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Threat or opportunity? A stakeholder perspective on country of origin brand and promoting gene edited foods

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ABSTRACT

Gene editing technologies could address critical challenges in the food system by producing gene edited foods (GEFs) with enhanced nutrition and climate resilient traits. Despite this potential, support for novel GEFs from stakeholders involved in their development, commercialisation, and marketing, remains uncertain. This research investigates the role of country of origin (COO) branding in promoting GEFs as sustainable food products. Through 28 interviews with New Zealand (NZ) agri-food industry stakeholders, we identify three key themes, 1) *Perceptions of GEFs and NZ's COO brand*, 2) *Inconsistency and incoherency in COO*, and 3) *Co-creating an adapted and repositioned COO*. Findings reveal that stakeholders viewed the misalignment of New Zealand's COO brand, often associated with 'natural' and 'sustainable', as a threat (brand damage) or as an opportunity (brand repositioning). This study provides new insights into branding dynamics by uncovering responses to incoherences created by GEFs within a well-established COO brand. It also offers valuable insights for stakeholders and marketing practitioners on the use of COO branding for sustainable foods.

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1. Introduction

To address global food system challenges, the world requires solutions that secure access to nutritious foods while mitigating climate change and environmental harm (McClements et al., 2021). Advocates propose that gene editing technologies¹ can address some of these challenges by rapidly producing gene edited foods (GEFs) with increased disease and climate resilience and nutrition (Karavolias et al., 2021). For example, estimates predict gene editing seeds could reduce micronutrient deficiencies in 100 million people (McClements et al., 2021). However, the use of gene editing technologies and GEFs

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are also debated due to concerns about unknown environmental (Jordan et al., 2022) and health impacts (Caradus, 2022), as well as market concerns related to intellectual property (IP) rights (Lemarié & Marette, 2022), and socio-cultural acceptance (Henderson et al., 2023). This tension between potential risks and benefits necessitates further research to understand the role of GEFs in sustainable food systems from a marketing and stakeholder perspective.

Food system stakeholders (FSSs) (e.g. industry and policymakers) are pivotal in discourse on GEFs as they make decisions concerning their development, regulation, commercialisation, and marketing (Lassoued et al., 2018). Although GEFs are new to consumers, they are rapidly gaining traction in the global marketplace (Brinegar et al., 2017). This growing presence makes it essential for FSSs to understand the market demand for GEFs. Particularly, the role of country of origin (COO) branding in the promotion of GEFs warrants closer examination.

COO branding can associate food products with positive country images (Roth & Romeo, 1992), shaping perceptions of food safety and quality, thereby helping to establish competitive advantage (Newman et al., 2014). Understanding how FSSs perceive COO branding in promoting GEFs is salient for several reasons. Firstly, even though marketing GEFs presents inherent challenges, limited research has focused on this area (Lassoued et al., 2018), with prior studies exploring policy and technological risks and benefits (Jordan et al., 2022). One such challenge is that, while scientists typically distinguish between genetically modified foods and GEFs (Karavolias et al., 2021), consumers generally perceive GEFs as similar to genetically modified foods, which carry existing negative connotations (Lemarié & Marette, 2022). Further, some consumers express safety concerns about GEFs, or are unaware of, or uncertain about, their purported sustainability benefits (Henderson et al., 2023).

Secondly, research exploring genetically modified foods found that COO labels resulted in consumers feeling more comfortable with these products if the COO was perceived to have high food safety standards (Gao et al., 2019). Such findings infer COO could also be important for GEFs. Consequently, a better understanding of COO might enable FSSs to strategically position these products to leverage existing positive COO images and influence consumer perceptions of food quality and safety. Along a similar line, in debates about genetically modified foods, there were concerns that their cultivation would negatively impact the reputation of countries exporting these products and consumer perceptions of conventional foods from those regions (Knight et al., 2005). Given these historical concerns, there have been calls to understand whether GEFs will face similar issues, particularly in leading food-exporting regions like Europe, Australia, and New Zealand (NZ) (Caradus, 2022). Additionally, as policies relating to GEFs have evolved, studies show that FSSs are interested in the export potential of these products (Wessler et al., 2019), underscoring the need to understand more about COO in the marketing of GEFs.

This research addresses this knowledge gap and seeks to answer the research question: *'how do FSSs perceive COO branding that promotes GEFs as sustainable food products?'*. The research draws on 28 in-depth interviews with FSSs based on NZ, a country known for its high-quality food exports and strong COO brand. It examines FSSs who, while not directly engaged in COO branding, can influence or be influenced by it. In the COO branding literature, these stakeholders are classified as 'secondary stakeholders' (Mäläskä et al.,

2011). For simplicity, this study uses FSSs as synonymous with secondary stakeholders distinguishing them from internal and external stakeholders who are directly involved in COO branding activities (Mäläskä et al., 2011). By examining how FSSs perceive COO branding that promotes GEFs as sustainable food products, we provide theoretical and practical implications.

Firstly, this research advances the marketing field by merging COO brand theory with gene editing technology scholarship, revealing COO's role in marketing novel, sustainable food products, like GEFs, thereby broadening the importance of COO branding in new contexts. Secondly, this research extends literature on COO brand theory by including perspectives from an underexplored stakeholder group (Mäläskä et al., 2011). FSSs, as secondary stakeholders, may offer new insights on how they negotiate COO branding, given their indirect stake in the brand (Brodie & Benson-Rea, 2016; Rashid et al., 2016). Specifically, this study contributes to COO branding literature by highlighting that FSSs hold diverse views on creating cohesive and consistent COO messages, supporting previous work (Brodie & Benson-Rea, 2016; Virgo & de Chernatony, 2006). It also extends work that questions whether a unified brand across all stakeholder groups is ideal (Merrilees et al., 2012), by revealing that FSSs regarded differences in COO brand images as either a threat (brand damage) or as an opportunity (brand repositioning). This suggests that despite their indirect stake in the brand, FSSs are concerned about a COO brand failing to deliver on its promises, while others desire for the COO brand to be refocused or embody a different meaning altogether. We offer practical insights for food industry managers and policymakers on using COO branding to promote GEFs as sustainable food products and provide strategies for managing an environment where FSSs negotiate COO branding.

The following section summarizes key literature on COO branding and stakeholder perceptions of GEFs. Next, the research context and methodology are described. The findings are then presented in three key themes, followed by a discussion. The paper concludes with theoretical and managerial implications, and suggestions for future research.

2. Literature review

2.1. Country of origin (COO)

COO is an extrinsic informational cue related to a product, used to infer beliefs about the product based on stereotypical images held about a country (Baker & Ballington, 2002; Verlegh & Steenkamp, 1999). Literature suggests that people process COO cues through an interplay of cognitive, affective, and normative mechanisms (Obermiller & Spangenberg, 1989). Cognitive processing identifies COO as a cue for product quality or related attributes, while affective processing suggests that COO can hold symbolic and emotional meaning, associating products with national pride, identity, past experiences, or social status. Normative processing pertains to social or personal norms related to COO, which may result in home-country bias or boycotting products from certain countries (Verlegh & Steenkamp, 1999). COO is also conceptualized to exist at distinct levels (e.g. general country image, specific product country image) and within different

evaluations (e.g. country of manufacturing, country of design) (Oduro et al., 2023; Rashid et al., 2016). In this research, COO is referred to as product-country images, which are mental representations of a country's people and culture, thus adding meaning to specific food products.

A substantial body of research has examined the effect of COO on perceptions and product evaluations (Roth & Romeo, 1992). The COO effect, which refers to the extent to which people differentiate between products from various countries (Diamantopoulos & Zeugner-Roth, 2010), relies on positive associations but can also be negative if the associations are unfavourable (Baker & Ballington, 2002). These effects have been found to influence purchase intentions and willingness to pay (WTP) a premium, although mixed results on their effectiveness are also prevalent (Newman et al., 2014). Consequently, marketers use COO to add value and differentiate products in the marketplace (Baker & Ballington, 2002; Diamantopoulos & Zeugner-Roth, 2010), with the intentional process of matching positive country images to products referred to as *COO branding* (Lee, 2011). The COO branding process is considered dynamic and involves various stakeholders (Brodie & Benson-Rea, 2016; Merrilees et al., 2012). For example, Merrilees and colleagues (2012) classified two types of stakeholder groups involved in the branding process, 1) primary stakeholders, those directly involved with the process and 2) secondary stakeholders, those who may affect or be affected by activities but have no direct involvement. In instances where stakeholders successfully work together, COO branding may result in 'strong brands' (Brodie & Benson-Rea, 2016), providing important strategic advantage (Rashid et al., 2016). Literature suggests that building shared, coherent, and consistent COO messages is important for successful branding (Virgo & de Chernatony, 2006). However, some research also cautions against complete convergence on brand meaning (Merrilees et al., 2012), given the interpretation of COO may vary among stakeholders (Mäläskä et al., 2011). To date, COO branding literature has overlooked how those with no direct involvement, in this case FSSs, negotiate COO branding, a gap this research aims to address.

2.2. Gene editing technologies and GEFs

GEFs refer to food products derived from organisms whose genetic material has been altered using gene editing technologies (Chen et al., 2019). Examples of GEFs available in the marketplace include less-pungent tasting mustard greens in North America and nutritionally enhanced tomatoes with high GABA levels in Japan. Gene editing technologies,¹ such as CRISPR-Cas9, allow scientists to modify DNA by adding, removing, or altering specific DNA sequences in organisms (Karavolias et al., 2021). Although similar, scientists distinguish gene editing technologies from genetic modification, which involves inserting foreign DNA² into an organism. Thus, a key feature of gene editing technologies is their ability to produce GEFs without introducing foreign DNA, unlike genetically modified foods. Furthermore, whereas conventional breeding takes many years to achieve desirable traits for food production (e.g. improved yield, reduced pesticide use) and consumption (e.g. taste, nutrition), gene editing technologies allow for the rapid development of GEFs, offering a faster solution to reach such outcomes. These advancements have led to various policy changes worldwide that consider GEFs equivalent to products derived from conventional breeding methods (Turnbull et al., 2021). For

example, countries such as the United States, Canada, and Australia have updated their policies to exclude GEFs as being subject to the same regulations of genetically modified foods (Lassoued et al., 2018).

2.3. FSSs perceptions of gene editing technologies and GEFs

Research indicates that FSSs view GEFs as playing a significant role in developing more sustainable food systems, highlighting benefits such as climate resilience, improved nutrition, reduced pesticide use, and higher crop yields (de Lange et al., 2022). However, for some FSSs concerns remain about their sustainability, including potential environmental risks (Jordan et al., 2022) and negative socio-economic consequences (Lemarié & Marette, 2022). For instance, not-for-profit organisations (NGOs) emphasize consumers' right to choose non-GEFs, and argue that the technology primarily benefits corporations, rather than consumers and farmers (Henderson et al., 2023). Overall, opinions among FSSs vary, from avoiding these technologies to a desire to rapidly commercialize these products (Henderson et al., 2023). For those seeking to commercialize, social acceptance is a key concern, particularly in leading food-exporting countries where export potential is critical (de Lange et al., 2022; Lassoued et al., 2018). Given FSSs perceptions of uncertainty surrounding consumer acceptance and export viability (Wesseler et al., 2019), further research is needed on how FSSs perceive COO branding in the marketing of these products.

3. Methodology

3.1. Research context

NZ is a compelling context to study the use of COO branding to promote novel sustainable foods due to its status as a world-leading food producer and exporter, strong brand, and unique regulatory position on GEFs. NZ's COO brand is distinguished by several unique elements that collectively create its brand proposition of innovation and ingenuity driven by care for people and planet (New Zealand Story, 2025). Initiated by the NZ government in 2013, the 'NZ Story Group' was established to protect, enhance, and promote their COO brand and the nation's reputation globally. The brand is underscored by the core elements of NZ's identity, history, and values. This includes the integration of Māori culture into everyday life and law, showcasing the country's commitment to honoring its Indigenous heritage. NZ also had a pioneering role in women's rights, being the first to grant women the vote in 1893, highlighting its progressive and inclusive values. Additionally, NZ is known for acting with integrity and honesty and has a strong commitment to protecting its landscapes emphasizing sustainability and environmental stewardship (New Zealand Story, 2025). Research indicates consumers associate NZ with a clean environment, and the country holds a high reputation in certain markets allowing their products to command a price premium (Dalziel et al., 2018).

When it comes to NZ's food exports, COO branding has significantly enhanced its competitive advantage. In 2022, the agri-food sector comprised 5.8% of NZ's GDP and accounted for 80% of the total exports (Rural News, 2022). Producers have leveraged the efforts of the NZ Story group and historical tourism campaigns like '100% Pure', which

depicts NZ as clean and green (Brodie & Benson-Rea, 2016; Brodie & Sharma, 2011). Specifically, NZ's meat and dairy industries use imagery of pristine countryside and free-range animals to promote high-quality products (Insch et al., 2016). Similarly, the wine industry's 'Pure Discovery' campaign positioned products as natural and sustainably produced (Brodie & Benson-Rea, 2016). Given the significance of agri-food exports in NZ and their focus on pure and natural branding of food products, the cultivation of genetically modified and gene-edited crops has been a contentious issue (Caradus, 2022).

In NZ, no genetically modified or gene edited crops are grown outside containment and GEFs fall under the same regulations as genetically modified foods (Fritsche et al., 2018). The NZ Government stated that they maintained strict regulations due to 'market perceptions', as an exporter of billions of dollars of food products' (The New Zealand Government, 2016, para 5). However, in 2024, the NZ government introduced a bill to liberalize the use of gene editing technologies, emphasizing its potential to boost the country's economy. During the bill's consultation process, industry stakeholders highlighted the ongoing relevance of NZ's brand in these debates (Ministry of Business, Innovation, & Employment, 2024).

3.2. Sample selection

A qualitative methodology was employed to address the research question, specifically through 28 semi-structured in-depth interviews with FSSs. This method utilized open-ended questions to initiate discussion and allow participants to provide detailed responses. This approach was appropriate given that the study aimed to explore how FSSs perceive COO branding and its role in promoting GEFs as sustainable food products. In-depth interviews are particularly useful for obtaining rich insights into participants' perceptions, experiences, and understandings of a given topic (Morris, 2015). The semi-structured format also allows the researcher to adapt the interview based on participant responses, enabling deeper exploration of unexpected themes while remaining on-topic (Cassell, 2015). Additionally, one-on-one in-depth interviews are especially well-suited for discussing potentially polarizing topics, such as genetic modification and gene editing technologies, as they create a setting where participants feel comfortable expressing their perspectives (Guest et al., 2013).

Participants were selected using both purposive and snowball sampling to ensure a diverse range of perspectives from FSS. Purposive sampling was initially used to identify participants followed by snowball sampling to broaden the participant pool. The inclusion criterion was as follows: 1) participants had to be aged 18 years or older, 2) located and working in NZ, 3) not directly involved in COO branding activities in a professional capacity, and 4) possess some knowledge of or professional experience in the NZ agri-food industry, particularly concerning GEFs. Stakeholders were recruited from across a broad range of groups including researchers, NGOs, trade representatives, industry, government, and the media. The sampling purposefully excluded consumers and internal stakeholders, such as brand managers and others directly involved in COO branding processes, to ensure an external perspective on the topic. Further, the criterion ensured that interviewees possessed relevant expertise and knowledge, which was important given the regulatory status of GEFs in NZ and their emerging presence in the global marketplace. The sample size of 28 participants was

determined based on the principle of saturation, an accepted practice for determining non-probability sample sizes (Guest et al., 2013). Saturation was reached when additional interviews no longer yielded new information or themes relevant to the research aims (Cassell, 2015). Participants were recruited using three methods: 1) personal networks of the author(s), 2) direct solicitation via email and LinkedIn based on job titles, and 3) snowball sampling, where participants were invited to recommend other relevant stakeholders for the study. A detailed outline of the interview participants by category and expertise is reported in *Appendix 1*.

3.3. Data collection and analysis

Interviews were based on a set of questions shown in *Appendix 2*. The interviews were divided into three sections, beginning with an icebreaker that invited participants to share their professional background and current role. The subsequent section included questions on challenges within the NZ agri-food industry, as well as participants' understandings of GEFs and their potential role in the sector, including perceived risks and benefits. The final section focused on the potential impact of GEFs on food exports, COO branding, marketing, and social acceptance. The interviews took place online (via Zoom) between February 2023 and July 2023 and lasted approximately 35 min to 1 h. Since all the interviews were conducted online, they were audio recorded and transcribed using Zoom's transcription software, resulting in 121 pages of text. The transcripts were edited for correctness using intelligent verbatim to remove unnecessary words and repetition, a process conducted by a single researcher. This step was typically completed within 2 weeks of the interview. The transcripts were then returned to participants for review, allowing them to approve or suggest further edits for accuracy.

The transcripts were analyzed and coded using reflexive thematic analysis (Braun & Clarke, 2006, 2019), a process which emphasizes the active role of the researcher in theme development and interpretation (Braun & Clarke, 2006, 2019). The aim of this six phased approach (familiarization, generating codes, constructing themes, reviewing themes, revising, and defining themes, and producing the report) is to produce an interpretation of the data, driven by the data (Braun & Clarke, 2006, 2019). This involved attaching codes to text throughout the entire transcript(s) in NVivo, a qualitative data analysis tool. Coding was conducted by one researcher for consistency. To manage individual coder bias, theme development from codes was conducted by four researchers through an iterative process. There was overall agreement on the coding and the emerging themes among all four authors. The data analysis was guided by the research question, which aimed to explore how FSSs perceive COO branding that promotes GEFs as sustainable food products. Specifically, the analysis focused on similarities and differences in perceptions of GEFs, NZ's COO brand, and their perceived impact of GEFs on COO branding. The following section presents the study's findings, organized into three themes that answer the research question, supplemented by illustrative quotes from the data analysis.

4. Findings

The following section presents the findings of the interviews with FSSs, organized into three key themes: 1) *Perceptions of GEFs and NZ's COO brand*, 2) *Inconsistency and*

incoherency in COO, and 3) *Co-creating an adapted and repositioned COO*. Overall, the findings highlight that stakeholders viewed the misalignment of NZ's COO brand, often associated with characteristics such as 'natural' and 'sustainable', as a threat (brand damage) or as an opportunity (brand repositioning).

4.1. Perceptions of GEFs and NZ's COO brand

The first theme highlights FSSs' perceptions of NZ's COO brand and its application in agri-food marketing. It also explores their views on GEFs as sustainable food products. Firstly, participants had mixed beliefs regarding the products' potential to contribute to more sustainable food production and consumption. While concerns were raised about the potential negative environmental, economic, and social consequences, most participants thought GEFs could help reduce NZ's agricultural emissions, and enhance the resilience of its food production in the face of climate change:

Things such a drought resistance. It might be recovery after a flood ... it may be disease resistance because with climate change, we will probably get a whole new array of diseases we haven't seen before. (Industry, In#9)

Thus, participants' perceptions of GEFs shaped their views on the role of COO branding in promoting GEFs as sustainable food products. This connection was evident when discussing the specific attributes participants associated with NZ food products and the broader COO brand, mentioning associations such as 'quality', 'natural', 'clean', 'green', and 'genetic-engineering (GE)-free'. 'GE-free' was a term commonly used by participants to encompass both genetic modification and gene editing technologies. Participants also believed the COO brand provided a competitive advantage and differentiated NZ's food products in the marketplace. For example:

Trying to position ourselves as a quality, natural food exporter ... we are actually winning this game. We've got the best exports. (NGO, In#15)

and

The value add that NZ offers as a GE-free nation and GE-free products, and be able to produce that clean, green image. (Trade representative, In#24)

Participants discussed that NZ's GE-free status upheld and emphasized its clean and green image. This is based on the fact that genetic modification and gene editing alter the genetic material of organisms, alongside lingering concerns about the health and environmental impacts of these technologies. Additionally, discussions highlighted NZ's history of banning these technologies in the early 2000s and its cultural significance:

The parallel is a little bit like being nuclear free. It's how people perceive the country works. (Industry, In#8)

4.2. Inconsistency and incoherency in COO

The second theme emphasizes how GEFs were perceived to create inconsistencies and incoherency in NZ's COO brand. This misalignment was seen as a potential threat that could damage the brand. Specifically, FSSs were concerned that promoting GEFs

originating from NZ could undermine the competitive advantage and broader reputation associated with NZ's brand.

Primary points of discussion thought to create inconsistencies in NZ's brand were the perception of GEFs as unnatural and NZ's image as a 'GE-free' nation. These beliefs stemmed from the underlying perception that GEFs lack consumer acceptance, among other concerns. Almost all participants noted that consumers are generally hesitant about genetic modification and GEFs, stemming from risk perceptions or limited understanding of these products:

As far as I know, across the world, high value consumers don't want genetic engineering ... that's not just organic consumers. That's across all high-value food consumers (Industry, In#10)

Participants also highlighted that consumers currently purchase NZ food products at a premium due to the strong COO brand. They believed consumers would be unlikely to pay a premium for GEFs given their negative perceptions:

The perception in the sector is around the market risk and perception of NZ being tainted with a brush that international consumers don't have preference for ... that it could reduce or change our market premiums ... and our brand and our image (NGO, In#16)

Furthermore, participants believed that consumers associated NZ's brand with characteristics such as 'natural', 'clean', and 'GE-free' and perceived that GEFs conflicted with these attributes. This misalignment was concerning for participants because it could lead to a decrease in preference for NZ's food products such as dairy, beef, and lamb:

We've got a particular story to tell which doesn't always fit with the genetically modified organism model ... we've got to be careful that this doesn't cut across the branding for the country around this clean, green, grass-fed product. (Trade representative, In#26)

Specifically, 'naturalness' was perceived as a significant challenge in promoting GEFs as sustainable food products. Participants believed that consumers perceive GEFs as 'unnatural', contradicting NZ's image as a 'natural' food producer:

Their judgement on naturalness or authenticity is about where and how the products grow. If you use this technology [gene editing technologies] to grow the product, they will say it's not natural. (Researcher, In#3)

Consequently, the positive associations with 'natural' that have historically given NZ's COO brand an advantage might now appear inconsistent or incoherent to consumers, thereby diminishing the brand's effectiveness. Similarly, given NZ is associated with being a 'GE-free nation (e.g. they do not allow the cultivation or release of genetically modified, or gene edited organisms), participants believed promoting GEFs would lead to inconsistent messaging, confusing consumers and weakening NZ's COO brand.

Furthermore, participants who believed it was a competitive advantage to be a 'GE-free' nation, emphasized the importance of reducing brand inconsistencies to maintain existing positive COO effects and consumer trust:

To be "GE-free" and then possibly have a [gene edited] crop that you can't tell is GE or not ... it destroys the trust that consumers have in that brand. (Trade representative, In#24)

Overall, when it came to promoting GEFs as sustainable food products, some participants were particularly concerned about the potential impact on NZ's COO brand. These participants discussed the need to protect the brand by avoiding inconsistent messaging that would damage the brand's image.

4.3. Co-creating an adapted and repositioned COO

While several participants believed that NZ's COO brand should not change, others believed it should be adapted and repositioned. The third theme emphasizes how the perceived misalignment of GEFs with NZ's COO brand was viewed as an opportunity to redefine the brand rather than a threat. This repositioning was perceived by some FSSs as an important step to facilitate the use of COO branding in promoting GEFs as sustainable food products.

Shifting consumer attitudes toward GEFs and their growing commercialization worldwide, especially among NZ's key trade partners, were two key reasons participants advocated the repositioning of NZ's brand. Furthermore, these participants believed GEFs held significant promise for achieving sustainable consumption and production goals. Instead of protecting the existing brand, they believed the brand should evolve to better reflect current sentiment regarding GEFs. For instance, one participant expressed their view that COO brands should be more fluid:

They are saying they don't want it [gene editing technologies] because of our brand. You create a brand, right? Your brand changes ... you create a brand for the need at the time (Trade representative, In28)

Similarly, other participants discussed that failing to reposition NZ's COO brand might put the brand at risk. This risk was attributed to consumer demand for sustainability claims on food products to be backed by scientific evidence, which GEFs could potentially satisfy. Therefore, co-creating a COO brand that resonates with and is more aligned with consumers' needs was seen as important:

I feel like the longer we wait the more brand risk we actually have ... in a decade or so the use of modern genetic technologies will be everywhere ... [the] public will be used to it. If ... that costs us thousands of kilos of carbon in the atmosphere, or poorer nutritional outcomes ... then that will be frowned upon (NGO, In16)

Specifically, consumer engagement in the process of brand repositioning can help to address consumers' needs and concerns and allow them to shape the brand's new messaging. Similarly, other participants rejected the idea that all consumers view GEFs as unnatural. They suggested that aligning NZ food products and the brand with 'naturalness' might not resonate with future generations and consumers whose attitudes toward technology are evolving. For example, one participant highlighted that consumers are likely to develop more accepting views of GEFs, perceiving them as part of a broader trend towards innovation in food production:

Natural is dependent on what you see as normal at the time you grow up as a young person ... gene editing or genetic modification. It's just another technology to most young people now. (Researcher, In#7)

Beyond the perceived need to reposition NZ's brand to align with shifting consumer attitudes, participants also discussed which brand associations should be used to adapt the COO brand. These attributes included 'innovation', 'sustainability', and 'problem-solving capabilities', which were perceived as more likely to provide competitive advantage in international markets, over existing associations like 'natural' and 'GE-free'. For example, one participant characterized GEFs as an opportunity to enhance NZ's COO brand:

Leading the world with new thinking about how we solve some of the world's biggest problems I think these new technologies have got a role to play in that revised version of the brand. (Industry, In11)

Thus, among these participants, the adapted COO brand would position NZ as leaders in innovative technologies and highly proficient in leveraging science to enhance the quality and sustainability of food, showcasing NZ's commitment to solving global challenges.

5. Discussion

5.1. Theoretical contributions

Two key theoretical contributions emerge from this research. Firstly, previous COO branding research has primarily focused on branding processes among internal stakeholders and consumer COO effects (Merrilees et al., 2021; Newman et al., 2014). This study is novel in providing a new understanding of how FSSs, with no direct involvement in COO branding, negotiate this process, building on the perspective that COO branding is a dynamic and collective activity involving industry and stakeholder networks (Brodie & Benson-Rea, 2016). Our novel finding is that FSSs, despite having no formal capacity to undertake COO branding activities, viewed incoherent brand messages (relating to GEFs) as either a threat (brand damage) or as an opportunity (brand repositioning). This supports the notion that coherency and alignment of brand meanings across stakeholder groups is not always a desired outcome (Merrilees et al., 2012) and meanings can be inconsistent (Berthon et al., 2009; Mäläskä et al., 2011). It also offers new insights into the dynamics of COO branding, as it reveals how FSSs react when 'strong' COO brands are challenged. In this instance, the FSSs were concerned that the COO brand might fail to deliver on its promises. On the other hand, some FSSs thought the COO brand should be refocused to embody a different meaning altogether. This finding indicates that inconsistent COO brand messaging is not always perceived negatively by FSSs, as it might be by internal brand stakeholders (Virgo & de Chernatony, 2006). Instead, FSSs saw it as an opportunity to co-create with consumers (and other stakeholders) in new ways. This co-creation process may include collaborative product development, active participation in research and social media discussions, and transparent communication about products (Siano et al., 2022). The work of Kristal et al. (2018) and Siano et al. (2021) on 'non-collaborative' brand co-creation emphasizes that brand managers need to adapt and manage the feelings of 'control' over a brand. This study shows that FSSs may experience similar feelings of 'loss of control' when COO branding is perceived as incoherent or inconsistent. Notably, understanding the dynamics of COO branding could foster more cohesive narratives among FSSs. This finding broadens COO branding literature,

suggesting that, for FSSs, COO is not merely a strategic marketing tool but also a phenomenon that embodies a nation's reputation and cultural stereotypes, illustrating how FSSs aspire for their country to be represented in the global marketplace.

Secondly, we extend COO brand theory into gene editing technology scholarship and provide new insights on how FSSs perceive COO branding that promotes GEFs as sustainable food products. To the authors' knowledge, this is the first study to report on how COO brands play a role in marketing GEFs. The findings revealed perceptions among FSSs that NZ's brand might suffer damage should these products be promoted. These perceptions assumed that GEFs would dilute or contradict consistent imagery (e.g. clean, green) historically and presently used to promote NZ agri-food products and create negative COO effects among consumers. This led to hesitancy among FSSs regarding whether gene editing technologies should be adopted by farmers and other stakeholders (e.g. retailers), based on consumer acceptance and potential brand damage. Although there is a risk of conflicting NZ's established brand, GEFs produced in NZ could also be seen more favorably than those from industrial producers like the US, potentially offering a different competitive advantage. Further, because COO brands have broader mental foundations in consumers' minds (Rojas-Méndez & Khoshnevis, 2022), such brand strategies might be fitting for novel products such as GEFs.

In line with this thinking, some FSSs viewed the promotion of GEFs as a potential opportunity to reposition NZ's COO brand for food products. Participants discussed that they believed consumer attitudes towards GEFs were changing based on generational differences which is supported by evidence showing Generation Z and Millennials consumers had more positive attitudes toward GEFs than consumers from other generations (Ferrari et al., 2020). These stakeholders (e.g. Government and Industry) had more fluid perceptions of NZ's COO brand and how it might adapt to changes occurring in the food system.

Conversely, concerns observed regarding potential brand misalignment are legitimate, considering exported foods are an important touchpoint for consumers and contribute to a nation's overall image (Achabou et al., 2023; Lee, 2011). Maintaining a GE-free status may be highly relevant for NZ's COO brand, given that several FSSs perceived GE-free as a positive brand attribute. For these stakeholders, the continued absence of GEFs in NZ's food system can reinforce a compelling narrative and unique selling point, not just merely the absence of a negative attribute. NZ could strategically reinforce its reputation for producing natural food, further solidifying a core branding message that has been integral to the country's identity for many years. More broadly, our findings align with past literature which highlight that NZ agri-food stakeholders recognize the significant influence of COO branding on consumer food purchases in export markets (Insch et al., 2016). It is apparent that COO branding, utilising imagery of 'natural' and 'GE-free' (as described by participants), was perceived to have served NZ's economic interests regarding agri-food exports and strategic competitive advantage. These perceptions appeared to be based on assumptions regarding consumer perceptions of GEFs. Concerns regarding WTP are partially supported by research indicating some consumers discount GEFs, although GEFs with 'beneficial' attributes absent from conventional foods may be valued higher than their counterparts (Marette et al., 2021). Similarly, regarding the naturalness of GEFs, some FSSs assumed that consumers would perceive them as 'unnatural'. While

certain consumer groups (e.g. organic food purchasers) do tend to view GEFs as unnatural, this perception is not universal, as preferences for natural food are often nuanced and complex (Nales & Fischer, 2023).

Ultimately, the decision to remain GE-free or utilize gene editing technologies may require careful consideration of marketing positioning, trade relationships, and sustainability goals. This study shows FSSs believe COO is critical in marketing GEFs, providing new insights into the marketing of novel and sustainable foods. The notion that GEFs could indeed alter a country's well-established COO brand image is intriguing. Specific agricultural sectors may also have more (or less) to gain considering their individual utilization of COO branding in their marketing campaigns. Looking forward, novel, and sustainable foods more generally may challenge COO brands historically used by FSSs across the globe to promote food products in international markets.

5.2. Managerial implications

This study offers valuable insights for FSSs' and marketing practitioners on the use of COO branding for GEFs and promoting sustainable food products more broadly. Designing effective COO brand strategies is becoming increasingly challenging as novel and sustainable food products enter the marketplace, requiring businesses to adapt to changing market conditions and consumer attitudes.

Firstly, the findings highlighted that FSSs believe repositioning the COO brand in the minds of consumers and other stakeholders is crucial for promoting GEFs. This process aims to align NZ's COO brand with new values and attributes. For instance, campaigns could showcase how GEFs from NZ can address climate change or food security challenges, associating the brand and products with qualities such as 'innovation', 'leadership', and 'problem solving'. Furthermore, FSSs acknowledged that changing consumer perceptions of GEFs would require marketers to be dynamic and develop campaigns that blend messages of innovation with existing attributes such as 'purity' and 'naturalness'. Promotions could emphasize how new food technologies, such as gene editing, enhance the natural qualities of food products like increasing micronutrient content.

Secondly, from the FSSs' perspective, repositioning the COO brand requires brand managers and other stakeholders to embrace the multi-faceted nature of brand meanings and recognize that even COO brands are rarely stagnant, despite long-standing stereotypes about countries and their products. Brand repositioning presents an opportunity to co-create with various stakeholders, given that in a globalized food system, several stakeholders contribute to a complex and interconnected brand environment. Co-creation with consumers and other stakeholders could involve exploring the brand origin concept, which includes other non-geographic brand-level attributes (Mills & John, 2023). Additionally, marketing promotions could be tailored to different consumer segments based on their preferences for innovative food products and involve pilot testing to ensure the new brand messaging resonates with consumers.

Lastly, given the fear of brand damage highlighted by some FSSs in this study, it is essential to engage with groups who may be impacted by activities aimed at repositioning a COO brand. Marketers should communicate and collaborate to understand these concerns and seek to mitigate inconsistent brand messaging which may create confusion

or mistrust among consumers. Furthermore, since COO brands are an important competitive advantage for a country's trade, we recommend policymakers include COO branding considerations in national food strategy plans and policies. This could involve appointing an industry-level COO brand advisor to negotiate and align definitions of 'sustainable food' among diverse stakeholders.

These findings also have broader relevance beyond the NZ context by highlighting the potential use of COO branding in supporting transitions to more sustainable food systems. As countries across the globe increasingly embrace novel technologies, this research prompts reflection on how national identity and product origin influence perceptions of sustainability and innovation in food production. Marketers can leverage the findings of this study to inform strategic decisions and implement branding approaches that foster positive perceptions of novel foods. Internationally, all marketers must remain responsive to shifting consumer values and global sustainability imperatives, whether or not these include GEFs, to ensure their messaging remains relevant and resonant. Particularly, European countries with similar conditions to NZ (e.g. no genetically modified crops grown and public resistance), such as Switzerland, Norway, and Austria, may benefit from improved understanding of COO branding in the promotion of GEFs. Further, novel food products are increasingly associated with specific countries as they build reputations for expertise and investment in this area, for example, Singapore as a leader in cultivated meat products (The Economist, 2023), highlighting the significance of this study's findings more broadly.

5.3. Limitations and future research

Future studies may look to build upon the limitations of this research. Firstly, the qualitative methods used produced findings that may not be generalizable to broader groups. Future research could incorporate perspectives from both consumers and internal stakeholders to understand how they differ or align. Additionally, this study was limited to FSSs perspectives on GEFs, which may reduce its transferability to other sustainable food products and contexts. Exploring other food product categories could be of interest. For instance, some countries (e.g. France) have imposed marketing restrictions on labelling plant-based and cultivated meat products (Carreño, 2022; Ewe, 2024). Investigating how COO branding influences the promotion of these products as sustainable foods would be valuable. Furthermore, quantitative research on consumers' perceptions of COO brands, focusing on variables such as 'natural' and 'sustainable', could enable FSSs to make more informed decisions about COO brand strategies. Lastly, while our qualitative work presents unique and nuanced insights into how FSSs view the use of COO branding to promote sustainable foods products, future research may wish to examine perceptual differences between diverse FSS groups and cross-cultural differences in COO brand perceptions.

Notes

1. Gene editing technologies are a range of technologies including CRISPR-Cas9 (clustered regulatory interspaced short palindromic repeats associated with protein Cas9), TALENs, and ZFNs. CRISPR is now the dominant technology used to undertake gene editing of

organisms. In this article, the authors define gene editing technologies as distinct from genetic medication, which produce organisms containing foreign DNA.

2. Foreign DNA relates to DNA from an unrelated or closely related species.

Data availability statement

Original data is available under request

Disclosure statement

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Ethical statement

This research was approved by the University of Auckland Human Participants Ethics Committee. All participants gave informed consent before taking part in the study.

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