How Quality, Safety, and Social Proof Shape Consumer Attitudes and Consumption Intentions toward Aquaculture Bivalves

Kako kvaliteta, sigurnost i društveni dokaz oblikuju stavove potrošača i namjere konzumacije školjkaša iz akvakulture

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Abstract

Aquaculture plays an increasingly important role in ensuring a sustainable supply of seafood; however, consumer acceptance remains a challenge, particularly for bivalves whose consumption is considerably lower than that of other aquaculture products. This study investigates how perceptions of aquaculture product quality and safety shape consumer attitudes toward aquaculture bivalves and, subsequently, their consumption intentions. Furthermore, it examines the moderating role of social proof in these relationships. Data were collected through an online survey on a nationally representative sample of fisheries and aquaculture product consumers in Croatia and Italy (n = 2,012). Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed using SmartPLS 4 software. The results show that both perceived quality and perceived safety significantly and positively affect attitudes toward aquaculture bivalves, while attitude significantly predicts consumption intention. Social proof positively moderates the relationship between perceived quality and attitude, and negatively moderates the relationship between perceived safety and attitude. The findings suggest that perceptions of other consumers' behaviour strengthen quality perceptions, whereas reliance on these social signals may reduce attention to safety evaluations. By integrating perceived quality and safety with social influence, the study offers important implications for aquaculture marketing strategies and consumer communication.

KEY WORDS

consumer attitudes
perceived quality
perceived safety
social proof
consumption intention
aquaculture bivalves

Sažetak

Akvakultura ima važnu ulogu u osiguravanju održive opskrbe hranom podrijetlom iz mora, no prihvaćanje od strane potrošača i dalje predstavlja izazov, posebice kod školjkaša, čija je potrošnja znatno niža u usporedbi s drugim proizvodima iz akvakulture. Ovaj rad ispituje kako percepcije kvalitete i sigurnosti proizvoda iz akvakulture oblikuju stavove potrošača prema školjkašima iz akvakulture i, posljedično, njihove namjere konzumacije. Nadalje, ispituje se moderirajuća uloga društvenog dokaza u navedenim odnosima. Podaci su prikupljeni na temelju internetskog upitnika na nacionalno reprezentativnom uzorku potrošača proizvoda ribarstva i akvakulture u Hrvatskoj i Italiji (n = 2.012). Primijenjeno je modeliranje strukturnih jednadžbi metodom parcijalnih najmanjih kvadrata (PLS-SEM) korištenjem softvera SmartPLS 4. Rezultati pokazuju da i percipirana kvaliteta i sigurnost značajno i pozitivno utječu na stavove prema školjkašima iz akvakulture, dok stav značajno predviđa namjeru konzumacije. Društveni dokaz pozitivno moderira odnos između percipirane kvalitete i stava, a negativno moderira odnos između percipirane sigurnosti i stava. Rezultati pokazuju da percepcije ponašanja drugih potrošača jačaju percepcije kvalitete, dok oslanjanje na takve društvene signale može smanjiti pozornost posvećenu procjeni sigurnosti. Integriranjem percipirane kvalitete i sigurnosti s društvenim utjecajem, rad nudi važne spoznaje za oblikovanje marketinških strategija u akvakulturi i komunikaciju s potrošačima.

KLJUČNE RIJEČI

stavovi potrošača
percipirana kvaliteta
percipirana sigurnost
društveni dokaz
namjera konzumacije
školjkaši iz akvakulture

1. INTRODUCTION / *Uvod*

Over the past years, aquaculture has been recognized for its growing contribution to ensuring a stable and sustainable supply of nutritious food [1]. At the global level, aquaculture is now the dominant source of seafood for human consumption, accounting for approximately 59% of aquatic animal foods in 2024, with an average annual growth of 3% [1]. In contrast, the European Union (EU) seafood market remains largely dependent on capture fisheries, which represent around 75% of total seafood supply, with aquaculture production reaching 1 million tonnes in 2024 [2]. Given the long-term stagnation of capture fisheries, aquaculture represents a key strategic sector for strengthening domestic seafood supply and supporting food security in the EU.

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Despite increasing recognition of the nutritional importance of seafood and its role in sustainable food systems, recent data indicate a slight decline in apparent seafood consumption in the EU. Average consumption remains just below 23 kg *per capita*, with notable regional differences. In Croatia, consumption is comparable to the EU average but declined by 6% in 2023 compared to 2022, while Italy remains above the EU average at over 30 kg *per capita*, showing a modest increase of 1% [3]. These patterns suggest that, despite continued EU policy support designed to strengthen competitiveness and sustainability of the sector and provide healthy and quality products to consumers [4-6], consumer demand for seafood is not uniformly increasing across Europe.

At the same time, aquaculture faces not only technological and production-related challenges but also persistent consumer scepticism. Understanding consumer decision-making is therefore essential to ensure that the potential benefits of aquaculture are fully realised [7]. Although aquaculture technologies and product quality have improved significantly, negative perceptions and misconceptions about farmed seafood continue to persist. In many cases, consumers still perceive wild-caught fish as superior to farmed alternatives, a preference often driven by limited information and emotional rather than rational decision-making processes [8]. This lack of knowledge contributes to uncertainty and scepticism in evaluating aquaculture products, as consumers generally have limited understanding of aquaculture production systems and associated product attributes [9].

These challenges are particularly relevant in the case of bivalves that have received limited scholarly attention. Despite increasing attention to sustainable and healthy dietary patterns, bivalve consumption remains relatively low compared to other seafood categories [3]. Given the environmental and nutritional relevance of bivalves [10], understanding the determinants of their acceptance is essential for promoting sustainable seafood consumption.

Consumer food choices are strongly influenced by perceived quality and safety. Food safety is generally regarded as a credence attribute because it cannot be directly verified by consumers, even after consumption, whereas quality encompasses search, experience, and credence dimensions, depending on the specific characteristic under consideration. As a result, individuals form perceptions based on available intrinsic and extrinsic cues, such as perceived freshness, taste, nutritional value, contamination control, and regulatory compliance [11-13]. Importantly, consumer acceptance is ultimately driven not by objective quality or safety alone, but by subjective perceptions of these attributes [11].

In addition to product-related evaluations, consumer decision-making is increasingly shaped by social influence mechanisms. Social proof refers to the tendency of individuals to rely on the perceived behaviour of others when forming judgments, particularly in situations characterised by uncertainty [14]. In such contexts, social information functions as a heuristic shortcut that helps consumers reduce complexity and uncertainty in decision-making. The relevance of these mechanisms is especially visible in aquaculture markets, where consumers often face information asymmetry and limited knowledge about production systems. In such conditions, general perceptions of aquaculture products may also extend to specific subcategories such as bivalves. Consumers tend to rely on category-based heuristics, meaning that evaluations formed at a broader product level can be transferred to related subcategories when direct knowledge is limited.

Although previous research has addressed the issues of quality, safety, and behavioural intention [9, 15-17], limited attention has been given to their combined role with social influences in shaping consumer attitudes and behavioural intentions toward aquaculture bivalves. In particular, little is known about how social proof interacts with perceived quality and safety in forming attitudes toward bivalves.

To address this gap, this study investigates how consumers' perceptions of the quality and safety of aquaculture products shape attitudes toward aquaculture bivalves and, subsequently, consumption intentions. In addition, it examines whether social proof changes the relationships between perceived quality, perceived safety, and attitudes toward aquaculture bivalves.

By integrating quality and safety perceptions with social influence mechanisms, this study contributes to a more comprehensive understanding of consumer behaviour in aquaculture markets, particularly in an underexplored segment of farmed bivalves.

2. THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT / *Teorijska osnova i hipoteze*

2.1. Perceived quality and safety / *Percipirana kvaliteta i sigurnost*

Consumer perceptions of quality and safety represent some of the most important determinants of food choice and product evaluation [11, 18]. Food quality is a multidimensional concept that encompasses both objective product characteristics and consumers' subjective evaluations. While the objective dimension refers to measurable product attributes, the subjective dimension reflects consumers' perceptions, expectations, and overall assessments of the product [19]. Different stakeholder groups, such as producers, scientists, regulators, marketers, and consumers, may evaluate food quality in different ways.

From the consumer perspective, quality is a multidimensional evaluative judgement that integrates several perceived attributes. According to a recent literature review on the dimensions of food product quality [20], consumer quality perceptions are generally organised around sensory attributes (taste, aroma, appearance, texture), health and nutritional attributes, safety attributes, convenience attributes, and process/trust attributes. Sensory and nutritional cues act, respectively, as primary drivers of product acceptance and health-conscious food choice. Taste has consistently been identified as one of the strongest predictors of liking and repurchase intention for food products in general. In addition, the provision of essential nutrients reflects the health and nutritional dimension that has become an increasingly important criterion in consumer food choice as awareness of diet-related health outcomes grows [20]. For aquaculture products, taste, together with freshness and nutrient content, has been identified among the attributes most strongly valued by consumers when evaluating these products [21].

In seafood markets, quality attributes can be classified along a search–experience–credence continuum: some characteristics, such as appearance and size, can be evaluated prior to purchase (search attributes); others, such as taste and texture, can only

be assessed after consumption (experience attributes); while attributes such as production method, feed composition, or the absence of contaminants remain largely unverifiable even after consumption (credence attributes) [22]. Because a substantial share of perceived seafood quality falls into the latter two categories, consumers are often unable to objectively assess many product characteristics prior to purchase or consumption. Consequently, consumers largely base their overall quality assessment on subjective perceptions of freshness, taste, nutritional value, appearance, and other extrinsic and intrinsic cues rather than on objective verification [11]. In the case of aquaculture products, such evaluations become particularly important because consumers frequently have limited knowledge of farming practices and production systems, which increases uncertainty in the decision-making process [9].

Previous studies consistently demonstrate that perceived quality is positively associated with consumer acceptance of aquaculture products. Reig et al. [23] found that stable quality and quality-related beliefs are among the strongest determinants of favourable perceptions of farmed seafood. Consistency of quality has emerged as one of the value attributes of aquaculture products because farmed production, unlike wild catches, is less exposed to seasonal and biological variability. Although research indicates that consumers tend to evaluate quality attributes more positively for wild-caught than for aquaculture products [24, 25], Menozzi et al. [9] showed that perceived quality plays a significant role in shaping positive attitudes and purchase intentions toward farmed fish. In the context of aquaculture-produced bivalves, perceived quality may strongly shape consumer evaluation for several reasons. First, bivalves are often consumed raw or minimally processed, meaning that their sensory characteristics are immediately experienced. Second, their chemical composition (content of high-quality proteins, omega-3 fatty acids, and micronutrients such as zinc, iron, selenium, and vitamin B12) is central for their positioning as nutrient-rich foods [26]. Third, since bivalves are filter feeders, consumers may associate their quality with environmental conditions and production practices, so perceived quality depends on stable, controlled quality. Consumers who perceive aquaculture products as high quality are therefore more likely to develop favourable attitudes toward bivalves. Accordingly, the following hypothesis is proposed:

H1: Perceived quality significantly influences attitudes toward aquaculture bivalves.

Food safety remains a central concern in seafood consumption due to risks associated with contamination, spoilage, and production transparency. Food safety refers to the assurance that food will not cause harm to consumers when prepared and consumed as intended [27]. As with food quality, food safety can be conceptualised as both an objective and a subjective construct. The objective dimension is based on scientific risk assessment, whereas the subjective dimension reflects consumers' perceptions of risk and safety, which may not always align with objective assessments [18].

Consumers typically evaluate food safety through cues such as the perceived absence of risk, regulatory control, guarantees, healthiness, and proper handling practices [11]. Unlike many other food categories, seafood is frequently associated with increased safety concerns, including contamination, environmental pollutants, microbiological risks, production practices, and traceability. These concerns are particularly relevant for bivalves, as they naturally filter large volumes of water and are therefore perceived as highly sensitive to environmental conditions. Accordingly, their consumption is strongly influenced by perceived safety, especially in contexts where global concerns regarding aquatic food safety are increasing [16].

Consumers tend to avoid products associated with uncertainty or perceived risk. In food markets, safety concerns often act as key barriers to product acceptance and consumption. Recent studies confirm that multiple dimensions of perceived risk, including health, environmental, functional, and socio-psychological risks, significantly shape consumer evaluations of seafood products and influence seafood-related decision-making [28].

Research in aquaculture contexts emphasises the importance of safety-related beliefs. Hall and Amberg [29] found that concerns regarding chemicals, antibiotics, and farming practices negatively affect consumer acceptance of aquaculture products. More recent studies suggest that transparency, traceability systems, and clear communication about production practices contribute to higher consumer trust and more positive evaluations of aquaculture products [9, 30]. Since attitudes represent evaluative responses formed on the basis of underlying beliefs, consumers who perceive aquaculture products as safe are expected to develop more favourable attitudes toward aquaculture bivalves. Therefore, the following hypothesis is proposed:

H2: Perceived safety significantly influences attitudes toward aquaculture bivalves.

2.2. Attitudes and consumption intention / *Stavovi i namjera konzumacije*

The relationship between attitudes and behavioural intentions is one of the most established relationships in consumer behaviour research. Attitudes reflect an individual's overall evaluation of a behaviour and serve as a direct antecedent of behavioural intention [31]. Individuals who hold favourable attitudes toward a product are generally more likely to express intentions to purchase or consume it.

In food consumption research, attitudes consistently emerge as one of the strongest predictors of consumption intention, which has also been confirmed in seafood and aquaculture contexts [17, 24, 32, 33]. Menozzi et al. [9] demonstrate that positive attitudes toward farmed fish significantly increase consumers' purchase intentions. Similarly, recent studies on consumer acceptance of sustainable aquaculture products identify attitudes as one of the most important determinants of purchase intention across European markets [33]. As a result, positive evaluations of aquaculture bivalves are expected to translate into stronger consumption intentions. Therefore, the following hypothesis is proposed:

H3: Attitudes toward aquaculture bivalves significantly influence consumption intention.

2.3. The role of social proof / *Uloga društvenog dokaza*

Social proof is a psychological phenomenon in which individuals look to the actions and behaviours of others to determine appropriate behaviour, particularly in situations characterised by uncertainty [34]. It reflects the tendency of individuals to rely on the observed behaviours of other people when making purchasing decisions. According to social influence theory, consumers often use information provided by others as a

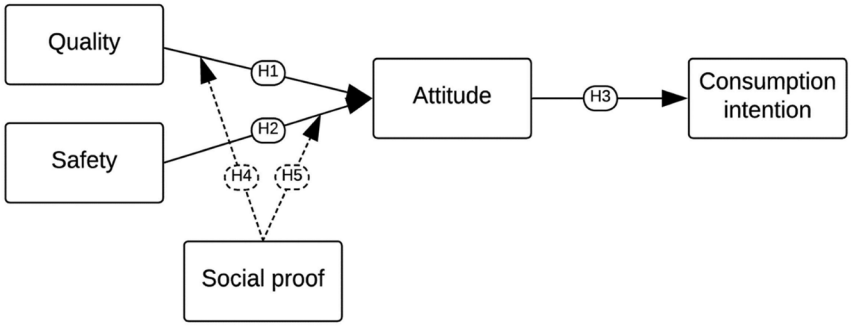


Figure 1 The conceptual model
Slika 1. Konceptualni model

Source: Authors

heuristic cue when evaluating products whose attributes are difficult to assess independently [14, 35].

The role of social proof becomes particularly evident in the context of aquaculture products, as consumers often have limited objective and subjective knowledge regarding production systems and product characteristics [9]. Previous research indicates that information asymmetry and uncertainty in aquaculture markets increase consumers' reliance on external informational cues when forming product evaluations [9, 30]. In addition, studies show that consumers' attitudes and purchase intentions toward aquaculture products are influenced by the information they receive, while social norms represent an important predictor of behavioural intentions in seafood consumption contexts [17, 24, 32].

When consumers perceive aquaculture products as high quality and safe, positive social signals indicating that others consume these products may further reinforce these beliefs and increase confidence in their product evaluations. From the perspective of informational social influence theory, individuals tend to rely on observed collective behaviour when evaluating uncertain products, as they assume that the group possesses more accurate information [36]. Accordingly, social proof can strengthen the relationship between consumers' perceptions and attitudes by validating existing beliefs and reducing perceived uncertainty. Based on that, the following hypotheses are proposed:

H4: Social proof moderates the relationship between perceived quality and attitudes toward aquaculture bivalves.

H5: Social proof moderates the relationship between perceived safety and attitudes toward aquaculture bivalves.

Figure 1 presents the conceptual model based on proposed hypotheses.

3. METHODOLOGY / *Metodologija*

An online survey was conducted by the professional market research agency Ipsos among its panel members in Italy and Croatia in January and February 2025. These two countries were selected due to their shared Mediterranean characteristics and maritime traditions, including their Mediterranean food culture and lifestyle, established consumption of fishery and aquaculture products, and comparable exposure to aquaculture products. Also, their geographical proximity and shared access to the Adriatic Sea provide comparable environmental and market conditions.

The study targeted consumers of fishery and aquaculture products aged 18-65 who are at least equally responsible for household food purchases. Stratified random sampling and proportional quota sampling were employed based on national population distributions for gender, age, and region, according to the most recent estimates published by Eurostat (Table 1). Quotas were allocated proportionally across demographic and regional groups within the population aged 18-65, which constituted the target population for the study. Eligible participants were randomly selected from the Ipsos panel and invited to participate via email. Quotas were established prior to data collection and continuously monitored throughout the fieldwork to ensure representativeness.

Table 1 National demographic distributions (18-65 y.o.)
Tablica 1. Nacionalne demografske distribucije (18-65 godina)

Variable		Croatia	Italy
Gender	Male	49.6%	50.0%
	Female	50.4%	50.0%
Age	<18	-	-
	18-24	11.8%	11.1%
	25-34	18.4%	17.0%
	35-44	21.8%	19.9%
	45-54	21.7%	25.8%
	55-65	26.2%	26.1%
	>65	-	-
Regions (Croatia)	City of Zagreb	20.1%	
	North Croatia	20.6%	
	Pannonian Croatia	26.3%	
	Adriatic Croatia	33.0%	
Regions (Italy)	North-west		26.6%
	North-east		19.5%
	Centre		19.8%
	South		23.2%
	Islands		10.9%

Source: Eurostat [37]

To ensure respondent relevance, two screening questions were included at the beginning of the questionnaire. Participants were asked whether they were responsible for household food and grocery purchases and whether they had consumed seafood within the previous 12 months. Respondents who did not meet these criteria were excluded from the study. Following the screening process, a total sample of 2,012 respondents was obtained.

The measurement instrument was developed based on previous research. The five aforementioned constructs were measured using a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The quality construct was adapted from the studies of Reig et al. [23] and Carrassón et

al. [8]. The three items were selected to capture the consistency (QUAL1), sensory (QUAL2) and nutritional (QUAL3) dimensions of perceived quality, which jointly form consumers' overall quality evaluation of aquaculture products. The safety construct was adapted from Reig et al. [23], Rickard et al. [38], and Hall and Amberg [29]. Social proof was measured using items adapted from Hong Do and Thanh Do [39], while the measures of attitude and consumption intention were adapted from Menozzi et al. [9]. Before the construct measurements, respondents were asked a series of socio-demographic questions and questions regarding their seafood consumption habits.

The data were analysed using partial least squares structural equation modelling (PLS-SEM) in SmartPLS 4 software [40]. Given the study's predictive orientation, the inclusion of moderation effects, and the use of latent constructs, PLS-SEM was considered an appropriate analytical technique [41, 42]. The analysis followed a two-step procedure consisting of measurement model evaluation and structural model assessment.

4. RESULTS / *Rezultati*

4.1. Sample structure / *Struktura uzorka*

The total sample consists of 2,012 consumers of fishery and aquaculture products. The sample is equally distributed between Italy and Croatia, with 1,006 respondents from each country. As stratified random sampling and proportional quotas were employed to reflect the population aged 18-65, the demographic structure of the sample closely mirrors the corresponding population distribution in both countries. Detailed socio-demographic characteristics of the respondents are presented in Table 2.

Table 2 Socio-demographic structure of the sample
Tablica 2. Socio-demografska struktura uzorka

Variable		Croatia (n=1,006)	Italy (n=1,006)
Gender	Male	49.7%	50.1%
	Female	50.3%	49.9%
Age	18-24	11.7%	9.6%
	25-34	17.9%	17.5%
	35-44	22.6%	20.6%
	45-54	21.5%	26.3%
	55-65	26.3%	26%
Regions (Croatia)	City of Zagreb	22.2%	
	North Croatia	18.9%	
	Pannonian Croatia	26.4%	
	Adriatic Croatia	32.5%	
Regions (Italy)	North-west		27.1%
	North-east		18.7%
	Centre		19.9%
	South		23.2%
	Islands		11.1%
Household income	<1,000 €	6.2%	6.4%
	1,000 – 2,000 €	24.1%	28.3%
	2,000 – 3,000 €	27.6%	25.1%
	>3,000 €	22.3%	31.8%
	No answer	19.8%	8.4%
Household size	1 member	8.8%	10.8%
	2 members	26%	25.3%
	3 members	27.6%	32.1%
	4 members	25.6%	25.4%
	5+ members	12%	6.4%
Fishery and aquaculture products consumption frequency	Almost every day	0.8%	4.1%
	2-3 times a week	16.9%	37.8%
	Once a week	43.1%	34.1%
	2-3 times a month	25.3%	14.5%
	Once a month	7.6%	5.4%
	Several times a year	5.8%	3.4%
	Once a year	0.5%	0.7%
Bivalve consumption frequency	Almost every day	0%	1.2%
	2-3 times a week	1%	7%
	Once a week	5%	18.9%
	2-3 times a month	10.2%	20.1%
	Once a month	13.2%	20.8%
	Several times a year	32.1%	17.2%
	Once a year	13.5%	5.2%
	Never	25%	9.6%

Source: Authors

There was a nearly equal proportion of male and female respondents in the sample. Approximately half of the respondents in both countries were aged 45 years or older. The majority reported a household income between €1,000 and €3,000 and lived in households consisting of two to four members. Regarding the general consumption of fishery and aquaculture products, the largest proportion of Croatian respondents reported consuming these products once a week (43.1%) or once a month (25.3%), whereas Italian respondents most commonly consumed them two to three times a week (37.8%) or once a week (34.1%). The consumption of bivalves was considerably lower. Most Croatian respondents reported consuming bivalves several times a year (32.1%) or never (25.0%), while Italian consumers most frequently consumed them once a month (20.8%) or two to three times a month (20.1%). Although bivalve consumption was relatively infrequent among Croatian respondents, all respondents were retained because the study examines behavioural intentions, with a particular focus on how consumer perceptions may shape future consumption behaviour irrespective of prior experience with bivalves. Since all respondents included in the study reported consuming seafood, they can be considered relative non-consumers of bivalves as their limited bivalve consumption does not necessarily indicate the presence of firm or persistent barriers, such as health-related or ideological objections. Rather, their relatively low consumption may reflect perceptions and attitudes that are potentially amenable to change. Given the shared characteristics of the two countries, as well as the study's focus on examining relationships among the variables rather than country-specific differences, a pooled sample was used for the subsequent analysis.

4.2. Measurement model evaluation / *Evaluacija mjernog modela*

The measurement model was evaluated to assess indicator and construct reliability as well as validity. The results are shown in Table 3.

The data show that reliability and convergent validity criteria have been met. During the initial assessment, the indicator "SAF2: Aquaculture feeds contain chemicals that can affect our health" was removed due to an outer loading value below 0.70, and its exclusion improved overall model quality. After excluding SAF2, all outer loading values range from 0.726 to 0.953, exceeding the recommended minimum and confirming indicator reliability [43]. Cronbach's alpha and composite reliability (CR) also surpass the threshold of 0.70, thus confirming the constructs' internal consistency reliability [44]. Average variance extracted (AVE) for all constructs is above the recommended limit of 0.50, indicating that each construct explains more than half of the variance of its indicators [44].

Discriminant validity was assessed using the Fornell-Larcker criterion and cross loadings. Fornell-Larcker results are given in Table 4.

Table 3 Construct reliability and convergent validity
Tablica 3. Pouzdanost konstrukata i konvergentna valjanost

	Outer loadings	α	CR	AVE
Quality (QUAL)				
QUAL1: "Aquaculture products have a stable quality."	0.726	0.700	0.833	0.625
QUAL2: "Aquaculture products have a good taste."	0.827			
QUAL3: "Aquaculture products provide essential nutrients for our health."	0.816			
Safety (SAF)				
SAF1: "Aquaculture products have more sanitary control than wild-caught products."	0.783	0.711	0.833	0.626
SAF3: "Farm-raised species are raised in a cleaner, healthier environment than where wild species live."	0.731			
SAF4: "The controlled diet for farm-raised fish ensures a good, safe product."	0.854			
Social proof (SP)				
SP1: "Many of my friends and relatives consume aquaculture products."	0.901	0.852	0.909	0.770
SP2: "Most of my neighbors consume aquaculture products."	0.824			
SP3: "Many people surrounding me consume aquaculture products."	0.906			
Attitudes (ATT)				
ATT1: "Farmed bivalves are healthy."	0.907	0.907	0.935	0.782
ATT2: "Farmed bivalves are nutritious."	0.895			
ATT3: "Farmed bivalves are ethical."	0.838			
ATT4: "Farmed bivalves are safe."	0.897			
Consumption intention (CI)				
CI1: "I am planning to purchase farmed bivalves in the near future."	0.947	0.934	0.963	0.897
CI2: "I am expecting to purchase farmed bivalves in the near future."	0.953			
CI3: "I will try to purchase farmed bivalves in the near future."	0.941			

Source: Authors

Table 4 Fornell-Larcker criteria
Tablica 4. Fornell-Larckerov kriterij

	ATT	CI	QUAL	SAF	SP
ATT	0.885				
CI	0.411	0.947			
QUAL	0.519	0.413	0.791		
SAF	0.469	0.390	0.676	0.791	
SP	0.250	0.396	0.409	0.336	0.878

Source: Authors

Since the square root of the AVE for each construct exceeds its correlations with all other constructs, discriminant validity has been confirmed [45]. Additionally, cross-loadings were checked and confirmed that all items load higher on their intended constructs than on other constructs.

4.3. Structural model assessment / *Evaluacija strukturnog modela*

For structural model evaluation, collinearity issues were assessed, followed by relationship testing and assessment of the model's explanatory and predictive power. Table 5 presents the inner model variance inflation factors (VIF).

Table 5 Inner model VIF
Tablica 5. VIF unutarnjeg modela

	VIF
ATT → CI	1.000
QUAL → ATT	1.978
SAF → ATT	1.865
SP x QUAL → ATT	2.299
SP x SAF → ATT	2.318

Source: Authors

As all inner VIF values are below 3, there is no multicollinearity issue in the model [46].

Structural relationships were tested using the bootstrapping technique with 10,000 subsamples as suggested by Hair et al. [46]. Results are shown in Table 6.

The structural model results indicate that all hypothesised relationships were supported. There is a positive and significant relationship between perception of quality and attitude toward bivalves ($\beta = 0.363$, $t = 13.537$, $p < 0.001$), with a small effect size ($f^2 = 0.095$), thus supporting H1. Among the examined predictors, perceived quality emerged as the stronger determinant of attitudes, suggesting that consumers place considerable importance on quality-related evaluations when assessing aquaculture products. This supports previous research demonstrating that quality-related beliefs represent one of the strongest drivers of consumer acceptance of aquaculture products [9, 23]. This result is consistent with the conceptualisation of perceived quality outlined in Section 2.1, whereby stable quality, taste, and essential nutrients jointly reflect the process-related, sensory, and health-related dimensions of food quality [18, 20]. Consistent with belief-based models of attitude formation [31], these quality perceptions act as key drivers of consumers' overall evaluation of the product: the more stable, tasty, and nutrient-rich aquaculture products are perceived to be [21, 23], the more favourable the resulting attitude toward aquaculture bivalves.

A significant positive relationship is also observed between perception of safety and attitude toward bivalves ($\beta = 0.215$, $t = 8.172$, $p < 0.001$), confirming H2, although the strength and contribution of the relationship are smaller ($f^2 = 0.035$). The significance of this relationship confirms the importance of safety-related perceptions in shaping consumer attitudes toward aquaculture bivalves. Previous studies have also found food safety to be a key determinant of seafood acceptance [9, 16, 29]. Consumers frequently associate seafood products with risks related to contamination, environmental pollutants, and production practices, making safety an important consideration in their decision-making process.

As hypothesised, there is a significant positive relationship between attitude and bivalve consumption intention ($\beta = 0.411$, $t = 19.804$, $p < 0.001$), with a moderate effect size ($f^2 = 0.204$), thereby supporting H3. The relatively stronger relationship in this case confirms some previous findings in seafood and aquaculture contexts [9, 32, 33], which identify attitudes as one of the strongest predictors of behavioural intentions. The findings indicate that consumers who hold more favourable attitudes toward aquaculture bivalves are more likely to consume them.

Table 6 Hypotheses testing
Tablica 6. Testiranje hipoteza

	β	t value	p value	f^2	Decision
H1: Quality → Attitude	0.363	13.537	0.000	0.095	Supported
H2: Safety → Attitude	0.215	8.172	0.000	0.035	Supported
H3: Attitude → Consumption intention	0.411	19.804	0.000	0.204	Supported
H4: Social proof x Quality → Attitude	0.058	1.974	0.048	0.003	Supported
H5: Social proof x Safety → Attitude	-0.058	2.106	0.034	0.003	Supported

Source: Authors

The moderation analysis showed that social proof has a significant moderating effect on the relationship between quality and attitudes ($\beta = 0.058$, $t = 1.974$, $p = 0.048$), supporting H4. The positive moderation effect suggests that stronger social proof reinforces the relationship between perceived quality and attitudes. Consumers who perceive aquaculture products as high quality develop even more favourable attitudes toward aquaculture bivalves when these perceptions are supported by the observed consumption behaviour of others. This is consistent with the informational social influence theory, which suggests that individuals rely on perceived collective behaviour when evaluating products characterised by uncertainty. Since consumers often possess limited knowledge about aquaculture products, positive social signals may serve as additional validation of quality perceptions and increase confidence in product evaluations.

Social proof also significantly moderated the relationship between perceived safety and attitudes ($\beta = -0.058$, $t = 2.106$, $p = 0.034$), supporting H5. However, this moderation effect is negative, indicating that stronger social proof weakens the relationship between perceived safety and attitudes. When strong social signals are present, consumers may rely less on their own safety assessments and more on socially derived information because they use the behaviour of others as a heuristic cue under conditions of uncertainty. At the same time, this suggests that food safety is a highly sensitive attribute that consumers typically expect to be supported by objective evidence such as certifications, traceability systems, quality assurance schemes, and institutional controls rather than social influence alone [30]. Consequently, social proof appears to partially substitute individual safety evaluations, reducing their relative importance in attitude formation.

Following the adjusted guidelines for effect sizes in moderation analysis [46], both interaction effects exhibited small effect sizes ($f^2 = 0.003$). Nevertheless, despite their modest magnitude, the findings reveal that social influence plays a meaningful role in shaping how consumers use quality and safety perceptions when forming their attitudes.

Considering the study context and focus on consumer behaviour, the structural model demonstrated satisfactory explanatory power exceeding 0.10 [46], with quality and safety perceptions explaining 29.8% of the variance in attitudes toward bivalves ($R^2 = 0.298$), and attitudes explaining 16.9% of the variance in bivalve consumption intention ($R^2 = 0.169$). Although the explanatory power for consumption intention is relatively lower, this suggests that additional psychological, situational, or market-related factors may influence consumers' intentions to consume aquaculture bivalves. All Q^2 values are above zero, ranging from 0.133 to 0.247, indicating adequate predictive relevance of the model.

5. CONCLUSION / *Zaključak*

This study examined the relationships between perceived quality, safety, social proof, attitudes, and consumption intentions toward aquaculture bivalves. The results show that perceived quality and safety of aquaculture products are significant predictors of attitudes toward bivalves, which in turn are positively associated with consumption intention. Social proof plays an important moderating role by strengthening the relationship between quality and attitudes, while weakening the relationship between safety and attitudes.

From a theoretical perspective, this study contributes to consumer behaviour literature by integrating consumers' quality and safety perceptions, which combine search, experience, and credence dimensions, with social influence mechanisms in the context of aquaculture products. It extends existing research by demonstrating that social proof does not operate uniformly across product evaluations but interacts differently with quality and safety perceptions. It also contributes to the understanding of the antecedents of consumer behavioural intentions regarding specific food segments such as bivalves' consumption.

In practical terms, the findings indicate that communicating the quality and safety of aquaculture products should be prioritized, as these attributes foster more positive attitudes toward bivalves, which in turn increase consumers' intention to consume them. This communication should be specific and precise, focusing on elements that consumers associate with safety and quality in their minds such as tastiness, healthiness, or sanitary control. Aquaculture producers and marketers should actively leverage social proof mechanisms to increase the visibility of collective bivalve consumption, thereby reinforcing perceived quality and encouraging positive attitudes. At the same time, safety communication should be based on objective and verifiable evidence, including certifications, traceability systems, and quality assurance labels, as social influence alone is insufficient to strengthen safety perceptions.

The study has several limitations that serve as potential input for future research. First, the study focuses on consumers in Italy and Croatia, which may limit the generalisability of the findings to other cultural or market contexts. It would be advisable to conduct the study in other cultural and economic contexts to observe differences across geographical regions. Furthermore, the data were self-reported, which may be subject to response bias, and the study focuses on behavioural intention, which may not fully correspond to actual behaviour. The cross-sectional design and use of self-reported data collected within a single survey may also limit the findings by introducing common method bias. Future researchers are encouraged to incorporate data on actual consumption behaviour or implement experimental research designs to better examine causal relationships. The higher proportion of respondents who do not consume bivalves in Croatia may also limit the generalizability of the findings. Their low consumption frequency may indicate limited direct experience with bivalves, meaning that their perceptions of quality and safety may be based partly on expectations or indirect information. Also, their limited experience may affect the relationship between positive perceptions or attitudes and actual future consumption behaviour, as stated attitudes may not necessarily translate into behavioural change. Therefore, future researchers are suggested to control for this variable and investigate the constraints affecting bivalve consumption in more detail. Finally, a relatively lower explanatory power was observed for the endogenous variable consumption intention. Despite attitude often being one of the strongest predictors of behavioural intention, these results indicate that, in this specific context, additional predictors may exist that were not included in this study. Similarly, although the moderation effects of social proof were

statistically significant, their relatively small effect sizes suggest further investigation. Future research should therefore explore additional psychological or situational variables that may influence consumption intention, such as health awareness, convenience, availability or some other constraints.

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Ethical approval: Ethical approval was not required for this study because the research was conducted as anonymous market research and did not involve the collection of sensitive personal or clinical data. Data collection is carried out by Ipsos in accordance with the ICC/ESOMAR Code and the ISO 20252 standard for market, media, and public opinion research. In addition to professional ethical requirements, Ipsos has established internal requirements applicable to all projects, as set out in the Ipsos Professional Code of Conduct and Ethics (the Ipsos Green Book). Detailed information on Ipsos' codes of ethics and values can be found at: https://www.ipsos.com/en-ro/values-and-conduct

Informed consent: Informed consent was obtained from all subjects involved in the study.

REFERENCES / *Literatura*

[1] FAO (2026). *The State of World Fisheries and Aquaculture 2026 – Blue Transformation: turning vision into impact*. Retrieved from https://doi.org/10.4060/cd8357en

[2] [Eurostat (2026). *Aquaculture statistics*. Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Aquaculture_statistics

[3] European Commission, Directorate-General for Maritime Affairs and Fisheries (2026). *The EU fish market: 2025 edition*. Retrieved from https://data.europa.eu/doi/10.2771/1531521

[4] European Commission (2020). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system*. COM/2020/381 final. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0381

[5] European Commission (2021). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a new approach for a sustainable blue economy in the EU – Transforming the EU's Blue Economy for a Sustainable Future.* COM/2021/240 final. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52021DC0240

[6] Regulation (EU) 2021/1139 of the European Parliament and of the Council of 7 July 2021 establishing the European Maritime, Fisheries and Aquaculture Fund and amending Regulation (EU) 2017/1004. (2021). *Official Journal of the European Union L 247*. Retrieved from http://data.europa.eu/eli/reg/2021/1139/oj

[7] Lu, J., Xiao, Y., & Zhang, W. (2024). Taste, sustainability, and nutrition: Consumers' attitude toward innovations in aquaculture products. *Aquaculture*, 587, 740834. https://doi.org/10.1016/j.aquaculture.2024.740834

[8] Carrassón, M., Soler-Membrives, A., Constenla, M., Escobar, C., Flos, R., Gil, J. M., Luzón, V., Piferrer, F., & Reig, L. (2021). Information impact on consumers' perceptions towards aquaculture: Dismantling the myth about feeds for farmed fish. *Aquaculture*, 544, 737137. https://doi.org/10.1016/j.aquaculture.2021.737137

[9] Menozzi, D., Wongprawmas, R., Sogari, G., Gai, F., Parisi, G., & Mora, C. (2023). The role of objective and subjective knowledge on the attitude and intention of Italian consumers to purchase farmed and wild fish. *Agricultural and Food Economics*, *11* (1), 47. https://doi.org/10.1186/s40100-023-00288-1

[10] Bratoš Cetinić, A. (2024). Shellfisheries in Croatia: From Manual Collection to Contemporary Practices. *Naše more*, *71* (3), 154-165. https://doi.org/10.17818/NM/2024/3.8

[11] van Rijswijk, W., & Frewer, L. J. (2008). Consumer perceptions of food quality and safety and their relation to traceability. *British Food Journal*, *110* (10), 1034-1046. https://doi.org/10.1108/00070700810906642

[12] Wu, W., Zhang, A., van Klinken, R. D., Schrobback, P., & Muller, J. M. (2021). Consumer Trust in Food and the Food System: A Critical Review. *Foods*, *10* (10), 2490. https://doi.org/10.3390/foods10102490

[13] Schrobback, P., Zhang, A., Loechel, B., Ricketts, K., & Ingham, A. (2023). Food Credence Attributes: A Conceptual Framework of Supply Chain Stakeholders, Their Motives, and Mechanisms to Address Information Asymmetry. *Foods*, *12* (3), 538. https://doi.org/10.3390/foods12030538

[14] Begho, T., & Liu, S. (2024). Does social proof and herd behaviour drive food choices of consumers? *British Food Journal*, *126* (3), 1050-1064. https://doi.org/10.1108/BFJ-08-2023-0676

[15] Claret, A., Guerrero, L., Gartzia, I., Garcia-Quiroga, M., & Ginés, R. (2016). Does information affect consumer liking of farmed and wild fish? *Aquaculture*, 454, 157-162. https://doi.org/10.1016/j.aquaculture.2015.12.024

[16] Wang, O., & Somogyi, S. (2018). Chinese consumers and shellfish: Associations between perception, quality, attitude and consumption. *Food Quality and Preference*, 66, 52-63. https://doi.org/10.1016/j.foodqual.2018.01.001

[17] Aminizadeh, M., Mohammadi, H., Karbasi, A., & Rafiee, H. (2024). Predicting consumers' intention towards seafood products: An extended theory of planned behavior. *Food Quality and Preference*, 113, 105061. https://doi.org/10.1016/j.foodqual.2023.105061

[18] Grunert, K. G. (2005). Food quality and safety: consumer perception and demand. *European Review of Agricultural Economics*, *32* (3), 369-391. https://doi.org/10.1093/eurrag/jbi011

[19] European Commission (2021). *Food Quality*. Retrieved from https://knowledge4policy.ec.europa.eu/food-fraud-quality/topic/food-quality_en

[20] Pramudito, P., Rachim, F., Abduh, M. S., Maulana, A., & Salim, C. (2025). Food Product Quality: Literature Study on the Dimensions of Food Product Quality. *International Journal of Social Science and Human Research*, *8* (6), 4413-4416. https://doi.org/10.47191/ijsshr/v8-i6-52

[21] Cantillo, J., Martín, J. C., & Román, C. (2021). A Best–Worst Measure of Attitudes toward Buying Seabream and Seabass Products: An Application to the Island of Gran Canaria. *Foods*, *10* (1), 90. https://doi.org/10.3390/foods10010090

[22] Caswell, J. A., & Mojduszka, E. M. (1996). Using Informational Labeling to Influence the Market for Quality in Food Products. *American Journal of Agricultural Economics*, *78* (5), 1248-1253. https://doi.org/10.2307/1243501

[23] Reig, L., Escobar, C., Carrassón, M., Constenla, M., Gil, J. M., Padrós, F., Piferrer, F., & Flos, R. (2019). Aquaculture perceptions in the Barcelona metropolitan area from fish and seafood wholesalers, fishmongers, and consumers. *Aquaculture*, 510, 256-266. https://doi.org/10.1016/j.aquaculture.2019.05.066

[24] Wongprawmas, R., Sogari, G., Gai, F., Parisi, G., Menozzi, D., & Mora, C. (2022). How information influences consumers' perception and purchasing intention for farmed and wild fish. *Aquaculture*, 547, 737504. https://doi.org/10.1016/j.aquaculture.2021.737504

[25] Murray, G. D., Fail, R., Fairbanks, L., Campbell, L. M., D'Anna, L., & Stoll, J. (2023). Seafood consumption and the management of shellfish aquaculture. *Marine Policy*, 150, 105534. https://doi.org/10.1016/j.marpol.2023.105534

[26] Wright, A. C., Fan, Y., & Baker, G. L. (2018). Nutritional Value and Food Safety of Bivalve Molluscan Shellfish. *Journal of Shellfish Research*, *37* (4), 695-708. https://doi.org/10.2983/035.037.0403

[27] FAO (n. d.). *About food safety*. Retrieved from https://www.fao.org/food-safety/about/en

[28] An, S., Eck, T., & Choi, J. (2024). Perceived risk and risk reduction behaviors in fish and seafood consumption. *Frontiers in Sustainable Food Systems*, 8, 1412041. https://doi.org/10.3389/fsufs.2024.1412041

[29] Hall, T. E., & Amberg, S. M. (2013). Factors influencing consumption of farmed seafood products in the Pacific northwest. *Appetite*, 66, 1-9. https://doi.org/10.1016/j.appet.2013.02.012

[30] Peiró-Signes, A., Miret-Pastor, L., Galati, A., & Segarra-Oña, M. (2022). Consumer Demand for Environmental, Social, and Ethical Information in Fishery and Aquaculture Product Labels. *Frontiers in Marine Science*, 9, 948437. https://doi.org/10.3389/fmars.2022.948437

[31] Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50* (2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T

[32] Skallerud, K., Armbrecht, J., & Tuu, H. H. (2021). Intentions to Consume Sustainably Produced Fish: The Moderator Effects of Involvement and Environmental Awareness. *Sustainability*, *13* (2), 946. https://doi.org/10.3390/su13020946

[33] Tunca, S., Budhathoki, M., & Brunsø, K. (2024). European consumers' intention to buy sustainable aquaculture products: An exploratory study. *Sustainable Production and Consumption*, 50, 20-34. https://doi.org/10.1016/j.spc.2024.07.021

[34] Cialdini, R. B. (2021). *Influence: The Psychology of Persuasion*. Harper Business, New York.

[35] Higgs, S., & Thomas, J. (2016). Social influences on eating. *Current Opinion in Behavioral Sciences*, 9, 1-6. https://doi.org/10.1016/j.cobeha.2015.10.005

[36] Cohen, J. B., & Golden, E. (1972). Informational social influence and product evaluation. *Journal of Applied Psychology*, *56* (1), 54-59. https://doi.org/10.1037/h0032139

[37] Eurostat (n. d.). *Census Hub*. Retrieved from https://ec.europa.eu/CensusHub/selectHyperCube?clearSession=true

[38] Rickard, L. N., Britwum, K., Noblet, C. L., & Evans, K. S. (2020). Factory-made or farm fresh? Measuring U. S. support for aquaculture as a food technology. *Marine Policy*, 115, 103858. https://doi.org/10.1016/j.marpol.2020.103858

[39] Hong Do, V. T., & Thanh Do, L. (2024). The effectiveness of social norms in promoting green consumption. *Social Responsibility Journal*, *20* (3), 444-461. https://doi.org/10.1108/SRJ-10-2022-0466

[40] Ringle, C. M., Wende, S., & Becker, J.-M. (2024). *SmartPLS 4*. SmartPLS GmbH. Retrieved from https://smartpls.com/

[41] Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31* (1), 2-24. https://doi.org/10.1108/EBR-11-2018-0203

[42] Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial Management & Data Systems*, *116* (1), 2-20. https://doi.org/10.1108/IMDS-09-2015-0382

[43] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate Data Analysis* (7th ed.). Pearson Education Limited, Harlow.

[44] Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet. *Journal of Marketing Theory and Practice*, *19* (2), 139-152. https://doi.org/10.2753/MTP1069-6679190202

[45] Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18* (1), 39-50. https://doi.org/10.2307/3151312

[46] Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook*. Springer, Cham. https://doi.org/10.1007/978-3-030-80519-7