Industrial Marketing Management 126 (2025) 266–278

Contents lists available at ScienceDirect

Industrial Marketing Management

journal homepage: www.elsevier.com/locate/indmarman

When being green is not enough – An experimental study of the effects of sustainable value propositions on B2B green buying decisions

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ARTICLE INFO

Keywords:
B2B
Green buying
Green offerings
Environmental sustainability
Sustainable value propositions
Market turbulence
Scenario-based experiment

ABSTRACT

Despite the increased importance of environmental sustainability in B2B buying, insights on the marketing mechanisms that influence B2B green buying behavior and green value perceptions at the individual level are still limited. Drawing upon signaling theory and the literature on sustainable value propositions in B2B markets, we first examine the effect of vendors' sustainable value propositions on individual B2B buyers' purchasing decisions for green technology offerings. In a second step, we further investigate the role of buyers' market turbulence as a contingent factor in this relationship. Our findings from a scenario-based experiment provide empirical evidence that a risk-based strategy is more effective under conditions of high buyer market turbulence, while a certification-based strategy, counter to the literature, is more impactful in less turbulent markets. We thus advance the knowledge on the factors that drive B2B green buying at the individual level and contribute to the literature on sustainability value and sustainable value propositions in business markets. Our results further provide guidance for vendors designing value propositions for green offerings and for buyers seeking to purchase environmentally-friendly technologies.

1. Introduction

In recent years, vendors in business-to-business (B2B) markets have increasingly launched technology-based products and services that enable B2B customers to improve their environmental performance. These technologies, also named green offerings, can comprise a range of innovations, stretching from new battery technologies, vehicle electrification, and renewable energy systems to digital technologies such as artificial intelligence (Bohnsack & Pinkse, 2017; Ellström & Carlborg, 2022; Kuo & Smith, 2018). As recipients and users of green offerings, B2B customers are in the process of adapting their purchasing practices and increasingly engage in green buying, which represents the purchasing of environmentally-friendly materials or products as inputs for more sustainable end products for downstream customers (Yu et al., 2022). Green buying has become an important topic of consideration for B2B buyers as they are confronted with novel technologies, uncertain product benefits and information asymmetry between them and the vendor (Patala et al., 2016). In this context, research has pointed out a gap between vendors' positioning as suppliers of green value and buyers' perception of the green value provided (Kapitan et al., 2019; Simula et al., 2009). Such a value perception gap poses challenges for vendors as value perceptions can influence both buyers' inclination to purchase an offering and their willingness-to-pay (Arslanagic-Kalajdzic & Zabkar, 2017; Hansen et al., 2008).

B2B sustainability marketing literature has reported the challenges sustainable vendors are confronted with when communicating an offering's green value to buyers, who in consequence often rely on their own perceptions when evaluating a green offering due to ineffective vendor marketing strategies (Chamorro et al., 2009; Kapitan et al., 2019). Unlike 'non-green offerings', products promising more environmental sustainability can be perceived with skepticism by B2B customers due to concerns of greenwashing. Therefore, vendors tend to be more cautious in the communication of their offering's green value, which can lead to missed selling opportunities as business buyers do not entirely understand the sustainability value of the offering (Kapitan et al., 2019; Nussipova, 2022; Susteras & Zamith Brito, 2023). For example, German manufacturer of flooring products UZIN launched its new eco label Eco2 Choice in 2023 as part of a proactive green marketing strategy which links the green performance of its offerings (e.g., improved CO2 emission balance of materials) to cost and regulatory-related benefits for its customers in the construction industry. As a consequence, UZIN strengthened its perception as a green vendor, which

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https://doi.org/10.1016/j.indmarman.2025.02.017
Received 18 March 2024; Received in revised form 5 February 2025; Accepted 19 February 2025
Available online 8 March 2025

enabled the company to manage demand uncertainties and a cyclical downturn in the construction sector by growing its business in less cyclical segments such as flooring maintenance and energy renovation (Uzin Utz, 2024).

Despite the widely acknowledged importance of understanding industrial buyers' motivation to engage in green buying, insights on the required marketing strategies and mechanisms that drive green buying in the B2B context are still limited (Sharma, 2020; Tzanidis et al., 2024; Yu et al., 2022). In addition, prior studies have mainly focused on factors that drive green buying practices on an organizational or divisional level (Blome et al., 2014; Ghosh, 2019), with few studies analyzing green buying decisions of individuals (Yu et al., 2022). However, individuals such as purchasing managers play a crucial role in B2B green buying decisions (Zsidisin & Siferd, 2001). Therefore, more research is required to improve the understanding of the marketing mechanisms influencing the green value perception and decision-making of individual B2B buyers as well as the contextual factors impacting the effectiveness of such mechanisms (Casidy & Yan, 2022; Sharma, 2020; Yu et al., 2022).

Sustainable value propositions (SVPs) are considered strategic tools in B2B sustainability marketing that effectively communicate the green value of an offering to a buyer (Patala et al., 2016). SVPs can be defined as "a promise on the economic, environmental and social benefits that a firm's offering delivers to customers and society at large, considering both short-term profits and long-term sustainability" (Patala et al., 2016, p. 144). However, existing studies have largely focused on the design and implementation of SVPs on the vendor side (Närvänen et al., 2022; Patala et al., 2016; Ranta et al., 2020), providing only limited insights on how vendors' SVPs actually alter green buying decisions of individual buyers. Drawing upon signaling theory and B2B value proposition literature, SVPs should help bridging the gap between vendors' sustainability positioning and buyers' green value perception as they signal the strategic priorities (in this case environmental sustainability) to buyers and create a positional advantage for the vendor that can lead to increased buying propensity (Connelly et al., 2011; Eggert et al., 2018; Patala et al., 2016).

In addition, this study analyzes the moderating effect of market turbulence on the relationship between vendors' SVPs and buyers' green purchasing decisions. Market turbulence can be described as the rate of change and degree of predictability of customer needs, product preferences and conditions of market competition (Jaworski & Kohli, 1993). Market turbulence is argued to influence B2B sustainability buying, particularly during the initial relationship formation phase (Maleki et al., 2023). Nevertheless, extant findings on the moderating role of market contingencies in shaping green buying behavior are still ambiguous (Ghosh, 2019; X. Yu et al., 2022). Sustainability-induced shifts in market structures and the novel nature of green offerings compound market and product-related uncertainties for B2B buyers, who themselves are confronted with rapidly changing preferences of their own downstream customers (Ellström & Carlborg, 2022; Mangus et al., 2020; Nagel et al., 2024). So far, empirical evidence is lacking for whether and how these external factors influence vendors' SVPs in the context of green buying decisions. However, it is important to improve our understanding of the contingent role of market turbulence as it potentially renders the signaling of a specific SVP strategy ineffective or at least mitigates its influence on prospective buyers. More specifically, depending on a buyer's experience with turbulent market environments, different SVP strategies may exert different effects on green buying decisions.

To address these research gaps, we develop a research model to investigate the effect of three distinct SVP strategies - monetization, certification, and risk assessment - on buyers' purchase intentions. These strategies address B2B firms' major objectives linked to sustainability such as cost reductions, risk prevention, and reputation (Kemper & Ballantine, 2019; Patala et al., 2016). We further add the moderating variable of market turbulence to examine its influence on the two non-financial strategies of certification and risk assessment. To test our model, we conduct a scenario-based experiment with 655 German business professionals with purchasing experience, which allows us to empirically examine actual buyer decision-making behavior on sustainability (Crisafulli et al., 2020; Esch et al., 2019) and extends extant explorative research on SVPs in B2B markets (Patala et al., 2016; Ranta et al., 2020).

The results offer three main contributions to the literature: first, we contribute to the literature on B2B green buying by examining marketing mechanisms that influence individual buying behavior. More specifically, we introduce the concept of SVPs and examine the effects of different strategies and their external boundary conditions on individual buyers' purchasing intention, thus extending the nascent literature on factors driving green buying decisions on an individual level (Yu et al., 2022). Second, we enrich the literature on sustainability value in B2B markets and in particular SVPs. By adding a buyer perspective, we provide empirical insights on the functioning and contingencies of three SVP strategies as strategic tools and signals of sustainability for green vendors (Kapitan et al., 2019; Patala et al., 2016). Third, we contribute to the literature on market turbulence in B2B buying by shedding light on its contextual role in influencing individuals' green buying behavior and the effectiveness of vendors' SVP strategies. The remainder of the study is structured as followed. First, the foundations of the relevant concepts of this study are laid out, based upon which our hypotheses and research model are introduced. After a presentation of our dataset and the applied method, the research model is empirically validated. Finally, the results are discussed and potential implications and limitations of the study are presented.

2. Conceptual background and hypothesis development

2.1. B2B green buying

The literature on B2B green buying offers valuable insights into the gate-keeping role of organizational buyers in selecting green offerings or materials that form the input for more environmentally-sustainable value creation (Yen & Yen, 2012; Yu et al., 2022). In the past, scholars have used different names to investigate the green buying phenomenon (Yu et al., 2022) such as socially responsible buying (Drumwright, 1994), environmental purchasing (Carter & Carter, 1998), green purchasing (Yen & Yen, 2012), green procurement (Blome et al., 2014; Ghosh, 2019), sustainable purchasing (Mogre et al., 2017), or green supply chain management (Giunipero et al., 2012). In general, green buying can be described as "purchasing and consuming products that are benign toward the environment" (Mainieri et al., 1997, p. 190). As one of the early works on green buying in the B2B context, Carter and Carter (1998) defined green buying "as the purchasing function's involvement in supply chain management activities in order to facilitate recycling, reuse, and resource reduction" (Carter & Carter, 1998, p. 660), while Drumwright (1994) pronounced considerations of public consequences of organizational behavior and the creation of larger societal good in green buying practices.

Most studies explored green buying antecedents on an organizational level and identified both internal and external firm-related factors. Firm-internal antecedents include top management commitment (Blome et al., 2014; Ghosh, 2019;Giunipero et al., 2012; Yen & Yen, 2012), collaboration with suppliers (Ghosh, 2019; Yen & Yen, 2012), internal environmental concerns (Ghosh, 2019), market performance (Blome et al., 2014), initial investment costs (Giunipero et al., 2012), and firms' environmental orientation (Chan et al., 2012), while discussed external antecedents comprise customer pressure (Ghosh, 2019; Yen & Yen, 2012), competitive pressure (Ghosh, 2019), and regulatory pressure (Giunipero et al., 2012; Yen & Yen, 2012).

Even though these findings provide an expansive overview on organizational antecedents for green buying, recent research has pointed towards a knowledge gap in regards to the factors influencing green decision-making of individual buyers (Tuncdogan et al., 2019; Yu

et al., 2022). Yu et al. (2022) were one of the first to shed light on individual buyer behavior by showing that B2B buyers disengage their pro-environmental values when being less experienced and confronted with hostile market environments. However, more knowledge on the influence of vendors' marketing strategies and communication frames on individual buyers' perceived value and decision-making is needed (Sharma, 2020; Simula et al., 2009). B2B sustainability marketing research suggests that vendors' sustainability-oriented branding and value propositions can align the sustainability value of an offering with buyer's value perceptions and positively influence organizational buyer performance in established vendor-buyer relationships (Casidy & Yan, 2022; Kapitan et al., 2019; Patala et al., 2016). This study extends these findings by exploring the link between vendors' SVPs and their contingent factors, and individual buyers' green value perceptions in the formation phase of a B2B relationship.

2.2. Sustainability value in B2B markets

How business customers perceive value is considered a major point of interest for both marketing scholars and practitioners (Mencarelli & Rivière, 2015). Perceived customer value can be described as "the customers' assessment of the value that has been created for them by a supplier given the trade-offs between all relevant benefits and sacrifices in a specific-use situation (Flint et al., 1997, p. 529)." Value perceptions are heterogenous and can vary between different stakeholders within the same organization, individuals and collectives, as well as vendor and customer firms (Eggert et al., 2019; Ulaga & Chacour, 2001).

Recent research in B2B sustainability marketing discusses the challenges sustainable vendors face in translating the sustainability of their offerings into perceived sustainability value on the buyer side (Kapitan et al., 2019; Simula et al., 2009). In the context of green offerings, customers may not be aware of the benefits as they do not perceive the value added of eco-design advantages (Dangelico & Pujari, 2010). In addition, green vendors exhibit problems in positioning themselves and their offerings as sustainable, which can lead to ineffective marketing strategies where customers rather perceive price arguments than the environmental value of the offering (Kapitan et al., 2019; Simula et al., 2009). While certain benefits of a product or service can be communicated explicitly (e.g., increased efficiency and cost reductions), other value elements are implicit and therefore more difficult to be perceived by the targeted customers (Payne et al., 2017; Ranta et al., 2020). This is particularly relevant for green offerings as environmental benefit is not always measurable in a way economic benefit is. Hence, prior research has suggested different coping strategies to address these issues such as communication based on third-party certifications (Dangelico & Pujari, 2010; Patala et al., 2016; Simula et al., 2009).

Recent studies indicate that such coping strategies should reflect a perspective shift from value-in-exchange to value-in-use (Eggert et al., 2018, Eggert et al., 2019). While value-in-exchange considers value as supplier-oriented with a unidirectional communication of the superior value towards the customer, value-in-use regards value as a result of co-creating activities among several stakeholders to achieve mutually positive results (Eggert et al., 2018). This view coincides with the value understanding in sustainability literature which comprehends value as the interplay of environmental, social and economic benefits that firms create for both customers and a larger set of stakeholders. Products and services that offer sustainability benefits often incorporate value that is temporally more-distant such as improved end product quality, less energy and resource consumption, reduced waste, or firm reputation (Elkington, 1998; Ellström & Carlborg, 2022; Patala et al., 2016). In consequence, applying a value-in-use perspective, for example through SVPs, can facilitate the understanding of how sustainability-related value is created in B2B relationships over a product's lifetime and how it can be translated into perceived customer value (Patala et al., 2016; Payne et al., 2017).

Following a value-in-use perspective, SVPs are based on the concept of customer value propositions, which are an established strategic tool in B2B markets to communicate the superior value of a vendor's offering and its strategic priorities to both internal and external stakeholders (Eggert et al., 2018; Payne et al., 2017). While the offering itself lies at the center of a vendor's (superior) value promise compared to market alternatives, the customer value proposition translates this relative value to the targeted customers (Eggert et al., 2018). Customer value propositions in B2B marketing literature usually focus on the communication and quantification of the economic value linked to a value offering (Anderson et al., 2006; Wouters & Kirchberger, 2015). However, the need to create more sustainable products and services in B2B markets has shifted the view on customer value propositions from a purely economic promise of a vendor's offering to a view where value proposition strategies further incorporate environmental and social considerations and address a wider array of stakeholders (Ballantyne et al., 2011; Emerson, 2003). Thus, SVPs are argued to provide a more holistic value offering approach in which B2B customers' perceived valued can be derived from a variety of factors (e.g., economic benefits, reputation, risk) and potential trade-offs between these factors can be addressed more effectively (Patala et al., 2016). Despite the aforementioned insights on SVPs, more empirically grounded research regarding the effectiveness and validity of these strategies is needed (Ramirez et al., 2014; Simula et al., 2009), in particular on how they unfold on the customer side and under which contextual factors.

2.3. Hypothesis development

2.3.1. The effect of SVPs on B2B buyers' purchase intention

Signaling theory (Spence, 1974) posits that in order to reduce information asymmetry, well informed economic actors can use signals to communicate unobservable qualities such as product quality or skills to external parties (Connelly et al., 2011; Spence, 1974). In business markets, signals can be considered as determinants of buyers' perceived value (Arslanagic-Kalajdzic & Zabkar, 2017; Yuan et al., 2020). Organizational buyers use signals, e.g., a vendor's brand or communication, to assess relevant vendor and offering-related attributes, in particular in cases where the value is intangible and product quality is difficult to observe from the outside (Erdem & Swait, 1998; Yuan et al., 2020). Green offerings are often technologically complex and novel to organizational customers, while the associated value promises tend to be more intangible and temporally distant. These factors contribute to buyers' uncertainty in respect to the actual sustainability value of the green offering and require vendors to proactively develop communication-based coping strategies (Casidy & Yan, 2022; Kapitan et al., 2019; Patala et al., 2016; Simula et al., 2009). We argue that vendors can use SVP strategies as signals to communicate the underlying sustainability value to buyer organizations and thereby reduce information asymmetry (Connelly et al., 2011; Payne et al., 2017). The choice of a specific SVP as signal does thereby depend on buyers' preferences and their inclination to identify these signals and to act on them (Connelly et al., 2011). B2B organization that purchase green offerings follow several motives, among which the most pertinent are efficiency-based cost reductions, pre-emption of risks and regulation, and improved reputation among own downstream customers (Kemper & Ballantine, 2019; Patala et al., 2016). We therefore consider the three SVP strategies of monetization, certification, and risk assessment (Patala et al., 2016) as signals that address these buyer-relevant sustainability objectives, which we will further elaborate on in the next paragraphs.

Although literature discusses different value proposition perspectives and strategies, expressing the value of an offering in its direct economic terms is probably the most widely used and straightforward way of formulating and communicating a value proposition in the B2B context (Hinterhuber, 2017). Based on that economic value understanding, a monetization strategy conveys B2B vendors' value propositions to its customers through quantification and explicit calculation of the underlying monetary value (Anderson et al., 2006; Wouters &

Kirchberger, 2015). This monetization strategy also applies to offerings that promise environmental benefits, especially in industries where financial motives are still predominant and improved environmental performance is closely linked to cost savings through less resource consumption, operational efficiencies or anticipation of external pressures from stakeholders and regulators (Henderson, 2015; Kapitan et al., 2019; Mogre et al., 2017). Communicating the quantified value of a green offering in monetary units should reduce uncertainty on potential financial value by applying a life cycle-based perspective, which signals the concrete long-term benefits of the offering from purchasing to end-of-use (Janeiro & Patel, 2015; Patala et al., 2016). In addition, the transformation of firms towards more sustainable business models will in many cases be evolutionary, starting with dedicated initiatives that trigger incremental change over time. Therefore, articulating the economic benefits of a green offering can serve as an entry point for vendors to address B2B customers' sustainability challenges (Inigo et al., 2017), hence increasing the likelihood of a green offering investment. We therefore argue that:

Hypothesis 1a. Adding a monetization-based SVP to a green offering is positively related to decision-makers' purchase intention.

The certification-based SVP strategy reflects the understanding that B2B buying organizations consider independent third-party certifications as a signal of environmental sustainability and select their vendors accordingly (Blome et al., 2014). Certifications such as ISO 14000 norms thereby serve as costly signaling mechanisms for non-observable product quality, which are linked to considerable investments on the vendor side both in terms of financial investments and skills (Connelly et al., 2011). Similar to standards or audits, they thus verify the environmental sustainability of a technology, reduce vendors' risks of being accused of greenwashing, and function as signals that reduce information asymmetry and buyers' perceived purchasing risk (Czinkota et al., 2014; Dahlin et al., 2020). In addition, integrating a certified green technology into its operations should be attractive for a B2B buyer as it signals environmental sustainability to its own downstream customers and therefore equips it with a "license to operate" vis-à-vis their stakeholders (Patala et al., 2016). Consequently, purchasing a certified green offering should increase stakeholder legitimacy and support the long-term survival of a buyer firm and therefore translate into both environmental and economic advantages for B2B buyers (Freeman, 1984). Empirical evidence from consumer markets shows that third-party certification labels reduce customers' perceived risks linked to sustainable products and lead to higher purchase intention (Brach et al., 2018). In a similar manner, studies in the B2B sustainability context report that third-party certifications are valued by organizational buyers (Kapitan et al., 2019; Simula et al., 2009) and that environmental certification positively impacts firms' environmental and economic performance (Melnyk et al., 2003; Turk, 2009; Younis & Sundarakani, 2019). Hence, we argue:

H1b. Adding a certification-based SVP to a green offering is positively related to decision-makers' purchase intention.

Environmental risks and the impact of those on business activities have become a major concern for businesses and are considered to be of strategic importance for managers (Boiral et al., 2020). These risks can include direct environmental impacts, such as extreme weather events, changes in access to natural resources and raw materials, or non-compliance of regulation (Gomez-Valencia et al., 2021). In consequence, businesses are increasingly selecting investments, e.g., in green technology offerings, that help manage these risks and enable a change towards more sustainable business practices (Henderson, 2015; Wüstenhagen & Menichetti, 2012). A risk assessment-based SVP addresses both buyers' immediate sustainability risk concerns and the risks embedded in buyers' supply chains. Consequently, this SVP should improve the brand positioning of both vendor and buyer within their supply chains as it represents concrete sustainability-related actions as signals of sustainability (Khan et al., 2023). Even though empirical insights on the role of sustainability-related risk in B2B purchasing decisions are yet limited (Khan et al., 2023), first studies highlight the important role of risk in technology investments (Kropp & Totzek, 2020; Paluch & Wünderlich, 2016) and support the notion that perceived risk influences purchase intentions in B2B markets (Matos & Krielow, 2019). Additional empirical support is provided through a more extensive literature body from consumer markets research showing that perceived consumer risk influences investment intentions and that risk mitigation is associated with greater purchasing intentions (Flanagin et al., 2014; Keh & Pang, 2010; Park et al., 2005; Yang et al., 2016). Thus, we posit that:

H1c. Adding a risk assessment-based SVP to a green offering is positively related to decision-makers' purchase intention.

2.3.2. *The moderating effect of market turbulence*

To effectively formulate vendor value proposition strategies and to deepen our understanding of B2B buyers' decisions for green offerings, the role of contextual factors should be further investigated. The literature discusses several contextual factors that influence B2B green buying such as internal factors like value congruence (Casidy & Lie, 2023), purchasing experience (Yu et al., 2022), or top management commitment (Yen & Yen, 2012) as well as external ones like market uncertainty (Homburg et al., 2013; Srinivasan et al., 2011), supply uncertainty (Carter & Carter, 1998; Srinivasan et al., 2011), competitive intensity, transactional uncertainty (Casidy & Yan, 2022), environmental hostility (Yu et al., 2022), customer pressure, or regulatory pressure (Yen & Yen, 2012). We follow previous research and examine the moderating role of market turbulence in affecting B2B buyers' decisions (Homburg et al., 2013; Leek & Christodoulides, 2012; Tuncdogan et al., 2019).

Market-related environmental factors can influence buyers' value perceptions and the importance they attach to vendors' branding in purchasing decisions (Leek & Christodoulides, 2012). Customers in both consumer and business markets are increasingly shifting their preferences to green products (Casidy & Yan, 2022; Gershoff & Frels, 2015). This should not only affect B2B vendor-buyer relationships and influence buyers' purchase decisions to "green" their operations (Lai et al., 2019), but should also increase uncertainty and difficulty for buyers to accurately scan their external environment due to limited information processing capability (Chatterjee et al., 2023; Srinivasan et al., 2011). Following the notion that vendors' use of signals reduces perceived uncertainty in buying decisions (Connelly et al., 2011), market turbulence should render signals of sustainable value more important to individual buyers and facilitate their decision-making for green offering purchases. In addition, buyers from turbulent market environments might be more acquainted with uncertainties and more inclined to actively look and act upon SVP-induced sustainability signals (Connelly et al., 2011). In the following, we examine the moderating role of market turbulence in influencing the certification and risk assessment-based SVPs, responding to the need for further investigation of non-financial marketing strategies in green buying (Mogre et al., 2017).

First, B2B firms that integrate third-party certified green offerings into their operations can utilize these credentials to demonstrate their efforts to become more environmentally sustainable and therefore gain credibility and support of their stakeholders (Delmas & Montiel, 2009). This should be particularly valuable for firms operating under high market turbulence, as increasing environmental demands from customers and investors will probably contribute to existing external uncertainties. Compared to their peers in more stable markets, these firms should therefore rely even more on third-party verifications that signal their environmental sustainability to other market participants and stakeholders (Homburg et al., 2013). Certifications can hereby reduce information asymmetry between the focal firm and its stakeholders (Akerlof, 1970; Montiel et al., 2012) and increase market transparency (Stahl & Strausz, 2017), which can lead to increased trust and legitimacy

(Heras-Saizarbitoria & Boiral, 2013). In line with that, empirical studies show that certifications and signals of quality can increase the likelihood that firms form business relationships and invest in projects when market turbulence is high (Podolny, 1994; J. Yu & Xiao, 2023). We therefore postulate that:

H2. The greater the market turbulence of a buyer, the stronger the relationship between a certification-based SVP and a buyer's purchase intention.

In a similar manner, the effect of a risk assessment SVP strategy on B2B buyers' purchase intentions should be affected by the presence of market turbulence. While distinct in their nature (Knight, 1921), the boundaries between risks and uncertainties are not always rigid and firms that operate in high uncertainty environments are often confronted with an array of both uncertainties and risks (Müllner, 2016). Hence, compared to their decision-making peers in stable markets, decision-makers in turbulent markets should be more acquainted with the management of risks and more sensitive to purchases that reduce environmental risks, such as the regulatory risk of non-compliance with CO2 emissions regulations that could result in financial penalties. In line with that, empirical studies report that businesses invest and engage in actions that reduce risk and volatility when operating in turbulent markets (Li & Wang, 2019; Tao et al., 2015; Wu & Knott, 2006) and that external uncertainties and risk perception impact B2B buyers' investment intentions (Matos & Krielow, 2019). Thus, decision-makers in turbulent markets should be more susceptive to the green offering if it emphasizes the benefits of environmental risk assessment. We hence argue that:

H3. The greater the market turbulence of a buyer, the stronger the relationship between a risk assessment-based SVP and a buyer's purchase intention.

In summary, we argue that adding a monetization (H1a), certification (H1b), or risk assessment (H1c) SVP strategy to a green offering has a positive effect on B2B buyers' purchase intention. Moreover, we propose that buyers' market turbulence moderates the relationship between a certification-based green offering (H2) and a risk-assessment-based green offering (H3) and buyers' purchase intention. Our research model is depicted in Fig. 1.

3. Method and data

3.1. Research design and data

To test our hypotheses, we developed a scenario-based experiment with a between-subject design in which participants were randomly assigned to one of several different green offering scenarios. We opted for this approach because scenario-based experiments are particularly suited for measuring subjective reactions to procedural preferences, such as the willingness to buy a certain product or service (Kwon & Weingart, 2004). Moreover, assessing the impact of our manipulations required control over potential confounding factors (Sommer et al., 2017). The scenario-based experiment is particularly suited for such settings as it allows the testing for causality in an abstract environment, while minimizing potential unaccounted effects of other variables (Charness et al., 2012).

For our sample we collaborated with a marketing agency and distributed an online survey to 978 German business professionals with budget responsibility. Upon entering the online questionnaire, participants were randomly assigned by the software to one of the different scenarios. As purchasing decisions not only require economic understanding but also experience in decision-making (Esch et al., 2019), we only included participants in our sample that possessed a minimum of one year of budget responsibility. After a sanity check based on which we excluded the participants without budgetary experience, our final sample comprised 655 participants of whom 42 % identified themselves as female and 57 % as male. We further validated that the randomly assigned groups were representative of the overall sample. The descriptive characteristics of our sample are provided in the Appendix A, Table A.1.

3.2. The research instrument

The aim of this study was to test the effect of different SVPs on buyers' purchase intentions for green offerings, considering the contingent role of buyers' market turbulence. We therefore asked participants via an online questionnaire to provide their purchase intentions for a hypothetical green product offer provided by a technology vendor. Before the scenario was shown to the participants, they were asked to put themselves in the role of deciding about specific green technology investments for their company. Following Esch et al. (2019), participants were asked to empathize with their own companies' situation to increase realism. In the scenario itself, participants were told that their company has set itself the general goal of becoming more environmentally sustainable and that, in this context, a German technology company has offered the company a technology-based green offering. Then a text describing the technology, its advantages, and an SVP (except for the control scenarios) were presented, followed by a questionnaire including manipulation checks for plausibility and realism, the dependent variable purchase intention, the moderator variable market turbulence, and background information about the survey participants. Each participant received only one scenario and was neither informed

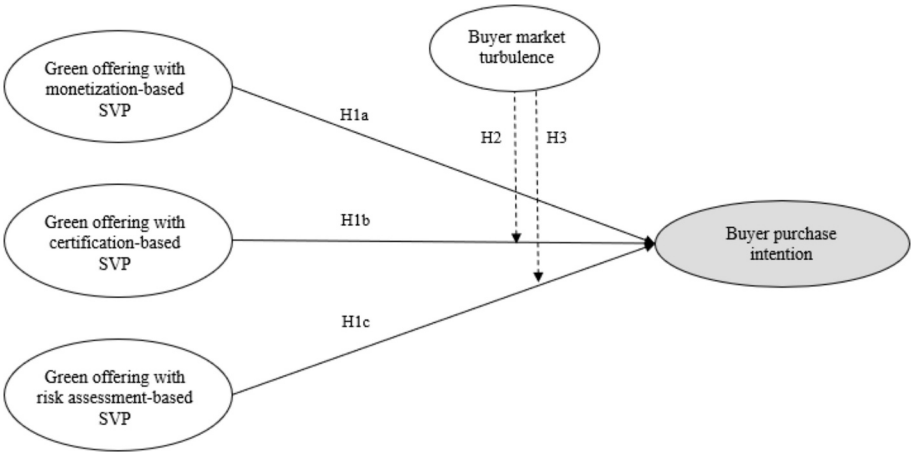

Fig. 1. Research model (own illustration).

about other green offerings nor confronted with SVP formulations other than the one obtained.

The utilized green offering scenarios varied in terms of the green technologies described and the SVP strategies with which these offerings were promoted to the participants (three different strategies of monetization, certification and risk assessment; one control scenario, which did not include a value proposition strategy). To ensure that our results were robust across a varied set of representative offerings (Heidenreich & Spieth, 2013), we screened the literature for suitable green offerings and drafted our scenarios based on three popular categories of green technologies: waste management, energy, and digital sustainability. We opted for the three categories as their use for environmental sustainability in businesses is widely discussed in the literature (Feroz et al., 2021; Kuo & Smith, 2018; Schulze et al., 2016). For each category we created two different scenarios resulting in a total of six baseline green offering scenarios. Savings in CO2 emissions were chosen as the one indicator among all scenarios to describe the positive environmental performance that would result from the deployment of the use cases and the value for CO2 emissions savings was the same across all scenarios. Hence, our final set comprised 24 different scenarios, consisting of six different green offering scenarios, including each three different value proposition manipulations and one control group.

To check whether these technology scenarios were plausible and realistic, we conducted a pretest ($n = 40$). Following Darley and Lim (1993), we included two items each to assess plausibility and realism of the scenarios. For all items a seven-point likert scale was used, ranging from 1 (*strongly disagree)* to 7 (*strongly agree*). For plausibility, respondents needed to agree with the following statements: "The technology presented seemed plausible to me," and "I found the description of the technology to be understandable." For realism, participants were asked to agree to the statements "I can imagine that companies are looking into this technology," and "I find the use of this technology in a company to be possible:" The two items for plausibility and two items for realism were then aggregated into one variable for plausibility and realism, respectively. Our results suggest that participants perceived all scenarios as both plausible (Mwaste = 5.99, Menergy = 5.8, Mdigital = 4.92) and realistic (Mwaste = 5.30, Menergy = 5.51, Mdigital = 4.75).

3.3. Provided information as basis for green buying decision

After having ensured that our technology scenarios were robust and the research instrument suitable, we added the different SVPs to the scenarios. In particular, we developed three manipulations for monetization, certification and risk assessment. These formulations were added to the technology scenarios and remained unchanged among all technologies. The manipulations for the three SVPs were formulated in line with Patala et al. (2016) and each comprised two sentences. For the monetization scenarios, we used the sentences: "The manufacturer particularly emphasizes the economic savings potential that comes with the technology," and "These efficiency gains enable you to reduce your costs in this area by €10,500 per year and system used and, in addition to the environmental aspect, also contribute to a more profitable operation of your company." Certification scenarios were manipulated using the phrases: "The manufacturer particularly emphasizes the environmental certification of the technology," and "The technology is ISO 14067 certified, which means it meets the highest transparency criteria for CO2 emissions from production to the end of use and demonstrates to your relevant stakeholders your activities and ambitions when it comes to sustainability." Lastly, the risk assessment scenarios included the sentence "The manufacturer particularly emphasizes the benefits of environmental risk assessment that come with the technology," as well as "In addition to risk prevention against potential climate impacts, the technology supports compliance with existing and future EU sustainability reporting regulations, such as CO2 emissions, which can reduce the risks of penalties or short-term, expensive adjustments." The following example illustrates how a waste management scenario was manipulated with a monetization-based SVP:

"Your company has set itself the goal of becoming more ecologically sustainable. In this context, a German technology group offers you the following technology-based service to make your company more ecologically sustainable. The technology involves waste garbage bins that are connected to a network and which you can use in offices, factories or logistics areas. *The manufacturer particularly emphasizes the economic savings potential that comes with the technology.* The tried-and-tested technology enables the filling levels to be recorded centrally using digital scales built into the respective waste bins. In addition, the software used to control the system provides information as soon as the maximum capacity of the bins is reached and they can be emptied. This makes waste management more efficient and environmentally friendly. The system is suitable for retrofitting existing waste bins. Compared to alternatives available on the market, this system can save you around 15 tons of CO2 emissions per year per installed unit at average capacity through reduced journeys and waste transport. *These efficiency gains enable you to reduce your costs in this area by €10,500 per year and system used and, in addition to the environmental aspect, also contribute to a more profitable operation of your company.*"

All other combinations of SVP manipulations and green offering scenarios were designed in the same way. The control group only received a green offering scenario without an additional SVP formulation. For an overview of all green offering scenarios please refer to Appendix B, B1.

3.4. Subject selection and randomization

To conduct our experiment, we sent an online questionnaire to the participants in which they were randomly assigned to one of the 24 scenarios. The participants then received the description of a green offering with either one of the three manipulated SVP scenarios or the control scenario that only contained the green offering description. After participants were confronted with the different scenarios, they were asked to state their purchase intention for the green offering.

3.5. Measures

The scenarios described above represented the independent variable of our study. For our dependent variable we adapted an established scale to measure purchase intention (Aaker et al., 2010; Crisafulli et al., 2020), consisting of three items (Appendix A, Table A.2): "I think the company I work for would be likely to buy this technology", "I would recommend this technology for investment by the company I work for", and "In a role of a buyer, I would like to acquire this technology for the company I work for." Our moderating variable of market turbulence was operationalized using four adapted items "In our kind of business, customers' product preferences change quite a bit over time", "Customer product requirements and product preferences are highly uncertain", "It is difficult to predict changes in customer needs and preferences", and "The competitive conditions of the market are highly unpredictable" (Jaworski & Kohli, 1993). Before the moderator and the control items where displayed, participants where again asked to answer the following questions related to the actual firm they work for. Similar to previous experimental studies (Esch et al., 2019; Heidenreich & Kraemer, 2016), we collected demographic data that was used as control variables including age, gender, education level, and industry affiliation. As participants were asked to take the role of a manager responsible for a budget, we further controlled for budget experience (1 = less than one year; 2 = 1 to 5 years; 3 = 5 to 10 years; 4 = 11–15 years; 5 = 16 to 20 years; 6 = more than 20 years).

4. Results

4.1. Manipulation, plausibility and realism checks

The plausibility and realism checks from the pretest were also included in the main study and confirmed that all green offering scenarios were perceived as both plausible (*M*waste = 6.65, *M*energy = 5.42, *M*digital = 4.88) and realistic (*M*waste = 5.49, *M*energy = 5.62, *M*digital = 5.25). We further conducted manipulation checks for the different SVP strategies presented to ensure they are recognized as such by the participants. The results of the independent *t*-tests show that compared to the control group scenario the manipulation checks were statistically significant at $p < .01$ for the monetization and risks assessment SVP strategies, and at $p < .05$ for the certification SVP strategy, respectively (see Table 1). We can therefore assume that the manipulations for the three different SVPs are effective and were perceived as such in the green offering descriptions by the participants.

4.2. Main effects

Following the procedure of Esch et al. (2019), we first tested our cumulative distribution function for distributional adequacy and ran a Kolmogorov-Smirnov test (Massey Jr., 1951). The results were statistically significant ($p < .05$), revealing the nonparametric nature of our data set. A subsequent Kruskal-Wallis non-parametric signed-rank test was performed, which verified the existence of significant differences among the three manipulated groups as well as the control group. The descriptive statistics and correlations of the variables are presented in Table 2.

4.3. Hypothesis testing

4.3.1. Hypothesis 1

We first tested hypotheses 1a-c if integrating the three SVP strategies of monetization, certification and risk assessment into a green offering description has a significant effect on B2B buyers' purchase intentions. Hence, participants were not only given different green offering scenarios but were also split into four groups: One group for each of the three SVP strategies with according descriptions for monetization, certification and risk assessment, respectively; and one group with a control scenario that only contained the green offering text without added SVP strategy. Using a two-tailed Mann-Whitney *U* test, each one of the three SVP scenarios was tested against the control scenario (Table 3). The results provide support to hypothesis 1a ($U = 9115.50$; $M_{Monet} = 4.45$; $n_{Monet} = 164$; $M_{Control} = 3.75$; $n_{Control} = 155$; $p < .01$) as well as hypothesis 1b ($U = 9436.00$; $M_{Cert} = 4.29$; $n_{Cert} = 154$; $M_{Control} = 3.75$; $n_{Control} = 155$; $p < .01$) and hypothesis 1c ($U = 12{,}206.50$; $M_{Risk} = 4.00$; $n_{Risk} = 182$; $M_{Control} = 3.75$; $n_{Control} = 155$; $p < .05$). They therefore confirm our hypotheses that decision-makers express a statistically significant higher intention to purchase a green offering when the sustainability value is highlighted through one of the three proposed SVP strategies.

4.3.2. Hypothesis 2

Our second hypothesis proclaimed that the relationship between certification and buyers' purchase intention is positively moderated by the market turbulence of the buyer firm. Again, a Mann-Whitney U test was conducted. The results of the group comparison show that there is a significant difference in the effect of the certification scenario on purchase intention between the two models of high market turbulence ($U = 2348.50$; $M_{Cert\_high} = 4.33$; $n_{Cert\_high} = 66$; $M_{Control\_high} = 4.08$; $n_{Control\_high} = 79$; $p = .30$) and low market turbulence ($U = 2236.50$; $M_{Cert\_low} = 4.27$; $n_{Cert\_low} = 88$; $M_{Control\_low} = 3.42$; $n_{Control\_low} = 76$; $p < .01$). While a significant effect can be confirmed, this effect is counter-intuitive as the certification SVP strategy was significantly enhanced in environments marked by low turbulence. Thus, we cannot confirm our second hypothesis.

4.3.3. Hypothesis 3

Lastly, hypothesis 3 asserted that the effect of the risk assessment strategy on buyers' purchase intention is strengthened in the presence of high buyer market turbulence. The moderation analysis followed the same procedures as for hypothesis 2. The results confirm the hypothesis by showing a statistically significant difference of the effect of a risk assessment strategy on purchase intention between firms in high market turbulence ($U = 2820.50$; $M_{Risk\_high} = 4.46$; $n_{Risk\_high} = 90$; $M_{Control\_high} = 4.08$; $n_{Control\_high} = 79$; $p < .05$) and firms in low market turbulence ($U = 3239$; $M_{Risk\_low} = 3.55$; $n_{Risk\_low} = 92$; $M_{Control\_low} = 3.42$; $n_{Control\_low} = 76$; $p = .41$).

5. Discussion

The aim of this study was to empirically investigate whether and how the use of SVP strategies affects individual B2B buyers' purchasing behavior for green offerings. To achieve this objective, we examined the

Table 2
Correlation matrix.

		1	2	3	4	5	6
1	Gender	1.00					
2	Age	−0.01	1.00				
3	Education	0.05	−0.04	1.00			
4	Budget responsibility	0.13	0.23	−0.03	1.00		
5	Purchase intention	−0.02	0.01	0.01	0.01	1.00	
6	Market turbulence	0.04	−0.06	−0.01	−0.03	0.23	1.00
	Mean	1.6	3.8	5.3	2.8	4.12	4.14
	Std. dev	0.55	1.3	1.1	1.12	1.6	1.27

Table 3
Results of hypotheses testing.

Hypothesis	Effect	Accepted/ rejected
H1a	Monetization-based SVP → Purchase intention	Accepted
H1b	Certification-based SVP → Purchase intention	Accepted
H1c	Risk assessment-based SVP → Purchase intention	Accepted
H2	Certification-based SVP * Buyer market turbulence → Purchase intention	Rejected
H3	Risk assessment-based SVP * Buyer market turbulence → Purchase intention	Accepted

Table 1
Manipulation checks results.

	Control group		Monetization group		Certification group		Risk assessment group	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Monetization value of offering	4.22	1.79	5.36	1.43	4.65	1.75	4.61	1.92
Certification value of offering	4.85	1.71	4.44	1.59	5.77	1.11	5.1	1.82
Risk assessment value of offering	4.79	1.55	4.14	1.6	4.65	1.75	5.99	1.17
Significance of mean difference vs. control group			Monetization value $p < .01$		Certification value $p < .05$		Risk assess. Value $p < .01$	

SD = Standard deviation

three SVP strategies monetization, certification and risk assessment as proposed by Patala et al. (2016) and argued that decision-makers' purchase intention will be higher when being addressed with a SVP strategy. We further hypothesized that buyers' market turbulence will positively influence the link between the certification and risk assessment strategies, and buyers' purchase intentions.

The first objective of this study was to examine the effect of the three SVP strategies of monetization, certification, and risk assessment on buyers' purchase intentions for green offerings. The empirical results confirm Hypothesis 1a-c. First, they underline the notion that economic value still plays a dominant role in B2B buyers' value perceptions for green offerings (Hockerts, 2015; Mogre et al., 2017) and that economic value quantification remains an important vendor ability that influences individual buyers' green purchase intentions (Wouters & Kirchberger, 2015). The results further align with previous findings on the role of certifications as signals that verify the environmental sustainability of a technology, create trust among potential buyers, and reduce fears of greenwashing (Connelly et al., 2011; Patala et al., 2016). The significant results for the risk assessment SVP underscore the role of perceived risk as a relevant factor in B2B purchasing decisions (Matos & Krielow, 2019). Moreover, they are in line with an emerging understanding that addressing sustainability risks in B2B markets represents an important vendor capability that affects buyers' value perceptions and can drive green offering purchases (Khan et al., 2023; Patala et al., 2016).

The second research objective concerned the moderating role of market turbulence. Counter to our expectations, the findings do not confirm Hypothesis 2 and show that a certification strategy is more effective in less turbulent markets than in high turbulent environments. On the one hand, the results differ from the findings of Casidy and Yan (2022), who report a stronger impact of competency trust, which can be reflected through certifications, on buyer performance when buyers' competitive intensity is high. On the other hand, the findings can indicate that a certification-based strategy might be more appropriate as a targeted signal when addressing buyers in less turbulent markets. These buyers usually possess more accurate knowledge on their downstream customers compared to firms that are confronted with more volatility and uncertainty on customers' demands for more sustainable products. Thus, more stable market conditions potentially render a costly investment in a certified signal more attractive. This observation further corroborates the findings of Patala et al. (2016), who suggested that certification-based SVPs can be particularly useful for buyers serving niche markets of sustainability-driven customers.

Regarding Hypothesis 3, the results confirm our expectation that a risk assessment-based SVP is particularly useful when buyers' market turbulence is high. This is in line with our previous stated assumption that B2B buyers, which already operate in turbulent environments, have more incentives to reduce avoidable and manageable risks compared to firms in more stable markets. In fact, firms that already work in a context of high uncertainty may have developed a set of dynamic capabilities that enables them to sense potential environmental risks by regularly conducting risk analysis and taking preemptive action (Zahoor et al., 2022). This disposition may in turn influence their preferences towards sustainability investments that reduce risks. Hence, our results empirically support the notion that developing risk-based value propositions and addressing buyers' risk concerns are important capabilities under conditions of high market turbulence (Oehmen et al., 2020).

5.1. Theoretical implications

Our findings contribute to the literature on B2B green buying (Tuncdogan et al., 2019; X. Yu et al., 2022) and sustainability value in B2B markets (Kapitan et al., 2019; Patala et al., 2016) by shedding light on SVPs as signals of green value that shape individual green buying decisions and on the moderating factors that influence this relationship.

First, our study contributes to B2B green buying literature and in particular its drivers at the individual level. Previous research on B2B green buying has largely focused on antecedents on an organizational or divisional level (Blome et al., 2014; Ghosh, 2019; Giunipero et al., 2012; Yen & Yen, 2012). However, less attention has been paid to the behavior of individuals in B2B green buying decisions (Yu et al., 2022) and to the question on how vendors' sustainability marketing mechanisms actually unfold on the buyer side (Casidy & Yan, 2022). Our examination of three different SVP strategies and their boundary conditions contributes to an improved understanding of the influence of vendors' sustainability marketing strategies on individual buyers' green value perceptions and their buying behavior. Thus, we advance the literature on the microfoundations of B2B green buying by shedding light on the external marketing mechanisms that shape green buying decisions of individuals and complement the findings of Yu et al. (2022), who investigated the role of buyer-related psychological factors in green buying. In that way, we also respond to calls for more research on the factors driving decision-making for B2B green buying (Mogre et al., 2017; Sharma, 2020).

Second, we extend the literature on sustainability value in B2B markets. Prior studies have discussed whether vendors' green business practices and the green character of an offering in itself can already function as positive signals that drive buyers' preferences towards sustainable offerings (Homburg et al., 2013; Vesal et al., 2021), or whether vendors need to develop proactive marketing strategies to overcome potential value perception gaps (Kapitan et al., 2019). Drawing upon signaling theory, we provide empirical evidence that vendors' use of SVP strategies as specific signals can drive green buying at an individual level and potentially close value perception gaps for green offerings. We further add a contingency perspective, outlining under which conditions SVPs such as certifications and risk assessment are most effective. Our findings thus contribute to a more detailed understanding of the role of sustainability-related risks (Khan et al., 2023) and certifications (Patala et al., 2016) in the design of SVPs and advance research on signaling theory in B2B sustainability marketing research (Vesal et al., 2021). In addition, we respond to the calls for more research on value perceptions in B2B markets at the individual level (Eggert et al., 2019; Macdonald et al., 2016) and for more empirical studies on the effectiveness of coping strategies in B2B sustainability marketing (Simula et al., 2009).

Third, we add to the literature on market turbulence as an external environmental factor in B2B green buying. Prior studies have mostly investigated external contextual factors on the seller side and only recently begun to examine the role of market-related factors from the buyer's perspective (X. Yu et al., 2022). Moreover, B2B scholars have focused on how market contingencies influence vendors' sustainability positioning in existing B2B relationships (Casidy & Yan, 2022), providing few insights on its role in the relationship formation phase when vendors initially address potential B2B customers with a green offering (Maleki et al., 2023). Our findings outline that individual buyers from turbulent markets seem to shift towards risk-oriented value promises when being addressed with a green offering, while their counterparts from less turbulent markets prefer certifications. We thus provide more in-depth knowledge on market turbulence as a relevant contingency in green buying decisions.

5.2. Managerial implications

Our findings also offer valuable implications for practitioners. First, they strengthen the notion that vendors should adapt sustainability-oriented marketing practices by designing clear value propositions for their green offerings (Khan et al., 2023). According to our results, SVP strategies can function as green signals that can be perceived by buying firms' decision-makers. Thus, marketing managers in green vendor firms should not exclusively rely on their own sustainable business practices and the environmental benefits of their offerings as signals of environmental value, but should design and actively communicate SVPs to their potential customers. In addition, marketing managers should consider the implications of contingent factors, like buyers' market turbulence,

that can potentially alter the effectiveness of certain SVP strategies. In the context of approaching new customers, our findings not only highlight the need to conduct comprehensive market research to understand buyers' business environments, but also the importance of gaining particular insights on how the green transformation affects the market behavior and preferences of buyers' downstream supply-chain partners and customers. For established B2B relationships, vendors could engage in SVP co-creation with buying organizations in order to improve the alignment between the green value offering and buyers' green value perception. This can be achieved through the reception of direct customer insights and preferences, which should reduce information asymmetry between the two parties.

Second, marketing managers can integrate the three tested SVP strategies into their offerings and can communicate the customer value through a monetization, certification or risk assessment-based value proposition. While our experimental study design only allowed for a separate evaluation of the different strategies, a combination of two, three or even more value proposition strategies could be possible and might further strengthen the communication towards business customers, for example by resolving potential trade-offs between conflicting sustainability objectives (Patala et al., 2016).

Third, our findings emphasize the need to train sales representatives in vendor organizations. On the one hand, such a training should incorporate knowledge on the green offering features that ultimately lead to value-in-use and thus also inform the design of an SVP, e.g., a green offering's feature that contributes to the achievement of environmental regulatory compliance in a specific sector. According to our findings, sales personnel should be further equipped with capabilities to quantify the economic value of a green offering (Hinterhuber, 2017), understand environmental risk management, and be acquainted with relevant certification standards like ISO 14067. On the other hand, sales departments should understand the contextual factors that can influence the green buying decisions of their business customers. We illustrated how buyers' preferences to invest in a green offering vary depending on the degree of market turbulence. Sales managers should therefore engage in a close contact with decision-makers, understand the market environment they operate in and, based on that, develop the best sales communication strategy that fits to customers' external environment.

Fourth, our findings also hold implications for B2B purchasing managers. Given that vendors often invest in costly signals based on clients' feedback (Connelly et al., 2011), B2B buyers should communicate their priorities to vendors and stakeholders. A prerequisite is that buyers themselves develop the necessary green knowledge that enables them to define these priorities and to subsequently perceive and act on vendors' green value signals. Therefore, buyers should engage in own market sensing activities and communicate with their own customers to detect how environmental issues change the preferences in their downstream supply chain. In consequence, understanding the green value signals that downstream customers will react on should facilitate buyers' own communication towards vendors and enable better-informed buying decisions for green offerings.

5.3. Limitations and future research

Like any research, the results of our study are subject to some limitations. The experimental design of our study relied on scenarios. While this approach ensured the control for external confounding effects, it can only assess respondents' intentional behavior (Sommer et al., 2017) and assumed a single stand-alone decision (Esch et al., 2019). However, purchasing processes in firms normally span several weeks or months and move through different stages until a purchasing decision is made (Eisenhardt, 1989). These decisions can be further influenced by vendors' ability to create and maintain good customer relationship with the buyer organization (Day, 1994). Moreover, investment decisions in the context of environmental sustainability are often complex and require in-depth assessments of different organizational and societal aspects (Hahn et al., 2014). In consequence, our results may be more interesting for single decision-makers or in the context of small-scale investments with a limited number of stakeholders involved. Second, our experimental design limited the number of different SVPs and did not account for possible interactions between SVPs in the communication to buyers. Third, this study relied exclusively on a sample of professionals working for German firms. Different socio-cultural systems and regulatory environments may influence the perceived importance of sustainability activities (Tata & Prasad, 2015) and therefore also the preferences of decision-makers and firms to invest in green technology offerings.

Future studies should account for these shortcomings, e.g., through real-life observations over a longer time horizon. In addition, future research could enhance the generalizability of our results to other geographies with different economical structures and industry distributions. Finally, other studies could test alternative value propositions in the context of environmental sustainability, e.g., circular economy design elements (Ranta et al., 2020), testimonials (Ramirez et al., 2014), non-economic and sociocultural propositions (Närvänen et al., 2022) or strategies emphasizing environmental and business modifications at the network level (Ellström & Carlborg, 2022).

CRediT authorship contribution statement

Marcel Aksoy: Writing – original draft, Investigation, Formal analysis, Conceptualization. **Benedikt Schnellbächer:** Writing – review & editing, Supervision, Methodology.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Appendix

Table A.1
Descriptive statistics of the subjects.

Sample categories	$n = 655$
Age	*(%)*
Below 26	2
26–35	32
36–45	34
46–55	17
56–67	9

(*continued on next page*)

Table A.1 (*continued*)

Sample categories	
	***n* = 655**
Above 67	0
Did not disclose	5
Job type	***(%)***
Upper Management	11
Middle Management	33
Employee	52
Other	4
Timespan of budget responsibility (in years)	***(%)***
1–5	53
5–10	27
11–15	10
16–20	4
>20	5
Size of organization (number of employees)	***(%)***
0–50	27
51–100	13
101–250	16
251–500	10
501–1000	9
1001–2000	5
2001–5000	5
>5000	14

Table A.2
Measurement items.

Construct	Items
Purchase intention	I think the company I work for would be likely to buy this technology.
Aaker et al. (2010); Crisafulli et al. (2020)	I would recommend this technology for investment by the company I work for.
	In a role of a buyer, I would like to acquire this technology for the company I work for.
Market turbulence	In our kind of business, customers' product preferences change quite a bit over time.
Jaworski and Kohli (1993)	Customer product requirements and product preferences are highly uncertain.
	It is difficult to predict changes in customer needs and preferences.
	The competitive conditions of the market are highly unpredictable.

Appendix B. Appendix

B.1. Green offering scenarios

B.1.1. Baseline scenario 1 (waste)

Your company has set itself the goal of becoming more ecologically sustainable. In this context, a German technology group offers you the following technology-based service to make your company more ecologically sustainable. The technology involves waste garbage bins that are connected to a network and which you can use in offices, factories or logistics areas. The tried-and-tested technology enables the filling levels to be recorded centrally using digital scales built into the respective waste bins. In addition, the software used to control the system provides information as soon as the maximum capacity of the bins is reached and they can be emptied. This makes waste management more efficient and environmentally friendly. The system is suitable for retrofitting existing waste bins. Compared to alternatives available on the market, this system can save you around 15 tons of CO2 emissions per year per installed unit at average capacity through reduced journeys and waste transport.

B.1.2. Baseline scenario 2 (waste)

[…][1] The technology is an intelligent waste system that you can use in offices, factories or logistics areas. This innovative technology enables the most common types of waste to be thrown into a bin, which can distinguish between the different types of waste using artificial intelligence-based image recognition and then separates them automatically. In addition, the intelligent waste system provides information on the optimal further use of the recyclable materials contained in the bin, e.g., for further use at other locations or recycling. […].

B.1.3. Baseline scenario 3 (energy)

[…] The technology is intelligent lighting control, which you can use in offices, factories or logistics areas. This tried-and-tested technology makes it possible to illuminate traffic routes in buildings only when they are needed. The lighting is controlled by sensors installed in the building and can be controlled easily and user-friendly via Bluetooth and an app. The intelligent lighting control system is also suitable for retrofitting in corridors and stairwells in existing buildings and, when installed, extends the service life of existing light sources. […].

[1] All formulations at the beginning and end of Baseline scenarios 2–6 equaled the one from Baseline scenario 1

B.1.4. Baseline scenario 4 (energy)

[…] The technology is an emission-free energy system that you can use flexibly and easily in offices, factories or logistics areas. This innovative technology enables heat to be stored in boxes that are easy to install and transport. Surplus energy from renewable sources is used to generate hydrogen, which is converted into water when called upon later, thus releasing the stored energy. The stored thermal energy can be accessed for an unusually long time, up to three months if required. Compared to conventional methods such as gas boilers, this energy system offers emission-free, flexible and sustainable energy storage up to high temperature ranges. […].

B.1.5. Baseline scenario 5 (digital sustainability)

[…] The technology is cloud computing and virtualization, which you can use in office, factory or logistics spaces. This proven technology enables the reduction of physical IT infrastructure (especially servers) in your company, resulting in lower energy consumption and less electrical waste. The resulting reduction in maintenance work in turn minimizes environmentally damaging transport and resource expenditure. The provider's cloud infrastructure is based on highly efficient technology that can be easily deployed across multiple locations. The energy required for operation comes exclusively from renewable sources. […].

B.1.6. Baseline scenario 6 (digital sustainability)

[…] The technology involves quantum-based digital doppelgangers that can be used in offices, factories or logistics areas. This revolutionary technology enables the digital representation of a physical object, process or service that behaves and looks like its counterpart in the real world. Quantum sensing is used to capture highly precise multiple properties of objects and processes via heat, wear or energy loss. The simulations of the quantum-based digital doppelganger thus enable the optimization of resource consumption across multiple dimensions (e.g., energy, CO2 and waste). […].

Data availability

Data will be made available on request.

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