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Research Paper

Coopetition and transparency as strategic pillars on the agri-food and forestry system

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ABSTRACT

This study aimed to analyze the factors of transparency and coopetition in Portuguese agri-food supply chain management, in relation to value creation. The Delphi method was applied to explore the future of the Portuguese agri-food sector over a 10-year time frame (2017-2027). Given the research problem, the Delphi method was chosen as the most appropriate tool to identify and anticipate forecast trends regarding the importance of coopetition and transparency as strategic factors. Three rounds of questionnaires were conducted and analyzed to gather opinions, judgments, and comments from a panel of experts. The findings indicate that it is viable to implement transparency and coopetition strategies that promote access to the "truth" — understood as a set of processes — within each food value chain. This trend reached a consensus rate of 88.6% among the experts, with the responses converging around level 4 on a five-point Likert scale. The development of an industry "transparency manual," supported by different stakeholders, also emerged as a relevant trend, with an 88.9% likelihood of being implemented during the studied period. As for research limitations, it would be important to compare these conclusions with other agri-food contexts regarding coopetition and transparency, and to gather managers' opinions on how to apply such strategies without negatively impacting business performance or profit margins. This research is particularly valuable as it represents the first study in Portugal to apply the Delphi methodology in order to understand the influence of coopetition and transparency strategies as tools to be implemented by all agri-food actors.

Keywords: Agri-food systems, Coopetition, Supply Chain Management, Transparency

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1. INTRODUCTION

Competitiveness in agri-food markets it´s about the ability to add value to the supply chain, that could allow best proximity between farmers and consumers. Transparency implies the involvement of the actors or links in the food value chain, in collaborative work, where information is shared objectively and timely (Hofstede, G. J., 2003). Following these characteristics about transparency, the research goals were defined, as follows: i) "will be possible the Portuguese consumer to have access to the agri-food truth (set of processes) of each value chain:"? and ii) "the Portuguese Agri-food sector will accept a standard of conduct adopted by all stakeholders that could favors total transparency in this sector"?

Transparency is knowing relevant aspects and characteristics of the market, such as the comprehensive product itinerary, food health insecurity, transformation and production processes, the techniques used, among others (Briz, De Felipe, & Briz, 2010).

Paste recent food events has framed various unfavourable crisis, which have influenced consumer trust. Considering Commandré, Macombe, & Mignon, (2021) and Bocco, Garat, & Velarde, (2013), to recover consumer trust on the food sector, it would be important to stimulate the consumption of local products and minimizing the number of intermediaries.

In other hand, based on Min, Zacharia, & Smith, (2019), those trends are pushing the agri-food companies to restructuring and rethinking of the food supply chain, namely based on the following aspects: serving micro segments for personalized customization, additive manufacturing, and the adaptation of technological advances.

The coopetition strategy can be considered as a management tool that generates possible business advantages that derive from synergies due to economies of scale and other risks, such as higher costs (Luo 2007; Gnyawali and Park 2009, 2011; Osarenkhoe 2010), research and development actions (Walley, 2007) and access to knowledge and other resources (Bengtsson & Kock, 2000; Akdoğan Cingšz, 2012).

This research paper has the following structure: i) introduction where were presented the main topics and the research objectives; ii) literature review, iii) methodology, iv) findings, v) conclusions and vi) limitations and future research.

2. LITERATURE REVIEW

2.1 Supply and Demand Chain in agri-food sector

As pointed by Shalini (2023), the traditional agriculture systems of production and consumption have several social, economic, and environmental implications.

Skalkos, (2023) explored the importance of sustainability across the agri-food Supply Chain and pointed out that the concept "from farm to fork" as a holistic approach to the production and consumption of food, could be consider as a key dimension for the sustainability and progress of all industry.

According to Rojas, Rivera, & Peña, (2024) and Singh, et al., (2024), seeking to manage the barriers that affect agri-food chains, it would be important to solve problems like, insufficient risk management, timely government schemes, transparency and traceability, inadequate infrastructure.

An assertive and timely response from the agri-food sector to address these challenges will help avoid the imbalance between demand and supply (Bhat & Jõudu, 2019; Manglaa, et al., 2018).

Grzybowska (2021), presents a link between supply chain management and global changes. Three key trends in supply chains were identified for three components of global changes: the digital supply chain to support Industry 4.0; the resilient supply chain to counteract unforeseen events (such as Covid-19); and the sustainable supply chain to support, among others, the positive behaviour of producers and consumers.

Given this environment, the commitment of the agri-food sector to serve the new consumer, provide sufficient and timely information on processes and products, considering adopting digital systems as part of its strategy and operation is implicit (Caiazzaa, Bigliardib, & Barbara, 2020).

2.2 Strategic Marketing in agri-food chain

Various studies provide some practices to face these new challenges on the agri-food sector, such as the optimization of decision-making in the production and storage of agri-food products that allow for improved profits (Chen, Chen, Lin, & Zhuang, 2021); application of Social Responsibility practices in agri-food companies increases economic performance (Sgroi, Donia, Franco, & Mineo, 2020); reducing food waste, through the transformation of by-products or recycled food (Lu, Parrella, Xu, & Kogut, 2024); local Agri-Food Systems based on Agroecology (ALAS) (López & González de Molina, 2021).

Within the web marketing strategy in the agri-food industry, four main pillars are recognized: i) monitoring consumer (user) behaviour with the application of software, ii) the virtual context based on the generation of websites, such as community portals, *wikis* and communication *sites* with the purpose of promoting the reciprocal exchange of ideas and values, as well as stimulating cooperation, iii) customer relationship management, and, iv) creation of brand value, a competitive advantage for an agri-food company (Rosa Caiazzaa, Bigliardib, & Barbara, 2020).

A study shows that willingness to pay, perception of traceability, trust, perceived risk, and perceived security are critical variables that influence consumer perceptions of food tracked with blockchain technology (Reitano, Pappalardo, Selvaggi, Zarba, & Chinnic, 2024). Regarding the circular economy applied to food waste, *i.e*. recycled food, studies show that consumers expressed positive associations towards them, as well as the role of attitude, perceived usefulness, and acceptance of the technology behind food recycling; (Aschemann, Asioli, Banovic, Perito, & Peschel, 2023; Hellali & Korai, 2023).

2.3 Transparency in agri-food system

Some studies suggest using a digital tool to simulate agricultural processes from the farm to the consumer, helping to estimate various indicators like economic, logistical, environmental, safety, and nutritional aspects of food orders (Guidani, Ronzoni, & Accorsi, 2024; Zarbá, Chinnici, Matarazzo, Privitera, & Scuderi, 2024).

Transparency in supply chains serves as a mechanism to realize several advantages associated with information sharing. These benefits include the acknowledgment of responsibility within the process, the assurance of a transparent supply chain, the enhancement of consumer trust, the practical application of corporate tools, and the accessibility of information regarding the environmental impact of food processing (Hobbs, 2004; Wadhwa et al., 2010; Egels and Hansson, 2015). As supply chains become larger, more complex, and decentralized, the interest of companies and *stakeholders* in transparency increases (Kashmanian, 2014).

Transparency supports sustainable production practices aimed at minimizing food and resource waste, ensuring that information flows seamlessly from the producer to the consumer (Astill et al., 2019). Hofstede (2002) defined the transparency of a network chain as the extent to which all *stakeholders* have a shared understanding and access to product-related information without loss, noise, delays, or distortions.

Transparency in supply chains facilitates access to timely and significant information on products, regarding their origin, processing, sustainable production, minimizing food and resource waste, allowing accessible information from the producer to the consumer (Astill, et al., 2019).

According to Caro, M.P., (2018), technology could help to improve the traceability of the agri-food systems, especially on a blockchain-based traceability system, such as specifically, on the "from farm to fork" project. The system, named AgriBlockIoT, integrates Internet of Things devices to collect and share data throughout the supply chain. This could result in more transparency, trust and efficient agri-food chains.

The adoption of Blockchain Technologies (BCT) in traceability systems in the agri-food sector is increasing due to its contribution to the development and implementation of a reliable, transparent, and decentralized system, where real-time decision-making and monitoring are enabled by automated processes. The application of this technology is most common in meat, dairy products and milk, and fruits and vegetables. It also offers benefits to food supply chains, such as Walmart and Carrefour, the case of tuna from New Zealand, and wheat from China (Bosona & Gebresenbet, 2023; Kraft & Kellner, 2022).

2.4 Coopetition

Companies adopt “paradoxical”, “complex” and “counterintuitive” relationships of both cooperation and competition, defined as coopetition relationships, to cope with the complexity of the economic environment and institutional pressures for sharing resources and skills, and innovating (Rabii, B. and Cyrine, B., 2024).

According to some authors, such as Gast et al, (2015) and Morris et al, (2007), it can be analysed from the joint point of view, in which the fusion between cooperation and competition forms a new type of strategic relationship between companies (Dagnino and Padula, 2002). It is a concept that emerged in 1996, proposed and studied by Brandenburger and Nalebuff in their book '*Co-opetition: a revolutionary mindset that combines competition and cooperation in the marketplace*'. Nevertheless, many studies about coopetition have focused on large multinationals (Dagnino and Padula 2002; Dussauge et al. 2000; Kanter, 1994). In the context of Small and Medium-Sized Enterprises (SMEs) and start-ups, the concept of coopetition remains underdeveloped. Reenforcing the idea about the need to discuss around the coopetition strategies on (SMEs), according to Granata, J., et al. (2018), there are some important stages to implement this strategy to achieve a better business performance. Some of them are related to management flexibility and

the capability related to the stakeholder's involvement. The example of the Pic Saint-Loup wine producers union represents a coopetition strategy among several competing.

Coopetition can occur between direct competitors, companies that complement each other and even between suppliers, since the competition is both for the market and for broader benefits (Brandenburger & Nalebuff, 1996; Bengtsson & Kock, 2014).

Above all, cooperation offers small businesses the possibility of reaching certain markets that they would not otherwise be able to access on their own. It is justified that, under a cooperation strategy, small organizations will also be able to access markets where leadership does play among large companies (Morris et al. 2007).

As noted by Ammirato (2021), establishing a collaborative and sustainable agri-food sector necessitates the development of robust shared networks.

3. METHODOLOGY

One commonly employed research method for identifying consumer trends is the Delphi technique. Following Linstone and Turoff (1975) this technique can be assumed as a method of structuring a group communication process, so that the process is effective in allowing a group of individuals to confront a complex problem.

Historically, the Delphi method originated in ancient Greece, where the oracle at Delphi provided insights about the future to those seeking advice (Gupta & Clarke, 1996). The Delphi methodology focuses on achieving a consensus of judgmental opinions and perspectives from a group of experts (Dajani et al., 1979). This method is used to gather opinions, insights, and perspectives from experts on specific topics, issues, or themes to better support decision-makers (Dalkey & Helmer, 1963). The Delphi method has been applied in various scientific fields, including education, technology, and other sectors (Cornish, 1997). It is considered a long-term forecasting technique based on the collective opinion and expertise of a panel of experts (Gupta & Clarke, 1996). According to Fowles (1978), the original Delphi process emphasizes three main factors: i) expert feedback, ii) structured information flow, and iii) anonymity, ensuring that each expert participant remains unaware of their peers' identities.

It is defined as "a method of structuring an effective group communication process, allowing a group of individuals to deal with a complex problem as a whole" (Linstone & Turoff, 1975, p. 3).

The literature identifies various types of Delphi studies, notably the classification proposed by Van Zolingen and Klaassen (2003), which encompasses three distinct categories: the classic Delphi, the policy Delphi, and the decision Delphi. The classic Delphi is characterized by five features: anonymity, iteration, controlled feedback, group statistical response, and stability in expert responses. The Delphi method has its primary application has focused on predicting future scenarios in different sectors, among which is the Education sector (López, 2018, Maxey & Kezar, 2016) in the Health sector Spina et al, (2023); Palomino, et al, (2018), logistics Von der Gracht & Darkow, (2010), in Business, Egfjord and Sund, (2020), transportation, Linz, 2012; Mason & Alamdari, (2007) and energy, Celiktas & Kocar, (2010;) and in food industry sector, Antonelli et. al, (2022); Bañuelos et. al., (2021); Mariani et al, (2021); Gonzales et al, (2019), Chamorro et al, (2012), Real H., Dias, R., R., & Graça, P., (2020).

Building upon the research work of Dias and Nogueira (2018), this study employs the Delphi method to forecast agri-food trends in Portugal over the forthcoming decade. Due to the intricate nature of the research problem, the Delphi method was selected for its efficacy in generating predictive insights through iterative questionnaires that collect and analyze expert opinions, judgments, and feedback (Brady, 2015; Gupta & Clarke, 1996; Hanafin, 2004).

The Delphi method has been extensively utilized in agri-food research. For instance, it has been employed to predict the role of blockchain in traceability management within the agri-food sector (Aldrighetti et al., 2021), evaluate the sustainability of food systems and diets in the Mediterranean region (Allen et al., 2019), and forecast scenarios for the fresh tomato industry in Italy and Germany (Bazzani & Canavari, 2013). Additionally, it has been used to develop a sustainability assessment tool for integrated food/non-food systems (Mullender et al., 2020), assess country-of-origin labeling for processed foods (Su & Canavari, 2018), and predict technology and innovation trends in southern Europe’s agri-food sector (Archontakis & Anastasiadis, 2019).

3.1 Panel selection criteria

According to Brockhoff (1975), and about the optimal number of experts, even small groups, as few as four, can perform effectively. Conversely, Powell (2003) emphasizes that the representativeness of the panel is more dependent on the quality of the experts rather than their quantity. Three criteria were used to select the experts: i) professional backgrounds, ii) involvement in innovation and trends, and iii) direct engagement in the agri-food sector.

As detailed in Table 1, each expert's profile and origin was meticulously evaluated.

Table 1. Delphi Experts Panel Profile and Origin

Experts CODE	Organization	Expertise
AD	Cor de Tangerina	Culinary Arts. Vegan Specialist. Slow Food Advocate.
D.A	AgroPortal - Former Secretary of State for Rural Development	Agri-food Policy. Trends Analysis. Communication Strategies.
J.C:M	Manager, Department of Science and Natural Resources, Municipal Chamber of Funchal - Madeira Island	Agri-food Policy. Trends Analysis. Communication Strategies. Production Systems. Agroecology. Organic Farming.
P.G	FCNAUP - Faculty of Nutrition and Food Sciences, University of Porto	Nutrition Researcher. Mediterranean Diet Specialist. Dean of Oporto Nutrition Faculty. Slow Food Advocate.
N.R	ICBAS - Institute of Biomedical Sciences Abel Salazar, University of Porto	Animal Production. Agri-Food Systems Research. Dairy Products Specialist. Animal Laboratory Manager.
CMB	Porto University	Pro-Rector. Trends Analysis. Marketing. Innovation. Food Advisor.
A.G	Porto University	Logistics and Supply Chain Specialist. Researcher. Business Advisor. President, Institute of Science and Innovation in Mechanical and Industrial Engineering.
P.B	Porto Business School	Trends Analysis. Technology. Digital Specialist.
T.S	Vida Económica - Agro Newspaper	Opinion maker. Supply and Demand in Agri-food Sector. Agri-Food Current Affairs from Business, Academic, and Public Sectors.
A.S	Herdade Freixo do Meio	Production, Agroecology, Trends Analysis. Slow Food Advocate. Agri-food Business Specialist.
F.A	Food Advisor	Production Specialist. Small Producers Market Manager. Retail Experience.
M.R	Casa Adega - Restaurant	Culinary and Cooking Specialist.
L.P	Naturalfa	Certification. Production and Market Experience.
O.A	SONAE – Club Produtores	Research Experience. Innovation and Agri-food Trends. Retail Experience.
P.R	AMAP - Association for the Maintenance of Proximity Agriculture	Permaculture. Organic Farming Specialist. Urban Ecology Production. Sustainable Agriculture Business Knowledge.
V.G	Casas da Li	Culinary Arts. Slow Food Advocate. Tourism Entrepreneur. Coordinator, Portuguese Chef Alliance Project.
O.E	Slow Food Algarve	Mediterranean Diet. Slow Territories Specialist. Alternative Food Production.
L.A	Cantinho das Aromáticas	Entrepreneur. Organic Farming. Urban Ecology Project. Herbs and Seasonal Plants Specialist.
M.R	Alivetaste	Food and Wine Writer. Food Critic.
J.F	AGROBIO	President, National Organic Association. Public Policy Specialist. EU Agriculture Programs Knowledge.

Experts CODE	Organization	Expertise
H.R	APN - Portuguese Nutrition Association	General Secretary, National Association of Nutritionists. Mediterranean Diet Specialist. Researcher. Food Trends and Tourism.
H.P	Slow Food Association	Slow Food Specialist. Earth Markets. Lecturer. Researcher.
J.M	Slow Food Convivium – Minho	Slow Food Specialist. Ark of Taste Project
J.L.R	IPAM and UTAD	Researcher. Slow Food Advocate. Technology Specialist.

*From the first invitation to the final round.

Experts' perspectives were evaluated using a 5-point Likert scale, gauging their concurrence or dissent about 20 sentences. The scale ranged from 1 ('highly improbable') to 5 ('highly probable'). The construction of the assertions concerning the philosophy dimension (Table 2) was deliberated prior to the final questionnaire. The current study was executed through three successive rounds of surveys. An initial round was conducted to achieve two primary objectives: i) to assess the level of self-knowledge of each expert and ii) to gather new insights and opinions from the experts. This final step enabled the inclusion of additional sentences on the subsequent rounds. Consequently, the Delphi survey was crafted using both the literature review and predominantly the knowledge provided by each expert.

Table (2) presents the two statements related to competition and transparency.

Table 2. Philosophy Statements

Statement Number	'Philosophy' Dimension Statements
16	"The Portuguese consumer will have access to the truth (set of processes) of each food value chain: plant and animal **through agri-food co-creation and coopetition**."
17	"Agri-food and pastoral marketing will have a standard of conduct adopted by all stakeholders that favors total **transparency and access to information**."

Source: Own elaboration, 2024

A quantitative analysis was conducted using statistical measures, specifically the mean, standard deviation (SD), and coefficient of variation (CV). According to Toppinen et al. (2017), quantitative analysis in Delphi studies was employed to ascertain the central tendency of responses and evaluate the level of consensus or disagreement.

As noted by Dajani et al. (1979), Delphi studies necessitate a predefined stopping criterion based on the consensus level. This research utilized two dispersion statistics: the standard deviation (SD) and the coefficient of variation (CV). In Delphi literature, a CV value of 0.5 or lower is commonly accepted as an indicator of consensus (Milli & Zúñiga, 2001).

To assess the stability of responses, changes in the relative CV between the three rounds were examined, as suggested by Mili and Bouhaddane (2021). Statements with lower levels of consensus were included in subsequent rounds for re-evaluation. Table 3 delineates the CV range values used to measure the degree of consensus.

Table 3. Consensus Levels in the Study

Coefficient of Variation (CV) Range	**Consensus Level**	**Decision for Next Round**
$CV \leq 0.15$	High consensus	Accepted. Proceed to Second Round
$0.16 < CV \leq 0.3$	Moderate consensus	Accepted. Proceed to Second Round
$0.31 < CV \leq 1$	Low consensus	Rejected. Proceed to Third Round

Source: Own elaboration, 2024

3.2 First round/pre-round

As previously noted, this round was designed to measure the expert's self-knowledge and to get insights from them concerning the study phenomenon.

Respecting the anonymity, which is one of the most important aspects to consider on this methodology, according to K., Dmitry (2023) is crucial for enhancing the objectivity of Delphi outcomes as it mitigates groupthink, the "halo effect" (a cognitive bias where one's overall impression of an individual influences the perception of that person's actions or statements), and the coercion on individuals to alter their viewpoints. Anonymity during data collection also enables panellists to express opinions that might otherwise be deemed unpopular or unconventional and facilitates the modification of their responses without the concern of reputational loss. In this study it was used the personal emails of each expert.

3.3 Second Round - Initial Feedback

Descriptive statistics were used, and decisions according to the acceptance or rejection of statements were made using the coefficient of variation. No significant differences in this coefficient were observed between rounds, with some statements showing a CV change of less or at 0.5%. This met the stability criterion proposed by Milli and Zúñiga (2001) reinforcing the opinion of Gracht, (2012) which refers that a coefficient of variation of 0.5 or lower is considered a threshold that signifies acceptable internal consistency. This stopping "parameter" was used and allowed the process to be concluded. Subsequently, all experts were invited to compare their individual responses with the panel's average.

3.4 Third Round and Final Feedback

As anticipated, the final round exhibited a lower level of standard deviation compared to the second round. This outcome indicates that one of the primary objectives of the Delphi methodology was achieved, as the study began with a considerably higher standard deviation, which is typical in such studies.

4. FINDINGS

Regarding the first analysed statement - "*the access of the Portuguese consumer to the truth (set of processes) of each food value chain: plant and animal basis, through agri-food co-creation and coopetition strategies*", the experts reached a high level of consensus (CV=11.4%). They estimated that achieving transparency in agri-food systems requires companies to adopt co-creation and coopetition marketing as a strategy to promote transparency.

The majority (66.6%) of opinions were centred on the fourth position of the Likert scale, "agree" level. Additionally, 20.8% supported this trend, indicating strong agreement. This trend aligns with conclusions from several studies, such as Hofstede (2002).

Based on some empirical studies results, particularly about the trend illustrated in figure 1, six principal dimensions of transparency in the agri-food sector have been identified. These dimensions include: i) consumer trust and confidence, ii) food safety and quality, iii) sustainability and ethical practices, iv) regulatory compliance, v) market differentiation, and vi) technological integration. The adoption of transparency strategies in the agri-food sector is essential for fostering consumer trust, ensuring food safety, promoting sustainability, adhering to regulatory standards, achieving market differentiation, and enhancing traceability using technologies such as blockchain. The figure underscores the significance of transparency, particularly through co-creation marketing strategies, with a substantial majority (88.6%) indicating a strong trend.

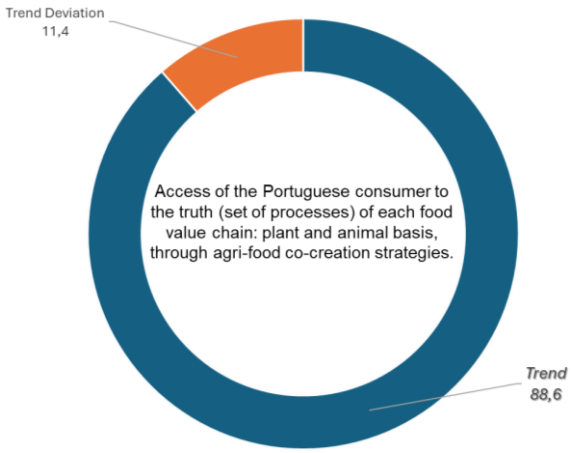

Figure 1. Transparency information/Consumer

Source: Own elaboration, 2024

Regarding the second statement evaluated by the Delphi panel, the results indicate that this trend is likely to occur within the studied timeframe (2017-2027) achieved a CV of 11.1%, which is a strong indicator that this could be realized.

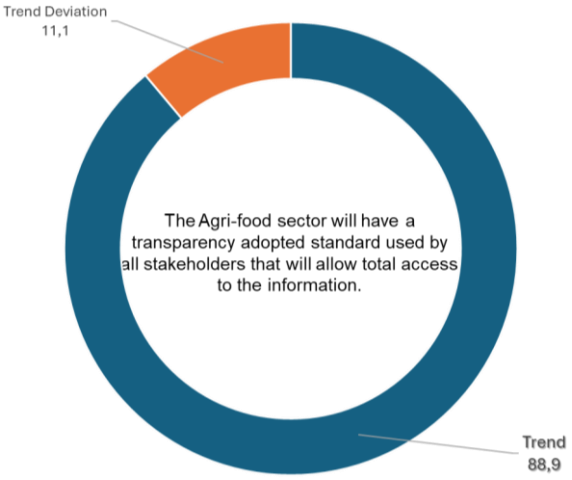

Figure 2 . Transparency/Agri-food sector Standard

Source: Own elaboration, 2024

To enhance trust in Portuguese agri-food information, it is essential to involve the consumer perspective through agri-food co-creation strategies. An exemplary model is the French dairy company "*C'est qui le patron, la marque du consommateur*." By adopting coopetition strategies, agri-food companies can complement each other, including their suppliers, to improve

management performance and achieve market benefits, as highlighted by various authors. The figure above (2) underscores the importance of transparency in the agri-food sector, with a significant level of CV (88.9%) indicating a strong trend towards its adoption. The mean reveals that this statement garnered slightly stronger opinions towards the "totally agree" Likert scale (5), with 25% of the experts in this level. This trend aligns with the perspectives of Brandenburger and Nalebuff (1996) and Bengtsson and Kock (2014), who argue that coopetition strategies can enhance market positions and yield significant benefits.

Coopetition strategies can leverage this trend by fostering collaboration among competitors to enhance transparency, improve food safety, promote sustainability, ensure regulatory compliance, drive innovation, and integrate advanced technologies. These benefits contribute to a more resilient and trustworthy agri-food system.

The adoption of coopetition strategies can balance competitive pressures meanwhile engaging in collaborative practices in the agri-food sector requires a strategic approach.

5. CONCLUSION

The way of the policymakers could help the national agri-food-sector transparency in Portugal, should be structure as follows: i) define clear objectives establishing specific goals for the transparency framework. Clear objectives provide a roadmap for implementation and evaluation, ensuring that all efforts are aligned towards common targets. For instance, improving traceability allows for better tracking of food products throughout the supply chain, enhancing food safety by quickly identifying and addressing contamination issues, ii) promote *stakeholder* engagement, involving all relevant agents in the policy process will be essential for creating comprehensive and inclusive strategies. *Stakeholders* such as farmers, producers, consumers, and regulatory bodies bring diverse perspectives and expertise, which can enhance the quality and acceptance of the transparency framework, iii) resource allocation. Adequate resources are vital for the successful transparency implementation. Financial support, technical assistance, and capacity-building programs are necessary to equip *stakeholders* with the tools and knowledge required to comply with transparency standards. Proper resource allocation ensures that the framework is not only theoretically sound but also practically feasible.

In today's information society, transparency remains a global issue across various economic sectors. Moreover, the establishment of a national transparency strategy could involve several key

components. First, it would require the development of standardized protocols for data collection and sharing. This could be facilitated by leveraging advanced BCT, which can provide a secure and immutable record of transactions throughout the supply chain.

Secondly, the strategy should include comprehensive training programs for all agents to ensure they understand the importance of transparency and how to implement it effectively. This could involve workshops, seminars, and online courses designed to "educate" managers.

Third, the strategy should promote collaboration among *stakeholders*, encouraging them to work collaboratively together, to achieve common goals.

Nevertheless, the success of the transparency strategy should be regularly monitored and evaluated. In addition to transparency, the concept of coopetition can also play a crucial role in agri-food sector. Coopetition can lead to shared resources, innovation, and improved market positioning. By working together, companies can tackle common challenges, such as sustainability and supply chain efficiency, more effectively than they could alone.

The integration of transparency and coopetition strategies can create a synergistic effect, enhancing the overall performance. Transparency builds trust and accountability, while coopetition fosters innovation and resource optimization. By following these principles, policymakers can create a robust and effective national transparency framework that benefits all stakeholders in the Portuguese agri-food sector.

6. LIMITATIONS AND FUTURE RESEARCH

There are some limitations on this study that should be acknowledged. Firstly, empirical validation will be essential on Portuguese framework transparency guidelines to ensure the effectiveness and applicability of proposed strategies. Studies have demonstrated that empirical data is crucial for understanding the real-world impact of policies. Transparency in the agri-food sector is vital for enhancing consumer trust and ensuring compliance with regulatory standards. Developing a new standard based on a transparency index, as proposed, could be the "step" for a new agri-food age. This should involve benchmarking methodologies and comparing results across different regions.

It would be important consider in future research about transparency and coopetition strategies, other examples were important to consider for evaluating the practicality and potential success of proposed solutions. These studies should consider technical, financial, environmental and social

factors to provide a holistic assessment. An iterative approach, involving continuous refinement, can help implement effective transparency.

It would be valuable to gather insights from agri-food sector managers regarding the implementation of transparency standards. Conducting in-depth interviews could provide a understanding of how to implement coopetition strategies without incurring information losses or business disruptions.

Future research could explore the following question: "How can a new transparency standard, be designed and implemented by all Portuguese agri-food stakeholders?"

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