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Examining Greenwashing Through the Lens of the Theory of Planned Behavior

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Abstract

The global push for sustainable development has prompted businesses to adopt environmentally responsible practices. However, the growing concern of greenwashing—where companies project an eco-friendly image without meaningful action—remains a critical issue. This study examines greenwashing through the lens of the Theory of Planned Behavior, focusing on the gap between firms' green intentions and their actual green behaviors within the consumer packaged goods industry and its implications for firm performance and risk. While prior research has explored the relationships between green intention, green behavior, and firm outcomes separately, this study establishes the mediating role of green behavior in linking green intention to firm performance and risk. By applying the Theory of Planned Behavior, the research reveals the mechanisms through which firms can bridge this gap, emphasizing the importance of stronger control capability such as improving operational efficiency and investing in R&D to transform green intentions into tangible actions that enhance performance and mitigate risk. The findings provide both theoretical insights and practical implications for firms seeking to align their sustainability commitments with genuine action while avoiding the reputational and financial risks associated with greenwashing.

Keywords

Sustainability, Greenwash, Intention-behavior Gap, and Behavioral Control Capability.

1. Introduction

Firms have spent greater attention on environmental performance and sustainable development in recent years, believing that addressing environmental and societal issues preemptively can mitigate business uncertainties and offer a competitive advantage. However, making commitments to environmental and social performance may not be enough. According to a recent survey by a financial advisory and global consulting firm, AlixPartners, the consumer package goods (CPG) industry executives lack confidence regarding their commitments to carbon emission reductions (Burt et al., 2022). The results are startling. The percentage of managers confident about reducing their scope 1 and 2

emissions to meet their targets is 49% for suppliers, 36% for manufacturers, and 31% for retailers. The percentages regarding scope 3 are even lower. Scholars have documented the gap between commitments and actual actions, highlighting their prevalence and framing them as greenwashing (Delmas and Burbano, 2011). The strategy literature has further referred to the gap as intentional strategic decoupling between symbolic gestures and substantive actions (Bromley and Powell, 2012).

However, do the findings from AlixPartner's report imply that most managers intentionally practice greenwashing or strategic decoupling? While the intention-behavior view from behavioral psychology suggests that intention is the strongest predictor of behavior changes, their connection remains fragile. As the theory of planned behavior (TPB) suggested, numerous factors could influence the relationship between intention and behavior changes (Ajzen, 1985). It is not entirely fair to call a person who fails his/her New Year weight-loss resolution a liar. In addition, AlixPartner's report calls for managers to sync their intentions and actual behaviors to ensure firms' actions protect the environment. But what could managers do to improve their odds of converting intention to behavior changes? The study aims to gain a better understanding of the following questions: (1) How does green behavior mediate the relationship between firms' green intentions and their performance and risk? (2) What mechanisms, as explained by the Theory of Planned Behavior, enable firms to narrow the gap between green intention and actual green behavior? (3) What control capabilities enable firms to translate green intentions into meaningful actions and mitigate greenwashing risks?

To address these questions, the study adopts the intention-behavior view and decomposes firm environmental actions into green intention and green behavior. Green intention is defined as the extent to which a company claims to be environmentally friendly, and green behavior is quantitatively how environmentally efficient the company is. The research first examines the relationships between green intention and green behavior. Next, as the literature has suggested that firms engage in greenwashing by taking symbolic communication to gain legitimacy without corresponding actions (Delmas and Burbano, 2011; Hawn and Ioannou, 2016; Guo et al., 2017), green intention should link to firm performance directly to incentivize a gap between intention and behavior. In addition, green behavior cannot fully mediate the relationship between green intention and firm performance. Otherwise, firms shall implement corresponding substantive actions. To validate these premises, the study examines the effects of green intention and behavior on firm performance using organizational theoretical lenses (i.e., stakeholder theory and resource-based view, respectively). Further, since past studies have shown that risk management is another key driver of environmental actions and that tradeoffs exist between profit and risk (e.g., Ye et al., 2020), the study also examines these premises with business risk. Lastly, guided by the TPB, control capability could affect the link between intention and behavior. Accordingly, the study operationalizes firms' control capability using their operational efficiency and explores whether it influences the relationship between intention and behavior.

This study does not aim to reexamine the direct relationships between green intention and firm performance/risk, nor between green behavior and firm performance/risk—both of which have been explored in prior literature. Instead, this research introduces a critical mediating mechanism: the role of green behavior in linking green intention to firm performance and risk. Establishing the direct relationship between green intention, green behavior, and firm performance/risk is a necessary step toward achieving our research goal.

We situate the study in the global CPG industry, motivated by AlixPartner's report. Firms in the CPG industry are more susceptible to reputational effects than other industries and attend to consumer sentiments more carefully since consumers directly access most products. Company names and brands are also highly recognizable, making the industry suitable for this study. The focus on a single industry also helps ease the control of heterogeneity. We use the Bloomberg Industry Classification system (Code 1210) to draw our sample firms and obtain Tobin's q as the proxy for firm performance and Altman Z for business risk. We use firms' adoptions of emission reduction policies from ASSET 4 to construct a latent variable as green intention and operationalize green behavior using the amount of greenhouse emissions reported to CDP (formerly the Carbon Disclosure Project). Finally, we employ the structural equation modeling approach to simultaneously examine all links among green intention, green behavior, firm performance, and business risk.

The study results first suggest a negative association between green intention and green behavior, and the prevalence of greenwashing (Delmas and Burbano, 2011) may help explain the finding. The results further show that intention and behavior are associated with firm performance and business risk and that behavior partially mediates these relationships, supporting the premises for the widespread gap between intention and behavior. Moreover, when considering firms' control capability, the negative association between green intention and behavior only appears

when a firm has low operational efficiency, suggesting that firms with weak control capability struggle to convert their intention to behavior changes.

To the best of our knowledge, our study is among the first in the environmental management and sustainable operations literature to adopt the intention-behavior view to examine greenwashing and highlight its nuances. We also examine the premises of the widespread greenwashing and obtain additional insights. The role of control capability operationalized by operational efficiency further underlines the importance of firm operational characteristics in converting intention into actual improvements. Additionally, while most prior studies utilizing the Theory of Planned Behavior rely on primary data (Hinterhuber and Khan, 2025), this study employs secondary data, offering a more objective and empirical analysis within the industry. This approach mitigates self-reporting biases and provides stronger validation of theoretical claims. We discuss the study's theoretical contributions, managerial implications, and limitations at the end of the paper.

2. Literature Review and Hypothesis Development

2.1 Intention, Behavior, and the Gap Between

Intention is deliberate attempts to perform (or not perform) a specific behavior. Social psychology researchers have agreed that intention is the immediate antecedent of actions (e.g., Fisher and Fisher, 1992; Gollwitzer, 1993). Under volitional control and with an appropriate opportunity, these attempts will translate into actions. The theory of reasoned action (TRA) by Ajzen and Fishbein (1980) highlights that intention increases the likelihood of achieving an outcome and focuses on two influential factors: attitudes and subjective norms. That is, the more favorable the attitude and the subjective norm supporting a behavior, the greater the chance the person performs the behavior. Scholars have since leveraged the theory and explored the effectiveness of external interferences in various fields, such as medical studies and political science. The TRA has also become the foundation of several social behavioral models, such as the subjective culture theory (Triandis, 1994; Lee, 2000), the information-motivation-behavioral skills model (Fisher and Fisher, 1992), and the technology acceptance model (Davis, 1985). Elliott (1995) further demonstrated the effectiveness of the TRA model at an organizational level by showing improvements in explaining firm purchasing decisions.

However, Ajzen (1985) noted the weak connection between intention and behavior changes and proposed the theory of planned behavior (TPB). Extending from the TRA model, the TPB suggests that perceived behavioral control, a new construct representing the perception of the ease or difficulty of performing the desired behavior changes, could moderate the likelihood of converting intention to behavior changes (Madden et al., 1992). Researchers have applied the TPB to improve the prediction of inducing behavior changes and come up with effective interventions for health concerns such as smoking, drinking, and substance use.

Scholars have followed the upper echelon theory and suggested that key decision makers' skills and characteristics play a key role in firm performance and organizational behavior (e.g., Dalton et al., 1998; Kanashiro and Rivera, 2019). Management studies have leveraged the theory to gain insights into factors affecting corporate philanthropy, green innovation, and sustainable purchasing (Hinterhuber, 2004; Dennis et al., 2009; Shou et al., 2023) or to examine the impact of corporate diversity programs (Wu, 2010). Further, TPB has enhanced the understanding of the connection between intention and behavior changes. However, Rhodes and de Bruijn (2013) conducted a meta-analysis of health studies and showed that the overall gap is 46%. Specifically, 42% of intenders do not change their behaviors, while 2% of non-intenders change their behavior. Hassan et al. (2016) reviewed ethic-related studies, predominated by environmental concerns, and found a gap between intention and behavior changes (i.e., a correlation lower than 50%). In sum, the intention-behavior gap is substantial and likely exists at the organizational level. As such, we apply the TPB to investigate the gap between manager's green intention and their actual behavior.

2.2 Greenwashing

Greenwashing is any communication that misleads people into having an over-positive impression about a product or a firm's environmental performance and practices (Lyon and Montgomery, 2015). The practice is prevalent and has garnered significant academic attention (Delmas and Burbano, 2011). Environmental management studies have recognized that firm-level greenwashing is a tactic that firms, to alleviate institutional and external pressures, leverage symbolic actions that lead to unverifiable environmental impact or do not engage in corresponding substantive actions (Delmas and Burbano, 2011; Hawn and Ioannou, 2016; Guo et al., 2017). For a thorough review of this vast body of literature, please refer to Lyon and Montgomery (2015) and Montgomery et al. (2023).

A stream in the greenwashing literature closely relates to the study is the notion of recognizing the gap between policy adoptions and organizational actions as means-ends decoupling (Weick, 1976; Bromley and Powell, 2012) or strategic misalignment (March and Olsen, 1976). Grounded in corporate strategy institutional theory, strategic decoupling is when firms implement rules and policies to appease external pressure or gain legitimacy reasons without knowing their outcomes in certain or without an expectation that they will not be implemented (Westphal and Zajac, 2001). In environmental and sustainability studies, Font et al. (2012) directly frame the disclosure-performance gap as greenwashing, and recent research has focused on the antecedents of the gap and its performance implications (Tashman et al., 2019; García-Sánchez et al., 2021; Bothello et al., 2023).

However, a limitation of the extant literature is that while stakeholders view the gap between symbolic communication and substantive action as deceptive (Delmas and Burbano, 2011; Walker and Wan, 2012; Tashman et al., 2019), they are not necessarily intentional. For example, the emergent decoupling mentioned by García-Sánchez et al. (2021) is that middle-level managers take their actions without support from top executives. It could be an unintended outcome and a management oversight. Although decoupling and greenwashing seem prevalent, some observed may not be intentional and could be the gap between intention and behavior noted in behavioral psychology studies. As such, the study adopts the intention-behavior view into the corporate environmental management context and explores an alternative explanation of greenwashing. Importantly, the main aim is to develop a better understanding of the underlying processes of how firms enact certain behavior (i.e., greenwashing, decoupling, or intention-behavior gap), allowing the specification of a more precise model and enabling practitioners to devise more effective interventions to induce desired behavior and mitigate the gap.

2.3 Hypothesis Development

2.3.1 Green Intention on behavior

Following the intention-behavior view, we decompose firm environmental action into green intention and green behavior (GB). Green Intention is the extent to which a company claims to be environmentally friendly, and Green Behavior is quantitatively how the company is environmentally efficient. A stronger intention leads to increased effort in attempts, which increases the likelihood of achieving a behavioral change. In environmental studies, Rothenberg et al. (2001) and Sroufe (2003) have found that adopting lean principles and environmental management systems decreases the actual consumption of materials and energy. Rao and Holt (2005) have also highlighted that implementing environmental initiatives reduces product weight and packaging, resulting in lower logistics costs. Fu and Su (2020) further show that adopting practices relating to pollution prevention and waste management leads to emission reductions in the context of greenhouse gas (GHG) emissions.

Although intention is the strongest predictor of behavior changes, meta-analyses for TRA show that the intention-behavior correlations are mostly below 0.5 (Ajzen, 2005 Pg. 100). As a result, sequential studies have investigated factors causing the discrepancy and established the TPB. In environmental management studies, Delmas et al. (2013) distribute environmental performance indicators into the processed-based group (e.g., internal commitment) and the outcome-based group (e.g., external quantitative impact) using the principal component analysis and show that the process-based group, which closely relates to green intention, the outcome-based group, which is similar to green behavior, has a weak and negative correlation, suggesting that firms may excel at leveraging environmental performance measurement systems and communication while still generating substantial emissions. Using a meta-analysis approach, Endrikat et al. (2014) also showed that process-based policy indicators do not always lead to improvements in outcome-based performance. Doda et al. (2016) implied that the effect of adopting carbon management practices on actual carbon emissions is inconclusive. Hartmann and Vachon (2018) further found that the link between the extent of adopting environmental initiatives and actual environmental performance highly depends on industry characteristics. Considering the prevalence of greenwashing (Delmas and Burbano, 2011), green intention and green behavior could be negatively associated.

In sum, the discussions above highlight that past studies have found mixed evidence for the relationship between managerial initiatives (i.e., intention) and environmental performance (i.e., actual behavioral changes) and imply that the association between green intention and green behavior is not a priori obvious. As such, we propose the following hypotheses:

Hypothesis 1a (H1a): A firm's green intention is positively associated with its green behavior
Hypothesis 1b (H1b): A firm's green intention is negatively associated with its green behavior

2.3.2 Green intention and behavior on firm performance and business risk

To motivate firms to engage in environmental actions, a fundamental assumption is that green behavior should lead to better firm performance. According to the Natural Resource-based view (Hart and Dowell, 2011), firms that address issues relating to the natural environment tangibly will gain access to resources that have VRIN characteristics (i.e., value, rarity, inimitability, and non-substitutability), which, in turn, obtain a competitive advantage over their peers. As a result, a firm with good green behavior should enjoy positive firm performance. Prior studies have also offered evidence for a positive relationship between actual green behavior, measured in emission reductions and waste and water control (Hart and Ahuja, 1996; King and Lenox, 2002), and firm financial performance. In the CPG industry, Fu and Su (2021) show that environmental efficiency measured by quantitative environmental measures is positively related to firms' profit.

Past environmental studies have also highlighted that companies take preemptive actions to assess the potential risk of environmental issues rather than solely focusing on financial performance (Kleindorfer and Saad, 2005; Weinhofer and Busch, 2013). Few studies have examined the effects of environmental actions on business risk and employed additional theoretical lenses. For example, Godfrey et al. (2009) propose that moral capital, the outcome of stakeholders' assessment of a firm's philanthropic intention and actions, is an insurance or a mitigator in environmental risk management. Bansal and Clelland (2004) take the legitimacy view (Suchman, 1995) to examine the relationship between a firm's environmental reputation and its business risk. From the empirical aspect, Orlitzky and Benjamin (2001) deploy the meta-analytic approach and show that environmental activities generally lower firm risk. Sharfman and Fernando (2008) and Dhaliwal et al. (2011) further show that firms with better environmental performance enjoy a lower risk, measured by their cost of capital. Nevertheless, Ye et al. (2020) highlight the tradeoffs between return and risk, highlighting the need to examine the implications to profit and risk together. Based on the above discussions, we argue that green behavior based on quantitative output data should help firm performance and reduce business risk. As such, we posit the following hypothesis:

Hypothesis 2a (H2a): A firm's green behavior is positively associated with its (i) firm performance and negatively associated with its (ii)business risk.

Although words are not louder than actions, managers can express intention in words and speak them often. A critical premise of engaging in greenwashing is that communicating intention will improve outcomes. As communication is a key element in the stakeholder theory, researchers have argued that successful communication and engagement with stakeholders reduces potential costs, such as avoiding regulations or consumer setbacks, and enhances revenue opportunities, like better market perception and positive community impact (e.g., Kassinis and Vafeas, 2006; van der Laan et al., 2008). Doing so can also help enhance firms' reputations and increase customers' willingness to pay (Wong et al., 2014).

As our society becomes more aware of environmental issues, managers may increase their efforts to address these environmental concerns. To improve the perception of their firms, managers can focus on articulating their green intention and communicate through press releases, corporate reports, conference calls, and advertisements. They can do so frequently with less cost than implementing actual changes. The psychology literature has highlighted the repetition effect, in which repeating an ambiguous statement increases the probability that it becomes believable (e.g., Bacon, 1979; Zaragoza and Mitchell, 1996). Past studies have also showcased the effectiveness of communicating intention in the context of social responsibility (e.g., Orazi and Chan, 2020). Further, as firm reputation plays a prominent role in the CPG industry, managers are incentivized to craft their communication carefully to influence the market.

Nevertheless, the evidence of how intention affects firm performance in the environmental management literature is inconsistent. Busch and Hoffmann (2011) showed that environmental initiatives relating to internal strategic decision-making processes correlate with firm performance negatively. Based on a similar view, Delmas et al. (2013) had an opposite finding. Further, Bansal and Clelland (2004) indicated that extensive communications may backfire.

Nonetheless, to incentivize managers to engage in greenwashing, they must believe that articulating their intention will improve firm performance. Therefore, we argue that green intention improves firm performance and reduces business risk, particularly in the customer-facing CPG industry, and we hypothesize the following:

Hypothesis 2b (H2b): A firm's green intention is positively associated with its (i) firm performance and negatively associated with its (ii) business risk.

Hypotheses H2a and H2b examine the first premise of greenwashing. That is, while improving behaviors yields desirable outcomes, communicating intention could also enhance outcomes. The premise, if satisfied, also raises the question of whether intention affects outcomes directly or through behavior changes. To allow the gap to sustain and greenwashing to be widespread, the second premise is that intention should be able to affect outcomes directly without being fully mediated by behavior changes. As a result, we examine the mediation effect of green behavior.

There are two types of mediation. If the influence of an independent variable on a dependent variable is significant but becomes insignificant in the presence of a mediator, the mediator fully (completely) mediates the relationship. Otherwise, the mediator partially mediates the relationship. As such, behavior can mediate the effects of intention fully or partially. A full mediation indicates that intention affects firm performance through changes in behavior, and a partial mediation suggests that intention could affect firm performance directly and that only a portion of the effects of intention are through changes in behavior. Allowing the gap between intention and behavior to sustain and greenwashing to be widespread, we posit the following hypothesis:

Hypothesis 3 (H3): Green behavior partially mediates the link from intention to (i) firm performance and (ii) business risk

2.3.3 Influence of control capability

To better understand the drivers of greenwashing, Delmas and Burbano (2011) proposed a framework and suggested that firm characteristics, such as resources and competencies, play a pivotal role. While Bromley and Powell (2012) indicated that gaps between means and ends may be intentional, they also suggested that decoupling could occur because of firms' limited capacity. These notions are in line with the proposition of the TPB. Ajzen (1985) introduced perceived behavioral control (PBC) in the TPB as a moderator between intention and behavior, suggesting that the greater a person's control over personal and external factors that may interfere, the greater the likelihood that the person will attain his behavioral changing goal. The PBC, the perception of the ease or difficulty of performing the desired behavior, is closely aligned with the conceptualization and operationalization of self-efficacy proposed by Bandura (1977). However, it serves as a proxy for the actual control capability. (Ajzen, 1985). Therefore, although it is more challenging to measure, Sheeran et al. (2003) posited that actual behavior control could improve the prediction between intention and behavior to a greater extent. Carrington et al. (2010) and Hassan et al. (2016) also suggested that planning capability could help further. Based on the discussions, we argue that firms' capability to control their internal operations, with respect to planning and efficiency, plays a vital role in the relationship between green intention and green behavior. As such, we posit the following:

Hypothesis 4 (H4): Firms' control capability moderates the gap between intention and behavior

Figure 1 further illustrates the study's conceptual model.

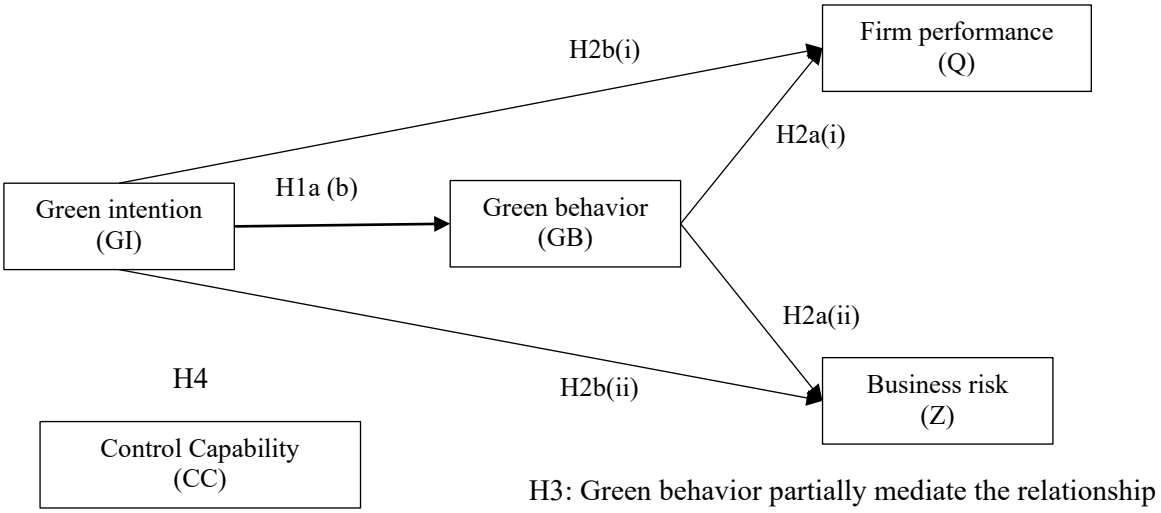

Figure 1. Conceptual Model

3. Data and Variables

3.1 Data and Sample

We use Bloomberg to identify our sample firms in the CPG industry (i.e., Bloomberg Industry Categorization code 1210). Bloomberg also provides a broad range of financial and environmental metrics. More importantly, it incorporates emissions data from CDP, a leading non-profit organization that provides self-disclosed environmental data for empirical research. We also access Refinitiv's ASSET 4 to observe the adoption of emission-related environmental policies of our sample firms. ASSET 4 is a dataset specialized in measuring firms' environmental, social, and government (ESG) performance (Lubin et al., 2017). It collects information from publicly available sources such as corporate annual financial and social responsibility reports, NGO articles, newspapers, journals, and trade publications. It has been widely used in academic studies (de Villiers et al., 2022). The resulting dataset contains approximately 180 global CPG firms.

3.2 Variables

3.2.1 Green intention

Manager intention is latent, and its extent is challenging to assess. Therefore, we use a firm's adoption of environmental policies and practices to reflect its managers' intention to address environmental concerns. Specifically, as Fu and Su (2020) identify a set of ASSET 4 indicators closely related to emission policies and practices and examine their influence on sequential GHG emission reductions, we adopt the same set of ASSET 4 indicators and summarize them in Table A1 in the appendix. We further employ the confirmatory factor analysis (CFA) to operationalize the latent variable, *green intention (GI)*. Using multiple observed variables that measure underneath character or phenomenon to construct a latent variable is a common approach in structural equation modeling. A major benefit of this approach is to estimate internal characters more reliably by alleviating measurement errors that commonly reside in observed variables (Bollen, 1989). We examine the variable validity and reliability of the latent variable later in section 4.1.

3.2.2 Green behavior

Managers' intention to address emission-related concerns should affect their actual emission amounts. Therefore, we collect our sample firms' GHG emissions amounts reported to CDP from Bloomberg. The reporting of GHG emissions follows the GHG protocol standard developed by the World Resources Institute (World Resources Institute 2017), which is considered an authoritative standard of GHG emissions reporting. Kyoto Protocol defines GHG emissions to include carbon dioxide (CO2), sulfur hexafluoride (SF6), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). The standard also requests firms to report emissions by their operational boundaries, namely, scopes 1, 2, and 3. Scope 1 emissions (direct emissions) are from sources owned or controlled by the company. Scope 2 emissions (indirect electricity emissions) are generated from purchased or acquired electricity stream, heat, and cooling, while scope 3 emissions (other indirect emissions) occur along the company's supply chain. We focus on the sum of scope 1 and 2 emissions because they are under the firms' discrete control. We operationalize

a firm's *green behavior (GB)* as its GHG emission amounts normalized by its revenue. To ease the interpretation, we have $GB_i = Max\left(\frac{Emission_i}{Revenue_i}, \forall i\right) - \frac{Emission_i}{Revenue_i}$, where i indicates a focal firm. As a result, a firm with a higher score indicates that it behaves better in terms of its GHG emissions.

3.2.3 Firm performance and business risk

Tobin's q (Q) The literature commonly uses Tobin's q as a proxy for forward-looking firm performance (Aouadi and Marsat, 2018). Compared to profitability measures such as return on assets (ROA), Tobin's q is more complex and complete, capturing a firm intangible value by evaluating the ratio of the firm's market value to its replacement cost. Therefore, we use Tobin's q as a proxy for firm performance.

Altman Z (Z) Altman (1973) developed an empirically estimated weighted score from the income statement and balance sheet to measure a company's internal financial health. The finance literature has used the score to estimate the probability that a firm will go bankrupt (MacKie-Mason, 1990). A firm with a greater Z score suggests a lower possibility of bankruptcy, and we use the score as a proxy for a firm's business risk.

3.2.4 Control capability

The sustainable operations literature has used operations-related efficiency to reflect managers' competency in manufacturing firms (Jacobs et al., 2016) and highlighted its role in capitalizing the benefits of environmental improvement into financial gains and competitive advantage (Fu and Jacobs, 2022). Therefore, we use a firm's operational efficiency to reflect its capability to plan and control its internal operations and operationalize operational efficiency using the ratio of fixed assets to revenue. The ratio measures how many units of fixed assets a firm needs to generate a unit of sales, and a lower ratio implies more efficient internal operations (Table 1).

Table 1. Descriptive statistics of samples and correlation of controls

Panel A	N	Mean	Variance	Min	Max		Panel B	GB	CI	RP
Q (Tobin's q)	184	1.844	1.134	0.570	5.693		GB			
Z (Altman Z)	184	4.229	7.527	-1.703	20.130		CI	0.278		
GB (green behavior)	178	1.666	0.049	0.000	1.787		RP	-0.223	-0.130	
CC (control capability)	187	.394	.181	.0354	3.9081		FS	0.101	0.472	-0.070
CI (capital intensity in ln)	187	0.203	0.331	-1.136	2.477					
RP (revenue percentage in ln)	186	4.031	1.536	-2.167	4.605					
FS (total asset in ln)	187	8.536	2.468	2.945	12.414					

4. Analyses and Results

4.1 Measurement Model Validity and Reliability

We employ the confirmatory factor analysis (CFA) to operationalize the latent green intention. We exclude two factors from our remaining analyses because of their low loadings and high p-values. We also examine multiple fit indices for the resulting CFA model: comparative fit index (CFI), Tucker Lewis Index (TLI), and root mean square error of approximation (RMSEA). The model has $\chi^2 = 41.44$, df = 20, CFI = 0.918, TLI = 0.885, and RMSEA = 0.093. According to Shah and Goldstein (2006) and Hu and Bentler (1999), all indices are above the range for acceptable fit. For brevity, we report the CFA loading results in Table A2 in the appendix.

4.2 Main Results

We employ structural equation modeling (SEM) to test our main hypotheses. The approach allows us to examine the complex relationships among our variables simultaneously. We report the parameter estimates, p-values, and model fit information in Table 2 Model 1, and the results are the two-tailed standardized outputs. The model fit indices are 64.070, df = 40, CFI = 0.957, TLI = 0.930, and RMSEA = 0.056, suggesting that the proposed model fits the data well (Hu and Bentler, 1999). Further, as we collect our data from multiple secondary sources, we mitigate the potential concern of common method biases. Among our controls, revenue percentage (RP) is positively associated with Q and Z, suggesting the market premium of the CPG industry. More importantly, the results highlight that green intention is

negatively associated with green behavior (the estimated coefficient of GI to GB is -0.397 with p = 0.013), supporting hypothesis H1b. The implication of this result is further discussed in the first paragraph of Section 5.

Table 2. Main results

	Model 1	Model 2	Model 3	
			Group L	Group H
Structure Path				
GI → GB	-0.397** (0.162)		-0.327*** (0.000)	0.533*** (0.002)
GB → Q	0.461** (0.185)		0.434*** (0.001)	-0.238 (0.467)
GB → Z	0.448*** (0.172)		0.340*** (0.000)	-0.057 (0.859)
GI → Q	0.888*** (0.307)	0.484** (0.210)	1.398 (0.143)	0.878 (0.117)
GI → Z	0.822*** (0.291)	0.465** (0.214)	1.218 (0.157)	0.482 (0.445)
FS → Q	0.035 (0.169)	0.058 (0.147)	-0.128 (0.764)	0.113 (0.459)
CI → Q	-0.062 (0.126)	0.001 (0.137)	-0.510 (0.257)	0.224 (0.361)
RP → Q	0.549** (0.251)	0.365** (0.153)	0.776 (0.188)	-0.109 (0.784)
FS → Z	-0.099 (0.158)	-0.086 (0.143)	-0.198 (0.627)	-0.080 (0.543)
CI → Z	-0.157 (0.101)	-0.094 (0.117)	-0.510 (0.167)	0.085 (0.733)
RP → Z	0.492** (0.235)	0.331** (0.136)	0.683 (0.219)	0.030 (0.932)
Item Loadings				
GI → GI1	0.855*** (0.100)	0.890*** (0.083)	0.926***(0.074)	0.892***(0.097)
GI → GI2	0.201 (0.138)	0.221 (0.159)	0.052(0.069)	0.129(0.183)
GI → GI3	0.237 (0.160)	0.287* (0.155)	0.066(0.097)	0.106(0.157)
GI → GI4	0.259* (0.137)	0.256 (0.162)	0.120(0.092)	0.186(0.158)
GI → GI5	0.994*** (0.089)	0.964*** (0.061)	0.849***(0.151)	0.935***(0.089)
GI → GI6	0.520*** (0.139)	0.695*** (0.165)	0.323**(0.145)	0.410**(0.205)
Model Fit				
χ^2	64.070	34.720	103.922	
df	40	32	84	
p-value	0.1922	0.3395	0.0694	
RMSEA	0.056	0.021	0.050	
CFI	0.957	0.995	0.941	
TLI	0.930	0.991	0.908	
Number of firms	197	197	93	94

Note: standard errors in parentheses; * p<0.1; ** p<0.05; *** p<0.01

The results from Model 1 imply that green intention and green behavior are positively associated with Tobin's *q*. The estimated coefficients of the path from GB to Q is 0.888 with p = 0.013, and that of GI to Q is 0.461 with p = 0.004, offering support for hypotheses H2a (i) and H2b (i). The results in Model 1 also imply that green intention and behavior have positive and significant effects on Altman *Z*. The estimated coefficient of the path from GB to Z is 0.448 with p = 0.009, and that of GI to Z is 0.822 with p = 0.005, supporting hypotheses H2a (ii) and H2b (ii). Further, the effects of GI on Tobin's *q* and Altman *Z* remain consistent in Model 2 but statistically insignificant because of sample sizes. The effects of GB are positive for less efficient firms but change signs for more efficient firms, suggesting a possible mediating role of GB.

To test mediation effects, the literature has suggested the following criteria (Sarkis et al., 2010): (1) the results should support an association between the independent variable and the mediator, (2) the results should also support an association between the mediator and the dependent variable, (3) the results should support an association between the independent variable and the dependent variable consistently without the presence of the mediator, (4) the direct effect of the independent variable on the dependent variable could become stronger when the mediator is absent. If the direct effect is statistically insignificant when the mediator is present, the mediator completely mediates the relationship between the dependent and independent variables. In contrast, if the direct effect remains statistically significant, it indicates a partial mediation.

The results in Table 2 Model 1 satisfy criteria 1 and 2. For criteria 3, we examine whether the direct effects between our key independent variable (green intention) and dependent variables (firm performance and business risk) are significant without the mediator and report the results in Model 2. The model fit information suggests that the model fits consistently (34.710, df = 32, CFI = 0.995, TLI = 0.991, RMSEA = 0.021). The estimated coefficient of GI to Q is 0.484 with p = 0.021, and GI to Z's is 0.465 with p = 0.030, showing continuous support for Hypotheses H2b(i) and H2b(ii) and satisfying criteria 3. Jointly, the results support Hypothesis H3, indicating that GB partially mediates the effects of GI. Interestingly, the effects of GI are more substantial when GB is present, likely contributed by the negative association between GI and GB.

To test hypothesis H4, we conduct a multi-group analysis. Specifically, we dichotomize our samples into Group L (less efficient) and Group H (more efficient) by their operational efficiency. As the ratio is positively skewed, we group firms with ratios higher than the median into Group L and have the rest in Group H. We estimate coefficients for each group and report the two-tailed standardized results in Table 2 Model 3. Likely driven by the reduced sample size, we observe a decrease in statistical significance overall. Notably, the estimated coefficient of GI to GB for the less efficient group is negative and statistically significant (-0.327 with p = 0.002). Conversely, the estimated coefficient of GI to GB for the more efficient group is positive and statistically significant (0.533 with p < 0.001). We further conduct the two-tailed Wald test with parameter constraints. The test statistics (6.794, df = 1, and p = 0.009) indicate that the link from GI to GB in these two groups differs statistically. The results imply that operational efficiency moderates the relationship between green intention and behavior. That is, less efficient firms likely contribute to the negative relationship between intention and behavior. For more efficient firms, the connection between intention and behavior is positive.

4.3 Additional Tests

We deploy the Monte-Carlo-based mediation analysis to test the mediating effect more rigorously, following the recommendation by Tofighi and MacKinnon (2011). We leverage the RMediation package of R and summarize the results in Table 3. The coefficient of the indirect effect of GI on Q is -0.184, and that of GI on Z is -0.180 (both with p < 0.01), implying that green behavior has negative indirect effects on both Tobin's *q* and Altman *Z*.

Table 3. Mediation analysis results

Hypothesis & Effect	Structure Path	Direct Effect	Indirect Effect	Standard Error	MC Error	95% Confidence Interval
IV → MV	GI → GB	-0.397**				
H4a						
MV → DV	GB → Q	0.461**				
IV → DV	GI → Q	0.888***	-0.184***	0.110	1.100e-06	(-0.437, -0.014)
H4b						
MV → DV	GB → Z	0.448***				
IV → DV	GI → Z	0.822***	-0.180***	0.107	1.100e-06	(-0.424, -0.015)

Note: * p<0.1; ** p<0.05; *** p<0.01; IV: independent variable, MV: mediating variable, DV: dependent variable, MC: Monte Carlo

To further examine the robustness of our results, we replace Tobin's *q* and Altman *Z* with return on asset (ROA) and the cost of equity (COE). We also use data from 2019 for all our variables as an alternative data specification. Further,

we alternate the model specification by disabling the full information maximum likelihood (FIML) estimator. Overall, the results are largely consistent. For brevity, we summarize these test results in Table A1 in the appendix.

We also alternate the operationalization of control capability using the R&D intensity as its extent reflects a firm's greater willingness to invest in itself, a proxy for self-control and planning. We calculate R&D intensity as the ratio of a firm's R&D expenditure to its revenue. We take a similar multi-group approach, grouping firms with values higher than the median in the high-intensity group and having the rest in the low-intensity group. The results offer consistent support to our findings. For brevity, we summarize these test results in Table A2 in the appendix.

5. Discussion

While the finding of the negative relationship between green intention and green behavior may suggest that greenwashing is prevalent, the study results highlight that the connection between green intention and green behavior is weak, which is in line with the expectation from the TRA. The study further showcases the conditions that permit the widespread of greenwash. That is, green intention and green behavior both improve firm performance and reduce business risk, providing managers with incentives to greenwash. In addition, green behavior partially mediates the effect of green intention. Guided by the TPB, the results further underline that the control capability, operationalized by operational efficiency, plays a crucial role in converting intention to actual behavior changes. Our findings are robust based on the results of various tests with alternative measures and specifications. In sum, intention-behavior gaps are prevalent, highlighting the challenging nature of converting intention to behavior. They could be framed as greenwashing or strategic decoupling. But if not intentional, managers should be preemptive to increase the odds to convert.

5.1 Theoretical Contribution

Our study contributes to the literature in several aspects. First, the study provides empirical evidence for the disparity between intention and behavior. The strategy literature has proposed the gap between intention and behavior as misalignment or decoupling and discussed its drivers (Bromley and Powell, 2012). Corporate social responsibility (CSR) studies have also examined the antecedents of such a gap (Li et al., 2017) and its implications (García-Sánchez et al., 2021). The adoption of the intention-behavior view from the TPB underscores the existence of the gap and offers an alternative and compelling explanation to the literature, suggesting that firms may not convert attempts to behavior changes effectively because of reasons such as lacking internal resources or control capability, not necessarily because of strategic decoupling or greenwashing. In addition, while most existing TPB studies rely on primary data (e.g., Hinterhuber and Khan, 2025), our study leverages secondary data to offer a stronger theoretical validation by avoiding potential self-reporting biases.

Second, the environmental management literature has recognized the multifaceted nature of environmental performance (Endrikat et al., 2014; Guenther and Hoppe, 2014). Wood (1991) has proposed a performance model that emphasizes the role of processes and outcomes. The measurement of processes is based on proxies indicating the extent or sophistication of management commitment toward environmental issues. In contrast, the measurement of outcomes focuses on direct environmental performance, such as the total amount of emissions. Similarly, Xie and Hayase (2007) proposed another model that dichotomizes indicators into two branches: environmental management performance (EMP) and environmental operational performance (EOP). EMP mainly covers managerial decisions on adopting environmental policies and practices, while EOP includes quantitative environmental input and outputs. It is worth noting that the intention-behavior view reconciles well with these multi-dimensional models. For example, while Wood (1991) designates announcing the adoption of an environmental policy as a process-based measurement, it merely indicates the managers' intention since the impact of adoption is difficult to assess (Xue et al., 2020). Also, quantitative environmental performance is an outcome-based measurement and reflects actual behavior. Therefore, the decomposition of firm environmental activities into green intention and green behavior is not novel but intuitive. More importantly, the view allows us to examine the direct implications of intention and behavior on firm performance and business risk and underlines the partial mediation effect of behavior changes. As the environmental performance model studies have consistently suggested that integrated environmental performance constructs likely lead to mixed findings of the impact of environmental activities (Endrikat et al., 2014; Guenther and Hoppe, 2014), common measurability and improper aggregation likely contribute to the limited validation power of behavior as well. As current environmental performance systems commonly measure intention and behavior changes together and likely aggregate them into an opaque index, stakeholders receive mixed signals and have difficulties validating managers' true intentions and corresponding behavior changes, creating opportunities for greenwashing. Through the intention-behavior view, our findings solidify the understanding of the multiple-dimensional nature of environmental activities

and offer a theory-oriented rather than a data-driven approach. Furthermore, they provide insights into the reasons behind the prevalence of greenwashing.

Third, Delmas and Burbano (2011) have suggested that firm characteristics, particularly resources and competencies, could be crucial factors when discussing organizational-level drivers of greenwashing. Anchored on the means-end decoupling, Bromley and Powell (2012) have also proposed that the decoupling may exist because of firms' limited capacity. Nevertheless, Montgomery et al. (2023) emphasize the interactions with external stakeholders but pay little attention to internal firm characteristics for ways to mitigate greenwashing. Our study results offer empirical evidence suggesting that firm internal characteristics play a significant role. The findings contribute to the sustainable operations literature by highlighting the importance of operational characteristics in mitigating greenwashing. Further, as the TPB suggests that control capability influences the likelihood of converting attempts into behavior changes, our study provides empirical evidence supporting the notion. The finding showcases that the TPB is an effective framework for understanding organizational decisions and behaviors toward a social phenomenon like greenwashing.

Last, researchers have suggested reconciling the two important theoretical lenses, the RBV and the stakeholder theory, in the environmental and CSR literature (Freeman and Reed, 1983). As the study validates the incentives of greenwashing (i.e., the effects of intention and behavior on firm performance and business risk), it investigates the effects of these two theoretic lenses distinctively and simultaneously. While the main results support both the RBV and the stakeholder theory, the results of robustness tests reveal inconsistencies between these two effects (see the results of Model 1R2 and 1R3 as an example). Our study paves the way and encourages future research to explore further, such as examining circumstances in which the effects of the two lenses differ or conflict.

5.2 Practical Implications

Our study findings highlight several practical implications. First, we find no tradeoff or conflict in the implications of green intention (and behavior) on increasing firm performance and reducing business risk. The findings are encouraging for managers as they can enhance the communication of their green intention or improve their quantifiable green performance without concerning major conflicts. Second, the finding that control capability can mitigate the intention-behavioral gap is particularly insightful for managers committed to addressing CSR-related concerns. Managers should enhance their internal operations to increase the chance of converting attempts into actual behavioral changes and avoid being recognized as greenwashing.

We find support for the premise of sustaining the intention-behavior gap, and the limited validation power of green behavior implies that a firm can consciously maintain a gap and retain positive benefits. Therefore, a firm can excel in talks, skip walking them, and avoid negative consequences. However, such firms cause more harm to the environment than firms that walk their talks. Therefore, external stakeholders such as policymakers and social planners should pay greater attention to how effectively managers convert their attempts into behavior changes. To suppress the prevalence of the intention-behavior gap (and greenwashing), stakeholders should aim to measure actual behavior more directly and explicitly and, in turn, enhance the validation power of behavior. Improving the validation power of actual behavior should also be of interest to the socially responsible investment community as it has become an impending issue in current ESG ratings (The Economist, 2022). The industry has been calling for reform (Whelan, 2022), and the study findings shed light on the direction.

5.3 Limitations and Future Research

We recognize several limitations in our study. First, our study only focuses on the CPG industry because of the differences in labor productivity, market competitiveness, and environmental concerns across industries. We encourage researchers to expand the intention-behavior view into other industries and firm performance measurements.

We also limited our study to the links between intention and behavior and their implications on firm performance and business risk. The TPB has proposed factors that affect intention and the gap between intention and behavior (see Miller et al., 2018 as an example). The framework is worth further examination to understand the complex nature between intention and behavior in the managerial decision context.

Further, our empirical approach is limited in addressing potential endogeneities, but our robustness test with alternative variables should alleviate the concern to an extent. In addition, intention can change over time, and so can desired behavior. Therefore, the relationship between green intention and green behavior and their implications could

evolve. The dynamic is beyond our current research scope. We hope future studies can leverage more rigorous approaches, such as the panel data model, to enhance our understanding.

In sum, the main purpose of this study is to provide a better understanding of the underlying processes of how firms enact certain behavior (i.e., the gap between intention and behavior, decoupling, or greenwashing), allowing the specification of a more precise model and enabling practitioners to devise more effective interventions to induce desired behavior and mitigate the gap. We believe that our study findings offer new insights and contribute to the discussions of building a more sustainable business society.

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Appendix:

Table A1: Description and adoption proportions for ASSET 4 indicators

Label	Description	Adoption
ENERDP0051	*Policy emissions*: does the company have a policy to improve emission reduction?	112 (91.1%)
ENERDP033	*NOx and Sox emissions reduction*: does the company report on initiatives to reduce, reuse, recycle, substitute or phase out Sox (sulfur oxides or NOx (nitrogen oxides) emissions?	15 (12.2%)
ENERDP036	*VOC emission reduction*: does the company report on initiatives to reduce, substitute or phase out volatile organic compounds (VOC)?	8 (6.5%)
ENERDP037	*Particulate matter emissions reduction*: does the company report on initiatives to reduce, substitute or phase out particulate matter less than 10 microns in diameter (PM10)?	8 (6.5%)
ENERDP062	*Waste reduction total*: does the company report on initiatives to recycle, reduce, reuse, substitute, treat or phase out total waste?	113 (91.9%)
ENRRDP031	*Toxic chemicals reduction*: does the company report on initiatives to reduce, reuse, substitute or phase out toxic chemicals or substances?	25 (20.3%)
ENERDP063	*E-waste reduction:* does the company report on initiatives to recycle, reduce, reuse, substitute, treat or phase out e-waste?	12 (9.8%)
ENERDP081	*Staff transportation impact reduction*: does the company report on initiatives to reduce the environmental impact of transportation used for its staff members?	20 (16.3%)

Note: N=123

Table A2: CFA loading results

Label	Estimated Loadings	Standard Error	P-value	Item Code
ENERDP0051	0.866	0.056	< 0.001	GI1
ENERDP033	1.074	0.037	< 0.001	GI2
ENERDP036	0.379	0.113	0.001	GI3
ENERDP037	0.840	0.053	< 0.001	GI4
ENERDP062	0.837	0.060	< 0.001	GI5
ENRRDP031	0.356	0.149	0.017	GI6
ENERDP063	0.158	0.155	0.308	Not Used
ENRRDP081	0.079	0.059	0.181	Not Used

Note: We perform the CFA with the weighted-least-square-mean-and-variance-adjusted (WLSMV) estimators using Mplus Version 8.6. Two indicators, ENRRDP063 and ENRRDP081, have p-values higher than 0.05, and their loadings are significantly lower than others. Therefore, we exclude them from our remaining analyses.

Table A3: Robustness test results

Panel A – alternative variables

Structure Path	Model 1R1
GI → GB	-0.424** (0.179)
GB → ROA	0.271* (0.152)
GI → ROA	0.522*** (0.201)
GB → COE	-0.325*** (0.125)
GI → COE	-0.250 (0.274)
FS → ROA	-0.048 (0.132)
CI → ROA	-0.046 (0.072)
RP → ROA	0.310* (0.168)
FS → COE	-0.067 (0.101)
CI → COE	0.318*** (0.062)
RP → COE	-0.177 (0.130)
Model Fit	
χ^2	60.513
df	40
p-value	0.203
RMSEA	0.052
CFI	0.959
TLI	0.932

Panel B – alternative specifications

Structure Path	Model 1R2	Model 1R3
GI → GB	-0.594*** (0.196)	-0.460*** (0.176)
GB → Q	0.869 (0.694)	0.612** (0.267)
GI → Q	1.411** (0.688)	2.077 (2.392)
GB → Z	0.792 (0.642)	0.550** (0.222)
GI → Z	1.251* (0.702)	1.823 (2.187)
FS → Q	0.218* (0.132)	-0.347 (0.960)
CI → Q	-0.447* (0.232)	0.449 (1.807)
RP → Q	0.448*** (0.152)	1.658 (2.494)
FS → Z	0.070 (0.118)	-0.434 (0.856)
CI → Z	-0.486** (0.209)	0.335 (0.971)
RP → Z	0.391*** (0.141)	1.457 (2.263)
χ^2	55.432	68.405
D. F.	40	40
p-value	0.221	0.179
RMSEA	0.046	0.079
CFI	0.971	0.946
TLI	0.952	0.912

Note 1: standard errors in parentheses; * p<0.1; ** p<0.05; *** p<0.01; Item loadings are omitted.
Note 2: In Model 1R1, we replace Tobin's *q* with return on asset (ROA) and Altman *Z* with the cost of equity (COE). The literature has leveraged the accounting-based ROA to measure profitability (e.g., Russo and Fouts, 1997; İmrohoroğlu and Tüzel, 2014). Past studies have also used the CAPM-based COE as firms' risk premium to reflect the extent of business risk (e.g., Dhaliwal et al., 2011; İmrohoroğlu and Tüzel, 2014). The results support all findings in the main results. In Model 1R2, we use data from 2019 for all our variables. We first observe a decrease in statistical significance overall, but all estimated coefficients retain the same direction as the main results. The comparatively strong results from the main model help address the concern of reverse causality. In Model 1R3, we change the model specification by disabling the full information maximum likelihood (FIML) estimator in Mplus. The default estimator uses a likelihood function to estimate a missing variable of a sample using available sample variables. Therefore, disabling the estimator limits our data listwise and reduces statistical significance. Nevertheless, all coefficients remain consistent in their direction.