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O MERCADO VOLUNTÁRIO DE CARBONO NO BRASIL: DESAFIOS, PERSPECTIVAS DE CONSUMO E CONTRIBUIÇÕES DO MARKETING PARA SUA CONSOLIDAÇÃO

RENNAN CARVALHO DOS SANTOS
UNIVERSIDADE FEDERAL DE PERNAMBUCO - UFPE

MARCONI FREITAS DA COSTA
UFPE - UNIVERSIDADE FEDERAL DE PERNAMBUCO

Introdução
As mudanças climáticas intensificam impactos ambientais e sociais, estimulando a criação de mercados de carbono como mecanismo de mitigação. No Brasil, o mercado voluntário de carbono (MVC) combina grande potencial de oferta com desafios de credibilidade, transparência e engajamento do consumidor. Este artigo busca compreender como fatores de confiança, percepção de valor e comunicação moldam a consolidação do MVC sob a ótica do marketing e do comportamento do consumidor.

Fundamentação e Discussão
A literatura sobre o MVC aponta três dimensões centrais: confiança e transparência, ligadas a padrões e verificações; comportamento e disposição a pagar, influenciados por conhecimento, preço e percepção de impacto; e dispositivos de mercado, como certificações e selos, que estruturam legitimidade. No Brasil, persistem dúvidas sobre integridade, fragmentação de padrões e baixa participação. Estratégias de marketing que simplifiquem a compra, reforcem credibilidade e conectem créditos a co-benefícios são cruciais para engajar consumidores, sobretudo jovens, com narrativas autênticas.

Conclusão
Conclui-se que a consolidação do MVC no Brasil depende de mecanismos regulatórios, mas sobretudo da capacidade de engajar consumidores por meio do marketing. A agenda proposta aponta três frentes: curto prazo, evidências empíricas sobre confiança e disposição a pagar; médio prazo, comparações entre Brasil e outros contextos; longo prazo, integração entre dispositivos de mercado e políticas públicas. Avançar nessa agenda é crucial para posicionar o Brasil como referência global no tema.

Referências
Kreibich & Hermwille (2020); Lang, Blum & Leipold (2020); Vargas, Sobrinho & Morgado (2022); GlobeScan (2022); One Planet Network (2023); Ecosystem Marketplace (2023; 2025); ICAP (2024); ICC Brasil & WayCarbon (2021); Planalto (2024).

Palavras Chave
Mercado de Carbono, Marketing, Consumidor

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ABSTRACT

The voluntary carbon market (VCM) has expanded globally as a mechanism to complement regulatory climate policies; however, it faces persistent challenges related to credibility, transparency, and consumer engagement. Brazil holds a strategic position due to its natural resources and recent regulations, but consumer participation remains limited. This article analyses the VCM in Brazil from a marketing and consumer perspective, showing how trust, communication, and perceived value shape adoption. The literature review highlights credibility signals, willingness to pay, and market devices as central to consumer decisions, while Brazilian evidence reveals a gap between environmental concern and purchase behaviour. We identify four challenges: credit integrity, fragmented standards, project concentration, and low consumer engagement. We propose a research agenda, comprising short-term tests on willingness to pay and trust cues, medium-term cross-country comparisons, and long-term SBCE-VCM integration to convert regulatory integrity into consumer-recognised value. Emphasising consumer trust and clear communication can consolidate Brazil's role as a supplier of high-integrity credits and a reference in marketing sustainable solutions to domestic and international audiences.

Keywords: voluntary carbon market; consumer behaviour; marketing

1 INTRODUCTION

Climate change, driven by the accelerated increase in greenhouse gas (GHG) emissions, has generated severe environmental and social impacts worldwide, including heatwaves, floods, and the spread of infectious diseases (Lee & Choi, 2019; Orazalin, Ntim, & Malagila, 2023; Ripple et al., 2024). Since the Industrial Revolution, the intensive use of fossil fuels has significantly increased carbon dioxide (CO_2) emissions, intensifying global warming (Pourakbari-Kasmaei et al., 2020; Benjaafar, Li & Daskin, 2013). In response, international initiatives such as the Kyoto Protocol and the Paris Agreement established frameworks for reducing emissions and fostering global cooperation (Broekhoff & Spalding-Fecher, 2021; Blum, 2020).

Within this context, carbon markets have emerged as economic mechanisms designed to price emissions and reward activities that reduce or sequester them (Takeuchi, 2012; Yuxian & Wang, 2023). These systems operate in two forms: the regulated market, in which governments impose emission caps and enable trading of allowances, and the voluntary carbon market (VCM), where companies and individuals offset their emissions beyond compliance obligations. The voluntary segment, in particular, has expanded significantly, enabling investments in forest conservation, renewable energy, and other projects that generate certified carbon credits (Lee, Kim & Kim, 2018; Carballo-Penela et al., 2018).

Despite this expansion, the VCM continues to face persistent challenges related to credibility, transparency, and governance. Concerns about additionality, monitoring, and verification mechanisms have raised doubts among stakeholders and consumers about the real environmental impact of offsets (Molthan-Hill et al., 2020; Kreibich & Hermwille, 2020). Experiences from different regions demonstrate that market consolidation depends not only on regulatory and institutional robustness but also on the ability to build consumer trust and demonstrate tangible benefits (Lang, Blum, & Leipold, 2020; Zhou, Gu, & Deng, 2022).

Brazil occupies a strategic position in this global scenario. The country is one of the world's largest potential suppliers of carbon credits due to its vast natural resources and recent regulatory advances, including the creation of the Brazilian Emissions Trading System (SBCE) under Law 15.042 in December 2024 (Presidency of the Republic of Brazil, 2024). Market projections indicate substantial growth, with revenues expected to rise from US$1.7 billion in 2023 to US$16.8 billion by 2030 (Ecosystem Marketplace, 2023; 2025). Earlier studies suggest that Brazil could meet up to 22% of the global demand for carbon credits (ICC Brasil & WayCarbon, 2021). However, despite this potential, the national VCM continues to face obstacles, particularly regarding consumer trust, limited awareness, and weak integration between voluntary and regulated initiatives (Valiergue & Ehrenstein, 2021; Adu, Flynn & Grey, 2022).

Understanding these barriers and opportunities requires going beyond institutional and financial perspectives to examine the marketing and consumer dimensions of the voluntary carbon market. The role of consumers is critical for consolidating demand and legitimising carbon credits, yet their participation remains limited, shaped by factors such as trust, value perception, and communication strategies (Vargas et al., 2022; GlobeScan, 2022).

This article aims to analyse the voluntary carbon market in Brazil from a marketing and consumer perspective. Its objectives are: (i) to contextualise the global and national development of voluntary carbon markets with emphasis on consumer-facing dynamics and marketing practices, (ii) to discuss the main barriers and drivers for consumer engagement, focusing on issues of trust, communication, and perceived value, and (iii) to propose a research agenda that advances academic debate and offers practical strategies for organisations to strengthen marketing approaches and foster consumer participation in the voluntary carbon market.

2 RETIONALE AND DISCUSSION

2.1 Carbon Markets Worldwide

The carbon market is an economic system designed to impose costs on greenhouse gas emissions and reward activities that reduce or sequester them (Forest et al., 2018). Over the past decades, international agreements and national policies have shaped its development, as summarised in Table 1, which highlights major global milestones.

Table 1 - List of events relevant to the world scenario

Year	Events
1979	The inaugural World Climate Conference (WCC) is held.
1988	The establishment of the Intergovernmental Panel on Climate Change has been confirmed.
1990	The IPCC has recently released its initial assessment report, which has prompted the Second World Climate Conference to urge a global treaty on climate change. Negotiations on a framework convention have commenced at the United Nations General Assembly.
1991	The initial gathering of the Intergovernmental Negotiating Committee (INC) has commenced.
1992	During the Earth Summit in Rio, the INC adopted the UNFCCC text. This was also when the UNCBD and UNCCD, two other important Rio Conventions, were opened for signature.
1994	The UNFCCC has officially come into effect.
1995	The initial meeting of the Conference of the Parties (COP 1) occurred in Berlin.
1996	The UNFCCC Secretariat is set up to support action under the Convention.
1997	The Kyoto Protocol was officially adopted during COP 3 in December.

Year	Events
2001	In 2001, the IPCC released its Third Assessment Report, followed by adopting the Bonn Agreements. These agreements were based on the Buenos Aires Plan of Action of 1998. Later, at COP 7, the Marrakesh Accords, which outlined the implementation rules for the Kyoto Protocol, were adopted. These accords also established new funding and planning instruments for adaptation and a technology transfer framework.
2005	The initial Meeting of the Parties to the Kyoto Protocol (MOP 1) was held in Montreal on the day the Protocol officially began. As per the regulations of the Kyoto Protocol, discussions on the succeeding phase of the KP were initiated by the Parties through the Ad Hoc Working Group on Further Commitments Parties under the Kyoto Protocol (AWG-KP). The Nairobi Work Programme on Adaptation, which eventually got its name in 2006, was acknowledged and approved during the meeting.
2007	The Fourth Assessment Report of the IPCC has been released, bringing climate science to the forefront of public awareness. During COP 13, Parties established the Bali Road Map, which outlined the path towards a post-2012 outcome through two work streams: the AWG-KP and the Ad-Hoc Working Group on Long-Term Cooperative Action Under the Convention.
2009	During COP 15 in Copenhagen, the Copenhagen Accord was drafted and duly noted by the COP. As a result, countries subsequently submitted their non-binding emissions reduction pledges or mitigation action pledges.
2010	The Cancun Agreements were drafted and widely accepted by the COP during COP 16.
2011	At COP17, the COP accepted and drafted the Durban Platform for Enhanced Action.
2012	At CMP 8, the CMP adopted the Doha Amendment to the Kyoto Protocol, which resulted in several decisions being made. These decisions have paved the way for increased ambition and action at all levels.
2013	At COP 19/CMP 9, crucial decisions were made regarding the Durban Platform, the Green Climate Fund and Long-Term Finance, the Warsaw Framework for REDD Plus, and the Warsaw International Mechanism for Loss and Damage. Parties agreed to submit their "intended nationally determined contributions" (INDCs) well before the Paris conference as part of the Durban Platform.
2014	During COP 20 in Lima in 2014, the Parties agreed upon the 'Lima Call for Action' that outlined crucial components of the upcoming Paris Agreement.
2015	From 2012 to 2015, the Ad Hoc Group on the Durban Platform for Enhanced Action (ADP) engaged in extensive negotiations that resulted in the adoption of the Paris Agreement by COP21 on December 12, 2015.
2016	In 2016, COP 22 was held in Marrakesh, Morocco, primarily focusing on limiting the global average temperature increase to 1.5ºC. Discussions revolved around the promotion of innovation to enhance clean energy use worldwide.
2017	In November 2017, Bonn, Germany, hosted the COP 23 conference with the support of the German government and chaired by the government of Fiji. The conference's main objective was to continue the progress made during COP 21 in Paris and implement the Paris Agreement, which aims to control the increase in worldwide temperatures to less than 2 degrees Celsius above pre-industrial levels.
2018	In 2018, the COP 24 conference took place in Katowice, Poland. Its primary goal was to put the Paris Agreement, adopted during COP 21 in 2015, into action. The Paris Agreement primarily aims to limit global temperature increases to less than 2 degrees Celsius. During COP 24, countries in attendance discussed strategies to decrease greenhouse gas emissions and tackle the difficulties associated with climate change.
2019	The COP 25 conference occurred in Madrid, Spain, from December 2 to 13, 2019. Its main goal was to move forward with negotiations to implement the Paris Agreement. This international treaty, signed in 2015, aims to restrict the rise in global temperatures to less than 2 degrees Celsius compared to pre-industrial levels.
2021	The COP 26 conference was held in Glasgow, Scotland, from October 31 to November 13, 2021. During the event, the rules for the regulated carbon market, which is linked to the Paris Agreement, were approved. This was a significant milestone towards increasing investments in decarbonisation projects in the future.
2022	From 6 to 18 November 2022, Sharm El Sheikh, Egypt, hosted COP 27. The event promoted climate technology solutions in developing countries through a new five-year work programme. Attendees discussed adhering to the Paris Agreement, utilising renewable energy sources, advancing decarbonisation, and addressing other sustainability concerns.
2023	COP 28 was held from 30th November to 12th December in the United Arab Emirates. The conference ground is being laid for a swift transition to a fossil fuel-free future, backed by deep emissions cuts and scaled-up finance.

Year	Events
2024	COP 29 was held from 11th to 22nd November 2024 in Baku, Azerbaijan. The conference focused on scaling up climate finance, establishing a global carbon credit trading framework, and emphasizing nature-based solutions to accelerate climate action, while addressing the needs of developing nations.

Source: Adapted from UNFCCC (2024)

The first milestone was the Stockholm Conference in 1972, which brought environmental preservation to the global agenda. Later, the 1988 Toronto Conference reinforced the urgency of reducing greenhouse gases and established the Intergovernmental Panel on Climate Change (IPCC) to assess the risks posed by human activity (Anukwonke & Abazu, 2020). These efforts culminated in the United Nations Framework Convention on Climate Change (UNFCCC), signed in 1992 and ratified in 1994, creating the foundation for international climate negotiations (UNFCCC, 1998). Since 1995, the Conferences of the Parties (COPs) have served as the primary arena for global decision-making, with COP29 in Baku (2024) emphasising scaled-up climate finance, global carbon credit trading, and implementation of the Paris Agreement (UNFCCC, 2024).

The Kyoto Protocol, adopted in 1997, was a turning point in climate governance. It introduced binding emission reduction targets, 5% below 1990 levels by 2012, and created three flexible mechanisms to support compliance: Joint Implementation (JI), which enabled the issuance of Emission Reduction Units (ERUs) for investments abroad; the Clean Development Mechanism (CDM), allowing projects in developing countries to generate Certified Emission Reductions (CERs), each equivalent to one tonne of CO_2; and Emissions Trading, which facilitated the exchange of Assigned Amount Units (AAUs) among participating nations. Together, these mechanisms not only supported countries in meeting their commitments but also demonstrated the potential of market-based solutions to address climate change and encourage sustainable investments (UN Environment, 2019; Anukwonke & Abazu, 2020; Broekhoff & Spalding-Fecher, 2021; Blum, 2020; Takeuchi, 2012). This laid the foundation for voluntary markets, which companies later adopted to exceed compliance and demonstrate environmental responsibility.

Alongside regulated markets, the voluntary carbon market (VCM) emerged to allow companies and individuals to offset emissions beyond compliance obligations. Since 2005, voluntary initiatives have generated over 430 million tonnes of CO_2eq reductions, with credit issuance and retirements growing steadily (Michaelowa et al., 2019). These markets became especially relevant as organisations sought to enhance their sustainability image and respond to societal pressures (Lee, Kim & Kim, 2018; Carballo-Penela et al., 2018).

Carbon markets today can be divided into compliance systems and voluntary offset systems (Takeuchi, 2012). Compliance systems, such as Emissions Trading Schemes (ETS), establish emission caps through regulation. Companies emitting below their cap can sell allowances to others, creating cost-effective incentives for reductions. The EU ETS remains the most extensive such system, recently extending to maritime transport in 2024, with emission reductions of 16.5% from stationary sources in 2023 driven by renewables (ICC, 2021; European Commission, 2023; European Commission, 2024).

In addition to compliance systems, voluntary carbon markets (VCMs) have emerged as a complementary mechanism, enabling companies and individuals to go beyond regulatory requirements. These voluntary systems are market-driven. Companies and individuals purchase credits to offset emissions, with forecasts indicating growth to USD 250 billion by 2050. Nonetheless, issues regarding credibility persist, particularly concerning additionality, monitoring, and project effectiveness (Prolo et al., 2021; CarbonCredits.com, 2024; World Bank, 2024).

2.1 Voluntary Carbon Market

Over the past two decades, the voluntary carbon market (VCM) has undergone significant evolution through innovation, experimentation, learning, and improvement (Spilker & Nugent, 2022). The VCM is a market-based mechanism designed to reduce global carbon emissions voluntarily (Spilker & Nugent, 2022). It enables the private sector, governments, and individuals to engage in carbon offsetting and trading, allowing them to offset their emissions while working towards decarbonising their supply chains and developing energy-efficient technologies. The VCM is governed by a self-regulating ecosystem of standard-setting organisations and certifiers (Spilker & Nugent, 2022).

In 2003, the World Wildlife Fund (WWF) collaborated with international non-governmental organisations (INGOs) to establish the Gold Standard, a voluntary carbon offset program and registry that aimed to optimise the impact of carbon projects and provide value to developers worldwide (Gold Standard, n.d.). Additionally, in 2007, businesses and environmental advocates collaborated to establish the Verified Carbon Standard (Verra), the most active VCM registry that has issued nearly 1 billion credits to date (Thiel, n.d.). These standards were developed to ensure the reliability and quality of carbon markets while maintaining user-friendly and secure registries (Spilker & Nugent, 2022).

During COP21 in 2015, the parties to the United Nations Climate Change Conference agreed on the Paris Agreement, which aimed to limit global warming to "well below two °C" compared to preindustrial levels. The VCM created a network of registries, standards, and frameworks that laid the foundation for a developed secondary market for VCM units (UNFCCC, 2015). The secondary market now includes financial derivative products that support its growth.

The importance of the VCM is increasing rapidly, particularly as the 2021 COP26 climate negotiations approach. Large private sector organisations have committed significantly to achieving net-zero carbon emissions through the use of offsets (Mountford et al., 2021). Before COP26, over 1500 companies had pledged to reduce or offset more than 3.5 gigatons of annual greenhouse gas emissions (Streck, 2021).

In response to the expansion of the voluntary market, numerous businesses and individuals are working to lower their carbon footprints. They increasingly rely on offsets produced in the voluntary carbon market to achieve emissions neutrality, driven by social and environmental responsibility, as well as the potential to enhance institutional sustainability (Ecosystem Marketplace, 2021).

The Paris Agreement, particularly through Article 6, marked a new stage in the integration of carbon markets by creating frameworks for international cooperation and reinforcing debates on transparency and double counting (UNFCCC, 2015). In this context, voluntary markets gained even greater relevance as complementary instruments to national climate commitments. For countries like Brazil, with vast natural resources and increasing institutional support through the SBCE, the evolution of global markets provides both opportunities and challenges, which will be addressed in the following section. For marketers, these global developments underscore the dual challenge of communicating credibility while simplifying complex market mechanisms for consumers.

2.1.1 Voluntary Carbon Market in Brazil

The voluntary carbon market (VCM) in Brazil reveals both promising opportunities and persistent challenges. According to Vargas et al. (2021), the country has approximately 159 active projects, most of which are certified by international standards, including the Verified Carbon Standard (VCS), the Gold Standard (GS), and the American Carbon Registry (ACR).

These projects are strongly concentrated in forestry and land use, reflecting the strategic importance of the Amazon and other biomes. However, agriculture and livestock remain underrepresented despite their significant mitigation potential, as highlighted by recent studies (Verra, 2021; GS, 2021; ACR, 2021; Vargas et al., 2022; Assad et al., 2021; 2022).

The institutional environment has undergone significant evolution over the past few years. The creation of the Brazilian Emissions Trading System (SBCE) and the approval of Law 15.042 in 2024 established the country's regulated carbon market under a cap-and-trade model (Planalto, 2024; Presidency of the Republic of Brazil, 2024). Although primarily aimed at compliance, these initiatives are expected to strengthen the VCM by improving monitoring, reporting, and verification (MRV) practices, enhancing transparency, and aligning Brazil with international standards (ICAP, 2024). Nevertheless, the absence of fully integrated guidelines continues to create uncertainty and limit broader participation.

In parallel, private platforms such as Sustainable Carbon and Carbonext have sought to expand access to voluntary credits by offering tools for calculating emissions and purchasing credits directly from certified projects (Sustainable Carbon, 2021; Carbonext, 2021). These initiatives reduce transaction costs, but their reach among Brazilian consumers remains limited. Research indicates that, despite growing concern for environmental issues in Brazil, barriers such as limited knowledge, mistrust in credit effectiveness, and perceptions of low individual impact still hinder the wider adoption of sustainable practices (Vargas et al., 2022; GlobeScan, 2022; One Planet Network, 2023).

Taken together, these dynamics show that Brazil combines vast natural potential and evolving regulatory structures with persistent barriers to consumer engagement. These consumer-facing dynamics, trust, accessibility, and communication, are particularly relevant for understanding how Brazil can convert potential supply into meaningful consumer demand. This tension highlights the importance of analysing the marketing and consumer perspective, which will be addressed in the following section.

2.2 Marketing and Consumer Perspective on the Voluntary Carbon Market

From a marketing standpoint, international and Brazilian evidence on consumer engagement with the voluntary carbon market (VCM) converges around three interconnected themes: trust and transparency, consumer behaviour and willingness to pay, and the role of market devices in shaping credibility and choice (Kreibich & Hermwille, 2020; Lang, Blum & Leipold, 2020; Kim et al., 2022; Lee, Kim & Kim, 2018; Valiergue & Ehrenstein, 2021; Birchall, Murphy & Milne, 2015). Research consistently highlights that perceived additionality, the robustness of monitoring, reporting and verification (MRV), and risks of double counting are central to whether offsets are seen as credible by both firms and individuals (Kreibich & Hermwille, 2020; Lang, Blum & Leipold, 2020; Molthan-Hill et al., 2020). In marketing terms, standards and registries such as VCS/Verra, the Gold Standard, and the American Carbon Registry function as quality signals, reducing perceived risk by codifying methodologies and maintaining public ledgers of issuance and retirement (Verra, 2021; GS, 2021; ACR, 2021). This signalling effect has been reinforced by growing demand for higher-integrity credits with verified co-benefits, such as biodiversity protection and community development, which serve as additional value cues that enhance willingness to pay and strengthen brand legitimacy (Ecosystem Marketplace, 2023; 2024).

Behavioural studies provide further evidence that environmental knowledge and perceptions of offset effectiveness positively influence purchase intention, whereas complexity in the transaction process and high price salience tend to reduce consumer conversion (Kim et al., 2022; Lee, Kim & Kim, 2018; Spash, 2010). In Brazil, consumer surveys reveal a rising concern for environmental issues, particularly among Gen Z and Millennials, but also confirm the persistence of the intention–behaviour gap, often linked to low levels of knowledge, limited trust in offset mechanisms, and the perception of low individual impact (Vargas et al., 2022; GlobeScan, 2022; One Planet Network, 2023). These findings point to clear segmentation opportunities, distinguishing between novice and informed consumers, while emphasising the importance of message framing that communicates tangible impact and directly addresses scepticism.

In addition to attitudes and behavioural drivers, the role of market devices and institutional arrangements is central in shaping consumer trust. Labels, methodologies, accounting rules, and disclosure formats influence what is accepted as a "credible" offset and thus structure both organisational procurement and consumer choices (Valiergue & Ehrenstein, 2021). Certification and transparent reporting also operate as forms of social proof, reinforcing perceived legitimacy (Birchall, Murphy & Milne, 2015). At the corporate level, engagement with voluntary carbon markets is often embedded in CSR strategies and brand positioning, working as a communication signal of environmental responsibility to consumers and stakeholders alike (Carballo-Penela et al., 2018).

Taken together, the evidence suggests that effective marketing in the VCM necessitates strategies that integrate credibility cues (standards, MRV, co-benefits) with clear and simplified purchasing processes, while also targeting consumer segments most receptive to sustainability narratives, particularly younger generations. At the same time, persistent barriers such as mistrust, knowledge gaps, and price sensitivity must be addressed through trust-building communication and more accessible offers (Vargas et al., 2022; Kim et al., 2022; GlobeScan, 2022; One Planet Network, 2023). Despite progress, gaps remain in empirical consumer studies, particularly in Brazil, where the divergence between attitudes and actual behaviours underscores the need for further investigation, an agenda that motivates the following section. This literature makes clear that voluntary carbon markets cannot expand without integrating marketing insights into their design and communication.

2.3 Challenges and Directions

Despite its potential, the voluntary carbon market (VCM) in Brazil faces challenges that directly influence both its institutional consolidation and its ability to engage consumers. A first challenge concerns the integrity and quality of credits. Technical discussions about additionality, monitoring, reporting, and verification (MRV) may appear distant from everyday consumers, yet they are perceived as signals of brand credibility. If credits are not trusted as genuine or effective, the entire market risks being dismissed as symbolic or "greenwashing," which undermines marketing efforts and erodes consumer confidence (Kreibich & Hermwille, 2020; Lang, Blum & Leipold, 2020). In branding terms, MRV robustness functions as a trust signal comparable to a certification seal in food or cosmetics, directly shaping willingness to engage.

A second critical issue is the fragmentation of standards and procedures. The coexistence of multiple registries, such as Verra, the Gold Standard, and the American Carbon Registry, without integrated national guidelines generates confusion not only for investors but also for consumers who struggle to understand which certificates to trust. From a marketing standpoint, this lack of standardisation dilutes messaging and weakens the potential of simple, recognisable quality signals that could facilitate consumer decision-making (Verra, 2021; GS, 2021; ACR, 2021; ICAP, 2024). This absence of a unified standard prevents offsets from achieving the kind of recognisable "eco-label" status that helps other sustainable products break into mainstream consumer markets.

The limited scale and diversity of projects represent a third barrier. Although Brazil has more than one hundred active initiatives, most are concentrated in forestry and land use, while sectors such as agriculture and livestock remain underrepresented (Vargas et al., 2022; Souza et al., 2012). This imbalance not only restricts the sector's mitigation potential but also narrows the narratives that marketers can use to demonstrate broad societal impact. Without greater sectoral diversity, there is a risk that consumer perceptions will reduce carbon offsetting to a niche activity, or worse, associate it with symbolic action rather than systemic change. From a marketing perspective, sectoral diversity would allow storytelling that connects carbon markets to everyday consumption categories (e.g., food, mobility, housing), thereby broadening resonance with consumers.

Finally, expanding the consumer base remains both the most difficult and the most promising direction for growth. Research shows that although Brazilians increasingly express concern for environmental issues, actual engagement with voluntary offsets remains low, limited by lack of knowledge, mistrust, and the perception of minimal individual impact (Vargas et al., 2022; GlobeScan, 2022; One Planet Network, 2023). Overcoming these barriers demands more than information campaigns; it requires marketing strategies that combine education with aspirational branding, positioning offsets not only as a technical mechanism but as part of a desirable and sustainable lifestyle. Digital platforms and fintech tools can play a central role here, simplifying purchases to mirror e-commerce experiences and reducing the friction that often discourages first-time buyers. Generational targeting is also key: younger consumers, particularly Gen Z and Millennials, demonstrate stronger pro-sustainability attitudes but are also the most sceptical of offsetting claims, highlighting the need for authentic and transparent communication tailored to their expectations. For example, while Gen Z expresses higher pro-sustainability concern, they also show stronger scepticism toward offsets, requiring narratives that combine transparency with aspirational identity cues (GlobeScan, 2022; One Planet Network, 2023).

In sum, the future of the Brazilian VCM will depend not only on regulatory alignment and institutional governance but also on how effectively it addresses these marketing and consumer-facing challenges. Enhancing credibility, simplifying standards, diversifying projects, and building authentic connections with emerging consumer segments are essential steps toward consolidating the market and positioning Brazil as a leader in voluntary carbon initiatives. Future consolidation will also depend on advancing consumer-focused research that informs both marketing strategy and policy design.

3 CONCLUSIONS AND RESEARCH AGENDA

The analysis indicates that the consolidation of Brazil's voluntary carbon market depends as much on consumer engagement and marketing effectiveness as on institutional and regulatory advances. Integrity and transparency remain crucial for credibility. The fragmentation of standards complicates communication, while the concentration of projects narrows the market narrative. Additionally, low awareness, mistrust, and perceptions of limited individual impact hinder participation. Building on these findings, the next step is to understand how Brazilian consumers evaluate carbon credits in practice, specifically how trust cues, price framing, and co-benefit communication influence their willingness to pay. These questions form the empirical basis for the next stage of this research, which will test how Brazilian consumers actually respond in practice.

In the short term, research should provide empirical evidence on Brazilian consumers' willingness to pay and trust. Priority tests include the effect of credibility signals (recognisable certification logos, MRV/third-party statements), price presentation (per-tonne vs. per-purchase add-on; bundled vs. optional), and co-benefit disclosure (biodiversity, community outcomes) on choice. Friction-reduction in the purchase journey (simple defaults, one-click flows) should be assessed alongside segmentation, contrasting Gen Z and Millennials with older cohorts and distinguishing novice from informed consumers. These results provide the tactical evidence needed for effective messaging and platform design in Brazil.

Medium-term, comparative studies should examine how cultural and institutional differences shape adoption by applying the same instruments across contexts (Brazil vs. other markets). Designs can contrast individual versus corporate purchasing, and evaluate the effectiveness of channels (specialised platforms, retail/airline checkout add-ons, branded loyalty ecosystems) in moving consumers from intention to action.

Long-term, research should explore synergies between SBCE and the VCM, focusing on mechanisms that combine policy devices (harmonised seals, registry interoperability, disclosure norms) with marketing devices (clear labels, impact dashboards, third-party endorsements). Public-private campaigns that align standards with consumer-friendly communication deserve special attention, as they can convert institutional integrity into recognisable quality cues that support scale.

By advancing consumer-focused research, Brazil can consolidate its position not only as a major supplier of credits but as a global reference in marketing sustainable solutions that resonate with both domestic and international audiences. Real progress will depend on bridging the gap between academic evidence, business practice, and public policy to transform pro-sustainability attitudes into credible and large-scale consumer participation.

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