

What do Italian consumers think about sea-based aquaculture? Exploring the role of certifications and sustainability in purchasing decisions

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Abstract: *Aquaculture plays a pivotal role in bridging the gap between traditional fishing and the world's increasing demand for seafood while promoting sustainability. With wild fish populations facing threats from overfishing, habitat destruction, and climate change, aquaculture offers a controlled environment for fish production that eases pressure on natural resources. Moreover, for consumers, sustainability serves as a key indicator of the quality and ethical production of seafood. Responsibly sourced seafood, whether wild-caught or farmed sources, is not only healthier but also produced with minimal environmental impact. By choosing sustainably sourced seafood, consumers can contribute to the conservation of marine biodiversity and support practices that ensure a steady, long-term supply of high-quality seafood. This research explores the potential for a new certification system for sea-based aquaculture - rather than traditional fish farming in tanks - based on preliminary data collected from a survey targeting Italian consumers. Our preliminary results show that consumers prioritise not only product quality but also its ethical and environmental impact, favouring brands that demonstrate transparency, sustainability, and local economic support. This focus on certifications, responsible production, and community engagement fosters long-term trust and loyalty, positioning these brands for success in an increasingly conscientious market.*

Keyword: fishing, sustainability, aquaculture, consumer behaviour, certification.

1. Background

Aquaculture represents a strategic solution in promoting fishing sustainability, addressing the growing demand for seafood while reducing pressure on wild fish populations. As global consumption of fish increases, overfishing has become a significant threat to marine ecosystems in terms of sustainability, leading to the depletion of many species and disrupting the balance of aquatic environments (Pauly et al., 1998; Jackson et al., 2001). Aquaculture – i.e., the farming of fish, shellfish, and

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aquatic plants – offers a valid and sustainable alternative by providing a controlled and efficient method of seafood production (FAO, 2020; Subasinghe et al., 2009). It can be practiced in two ways: within the marine environment and outside of it. Both approaches share the same ultimate goal but have significant differences. Marine aquaculture involves farming species in natural ocean environments, often utilising cages or nets, and benefits from natural marine conditions such as water quality and currents. However, this method poses challenges like disease management and environmental impact (Diana, 2009). On the other hand, onshore aquaculture typically uses tanks or ponds, which provide greater control over water quality, temperature, and disease prevention (Bostock et al., 2010). However, it requires significant investment in infrastructure and energy. By cultivating fish in managed environments, it can meet the rising demand for seafood without further depleting wild fish stocks (Naylor et al., 2000; Bostock et al., 2010). In particular, this practice helps to stabilise wild populations, allowing ecosystems to recover and maintain biodiversity (Diana, 2009; Worm et al., 2006). Moreover, it allows for the reduction of feed waste, the minimization of water pollution, and the promotion of environmentally friendly feed sources (Boyd et al., 2022; Troell et al., 1999). Additionally, aquaculture contributes to food security and economic development, particularly in coastal and rural communities where fishing is a primary livelihood (Beveridge et al., 2013; World Bank, 2013). Overall, by providing a reliable source of seafood, aquaculture helps ensure that future generations can continue to enjoy fish as a vital component of their diet while supporting the long-term health and sustainability of marine ecosystems (Troell et al., 2014; Hall, 2011). From a managerial standpoint, aquaculture enables more controlled production environments, allowing for rigorous quality control measures and traceability systems, which are crucial for maintaining consumer confidence in seafood products (Verbeke et al., 2007). Moreover, the industry's ability to adopt innovative practices, such as selective breeding and optimized feed management, enhances farmed fish's nutritional value and health benefits, aligning with consumer preferences for high-quality, health-conscious products (Rana et al., 2009). As consumer awareness of environmental and ethical issues increases, demand for transparency in food production has grown significantly. Aquaculture provides a reliable source of seafood to meet the ever-growing global demand while ensuring top-notch quality and safety standards. In this context, certifications provide clear information about the environmental and ethical practices involved in sustainably produced seafood (Potts et al., 2011). Examples of certification schemes include those provided by the Aquaculture Stewardship Council (ASC). The ASC verifies that aquaculture practices meet strict environmental, social, and food safety standards (Vandergeest & Unno, 2012). Furthermore, these certifications help to maintain stable supply chains and enable producers to access premium markets. They also help build consumer trust by distinguishing their products in the competitive seafood market (Asche et al., 2016; Bush et al., 2013). These certifications often involve stringent auditing and compliance with international standards, which can improve the operational efficiency and sustainability of aquaculture businesses (Gutiérrez et al., 2014). In addition, certified products can fetch higher prices, reflecting the added value of sustainability and ethical production practices (Potts et al., 2011). Considering the above, this research aims to

conduct a preliminary study to assess the significance of a new certification designed to ensure the origin of fish bred in their natural marine environment. Specifically, we are interested in understanding the importance Italian consumers place on these certifications when purchasing fish and whether they are willing to pay more for sustainably raised products. Therefore, this preliminary stage is guided by the following research questions:

RQ1: *What factors drive Italian consumers to purchase farmed fish?*

RQ2: *Does the presence of sea farming certifications positively influence their fish purchases?*

RQ3: *Are Italian consumers willing to pay more for this specific type of fish product?*

After providing this background, the paper is structured as follows: Section 2 details the sample data and methodology, Section 3 presents preliminary results, and Section 4 focuses on discussion and conclusion.

2. Methodology and data

Based on the previous background and research objectives, an online questionnaire targeting Italian consumers was developed. After an initial pre-test, an adequate sample of 262 respondents was reached through the Google Form platform from November to February 2024. To measure responses, some questions used a seven-point Likert scale (where '1' and '7' identified a poor or high match), while others included open-ended or multiple-choice answers. In detail, participants were 55% male and 45% female, mainly from Southern Italy and Isles (52%), with an average age of 36 and a college or university education (53%). As for occupation, half of the respondents were employed (47%), followed by students (20%), and entrepreneurs or self-employed (17%). This data is reflected in the average monthly income recorded, which stands at a medium-high level with an average of EUR 2.500,00.

3. Results

IBM SPSS Statistics was used to perform the Exploratory Factor Analysis (EFA). A correlation analysis confirmed the significance of all variables in explaining the phenomenon, showing positive low, medium, and high values. To ensure the analysis's robustness and test the sample's adequacy, we performed the KMO Test and Bartlett's Test of Sphericity, both of which yielded significant measures, allowing us to proceed with the analysis. Next, communalities were studied, showing noteworthy values in terms of the variance explained by common factors. Specifically, eight factors were extracted, accounting for over half of the total variance (precisely, 72.89%), as briefly summarised in Table 1.

Tab. 1: Summary of the latent factors

	<i>Latent factor</i>	<i>Description</i>
1	<i>Consumer Trust and Loyalty to Certified Aquaculture Brands</i>	It encapsulates a comprehensive set of beliefs and attitudes – such as trust, quality perception, health considerations, willingness to pay a premium, and brand advocacy – that drive Italians to purchase certified aquaculture products.

2	<i>Health and Sustainability-Oriented Seafood Purchasing</i>	It shows the importance consumers place to nutritional benefits, health impacts, sustainability practices, and certifications when purchasing farmed fish.
3	<i>Trust and Behavioural Influence of Certifications</i>	It stresses the central role of certifications in shaping consumer trust, simplifying purchase decisions, and influencing both current and future purchases.
4	<i>Localism and Sustainable Community Development</i>	It displays a consumer mindset that emphasizes support for local producers, economic and community well-being, and sustainable production practices.
5	<i>Corporate Reputation, Management, and Social Responsibility</i>	It reflects the importance of corporate reputation, strong management, community involvement, and responsiveness to consumers in shaping consumer perceptions.
6	<i>Sensory Quality and Locality</i>	It highlights the critical role of freshness, taste, and local sourcing in driving consumer preferences for seafood.
7	<i>Economic Considerations</i>	It captures the importance of price sensitivity and deal-seeking behaviour in the seafood market when making purchasing decisions.

Source: our elaboration with IBM SPSS Statistics

4. Discussion and Conclusion

Table 1 presents some preliminary insights into what drives Italian consumers to purchase farmed fish and whether certifications contribute to this phenomenon. It emerges that the aquaculture industry must recognise the evolving expectations of modern consumers, who are increasingly engaged in their decision-making, seeking products that align with their values of health, ethics, and sustainability. Certifications and product traceability are vital in helping consumers make informed purchasing decisions and developing brand loyalty. Companies that prioritize transparency, maintain high certification standards, and communicate the health and environmental benefits of their products are more likely to gain long-term consumer trust. Additionally, consumers increasingly value supporting local economies and sustainable practices, making it essential for businesses to highlight the positive social and environmental impact of local seafood. Alongside this, corporate social responsibility (CSR) remains crucial, with consumers favouring companies that are well-managed, socially responsible, and actively involved in their communities. Freshness, taste, and local sourcing are also paramount, driving consumer perceptions of quality and authenticity. To succeed, businesses need to find a balance between these premium attributes and competitive pricing and promotional strategies to appeal to both value-conscious and socially aware consumers and secure loyalty in a competitive market. Our preliminary findings are crucial as they pave the way for further analysis to gain a deeper understanding of the future trajectory of the farmed fish industry. It's imperative to acknowledge that this study is just the beginning and is focused on uncovering consumer behaviour patterns before embarking on more comprehensive analyses. Indeed, to answer the second and third research questions outlined in Section 1, a CFA and Path analysis will be performed in the near future.

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