

## QUALITY MANAGEMENT OF HONEY IN THE BANI WORLD: CONSUMER PERCEPTIONS AND MARKET RESPONSES

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**Purpose:** The article aims to explore the role of quality perception in managing honey quality under market instability, characteristic of the BANI world. The study focuses on the relationship between consumer perceptions and producers' adaptive strategies.

**Design/methodology/approach:** A mixed-method approach was applied, combining literature analysis with a CAWI survey conducted in 2024 on a sample of 756 adult honey consumers. The study examined quality perception mechanisms, preferences for product origin, and acceptable price levels.

**Findings:** Consumers show a strong preference for domestically produced honey and are willing to pay a premium for products perceived as local and authentic. However, there is low trust in external quality certifications. Distinct consumer segments were identified, indicating the need for flexible and targeted quality management approaches.

**Research limitations/implications:** The purposive sampling method limits the generalizability of the results. Further research is recommended to explore how consumer perceptions can be better integrated into quality management systems, particularly in sectors vulnerable to market disruptions.

**Originality/value:** The study contributes to quality management theory by combining consumer perception with systemic resilience, offering practical insights for the agri-food sector.

**Keywords:** honey quality, consumer perception, BANI, flexible management, food market.

**Category of the paper:** Research paper.

### 1. Introduction

Contemporary quality management in the food sector unfolds amid escalating instability, complexity, and growing difficulty in forecasting change. Climate change adversely affects production yields, food quality, and supply chains (Owino et al., 2022; Mirón, Linares, Díaz,

2023). Moreover, global crises and shifting consumer behaviors place mounting pressure on quality systems to adapt (Sparling et al., 2024).

Disruptive phenomena in contemporary market systems are increasingly interpreted through the lens of the BANI paradigm, which describes conditions as brittle, anxious, nonlinear, and incomprehensible. Unlike the earlier VUCA model (volatility, uncertainty, complexity, ambiguity), BANI highlights structural fragility, anxiety as a dominant decision-making emotion, the nonlinearity of interactions, and difficulty in tracing causality (Mieszajkina, Ostapińska, 2024). Organizational transformation literature emphasizes that operating in the BANI environment requires the implementation of agile management practices, a learning-oriented culture, and resilience-driven leadership (Olkowicz, et al., 2024; Vishwakarma, Pandey, 2025).

In such a dynamic environment, traditional quality management systems often prove inadequate. Effective approaches increasingly demand adaptability, strategic flexibility, and a deeper understanding of stakeholder perceptions, particularly those of consumers (Araújo, Arruda, 2024; Mieszajkina, Ostapińska, 2024).

The honey sector is especially vulnerable to market disruptions. Honey quality results from complex interactions involving environmental conditions such as climate and forage availability, biological processes including bee activity, technological factors like harvesting and storage methods, as well as regulatory and market dynamics. In recent years, both Poland and other European countries have experienced significant supply–demand imbalances in the honey market, caused by weather anomalies, the influx of honey from diverse geographic regions, shifts in consumer preferences, and a growing interest in natural and organic products (Peres et al., 2025; Żak, Wilczyńska, 2023).

From this perspective, honey quality is no longer defined solely by its physicochemical parameters. Instead, it increasingly becomes a perceptual construct shaped in consumers' minds by beliefs, past experiences, marketing communication, and media narratives (Mohamadzade Namin et al., 2023; Manickavasagam et al., 2024). Research shows that perceived quality often diverges from a product's objective attributes, with factors such as certification, labeling, price, and declared geographic origin playing a decisive role in purchasing decisions (Sadílek, 2019; Mohamadzade Namin et al., 2023; Manickavasagam et al., 2024). At the same time, unverified media reports about honey adulteration or the ineffectiveness of quality oversight mechanisms may undermine trust and create confusion among consumers (Żak, Wilczyńska, 2023).

Consequently, quality perception serves as a critical link between market mechanisms and management strategies. It integrates three key domains: market dynamics, including supply and demand fluctuations, import pressures, and pricing policies; consumer expectations and preferences related to apicultural products; and producers' adaptive capacities in areas such as market segmentation, quality communication, and flexible production standardization (Stone, Rahimifard, 2018; Wu et al., 2021).

The primary aim of this article is to examine the role of perceived quality in shaping adaptive quality management strategies for honey under volatile market conditions, typical of the BANI environment. To achieve this goal, the study analyzes key market forces influencing quality perception, identifies consumer preferences, and evaluates their impact on producer strategies. Furthermore, it proposes potential adaptive approaches for quality management practices and offers strategic recommendations for stakeholders in the beekeeping sector, which may also serve as a basis for further research.

The article is structured into five sections. The first outlines the theoretical framework and rationale for the research. The second discusses the destabilizing mechanisms influencing the honey market in Poland. The third presents the research methodology. The fourth describes the survey findings, including consumer segmentation. The final section explores practical implications for quality management in the honey sector, viewed through the lens of organizational and systemic resilience.

## **2. Market instability in the honey sector**

Under BANI conditions, every segment of the food production system, including the honey market, faces heightened structural and external pressures. This section explores the main destabilizing mechanisms affecting the honey market in Poland and globally, along with their implications for quality perception and adaptive strategy development.

### **2.1. Climatic and economic pressures as sources of supply and price instability**

Honey production is highly dependent on environmental factors such as the availability of nectar sources, climatic conditions, and hive health. In recent years, the frequency of extreme weather events - including droughts, heatwaves, and delayed springs - has increased, leading to significant inconsistencies in honey yields in terms of both quantity and quality (e.g., reduced sugar content, increased moisture levels)). Literature on food system resilience emphasizes that climate variability is a major risk factor with downstream effects across the supply chain (Gajardo-Rojas et al., 2022; Roosevelt et al., 2023; Vincze et al., 2025).

Food systems must demonstrate adaptive capacity in the face of disruptions, which in practice involves increasing system flexibility through diversification of supply sources, establishment of buffer stocks, and implementation of shock-absorbing mechanisms (Roosevelt et al., 2023; Deconinck et al., 2023). In the honey sector, such resilience is often constrained by the strong dependence on local climatic conditions and the limited window of optimal nectar collection periods.

On the global market, honey trade between countries has intensified, influencing both international and domestic pricing. Imports from low-cost production regions exert substantial competitive pressure on domestic producers. In a context of volatile exchange rates, fluctuating transportation costs, tariffs, and variable global demand, honey prices are highly susceptible to external shocks, exacerbating market volatility. Studies on food supply chain resilience suggest that food markets are increasingly vulnerable to risk transmission across production and consumption segments (Deconinck et al., 2023; Hadachek, Ma, Sexton, 2024).

Critical analyses of agri-food supply chains underscore that one of the key challenges is the shifting of risk along the value chain - producers, distributors, and retailers respond differently to disruptions, which can lead to risk concentration and systemic imbalance (Stone, Rahimifard, 2018).

## **2.2. Consumers in market disruption contexts – attitudes, perceptions, and trust**

Market instability, especially when accompanied by media coverage of product fraud or concerns about quality, directly influences consumers' perception of risk (Manning, Kowalska, 2021). Under uncertain conditions, consumers are more likely to rely on indirect indicators of quality such as brand reputation, certifications, and peer recommendations, compensating for limited awareness of the product's physicochemical characteristics (Wu et al., 2021). The literature on food systems suggests that during periods of crisis, consumers tend to prefer geographically proximate products obtained through shorter supply chains, which are perceived as more trustworthy and easier to control (Radzymińska, Jakubowska, 2018). In the honey sector, this shift in preferences may benefit local products while simultaneously intensifying competitive pressure on producers to ensure transparency and quality differentiation.

The functioning of the honey market under unstable conditions, marked by fluctuating supply, import pressure, and volatile prices, does not operate in isolation (Ballco, Jaafer, de Magistris, 2022). Rather, it is strongly interlinked with consumer behavior, creating dynamic feedback loops that hold significant systemic relevance. For instance, in response to intensified price competition, producers may increase their emphasis on communicating quality-related attributes such as certification, geographic origin, or production practices (Bravo et al., 2024). These efforts, in turn, shape consumer perceptions of value. As a result, consumers driven by perceived quality may exhibit a higher willingness to pay a premium for products considered safe, authentic, or locally produced (Zeng et al., 2023). This form of market responsiveness opens a path for producers to enhance both the actual and perceived quality of their offerings through technological improvements and strategic communication.

At the same time, disruptions in price or product availability, such as the influx of low-cost honey, may erode consumer trust and destabilize established value assessment mechanisms. These disturbances may require compensatory measures, including adjustments in pricing strategies, promotional efforts, or the redefinition of profit margins (Deconinck et al., 2023).

Scholars in the field of food system resilience emphasize that one of the most effective leverage points for strengthening value chain resilience lies in the area of information management, transparency, and communication among stakeholders (Astill et al., 2019; Burgess, Sunmola, Wertheim-Heck, 2023). This suggests that managing information, both in its technological form and in the way it is perceived, has become a strategic pillar of modern quality management.

Given these interdependencies, the honey market cannot be adequately analyzed using classical linear economic models. A systems-based approach is required, one that incorporates the interrelationships between production, distribution, and consumer-perceived value. At the center of this system stands the consumer, whose preferences, expectations, and sensitivity to risk now constitute the central point of reference for adaptive strategies in the apiculture sector. The following sections explore selected dimensions of consumer perception, with particular focus on the roles of geographic origin and acceptable pricing levels as determinants of purchasing behavior and foundational elements for flexible quality management.

### **3. Research Methodology**

A consumer survey was conducted in 2024 to investigate purchasing preferences related to honey, with particular attention to country of origin, acceptable price levels and product-selection criteria. A quantitative approach was used, employing a Computer-Assisted Web Interview (CAWI) administered online. Respondents were recruited via an established online access panel and selected based on predefined eligibility criteria: being at least 18 years of age and having declared purchasing honey in retail outlets (supermarkets, hypermarkets, or grocery stores). The purposive sample consisted of 756 adult honey consumers.

The study sample included individuals aged 18-34 years (28%), 35-54 years (46%), and over 55 years (26%). The majority of respondents held higher education degrees (58%) or secondary education (31%), while 11% reported having completed primary or vocational education. Urban residents from large cities accounted for 22% of the sample, those from medium and small towns for 51%, and rural residents for 27%. The sampling approach enabled the inclusion of a broad range of consumer attitudes and allowed for the analysis of demographic variation.

The questionnaire included closed-ended questions, both single- and multiple-choice, covering the significance of honey origin in purchasing decisions, preferred price per 1 kg of honey from selected countries (with respondents specifying a value in PLN), and the key factors influencing product selection. Responses were provided using nominal scales, and participants were asked to rank up to three most important criteria. Price-related data were analyzed

descriptively, including calculation of medians, standard deviations, and the proportion of respondents willing to pay a higher price (above 50 PLN).

#### 4. Results of study

The analysis of survey results indicates that the country of origin plays a significant role in honey purchasing decisions among consumers. Approximately 73% of respondents declared that they consider the country of origin when buying honey, and among them, 90% expressed a preference for domestically produced products. This highlights a strong consumer orientation toward local food and a high level of trust in the national food system.

These findings are consistent with previous studies by Źak and Wilczyńska (2023), which emphasized the growing relevance of local origin certifications and geographical indications as factors reinforcing consumer loyalty in the honey market. The results also align with broader research underscoring the importance of short supply chains and geographic proximity as indicators of product credibility, particularly in uncertain conditions (Benos et al., 2022). This behavior may be interpreted through the lens of “food citizenship”, where consumers demonstrate conscious preferences for sustainable and locally rooted production models (Lozano-Cabedo, Gómez-Benito, 2017).

Conversely, the country’s most frequently associated with consumer distrust included China (39.7%), Ukraine (32.6%), and Russia (19.6%) – table 1. These perceptions are consistent with the findings of the European Food Safety Authority (EFSA, 2021), which has repeatedly reported irregularities in the composition and labeling of honeys imported from these origins. Nevertheless, only 12% of all respondents declared a complete rejection of honey from China, suggesting that price sensitivity may outweigh concerns in certain consumer segments.

**Table 1.**

*Countries of origin most frequently rejected by consumers considering origin in their honey purchases*

Country of origin	Share [%]
China	39.7
Ukraine	32.6
Russia	19.6
Any country other than Poland	4.9
Any country outside the EU	4.9
Other	10.7
Hard to say / Don’t know	1.8

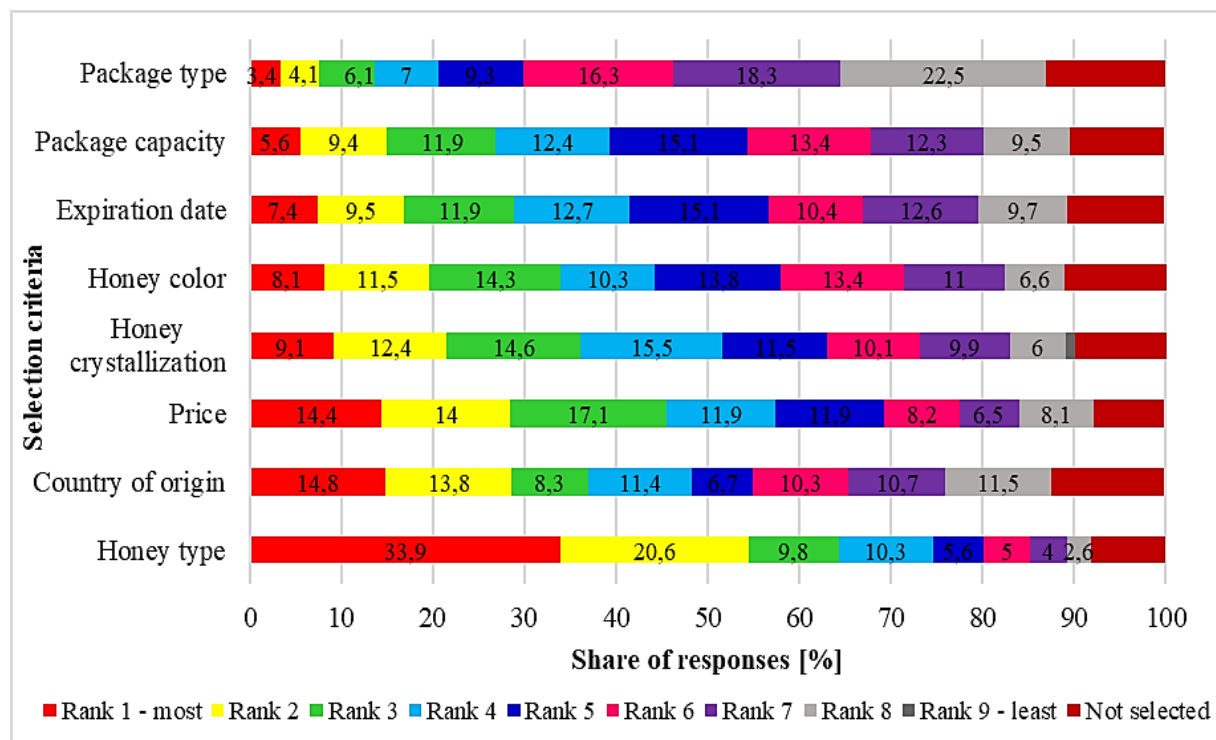
Note: Multiple answers were allowed. Percentages refer to respondents who indicated that the country of origin influences their honey purchasing decisions.

Source: Own work.

The relationship between the perceived origin of honey and the acceptable price level was confirmed in a detailed analysis. Consumers who considered the country of origin in their purchasing decisions were significantly more likely to pay a premium for honey produced domestically or sourced from trusted regions. In contrast, respondents who did not attribute importance to origin demonstrated greater price flexibility and more often chose the cheaper product regardless of its provenance.

This trend supports the hypothesis formulated by Mohamadzade Namin et al. (2023), who argue that the perception of authenticity and product safety acts as a modulator of price acceptability. In other words, consumers are willing to pay a price premium in exchange for perceived quality, particularly in product categories associated with naturalness, such as honey. These findings emphasize the relevance of market segmentation and the need to adapt quality management strategies to heterogeneous consumer expectations, which is consistent with the principles of value-based pricing and relationship marketing (Hinterhuber, 2017; Espejel, Fandos, Flavián, 2008).

In the question regarding the most important factors influencing honey choice, respondents were asked to indicate up to three determinants from a predefined list. As shown in Figure 1, the most frequently selected criteria included: (1) type of honey (e.g., linden, multifloral), (2) price, (3) degree of crystallization, and (4) country of origin. Secondary factors such as packaging design, presence of certifications, and recommendations from acquaintances played a less decisive role.



**Figure 1.** Factors influencing consumer choice of honey.

Source: Own work.

Interestingly, quality certifications (e.g., organic labels) played only a marginal role in purchasing decisions. This may indicate limited consumer trust in external verification systems or a lack of familiarity with certification schemes. This observation is consistent with findings by Peres et al. (2025) and Grunert et al. (2014), who argue that quality labels are only effective when they are both recognized and clearly communicated to consumers.

The analysis of acceptable price levels for honey from different origins (Table 2) revealed distinct differences in consumers' willingness to pay depending on the product's country of origin. The highest median price was reported for domestic honey (PLN 45), whereas products from China and Ukraine were valued lower, at PLN 27 and PLN 32, respectively. As many as 41% of respondents declared a willingness to pay more than PLN 50 per kilogram for Polish honey, compared to only 7% for honey from China. These results support the hypothesis formulated by Mohamadzade Namin et al. (2023), who argue that the perception of authenticity and product safety acts as a modulator of price acceptability.

**Table 2.**

*Acceptable price for 1 kg of honey depending on its country of origin (PLN)*

Honey country of origin	Median acceptable price [PLN]	Standard deviation	Proportion of respondents [%] who would accept a price above PLN 50
Poland	45	8.6	41
UE (np Germany, Spain)	39	7.4	25
Ukraine	32	6.2	14
China	27	5.1	7

Note: Responses of respondents who consider the country of origin when purchasing honey.

Source: Own work.

The research findings indicate that under conditions of market instability, the consumer plays a crucial role as an active participant in the quality-management process. Through their purchasing decisions, consumers influence producers' strategies, including choices related to raw-material sourcing, distribution channels, and pricing policies.

Consumer preferences for domestic honey and the willingness to pay a premium for products from trusted sources align with the emerging body of research on resilient consumption. This concept emphasises the importance of local relationships, supply-chain transparency, and personal engagement in product selection (Stone, Rahimifard, 2018; Frewer et al., 2016).

Given the complexity and non-linearity of contemporary markets, understanding consumer perception patterns and preferences becomes essential for building sectoral resilience. The observed differences underscore the importance of tailored quality communication strategies and adaptive market responses.

The analysis of consumer preferences and price acceptance levels presented above is on observed distribution patterns and descriptive comparisons between identified segments. This approach enables a better understanding of perception diversity and provides a basis for identifying key areas relevant to quality communication and market adaptation.

## **5. Implications for honey quality management under market instability**

The empirical findings and analysis of current market dynamics suggest that effective honey quality management in the BANI context requires a departure from traditional models grounded in stability, linearity, and predictability. Increasing complexity, vulnerability to disruptions, and information ambiguity call for a strategic shift - from operational optimization to building systemic resilience, adaptive capacity, and effective quality communication. This section identifies key areas requiring adaptive interventions to enhance the ability of quality management systems to operate in volatile and unpredictable environments.

### **5.1. Origin transparency and communication as a foundation of trust**

Although consumers declare a strong preference for domestic honey, this is not fully reflected in their awareness of authenticity criteria or recognition of quality assurance schemes. Enhancing origin transparency is therefore a strategic priority. This can be achieved through both digital tools (Treiblmaier, Garaus, 2023; Li et al., 2025) and the development of geographical indications alongside consumer-oriented educational initiatives. As Doherty et al. (2023) argue, the resilience of food quality systems depends not only on formal certification mechanisms but also on societal trust and the legitimacy of production practices.

Transparency should thus be viewed not merely as a regulatory requirement, but as a strategic asset that fosters consumer loyalty and competitive advantage. Modern consumers evaluate product value not solely on physicochemical characteristics, but also on symbolic and narrative meanings linked to origin, packaging, certification, and brand identity. For this reason, quality communication must be coherent and multidimensional.

The use of integrated multichannel communication strategies is essential. These should include traditional product labeling, digital technologies, and a wide range of consumer touchpoints, such as retail environments, e-commerce platforms, social media, and promotional or educational initiatives. These elements, treated as integral components of the consumer experience, play a significant role in shaping quality perception, influencing levels of trust, loyalty, and willingness to pay a premium for products perceived as authentic and valuable (Nguyen, Nguyen, 2025; Tran et al., 2024; Wu et al., 2021).

Practical implementation of these principles may include the use of digital traceability tools, such as blockchain-based systems, which enable consumers to check the origin and production details of honey in real time (Treiblmaier, Garaus, 2023; Li et al., 2025). In addition, tools such as stakeholder mapping or QR codes leading to product information and feedback options can support closer cooperation and build trust between producers and consumers. These solutions strengthen transparency not only as a communication element, but also as an integral part of adaptive and responsive quality management.

Supporting this approach, international comparative studies have confirmed the importance of consumer trust and perceived authenticity in food purchasing decisions. Macready et al. (2020) found that trust in the food value chain varies across European countries and significantly affects consumer confidence. Their results underline the need for culturally sensitive communication strategies and locally adapted quality signaling. Similarly, Wilson et al. (2020), analyzing data from Australia, New Zealand, the UK, and Ireland, emphasized that building trust requires not only transparent information but also credible actors and long-term engagement. These findings support our results, showing that country of origin and the clarity of quality cues play a decisive role in purchasing decisions, particularly under conditions of market uncertainty.

Taken together, these observations underscore a broader principle: transparent origin and strategic communication reflect a core component of resilient food systems – namely, the capacity to build and maintain consumer trust despite exogenous shocks. From a resilience theory perspective, trust-building mechanisms act as buffers, mitigating volatility and strengthening system stability by fostering loyalty and informed decision-making (Folke, 2006; Tendall et al., 2015; Hirth et al., 2025).

## **5.2. Flexibility and resilience as strategic responses to market complexity**

The study reveals distinct consumer segments differing in price sensitivity and expectations related to honey origin and quality. Effective quality management therefore requires a differentiated approach in portfolio design, pricing, and communication. A dual-track strategy may be suitable:

1. Standard products targeting price-sensitive consumers.
2. Premium products tailored to consumers who value regional origin, certification, and authenticity and are willing to pay a price premium.

This approach is also supported in the literature. For instance, Hempel (2024) identifies consumer clusters with varying levels of price sensitivity amid rising food prices. Value-based pricing, in which price reflects the perceived value rather than production costs, provides a sound framework for premium strategies in markets where consumers are willing to pay more for higher-quality offerings (Hinterhuber, 2017; Alberto de Morais Watanabe et al., 2023).

These adaptive strategies resonate with the principles of agile quality management, which prioritizes responsiveness, continuous feedback, and modular decision-making structures (Theobald, Diebold, 2017; Sutar, Wagh, 2025). The empirical segmentation observed in consumer behavior highlights the need for decentralized quality strategies that can flexibly accommodate varying expectations, especially under conditions of high uncertainty and informational ambiguity, characteristic of BANI environments (Stone, Rahimifard, 2018; Skrzypek, 2024).

In the BANI world, the goal is not merely to minimize volatility, but to develop capabilities that enable organizations to absorb, adapt to, and leverage it in strategic decisions. In the honey sector, this includes:

- diversifying raw material sources, including partnerships with apiaries from different regions,
- strengthening internal quality autonomy through the development of proprietary standards and in-house quality control systems,
- adopting proactive risk management practices such as scenario planning, trend monitoring, and flexible decision models (Hobbs, Hadachek, 2024; Pashkevich et al., 2024; Papalexidou et al., 2024).

According to agile quality management principles, quality should be understood not as a static attribute but as a dynamic process of continuous adjustment to changing conditions and stakeholder needs (Theobald, Diebold, 2017). As noted by Stone and Rahimifard (2018) and Banach et al. (2025), flexible and adaptive structures supported by digital technologies such as IoT and AI are becoming essential in managing food quality in globally unstable contexts.

Finally, Skrzypek (2024) underlines the importance of integrating flexible quality approaches with risk management and organizational transformation. Similarly, Olkiewicz, Jarosik-Michalak, and Kozłowski (2024) stress the critical role of leadership in shaping employee behavior and communicating quality values - serving as a core adaptive mechanism in quality management.

## 6. Conclusion

The research findings and contextual analysis of the honey market operating under BANI conditions allow for the formulation of key generalizations regarding future directions in quality management within the apicultural sector.

1. Honey quality, increasingly viewed not solely through the lens of physicochemical parameters but also as a perceptual construct, is shaped by social and behavioral factors. Consumers are demonstrating heightened sensitivity to locality, transparency of origin, and the consistency of communicated quality values.
2. Maintaining competitiveness in a volatile market environment requires producers and distributors to implement flexible quality management mechanisms that account for shifting consumer preferences, diversification of distribution channels, and differentiation in product offerings. Market segmentation strategies, value-based pricing, and the use of advanced communication tools are gaining strategic importance.

3. Effective performance in a complex and unpredictable environment necessitates a paradigm shift in quality management, where resilience and adaptability become key responses to fluctuations in quality perception and changing consumer expectations. Quality management should be understood as a continuous process, integrated with data interpretation, organizational learning, and operational agility.
4. Rebuilding and reinforcing consumer trust must be grounded in the development of traceability systems, transparent supply chains, and the promotion of national and regional quality certification schemes. These elements not only signal market responsibility but also serve as sources of competitive advantage.

In conclusion, operating within the BANI world requires a transformation of traditional quality management approaches in the honey sector - toward more flexible, resilient, and perception-driven models. Producers' ability to integrate market intelligence, anticipate evolving consumer expectations, and communicate quality values effectively is emerging as a critical success factor in navigating economic volatility. These findings underscore the need for further interdisciplinary research on the integration of consumer behavior, quality perception, and resilience-based strategies in food quality management systems. The study's outcomes may serve as a foundation for policy makers, industry stakeholders, and researchers aiming to enhance quality governance in sectors exposed to high levels of complexity and uncertainty.

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