IMPACT OF NATURAL DISASTER ON CONSUMER BEHAVIOUR: ITALIAN CASE OF XYLELLA FASTIDIOSA

Angelo Corallo
University of Salento, Lecce, Italy
angelo.corallo@unisalento.it
ORCID: 0000-0001-5216-5366

Maria Elena Latino[1]
University of Salento, Department of Innovation Engineering, Lecce, Italy
mariaelena.latino@unisalento.it
ORCID: 0000-0001-8686-5109

Marta Menegoli
University of Salento, Department of Innovation Engineering, Lecce, Italy
marta.menegoli@unisalento.it
ORCID: 0000-0002-6771-509X

Fulvio Signore
University of Salento, Department of Human and Social Sciences, Lecce, Italy
fulvio.signore@unisalento.it
ORCID: 0000-0003-4046-7353

Abstract

Purpose: Natural disasters can influence the consumer behavior overtime. These phenomena have the potential to undermine socio-economic systems of an entire industry or country, as happened in Italy, since 2013, with the advent of phytosanitary emergence caused by Xylella Fastidiosa infection in olive trees. This study deepened the reaction of consumers to a stressed socio-economic system in the real context of the Italian phytosanitary

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1   Corresponding author: Maria Elena Latino
Mail address: mariaelena.latino@unisalento.it

emergency to provide marketing and policy insights, based on stimulus-response model.

Methodology: Data of 637 Italian respondents were collected through a quantitative survey and interpreted with different hypotheses performed with Structural Equation Modeling to detect a causal model. Different variables were measured, such as willingness to buy, social influence and other.

Findings: The results show that of the various factors hypothesized, only the social ones influence the willingness to buy olive oil. On the other hand, the model turns out to be non-significant as a function of the effect of personal and cultural influence factors.

Originality: The current study is the first to interpret the impact of the Xylella phenomenon from the perspective of implementing socio-economic strategies, rethinking marketing lines of action capable of capturing sustainable modes of action. Implications for academic, marketers, agribusiness and policy makers were discussed.

Keywords: Consumer behavior, Xylella fastidiosa, marketing, SEM, climate change

JEL index: M20, M31, O13

1. Introduction

In the last decades, many studies have focused on how marketing systems reacted to situations beyond the normal, be they natural, economic, social or cultural disasters (Iacobucci, 2019). The single-case nature of these events makes investigating these phenomena for theory development and testing difficult. Thus, the significance of the policies put into practice, the strategies adopted, and the social, cultural, and individual adjustments made to respond to new demands and situations and incorporate them into the planning of future events, becomes apparent (Baker, Hill, Baker, & Mittelstaedt, 2015). Layton (2011) proposed a diagram in which the major issues that marketing academics have commonly discussed are depicted: the two-dimensional diagram suggests random events or emergent, structured and purposeful approaches on the x-axis and micro, meso, and macro phenomena on the x-axis (Figure 1). This diagram suggests a reflection on the nature of the most frequent studies in the literature. In fact, whilst the four corners of the figure are deemed to be well populated with studies by marketing specialists, economists, and other social scientists, the cross within (the "macro-cross") consists of topics that are still relatively unexplored. Several disasters were taken into consideration as themes for the macro-cross because they can serve as the basis for new macro knowledge that can be used to assess the efficacy of ad hoc actions or to develop management plans for emerging problems (Iacobucci, 2019).
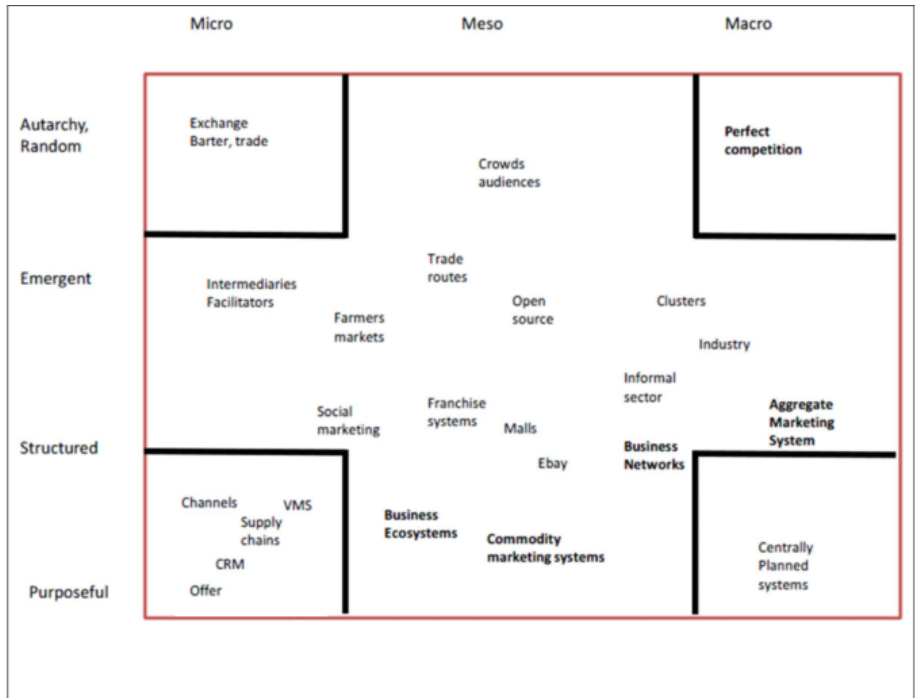
Figure 1: Marketing Systems and "Macro Cross", figure retrieved from (Layton, 2011) and adapted by (Peterson, 2016)

In this regard, Guion, Scammon, & Borders (2007) and Leonard & Scammon (2007) for Hurricane Katrina, Baker, Hunt, & Rittenburg (2007) and Baker & Hill (2013) for tornado-related consequences, and Shultz, Burkink, Grbac, & Renko (2005) and Manfredo & Shultz (2007) for post-war recovery marketing strategies are a few examples of these studies. Furthermore, (DeLorme, Zinkhan, & Hagen, 2004) and (Sneath, Lacey, & Kennett-Hensel, 2009) studies explored how the consequences of a natural disaster have effects in terms of both impulsive and compulsive buying behaviour, as well as disorientation, loss and threat. Finally, the study of (Septianto, Nasution, Arnita, & Seo, 2022) explored the role of advertising in emotional response to natural disasters.

Amongst other problems, climate change caused an increase in biological invasive species that insist on agricultural environments (Raven & Wagner, 2021). These transformations of the landscape, which often cause greater damage than natural effects, led to the proliferation of species that are harmful to certain plants, such as olive trees. Since the 2013, brought about the emergence and growth of one of the biggest socio-economic emergencies for entire agricultural sectors worldwide: the Xylella Fastidiosa infection (Vurro, Bonciani, & Vannacci, 2010). One of the countries hardest hit by this emergency, and one

that makes oil production and marketing one of its cornerstones, is Italy. As described in the appendix, this emergency is generating significant impacts on the country's economic and productive system.

System reaction to extraordinary events could be crucial for marketers to discover strategies to adjust to the typical changes that occur in the environment (Kotler & Caslione, 2009), as strategic planning process must adapt in step with the environment's changing nature (Peterson, 2016). Accordingly, various elements have an impact in determining stress conditions of marketing systems (e.g., environmental problems, culture, political models, geography, and time). Consumers choices drive market dynamics, influencing supply and demand, pricing, competition, and innovation. Therefore, knowing the factors that condition consumer choices in stressed systems allows businesses to anticipate market trends, identify emerging opportunities, and tailor products, services, and marketing strategies to meet consumer demand effectively, nourishing at the same time the resilience of businesses during stressing condition. The extant knowledge about consumers behaviour dynamism analysis within stressed markets does not provide evidences about the factors able to influence agri-food products consumers' willingness to buy. Positioning itself in that research route, and trying to fulfil the above mentioned gap, that studies disastrous events that developed and deepened already, this research intends to investigate how a stressful condition, such as the phytosanitary emergence caused by Xylella fastidiosa event, capable of causing catastrophic economic and social consequences, influenced the olive oil consumer willingness to buy, based on the stimulus-response consumer behaviour model.

The manuscript is organized as follow: after a brief introduction on the role of the consumer behaviour in marketing strategy, the hypotheses were developed. Then, in materials and methods section, procedure and sampling were deepened, as well as the performed analysis through quantitative measures. The results obtained, furthermore, enhanced a structured discussions on the model and the outcomes. The manuscript ended with implications and conclusion, limits and follow up.

1.1. A brief description of the economic impact of Xylella Fastidiosa

The infection inflicted heavy losses on the economies of several countries. Indeed, the infection was reported in countries such as France, Portugal and Spain, in Italy, the consequences thereof proved devastating (Schneider, Mourits, van der Werf, & Lansink, 2021). Specifically, Apulia, one of the Italian regions with the highest concentration of centuries-old olive trees and where the pathogen spread most frequently, experienced serious negative effects in terms of culture, architecture, landscape and nature, as well as tourism (Saponari, Giampetruzzi, Loconsole, Boscia, & Saldarelli, 2019).

Based on the estimates by the International Olive Council, in 2022 Italy is the second country in the world for olive production (beyond Spain), with 315 thousand tonnes of product and a growth of 15% compared to the previous year. In this context, Italy's leading oil-producing region is Apulia, with 161,551 tonnes of Apulian oil produced by processing

olives from the olive tree (estimated data from Ismea-Unaprol for the year 2021). This data underling the impact that the infection is having on the entire business system. Therefore, due to the Xylella Fastidiosa infection, olive trees have localized desiccation of branches and twigs as well as some marginal or apical necrosis of the leaves, which progresses to cover the entire leaf blade. Because infected olive trees do not have leaves until the rainy season (late autumn), it is easy to spot the damaged branches, which at first are sparse and solitary. The afflicted branches ultimately become more numerous and larger, affecting significant areas of the foliage. Seasonal changes limit the growth of the entire plant, and finally the olive trees quickly wilt and die. Italian agribusinesses deal with the production and transformation of olives in oil are putting on their knees conditioning the evolution of the market (Authority (EFSA), 2020). According to Schneider, Mourits, van der Werf, & Lansink (2021) the spread of the disease, simulated through models based on climatic-suitability and radial expansion of the invaded territory (Italy, Greece, and Spain), have the potential to drastically impact on the national socio-economic conditions. Following the Schneider et al. (2021) forecasting economic model, the spread of Xylella Fastidiosa infection in Italy will impact, over 50 years range from 1.9 billion to 5.2 billion Euros for the economic worst-case scenario, in which production ceases after orchards die off. If the possibility to replanting resistant plant varieties (such as leccine olive trees (Vergine et al., 2019) will be considered and implemented along the damaged territory, the impact ranges decrease from 0.6 billion to 1.6 billion Euros. The current guidelines for facing Xylella Fastidiosa phytosanitary emergence and therefore supporting agribusinesses, proposed by EU regulatory measures, included the creation of an infected zone and buffer zone; the eradication of infected or symptomatic plants in the infected zone; the establishment of agricultural practices to prevent the presence and reduce vector population and the planting of specific crops in the infected zone. These measures were then implemented locally by the administrators of the Apulia Region, who established the eradication of infected olive trees to spare the still free regional areas, thus reducing the vector population of the organism, and developed powerful communication and information campaigns, with effects on numerous stakeholders.

2. Literature review and hyphoteses development

Consumer behaviour has a significant influence on marketing strategy and is important for the product success (Arora & Sahney, 2018; Deliana & Rum, 2017; East, Singh, Wright, & Vanhuele, 2022); therefore, marketing strategy must be determined by analysing consumer behaviour to understand what customers want. Delving into the factors and circumstances that may contribute to favouring/limiting the purchase of products becomes central to the implementation of marketing strategies. According to several authors, the fundamental tenet of marketing is client/consumer well-being (Iacobucci, 2019; Sirgy, 2021). The consumer becomes an important social player in the contemporary society. To

understand the needs of various consumer target groups and how their behaviour is influenced by various micro- and macro-environmental factors, it is essential to understand consumer behaviour. This will help researchers to identify the factors that will impact on consumers' purchasing decisions (Ahmed, Su, Rafique, Khan, & Jamil, 2018; Sirgy, 2021).

Different consumption models enabled to establish how strategic social, personal, and cultural factors are in determining and predicting purchasing behaviour. Therefore, several authors demonstrated how the joint consideration of different aspects is important, such as those inherent to social influence (e.g., family), personal influence (e.g., age, gender) and cultural influence (e.g., geographical origin) (Carrete, Castaño, Felix, Centeno, & González, 2012; Dekhili, Crouch, & El Moussawel, 2021; Kotler & Armstrong, 2012). Within the present study, emphasis was placed on a theory developed to identify the most important factors in determining purchasing behaviour. Specifically, Kanagal, (2016) extended a general theory, the stimuli-response model, that brings together several insights capable of explaining and predicting the processes of purchasing decision and behaviour (Kotler & Armstrong, 2012). According to the holistic viewpoint of marketing, the attention to consumer is an essential element in guaranteeing an improvement in the business performance (Ngo, 2023). In fact, devising campaigns and strategies to inform, involve and even include in the processes themselves, identifying the characteristics of the individual consumer, becomes a tool for also realising mechanisms for improving the advertising and marketing campaigns of a product (Kshetri, Dwivedi, Davenport, & Panteli, 2024; Ushakova, Hrabovskyi & Szymczyk, 2023). According to this model, consumer behaviour and decision-making process is tied to cultural, social, and personal factors, as confirmed by several authors both in agri-food and in other industries (Pantano, 2011; Bravo, Cordts, Schulze, & Spiller, 2013; Berbel-Pineda, Palacios-Florencio, Santos-Roldán, & Ramírez Hurtado, 2018; Ma, Li, & Zheng, 2022; Tomić, Leković, & Tadić, 2019; Melnyk, Carrillat, & Melnyk, 2022). Social factors refer to how reference groups, family and social roles influence consumer behaviour. A person's reference groups are all groups that have a direct (face-to-face) or indirect influence on his/her attitude. Some of these are primary groups with which the person interacts continuously and informally, such as family, friends, and colleagues. A large part of the literature on consumer behaviour has focused on this aspect. For example, Bravo, Cordts, Schulze, & Spiller (2013) found that influences on consumer behaviour are determined by family communication, which is also a precursor to consumer socialisation behaviour, family decision-making and intergenerational influences. Furthermore, social norms, influence, and shape consumer behaviour, at a level that is independent of time and cultures of origin (Melnyk, Carrillat, & Melnyk, 2022). Shen & Chen (2020) highlighted how this influence is significant and decisive even in the purchase intentions of innovative products, such as artificial meat. Therefore, the first hypothesis was defined:

H_1: *social influence affected the willingness to buy.*

According to Ma, Li, & Zheng (2022), personal factors, such as gender and age, have an impact on the purchasing behaviour and willingness to buy of sustainable agri-food products (also for online purchase). The study by Hervé & Mullet (2009), placed in the

context of clothing products, showed how age also plays a key role in determining purchase choice. For younger participants, the low price was a sufficient reason to influence the purchase; for older participants, the suitability of the product was the most important factor, while for the oldest participants, durability played the most crucial role. This trend was also confirmed in tourism, where the study by Tomić, Leković, & Tadić (2019) found that travel destinations also depend on age and family structure. Thus, the second hypothesis was specified:

H_2: *personal factors (age and gender) affected the willingness to buy.*

Another widely studied factor in influencing purchasing behaviour and willingness to buy is culture. It invokes extremely broad and transversal definitions: in this study we will limit ourselves to saying that among the various aspects that influence the purchase of a product are cultural sub-aspects that are linked to the territories to which they belong. Pantano (2011) found that cultural aspects, including image and regional influence, are among the elements that most influence product purchase choices. Berbel-Pineda, Palacios-Florencio, Santos-Roldán, & Ramírez Hurtado (2018) also identified a direct causal relationship between land of origin and consumer shopping intentions, thus confirming what is summarised by Kotler & Armstrong, (2012) and Kanagal, (2016). Consequently, the last hypothesis was defined:

H_3: *cultural factors affected the willingness to buy.*

3. Methodology

The purpose of the study is to analyse the consumer response to the stimuli represented by the phytosanitary emergency due to Xylella Fastidiosa. Data were retrieved in the period between March to June 2020 and detected, through an ad hoc questionnaire, the willingness to buy olive oil products during the emergency. therefore, the investigation aims to verify the resilience of one of the founding elements of marketing systems, namely consumer behaviour, as influenced by personal, social, cultural factors.

3.1. Procedure and sampling

Participants in the research, contacted through appropriate surveyors, expressed their consent to data processing and to participate in the study. The survey was carried out on a sample selected with probabilistic procedures, composed of 637 Italian regular olive oil consumers. In relation to the study sample, 56.2% of the subjects (358) were female and 43.8% (279) male. In terms of geographical area, 54% of the respondents were from central-southern Italian regions (25% central, 159 subjects, and 29% southern, 185 subjects), while 46% were from the north (16% north-east, 102 individuals, 30% north-west, 191 individuals). Finally, the average age was 44.2 years, with a Standard Deviation of 14.2, and in a range covering ages from 18 to 75 years.

3.2. Analysis and measures

The survey was conducted using a validated questionnaires, which were tested in their statistical efficacy and reliability through appropriate indices, as Cronbach's alpha (α) and McDonald's omega (ω) (Creswell & Creswell, 2017). Once the replicability and statistical goodness of the variables involved were verified, the relationships were studied by means of Structural Equation Models (SEM) and through Multigroup Analysis (MGA) to determine the moderating role of geographical background.

Specifically, to test the influence of qualitative factor (gender and regional belonging) on quantitative dependent variable (willingness to buy), parametrical T-Test and Multigroup Analysis were performed. T-Test enables the averages of two different groups to be compared by indicating whether the difference between them is statistically significant (Gallucci, Leone, & Berlingeri, 2017), while Multigroup Analysis provides a way of establishing whether certain structural relationships between two variables, estimated by SEM or PLS-SEM, are different as a function of a factor, and whether these differences are statistically significant (Hair Jr, Hult, Ringle, & Sarstedt, 2021). Aimed at exploring the role of cultural factors on willingness to buy, the qualitative factor of regional belonging was explored by splitting the dataset in two different groups: north Italian consumers (46%, 293 individuals) and central-southern Italian consumers (54%, 344 individuals).

The variables investigated by the questionnaire (with a Likert scale from 1 = Not at all agree to 7 = Totally agree) were:

- Personal factor, measured by the quantitative variable age (quantitative) and gender (qualitative).
- Social influence, measured by 3 items adapted from Armitage & Conner (1999) with reliability = 0.96. Example: "*According to their experiences, my friends think that I should consume Apulian oil produced after the spread of Xylella*".
- Cultural factor, measured through the expression of geographical origin coded as North and Centre-South.
- Willingness to buy, measured through three items adapted from Armitage & Conner (1999), with reliability = 0.95. Example: "*I will inquire to buy Apulian oil produced after the spread of Xylella*".

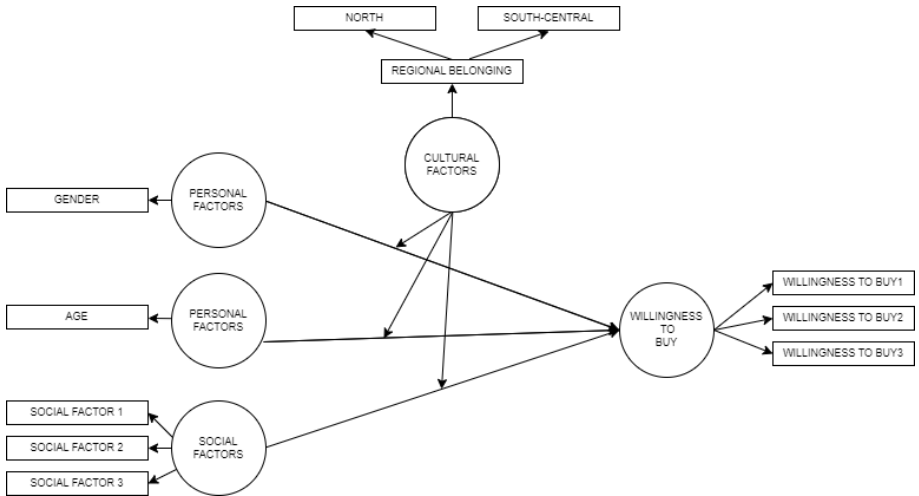Figure 2 summarizes the hypothesized model.

Figure 2: The hypothesized model

4. Results

The hypothesised SEM enabled to find out whether the research hypotheses could be confirmed or not. The measurement model shows how the different manifest variables can be regarded as good indicators of the latent ones (Iacobucci, 2010). The variable age was measured with a single item, while a Multigroup Analysis was performed to highlight the impact of cultural factors with the classification factors north and south-central. Convergent validity was confirmed as the Average Variance Extracted of all latent variables exceeds the value 0.50 (Hair Jr et al., 2021).

The relationships tested in the structural model showed that only social factors (β_1 = 0.65, p < 0.001, CI: [0.61; 0.75]) had a significant influence on the willingness to buy. In contrast, personal factors such as age (β_2 = -0.04, p = 0.196, CI: [-0.01; 0.00]) do not appear to be significant predictors of buying behaviour (β_3 = -0.04, p=0.267, CI: [-0.11; 0.03]). The variance explained by the latent variable buying behaviour is around 43.1%. The fit indices of the overall model were satisfactory: in particular CFI = 0.96, TLI = 0.95, SRMR = 0.033, RMSEA = 0.093, CI: [0.084; 0.102] (Kline, 2016).

the hypothesis 2 with a twofold procedure: the role of gender toward willingness to buy was tested by means of a comparison of averages performed by means of a parametric T-test and a Multigroup Analysis. The results show substantial similarity in purchasing behaviour in both the male and female gender. The subsequent T-Test revealed a non-significant difference between women ($\text{MEAN}_{\text{WOMEN}}$ = 3.98, MEAN_{MEN} = 4.05) and men in willingness to buy (p = 0.568, mean difference = -0.07)

Table 1: Mean for women and men in willingness to buy behaviour

		N	MEAN	SD
Willingness to buy	WOMEN	358	3.98	1.46
	MEN	279	4.05	1.43

The analyses were further developed to test the role of cultural background with respect to willingness to buy. Therefore, a MGA was performed, where the general model was split and deepened according to geographical origin (Hair Jr et al., 2021).

Table 2: MGA and coefficients for south-central and north sample

	South-central		North	
Relationships	**Social Factors → Willingness To Buy**	**Age → Willingness To Buy**	**Social Factors → Willingness To Buy**	**Age → Willingness To Buy**
β	0.66	-0.02	0.60	-0.08
Lower	0.62	-0.01	0.50	-0.01
Upper	0.81	0.01	0.71	0.00
p	< .001	.633	< .001	.092

As the Table 2 clearly shows, the only significant relationship in the hypothesised model concerns the one testing the impact between social factors and willingness to buy. although the coefficients are very close in terms of intensity ($\beta_{\text{SOUTH-CENTRAL}}$ = 0.66, p < .001, β_{NORTH} = 0.60, p <.001), this relationship is more important in consumers from Southern Italy. Moreover, as also verified in the results presented for the previous model, age do not seem to influence the willingness to buy, even as a function of geographical origin.

5. Discussion

The present study intends to align itself, according to the perspective expounded by Iacobucci, (2019), with the in-depth study of phenomena that have (had and will have) the capacity to trigger changes in complex systems, including marketing systems, to which experts in the field must find solutions (Kotler & Caslione, 2009). Therefore, starting from the assumption that phenomena of enormous magnitude and with important consequences (natural disasters, wars, pandemics) have obvious consequences on consumer behaviour and thus on marketing models (Hakim Masmoudi, Jmour, & ElAoud, 2022; Ngo, 2023), the study focused on how a phenomenon of significant importance, the phytosanitary emergence due to Xylella Fastidiosa infection, led to changes and insights into consumer welfare in Europe and the whole world. Specifically, the aim was to test how a complex model of

explaining the genesis of purchasing behaviour, particularly with regard to personal, social and cultural factors (Kotler & Armstrong, 2012), also had an impact in marketing systems under stress. The results obtained from the case study of Italian subjects, and thus immediately affected by the social and economic consequences of the Xylella Fastidiosa emergency, showed that of the three factors postulated by stimuli-response model (Kanagal, 2016; Kotler & Armstrong, 2012), only social influence (Risselada, de Vries, & Verstappen, 2018) seems to have influenced the willingness to buy Apulian olive oil post-Xylella. Focusing on the social factors investigated in this study, we found that the opinion of family, friends and colleague lead the consumer to choose Apulian olive oil produced after the spread of Xylella Fastidiosa. Therefore, the relational and social contexts closest to the life of the single consumer were the most significant ones.

In contrast to what was predicted and studied in different research, the personal factors of age and gender (Hervé & Mullet, 2009; Ma et al., 2022; Tomić et al., 2019) did not impact on the willingness to buy. Similarly, cultural factors (Pantano, 2011) such as geographic origin did not represent a watershed factor in determining the willingness to obtain the product.

There is therefore an urgent need to rethink models for explaining context-specific consumer behaviour. Marketing strategies focused on the perception of product safety, for example, could be useful in reinforcing the role of social factors in determining product choice and purchase (Sharma & Silal, 2023). In fact, as hypothesised in the meta-analysis developed by (Ekici, Genc, & Celik, 2021), a fruitful substrate of marketing intervention, inherent to the food and agriculture aspect, concerns food security and food safety regulations, which might be able to feed more effective marketing strategies, in terms not only of micro-contexts, but also of broader dimensions.

6. Implications

From the theoretical implications' viewpoint, this study is in line with those aimed at testing whether certain extraordinary circumstances (such as natural disasters) can influence the validity of "traditional" marketing models, with obvious implications in the field of marketing. Therefore, the research enriches this field exploring whether a phytosanitary emergency created conditions of stress in the economic and social system in question, leveraging on the Xylella Fastidiosa emergency in the Apulian region and focusing on the impact that the stressed condition generate on the consumer behaviour.

Since, in the chosen context, the part of stimuli-response marketing model based on the influence of social, personal, and cultural factors on consumer behaviour was found to be unable to correctly describe the change during an emergency period. Thus, this study revealed the need to focus the effort of the research in marketing to define new models (or improving the existing) capable of supporting researchers and practitioners in analysing consumer behaviour under stressed and extraordinary conditions of the system in which

they act. Achieving this objective may offer useful tools for the study of marketing. Hence, this investigation offered further insights to the need of expanding the knowledge when systems are influenced by external and uncontrollable factors.

From practical implications viewpoint, the retrieved findings could be helpful to marketers, agribusiness and policy makers to comprehend how specific events could influence the society reshaping the market. Specifically, our findings provide useful suggestion in the establishment of marketing campaigns. Marketers and agribusiness, in promoting the olive oil post Xylella Fastidiosa, need to act on the social factor of the consumer. For example, it could be interesting for an olive oil company understand in the networks of consumers who is the person capable of influencing others with the opinion on the product. Advertising and promotion strategies could be redesigned and reinforced with the aim of acting on the influencers, generating a cascade effect on a wider target of consumers. Social network and sentiment analysis could provide an interesting support in these kinds of strategies, especially for those companies that adopt the web and social networks to promote their food products. This includes, also, the possibility of choosing a testimonial of the product (or influencer according to the modern viewpoint) by creating strategies that can make him or her become a member of the consumer's social network. Looking to a business context made of small companies, strictly related to the territorial elements, another winning strategy could be word of mouth. Although, this is often considered a spontaneous event, agribusiness and marketers can design strategies focused on triggering this mechanism such as social currency (e.g., inviting to share on social network the shopping and consumption experience) or stimuli (e.g., associating the product/brand with a trigger that consumer will often encounter).

7. Conclusion, limitations and direction for future research

The investigation performed in this paper attempts to fit within that research gap that lies inside the macro-cross hypothesised by Layton, (2011). In particular, the specific attention is focused on verifying the importance of specific factors (social, cultural, personal ones), crucial in marketing models, in implementing the willingness to buy within stressed systems. Therefore, at the best of the authors' knowledge, although some studies have already embarked on the road of studying how natural or human-induced disasters shaped and transformed marketing systems and consequently also decision-making plans, there are yet no such in-depth studies on the consequences of the Xylella Fastidiosa infection, which originated from substantial natural changes. The impact that this emergency had on Italy, and particularly on the southern economic areas of the country, affected society and how society impacted on marketing systems. According to the obtained results, the impact of factors that usually have an influence on purchasing behaviour does not seem to be in line with what is theorised in the literature. Specifically, considering, as extensively treated by (Kanagal, 2016; Kotler & Armstrong, 2012), social factors (influence of

the systems closest to the consumer), cultural factors (geographical origin) and personal factors (gender and age) as determinants of buying choice, in the case of systems stressed by the consequences of the Xylella Fastidiosa infection, only the social ones seem to be important. The lack of significance of the other factors, therefore, appears to point to the strategic importance of the local analysis of the context in which these systems became "stressed", thus not considering general models as sufficient to explain crucial processes such as those linking seller and consumer. The explanation of behaviour can only be fully understood, evoking suitable decision-making models, by studying the characteristics of the systems that have been altered or changed. There is therefore a need to identify models for explaining behaviour that are best suited to contingent situations.

The study clearly presents limitations which must be addressed to extend the validity of the results. First, although the sample of individuals involved was probabilistic, the measures are predominantly self-report, and thus susceptible to flexibility. For this reason, it is possible that a desirability bias may occur in the answers, which may ultimately provide results that differ from reality. One way to overcome this problem could be to use more objective measures that are less prone to individual vulnerabilities in future studies. Furthermore, given the local nature of the study, it might be interesting to extend it to other countries affected by Xylella Fastidiosa infection to understand whether the structural relationships between identified variables are geographically specific or not. Finally, the study is cross-sectional in nature, so causal relationships need further investigation in longitudinal studies.

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