environmental challenges proactively. Notably, the findings show under what conditions firms adopt green acquisition and green innovation strategies.

12.1 Theoretical contributions

The mixed results contribute to the existing literature in multifaceted ways. I find that stricter environmental regulation does not affect firms' propensity to adopt green acquisitions. In contrast, it positively affects firms' likelihood of adopting green

innovation strategies when firms' TMT is committed to sustainability. Namely, sustainability-conscious firms are more willing to respond to environmental pressure by engaging in green innovations. These results broaden our understanding of green innovation literature, illustrating that strict environmental regulations only spur firms to go green through green innovations when TMT is committed to sustainability. Notably, this finding complements previous research on the direct relationship between environmental regulation and green innovation (Jiang, Wang, and Zeng 2020; Pujari, Wright, and Peattie 2003). It highlights the catalyst role of TMT sustainability commitment in stimulating firms to engage in green innovation when facing strict environmental regulations.

Moreover, firms facing greater media attention are more likely to engage in both green innovation and green acquisition. However, with the presence of TMT sustainability commitment, the positive effect of media attention on firms' likelihood of adopting green acquisitions will weaken. While extant research investigates the role of media in firms' adoption of sustainable reporting (Nikolaeva and Bicho 2011) and firm-level CSR strength (Zyglidopoulos et al. 2012), its influence on firms' engagement in green acquisitions has not been explored. The findings add to the literature on the drivers of corporate sustainability strategies, providing strong evidence that more media attention could motivate firms to engage in holistic and high-investment green strategies. When a firm is put under the spotlight, its actions are closely monitored by the public. The firm must send high-quality signals to the public to build green credentials by undertaking costly green initiatives rather than superficial or low-investment strategies. For instance,

insincere or exaggerate claims of environmental benefits on packaging or in advertising easily lead to public skepticism, while heavy investments on innovating environmental-friendly products or acquiring green brands signal true commitment.

Although media attention pushes firms to conduct green acquisitions, firms' intention to engage in green acquisitions will weaken when the TMT commits to sustainability. The reason behind this counterintuitive result may be that sustainability-committed firms usually employ more long-term-oriented strategies to achieve sustainable business development. Green acquisitions may raise the suspicion of greenwashing among stakeholders when they sense a misfit between the acquired green brands and acquirers. Therefore, under massive media attention, senior management may avoid myopic decisions, focus more on stakeholder concerns, and act cautiously. This finding is intriguing as it challenges previous research on the role of TMT in stimulating sustainable business practices (Hoejmose, Brammer, and Millington 2012; Strand 2013). It draws attention to the complicated role of sustainability-committed TMT in evaluating sustainable strategy decisions under different stakeholder pressures.

Additionally, although not the focus of this study, I also find that firms with prior innovation experience are more likely to involve in green innovations. Since prior green innovation experience prepares firms with related green knowledge regarding products and processes, it is easier for experienced firms to engage in innovation repeatedly. Similarly, firms with prior acquisition experience are more likely to conduct green acquisitions. Firms can utilize specialized knowledge from prior experience to guide future acquisition activities, whether it targets green or non-green firms, as the procedures

are similar. These findings are consistent with the previous research on organizational behavior, which argues for the path-dependent nature of firms (Kamuriwo, Baden-Fuller, and Zhang 2017).

12.2 Managerial implications

This study provides insights into firms facing increasing environmental and media pressures. I present how U.S. food and beverage firms have responded to sustainability issues addressed by environmental regulations and mass media over almost two decades. Firms usually have limited resources (e.g., human and financial capital) to deploy at a specific time. When examining the sustainability-related behaviors of their stakeholder companies (e.g., supply chain partners and competitors), firm managers could refer to and utilize the findings from this study, which demonstrated their peers' average responses to media attention and environmental regulations, to guide their strategic decision-making. Similarly, firms interested in incorporating environmental considerations into their business strategy should be mindful of the level of media attention and regulatory stringency when deciding whether to pursue green acquisition and/or green innovation. Particularly, firms should take advantage of the presence of sustainability-committed TMT to prioritize green innovation strategy when facing stringent environmental regulations.

12.3 Public policy implications

This study also offers practical implications for regulators. The findings offer practical implications for regulators regarding the design of environmental regulations.

Particularly, this study shows environmental regulation stringency doesn't work effectively in motivating firms to eco-innovate in general. Stringent environmental regulations put pressure on firms to eco-innovate only when the TMT embraces sustainability. Environmental policymakers should take a holistic approach when designing effective regulations and selecting suitable regulatory instruments that may include incentives (Taylor et al. 2013).

12.4 Limitations and future research

This study has several limitations. First, alternative external drivers of green innovation and green acquisition besides environmental regulation stringency and media attention are not explored due to the stated scope of this research and the limitations of data availability. Future research can examine other commonly adopted determinants of firms' engagement in green acquisitions, such as government incentives (Rodrigue, Magnan, and Cho 2013), pressure from environmental NGOs (Berrone et al. 2013), and technology environment (Bossle et al. 2016). Second, although I provide some valuable theoretical explanations on why the presence of sustainability-committed TMT weakens firms' willingness to engage in green acquisitions under high media attention, a follow-up qualitative research should be conducted to unpack the underlying reasons behind this phenomenon further. For instance, future research can provide additional insights into this issue by interviewing TMT in companies regarding their decision-making processes. Finally, this study only focuses on the food and beverage industries, which are considered environment-sensitive and intermediately-innovative. Therefore, the generalizability of the findings may be constrained due to the relatively narrow industry focus. Future

research could expand the scope of investigation to explore how environmental and media factors drive green innovation and acquisition in other industries.

Appendices

Appendix 1 Additional information on related research

Empirical research	Research focus	Empirical context and sample	Adopted theory	Method	Key findings	Addressed		
						M&A	Performanc-e	Green marketing strategy
Mathur and Mathur (2000)	Effects of announcements of green marketing activities on stock market value	63 green marketing announcements between 1989–1995	Stakeholder theory	Event study	Announcements of green products, recycling efforts, and appointments of environmental policy managers result in insignificant stock returns, while green promotion announcements generate significantly negative stock returns.	No	Yes	Yes
Aktas et al. (2011)	Effects of targets' social and environmental performance on acquirers' stock market value	106 M&A announcements between 1997–2007	Theory of the market for corporate control	Event study	The target firm's social and environmental performance positively affects the acquirer's stock return.	Yes	Yes	No

Wiles et al. (2012)	Effects of brand acquisition and disposal strategies on financial performance	572 brand acquisition and 308 brand disposal announcements in 31 consumer industries	Resource-based view	Event study	Marketing capabilities, channel relationships, and brand portfolios affect stock market returns in response to brand acquisition/disposal announcements differently.	Yes	Yes	No
Leonidou et al. (2013)	Effects of green marketing programs on firm performance and the contingent effects.	183 British manufacturer	Stakeholder theory, resource-based view, and institutional theory	Survey	Green product and green distribution programs positively affect firms' market performance; green pricing and green promotion activities directly and positively affect firms' return on assets.	No	Yes	Yes
Olsen et al. (2014)	Drivers of green new product introductions and the moderating effects	2904 product introductions in FMCG industries between 2009 –2012	Social identity and framing theories	Archival data	Green new product introductions improve brand attitude. Both the brand and category's positioning affect the introduction of new green products.	No	Yes	Yes

Fine et al. (2016)	Brand acquisitions' short- and long-term performance implications and brand features' impact on risk and performance	169 brand acquisition announcements between 2000 – 2007	Brand equity, agency theory	Event study	The market responds to brand acquisitions differently based on the brand's characteristics (hedonic vs. utilitarian, acquisition of brand vs. acquirer of the brand owner, domestic vs. cross-border, related vs. diversifying), which also affects post-acquisition performance.	Yes	Yes	No
Saboo et al. (2017)	Role of innovation and relational overlap in affecting acquisition performance	319 US biopharmaceutical acquisitions between 1995–2013	Institutional theory and resource-based view	Event study	Innovation overlap positively affects acquisition outcomes, while relational overlap negatively affects acquisition performance.	Yes	Yes	No
Sadovnikova and Pujari (2017)	Effects of green partnerships on firm performance and the moderating roles of firms' prior green performance and partnership type	190 green partnerships announced between 2005– 2007	Resource-based view	Event study	Announcements of green marketing partnerships positively affect stock market value, while green technology partnership announcements generate negative results. The investor valuation of green partnerships is	No	Yes	Yes

					contingent on firms' past green performance.			
Wickert et al. (2017)	Determinants of firms acquiring socially-oriented targets	N/A	Institutional theory and organizational identity	Theoretical	The main determinants of socially responsible acquisitions are variances in organizational identity orientation between acquirers and target firms.	Yes	No	Yes
Current study	Green acquisitions' short-term financial performance implications and the effects of firm capabilities and industry environmental sensitivity on firm performance	182 green acquisitions announced between 2000– 2018	Signaling theory and resource-based view	Event study	Green acquisition announcements positively affect stock market value. Firm marketing capability positively affects the green acquisition-stock return relationship, while innovation capability negatively affects the green acquisition-stock return relationship. Industry environmental sensitivity moderates the above two effects.	Yes	Yes	Yes

Appendix 2 Stage 1 Heckman selection model results

Decision to engage in a green acquisition	Estimate	Robust S.E.
Firm total assets	-0.00002**	0.0000
Firm financial leverage	-1.3959**	0.6269
Firm financing	-3.0762***	1.1159
Firm slack resource	-0.0805	0.0580
Cost of goods sold	-0.3597**	0.1763
Firm sales	0.00003*	0.00002*
ROA	-1.0257	0.6262
Industry competitive intensity	0.9672**	0.4734
Market share	1.1278	0.7496
Industry Dummies Included	Yes	
Year Dummies Included	Yes	
Intercept	1.2562**	0.6101
Pseudo R2	0.0989	
Wald chi2(13)	41.72**	

***$p < 0.01$;**$p < 0.05$; *$p < 0.1$; $N = 302$.

Appendix 3 Search words used to identify green patents

Keywords used with right truncation in search for green patents
green$ or recycl$ or reus$ or renew$ or natur$ or clean$ or remanufac$ or ecolog$ or eco-fr$ or environment$ or sustainab$ or degrad$ or organic or efficien$ or low-carb$ or energy-sa$ or waste or toxi$ or contamina$ or pollut$ or hazard$ or circula$ or compost$ or ozone-$ or cycling or emission or exhaust or effluent or refuse or rubbish or trash or garbage or scrap

Appendix 4 Examples of green innovation

Company	Issue date	Patent name	Relevant description
Wm.Wrigley Jr.Company	2/20/2001	Environmentally friendly chewing gum bases, including polyhydroxyalkanoates	"The present invention relates generally to chewing gum compositions and methods for making same. More specifically, the present invention relates to chewing gum compositions that are more environmentally acceptable than typical compositions."
The J.M.Smucker Company	6/29/2004	Natural peanut butter	"An all natural ingredient peanut butter and/or peanut butter spread which contains a homogeneous mixture of peanut particles, peanut oil, and a natural stabilizer."
The Coca-Cola Company	8/21/2012	Preforms for preparing lightweight stretch blow molded pet copolymer containers and methods for making and using the same	"Lighter weighted containers also provide less solid waste and have less negative environmental impact."
PepsiCo	2/7/2017	Preservative system for acidic beverages based on sequestrants	"This invention relates to beverage preservative systems and beverage products comprising the preservative system. In particular, this invention relates to beverage preservative systems having formulations suitable to meet consumer demand for healthy and environmentally friendly ingredients."

Campbell Soup Company	1/23/2018	Rotary filling apparatus and methods	"This can lead to reduced waste by eliminating or reducing the circumstances in which food product might otherwise have to be purged from the system."

Appendix 5 Search words used to identify sustainability-related media attention

Keywords used in the search for sustainability-related news
"company name" and ("socially responsible" or "social responsibility" or sustainability or "environmentally responsible" or "environmental responsibility" or "sustainable environment" or "green program" or "green programs" or "greener program" or "greener programs" or "greening program" or "greening programs" or "sustainable program" or "sustainable programs" or "green practice" or "green practices" or "greener practice" or "greener practices" or "green product" or "green products" or "green produce" or "green producing" or "green production" or "greener product" or "greener products" or "greener produce" or "greener production" or "greening production" or "greening product" or "greening products" or "green project" or "green projects" or "greener project" or "greener projects" or "greening project" or "greening projects" or "sustainable project" or "sustainable projects" or greenwash* or "green consumer" or "green customer" or "green consumers" or "green customers" or "green consumption" or "green purchasing" or "sustainable product" or "sustainable products" or "sustainable produce" or "sustainable production" or "sustainable producing" or "sustainable sourcing" or "sustainable manufacturing" or "sustainable manufacture" or "sustainable manufacturer" or "sustainable agriculture" or "sustainable farming" or "sustainable practices" or "sustainable practice" or "sustainable design" or "sustainable brand" or "sustainable brands" or "sustainable developing" or "sustainable development" or "sustainable develop" or "sustainable food" or "sustainable foods" or "sustainable beverage" or "sustainable materials" or "sustainable ingredients" or "sustainable resources" or "organic foods" or "organic food" or "organic beverage" or "sustainable investing" or "sustainable investment" or "sustainable investments" or "sustainable package" or "sustainable packaging" or "sustainable packages" or "environmental footprint" or "environmental footprints" or "environmental technology" or "environmental technologies" or "green technology" or "green technologies" or "greener technology" or "greener technologies" or "environmental innovation" or "green innovation" or "eco-innovation" or "sustainable innovation" or "environmental activity" or "environmental activities" or "environmental activist" or "environmental activists" or environmentalism or environmentalist or "environmental stewardship" or "environmental impact" or "environmental protect" or "environmental protecting" or "environmental protection" or "environment friendly" or "environmental friendly" or "eco-friendly" or "corporate citizenship" or ecological)

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