



**11th Annual Conference of the  
EuroMed Academy of Business**

**Research Advancements in National and Global Business  
Theory and Practice**

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**Published by:** EuroMed Press



# **11th Annual Conference of the EuroMed Academy of Business**

CONFERENCE READINGS

BOOK PROCEEDINGS

September 12-14 2018

Valletta, Malta

## **Research Advancements in National and Global Business Theory and Practice**

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All full papers and abstracts submitted to the EMRBI Conference are subject to a peer reviewing process, using subject specialists selected because of their expert knowledge in the specific areas.

ISBN: 978-9963-711-67-3

Published by: EuroMed Press



## FOREWORD

The Annual Conference of the EuroMed Academy of Business aims to provide a unique international forum to facilitate the exchange of cutting-edge information through multidisciplinary presentations on examining and building new theory and business models for success through management innovation.

It is acknowledged that the conference has established itself as one of the major conferences of its kind in the EuroMed region, in terms of size, quality of content, and standing of attendees. Many of the papers presented contribute significantly to the business knowledge base.

The conference attracts hundreds of leading scholars from leading universities and principal executives and politicians from all over the world with the participation or intervention of Presidents, Prime Ministers, Ministers, Company CEOs, Presidents of Chambers, and other leading figures.

This year the conference attracted about 200 people from over 35 different countries. Academics, practitioners, researchers and Doctoral students throughout the world submitted original papers for conference presentation and for publication in this Book. All papers and abstracts were double blind reviewed. The result of these efforts produced empirical, conceptual and methodological papers and abstracts involving all functional areas of business.

## **ACKNOWLEDGEMENT**

Many people and organizations are responsible for the successful outcome of the 10th Annual Conference of the EuroMed Academy of Business. Special thanks go to the Conference Co-Chairs Prof. Vincent Cassar and Prof. Frank Bezzina and the University of Malta, for accomplishing an excellent job.

It is acknowledged that a successful conference could not be possible without the special co-operation and care of the Track Chairs and Reviewers for reviewing the many papers that were submitted to this conference. Special thanks to the Session Chairs and Paper Discussants for taking the extra time to make this conference a real success.

The last but not the least important acknowledgment goes to all those who submitted and presented their work at the conference. Their valuable research has highly contributed to the continuous success of the conference.

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# **BOOK OF CONFERENCE PROCEEDINGS**

## IRRADIATED FOODS BETWEEN CONCERN AND ACCEPTANCE IN THE ITALIAN MARKET

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### ABSTRACT

Consumers have always shown a marked concern for the novel technologies. The treatment of foods with ionizing radiation, not entirely new, has always been a major concern among consumers for the impact that the consumption of treated food could have on health. The aim of this paper is to investigate Italian consumer attitudes towards the irradiated food and in particular the perceived risk and the acceptability of these technology. A survey was carried out in Italy by administering an on-line questionnaire to a sample of 392 consumers. The results of the study highlight a low level of knowledge of food irradiation, often associated with nuclear radiation and doubts about the effect that the consumption of irradiated food can have on human health. Moreover, there is a marked need, expressed by interviewees, to acquire more information on the technology and the benefits that can be obtained. This study has some political, managerial and ethical implications.

*Keywords: Food irradiation, Attitudes, Food safety, Consumer behavior, Novel technologies.*

### INTRODUCTION

In recent years, several case of food contamination of food, such as dioxins and BSE, have negatively affected the consumers' behavior and have resulted in a major loss of confidence in food products, resulting in a contraction of the demand (Rosati and Saba, 2004). To respond to the need of food safety, many processing methods have been developed for example to prevent food spoilage and raise safety by providing better guarantee to the consumers, among these drying, smoking, salting, pasteurization, canning, freezing, refrigeration, chemical preservatives, and food irradiation (Agrios, 2005).

Food irradiation is a physical treatment of food with energy ionizing radiation, that produces the same benefits as when it is processed by heat, refrigeration, freezing, ore treatments with chemicals (Parlato et al., 2014). The process is useful to improve food safety, inactivating micro-organisms, virus, bacteria and insects, increase food security, reducing the speed of ripening, spouting and aging of fruits and vegetables contributing to reduce food losses and wastage, and offer an opportunity as

phytosanitary treatment for food moving across international or national borders (Lima Filho, 2016; Parlato et al., 2014; Roberts, 2014; Fan and Sommers, 2013).

The multiple benefits of food irradiation have been recognized by international bodies (World Health Organization, Food and Agricultural Organization, International Atomic Energy Agency), but the commercial application of this technology is still limited because of potential risks perceived by consumers. In particular, food irradiation technology is particularly widespread in the United States and in several Asiatic countries (Eustice, 2018). In the European Union (EU) the use of this method, regulated by the Directive 1999/2/CE of the European Parliament and of the Council of 22 February 1999, is very uncommon as emerge by the small quantity of foodstuff irradiated in the year 2015 in the EU countries, which amount to 5,685.9 tons (EU, 2016). The main reasons of the low utilization of the food irradiation technology in the EU countries is the lack of proper knowledge of such technology among consumers, processors and distributors. As emphasized by Nayga et al (2005) the awareness about the nature and benefit of food irradiation led to positive changes in consumers' perception affecting their decision to buy irradiated food.

In this context takes on fundamental importance the learning of the level of knowledge and consumers' acceptance of food products treated with ionizing radiation taking into account that the understanding of the benefits produces and the acceptability of this food technology is crucial for the development and strengthening of the same process in the food industry. With this in mind, the aim of this paper is to investigate Italian consumers attitudes towards the irradiated food and in particular the perceived risk and the acceptability of these products.

## LITERATURE REVIEW

The consumer acceptance of novel food technologies or new products and the public perception of risk and trust in information associated to them may be important discriminants of consumer reaction and are crucial for the assertion of these innovations. Analyzing a range of food technologies, emerging worldwide in food production, processing and preservation, several authors show that not all of these are equally accepted by consumers (Frewer et al., 2011; Siegrist, 2008). Among the novel food technologies, food irradiation has drawn attention of scientist and several studies have been conducted to explain through empirical evidences the consumer awareness and concerns about irradiated foods showing different results. These studies have been mainly focused on the analysis of the consumer knowledge, opinions, neophobia, thoughts related to food treated with ionizing radiation. As emerge from the economic literature, consumers' knowledge about the irradiation technology depend on several factors both demographics and related to the geographical area in which the consumers live. Resurreccion et al. (1995), through a direct survey conducted in the Metro-

Atlanta area in USA on a sample of 446 consumers, found that 72% of the respondents had heard of irradiation, but 87.5% of these consumers didn't know much about this technology. Similar investigations conducted in other countries show, on the contrary, that the consumers' knowledge about food irradiation is very low. Gunes and Takin (2006) for example on a sample of 444 Turkish consumers show that only 29% of them were aware of irradiation. Junqueira-Goncalves et al. (2011) found that only 33.5% of 497 consumers in Chile had heard of irradiation as a treatment for food preservation. A similar result has been obtained by Rosati and Saba (2004) in the Italian market and more recently by Lima Fihlo et al. (2016) in their empirical survey carried out in a small city located in Brazil. The lack of knowledge of the treatment of food with ionizing radiation is to be put in relation to the insufficient information about this technology, which leads to a negative perception of the irradiated products. Most consumers who do not know the process or who have little knowledge of it, show greater uncertainty about safety of the irradiated food and often believe that irradiated foods become radioactive and have harmful compounds (Resurreccion et al., 1995; Resurreccion and Galvez, 1999; Gunes and Takin, 2006; Ornellas et al., 2006; Behrens et al., 2009; Junqueira-Goncalves et al., 2011; Lima Fihlo et al., 2016). Therefore, the central role that can have a correct information on the perception and attitudes of consumers towards irradiated foods emerges. Precisely for these reasons, as pointed out by Behrens et al. (2009) the terms "Cold pasteurization" could be more widely accepted by consumers than irradiation. Therefore, the central role that can have a correct information on the perception and attitudes of consumers towards irradiated foods emerges. Indeed, as found Junqueira-Goncalves et al. (2011) almost all respondents reveal that they might become consumers of irradiated food if they would know that this process increase food safety and does not causes short term and/or long terms health problems. Consistent with those, Gunes and Takin (2006) and Pohlmann et al. (1994) highlight that after having informed the consumers about the food irradiation benefits the willingness to buy tends to increase.

Several studies show that while the willingness to pay (WTP) and the actual purchase are affected by the information related to the safety and by the handling instruction on package label and appearance, the intention to purchase is mainly influenced by the demographic characteristics. An empirical investigation conducted in Texas in 2001 on a sample of 270 consumers show that are the woman that reveal a greater WTP for irradiated beef because they consider food irradiation as an assurance of safety and quality. This finding is inconsistent with that obtained by Rimal et al. (2013) according to which woman showed a higher level of concerns about food irradiation and are less likely to buy irradiated products such as beef. In addition, studies show that educational level and the monthly family income positively affect the attitudes of consumers towards irradiated foods and the

intention to purchase (Resurreccion et al., 1993; Resurreccion et al., 1995; Gunes and Takin, 2006; Rimal et al., 2013).

An interesting thing that emerges from the economic literature about the food products treated with ionizing radiation is linked to the consumers' perception of the "Radura" symbol on the label of the marketed products. Resurreccion et al. (1995) show that 81% of the USA consumers considers the information contained in the label of great importance, although approximately half of consumers considers that the "Radura" symbol is inadequate to inform the consumers that the food has been irradiated. Furthermore, if on one hand, as emerged in the study of Junqueira-Goncalves et al. (2011), this symbol gives to the consumers the sensation of confidence and safety, on the other hand, the same is considered by consumers as a warning, influencing the willingness to pay for products treated with radiation (Nayga et al., 2004).

## **DATA COLLECTION AND SURVEY INSTRUMENT**

A survey was carried out in Italy to analyze the attitudes of consumers living in Italy towards food treated with ionizing radiation. Data have been collected by administering an on-line questionnaire to a sample of 392 consumers. Respondents have been invited to participate to this survey through an e-mail and a message promoted through the most important consumer associations operating in Italy. Even though it is an on-line survey, the number of the respondents reflects the distribution of the resident population in all 20 Italian regional capitals.

The survey was carried out between January and March 2018. The questionnaire administered was structured in three sections. The first, includes a series of questions aimed to analyze the perceived risk of consumers related both to the novel technologies and the use of additives and others substances in the open field that feed concerns among consumers. In the second section we collect several information in order to understand the level of knowledge of irradiated food, the perceived risk associated to the consumption of food products treated with this technology, and the acceptability of these products after a brief description of the potential benefits offered by the irradiation process. Several questions were measured on a five-point Likert scale, where 1 means "Strongly disagree" and 5 "Strongly agree". Finally, the last part includes all variables concerning the socioeconomic features of the interviewees, such as age, gender, education, number of household members, employment, and monthly household net income in euros.

## **RESULTS AND DISCUSSION**

### *4.1. Profile of the respondents*

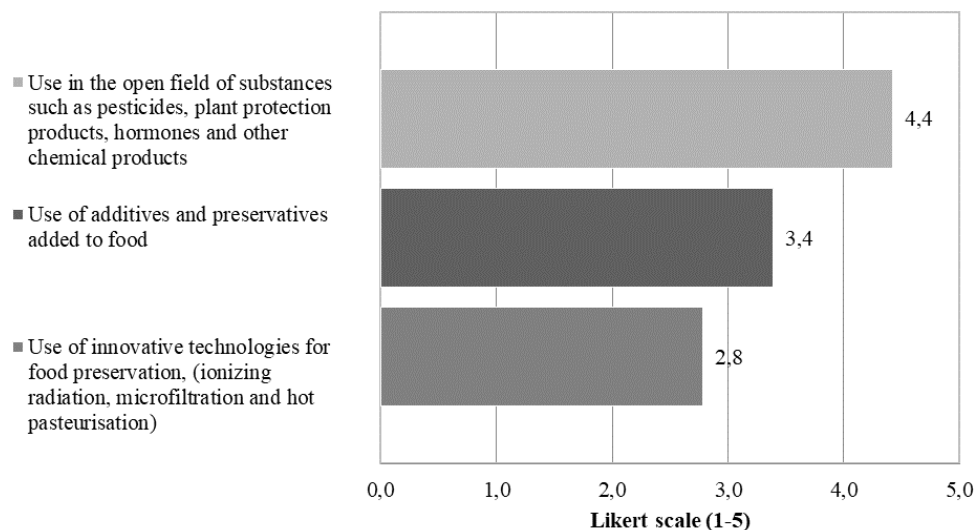


The survey was carried out in Italy and a total of 392 interviews were completed. The numbers of male and female participants in the survey exactly the same (50% respectively) and represented a wide range of age categories. In particular, most participants were between 25 and 44 years (52.3%), is part of a household of 4 people (38.0%), have a higher level of education taking into consideration that 57.9% of the respondents have a degree or a second level master degree. As regards their occupation, the majority of the respondents are employed (44.1%), while only 17.9% were students. In terms of monthly family income 40.1% of the respondents have an income between one thousand and two thousand euros.

#### 4.2. Consumer risk perception and knowledge and attitudes towards irradiated food

The majority of consumers (69.6%) associate the food risk to the food products treated with chemical fertilizers and harmful to health, while 30.4% associate the food risk to the food products with additives and preservatives in quantity higher than normal. In particular, is the use in the open field of substances such as pesticides, plant protection products, hormones and other chemical products during the production and processing phases to determine a greater perception of health risk by respondents (4.4), followed by the use of additives and preservatives added to food (to color, preserve or improve the appearance, taste, color and smell of the product) (3.4) (Figure 1). On the contrary, the use of technologies for foods preservation, such as ionizing radiation, microfiltration and hot pasteurization, is perceived as less negative by consumers (2.8).

**Figure 1 – Consumers risk perception**

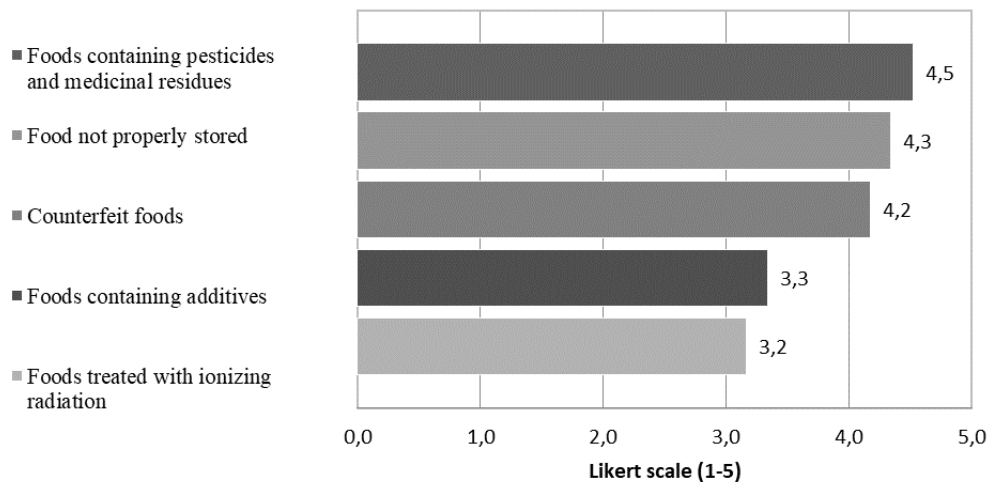


Source: Our elaboration on collected data

The main concerns expressed by respondents and therefore the highest levels of risk are found for foods containing pesticides and medicinal residues (4.5), for those not properly stored (4.3) and for counterfeit foods (4.2) (Figure 2). In contrast, consumers do not consider foods containing additives and those treated with ionizing radiation particularly worrying for health. Our findings are consistent

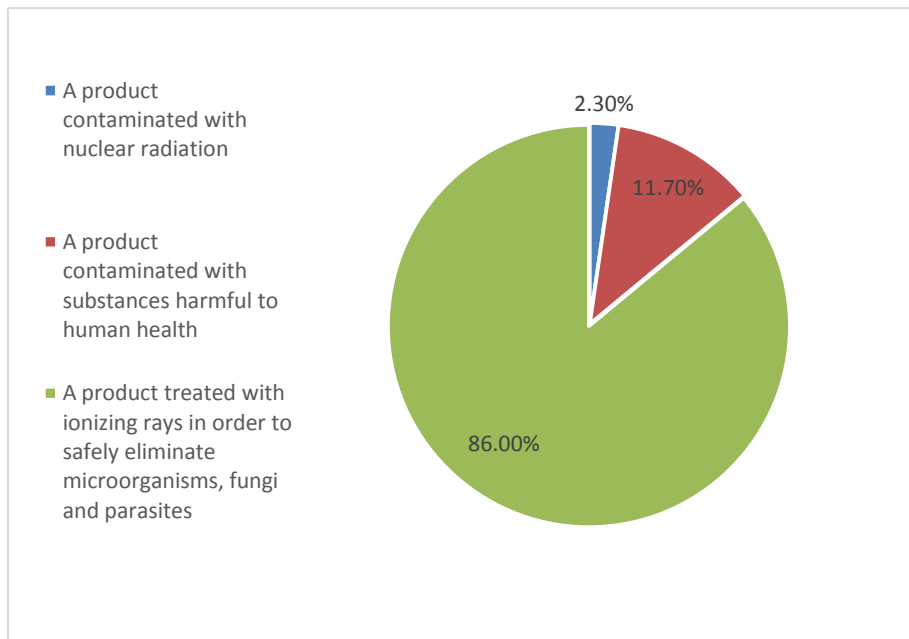
with the results of Resurreccion et al. (1993), Resurreccion et al. (1995) and Lima Fihlo et al. (2016) according to which consumers have some level of concerns for problems linked to the pesticides, hormones, bacteria, than irradiation.

**Figure 2 – Risk perception and typologies of products**



Source: Our elaboration on collected data

84.2% of the Italian respondents did not know of treatment processes of food products with ionizing radiation and 83.2% of them is not aware that in Italy are sold food products previously treated with ionizing radiation. The low level of consumer's knowledge about food irradiation has been revealed in several empirical researches (Gunes and Takin, 2006; Junqueira Goncalves et al., 2011; Rosati and Saba, 2004; Lima Fihlo et al., 2016). 62 respondents who know the treatment of food products with ionizing radiation, are mainly resident in the Southern Italian regions, are part of households with an average of 4 members, and have a high level of training. Although there is a low level of knowledge of the treatment of food products with ionizing radiation, 86.0% of the respondents affirm that these are products treated with ionizing rays in order to safely eliminate microorganisms, fungi and pests for human health (Figure 3). On the contrary, 46 respondents (11.7% of the total) said that they are product contaminated with substances harmful to health and only 9 respondents (2.3%) replied that it is a product contaminated with nuclear radiation. Several studies showed that often consumers associate food irradiation to radioactivity, cancer, and nuclear accidents (Resurreccion et al., 1995; Resurreccion and Galvez, 1999; Gunes and Takin, 2006; Ornellas et al., 2006; Behrens et al., 2009; Junqueira-Goncalves et al., 2011; Lima Fihlo et al., 2016).

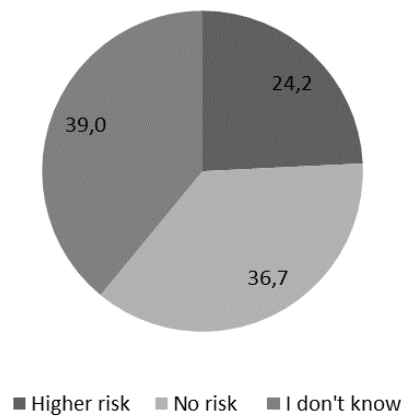
**Figure 3 - Interpretation of the concept of product treated with ionizing radiation**

Source: Our elaboration on collected data

The low level of knowledge on the treatment is also reflected on the knowledge of the symbol included on the label of the marketed products. In fact, as emerges from the survey, 85.2% of respondents do not know the symbol "Radura".

In order to understand the effect of a greater knowledge of the treatment of food products with ionizing radiation on the acceptability and attitude of consumers towards irradiated foods, in a special questionnaire box, the technology and benefits that can be obtained in terms of food safety and food security were presented. After acquiring this information, the majority of consumers (39%) show a certain degree of uncertainty about the effect that the consumption of irradiated foods can have on human health in the long period (Figure 4). 36.7% of respondents, however, do not associate the consumption of products irradiated with problems for human health. On the other hand, 24.2% of respondents perceive such products negatively, so much so that they believe that the long-period intake of irradiated products can cause problems for human health. Several empirical evidences emphasize that if the consumers is informed about food irradiation benefits, their willingness to accept and by irradiated food tends to increase (Gunes and Takin, 2006; Pohlmann et al., 1994).

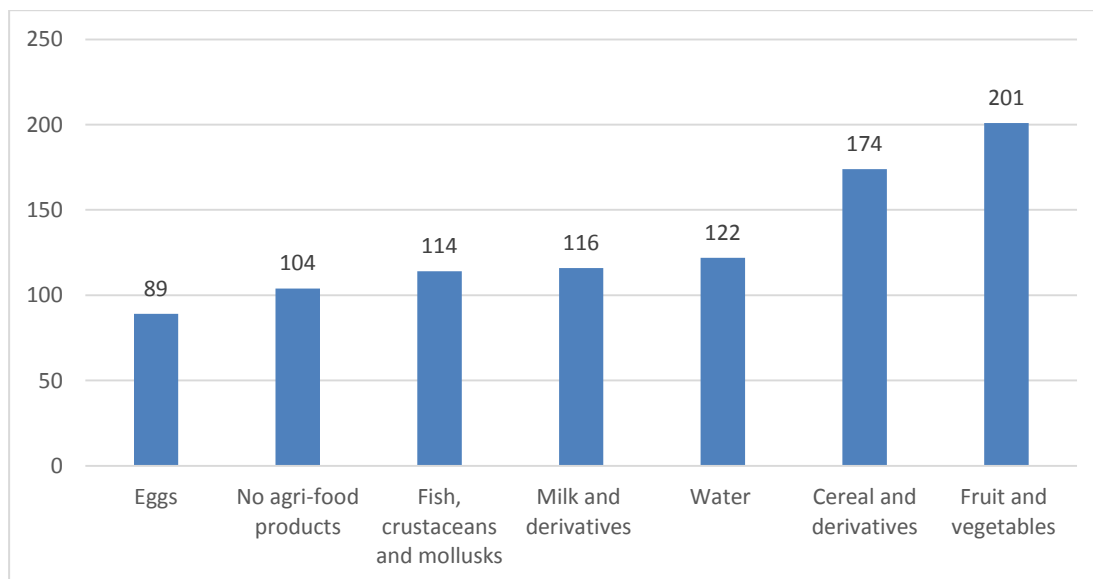
**Figure 4 – Risk perceived for irradiated food consumption**



Source: Our elaboration on collected data

The level of uncertainty prevalent on the possible impact on human health of irradiated foods means that 26.5% of respondents, despite having acquired information on the benefits produced by the treatment, would not buy any irradiated food product. This is the case of consumers with a secondary school mainly and with a medium-low income level. The remaining 288 respondents say they would be willing to consume if treated with ionizing radiation, fruit and vegetables (69.8%) and cereals and derivatives (60.4%), followed by meat (44.1%), water (42.4%), milk and derivatives (40.3%) and fish, crustaceans and mollusks (39.6%) (Figure 5). The product that consumers would be less willing to consume with the knowledge that it was treated with ionizing radiation are eggs (30.9%).

**Figure 5 - Products that consumers would be willing to buy with the knowledge that they were treated with ionizing radiation**



Source: Our elaboration on collected data

89.5% of the Italian respondents believe that, taking into account the benefits of the irradiation technology, an effective awareness campaign is necessary. Indeed, our findings show that 89.3% of the respondents is interested in acquiring more information on agro-food products treated with ionizing radiation and 95.4% of them is interested to have more information on how to recognize a treated product than conventional foods products. 93.1% of the respondents is interested in a better understanding of the differences between the different food technologies. Therefore, a clear informative need emerges from the interviewed subjects. In fact, 88.5% believe that the introduction of elements that lead back to the treatment of products during production processes is fundamental in the labels of fresh and processed products.

Lastly, the interviewees were asked whether the terms irradiation could influence their purchase intention and whether the replacement of the terms irradiation with could pasteurization could change their opinion on these products and their purchase decision. 59.4% of the respondents consider that the expression irradiated food affect the purchase intention, and 58.4% of people interviewed thinks that changing the term "irradiation" with "cold pasteurization" can positively change his opinion and his choice of purchase on irradiated products. Our findings are consistent with Beherens et al. (2009) according to which could pasteurization is more widely accepted by consumers than irradiation.

## CONCLUSIONS

This study analyze the level of knowledge of the irradiation technology applied to foods products among Italian consumers and the perception of the risk associated by themselves to the consumption of products treated with ionizing radiation. The survey carried out in Italy shows, in accordance to the results of empirical surveys conducted in other countries, that the main Italian consumers concerns are associated to foods containing pesticides and medicinal residues, not properly stored, and counterfeit foods, and less to irradiated foods or products containing additives. This low level of risk perception is related to the low level of knowledge among the consumers of the food irradiation technology. Indeed, as emerges from our investigation, 84.2% of the Italian respondents did not know of treatment processes of food products with ionizing radiation and 83.2% of them is not aware that in Italy are sold food products previously irradiated. Even as a result of the acquisition of information on the technology and its benefits in terms of food safety and food security, most consumers continue to express doubts about the impact that the treatment of agro-food products with ionizing radiation can have on health in the long period. A concern that is mainly linked to the expression "food irradiation" that is perceived in its most negative association. Indeed, the replacement of the expression "food irradiation" with "could pasteurization" for food products, being the same

technology, could change the attitude of consumers towards the treated products, increasing the propensity to buy irradiated foods.

The results highlight, on the whole, the need to start an effective communication campaign aimed at making known the benefits of technology, taking into account the impact that the same can have both on the food safety and on the food security.

This study provides some both political and managerial implications. From a political point of view, this study, could reinvigorate the interest of the European and National governments towards the irradiation technology, taking into consideration that this technology contributes as a whole to the wellbeing of society, but which requires several investments in communication campaigns. On the managerial point of view, our findings can support the decision making process as they provide indications on the main perceived risks for food products, contributing to satisfy the consumers expectations. In addition, the use of this technology could contribute to solve an ethical issue related to the food waste caused by many pests and contaminants that can be eliminated through ionizing radiation treatment.

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## ADOPTION OF PRACTICES OF ENVIRONMENTAL SUSTAINABILITY IN VITICULTURE: FIRST SUGGESTIONS FROM CANTON OF TICINO

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### ABSTRACT

The paper investigates the practices of environmental sustainability implemented in viticulture to minimize the negative impact of agricultural operations on the environment. Through the use of an electronic questionnaire, developed on a theoretical approach based on the Stakeholders Theory and the Theory of Planned Behaviour, and sent to a sample of wineries of the Canton of Ticino, the research pursues a triple aim: (i) to understand which are the main practices and initiatives of environmental sustainability adopted at firm level; (ii) to identify the main stakeholders that affect the choices of managers and owners to orient the firms towards the adoption of practices aimed at greater environmental sustainability; and (iii) to identify the personal drivers that most influence the managers' orientation towards a lower impact on the environment. The results show that the most common practices are the reduction of chemical inputs and the minimization of soil working. In this sense, a significant weight is exerted by the pressures coming from regulatory, societal, and value chain stakeholders, that, together with the manager's perception on the environmental practices, influence the orientation of the firm towards strategies that have a lower impact on the environment. The small size of the sample does not allow generalizing the results, but it provides some suggestions from a managerial and political point of view and it gives new ideas for future research.

*Keywords: Sustainable viticulture; Environmental sustainability; Environmental practices; Ticino wineries; Stakeholders Theory; Theory of Planned Behaviour.*

### INTRODUCTION

Conventional agriculture, characterized by high mechanization and inputs-dependent agricultural practices, threatens the ecological foundation of the world's food systems, due to the depletion of the limited natural resources (Alder *et al.*, 2012). The numerous reflections on the protection of the environment and on food security have led to rethink and redefine the production models of the agricultural and rural world towards a greater sustainability of the natural resources and an agro-ecological approach (Horlings and Marsden, 2011), modifying the traditional linear models of



production-consumption-disposal towards sustainable and circular systems aimed at the reuse of resources, with a view to a circular economy (Lacy *et al.*, 2016; Paolotti *et al.*, 2016). The concept of sustainability in agriculture has therefore begun to make its way among the farmers, and it is increasingly becoming widespread mostly in vitiviniculture (Borsellino *et al.*, 2016; Chiusano *et al.*, 2015; Corbo *et al.*, 2014). According to the International Organization of Vine and Wine (OIV) the sustainable vitiviniculture is defined as a *global strategy on the scale of the grape production and processing systems, incorporating at the same time the economic sustainability of structures and territories, producing quality products, considering requirements of precision in sustainable viticulture, risks to the environment, products safety and consumer health and valuing of heritage, historical, cultural, ecological and aesthetic aspects* (OIV, 2011).

As suggested by the Stakeholders Theory (SHT) proposed by Freeman (1984), the choices of the managers can be affected by the pressures of stakeholders, such as institutions, trade associations, employees, suppliers, customers, members of local communities, and environmental associations. In this regard, the stakeholders, thanks to their influence, are able to direct organizations towards adopting more environmentally friendly practices (González-Benito *et al.*, 2011; Marshall *et al.*, 2010; Sarkis *et al.*, 2010). To this must be added the attitudes, the subjective norms, and the perception by the managers of a given behaviour. These drivers, in fact, are able to influence the environmental choices of the managers (Wauters *et al.*, 2010; Fielding *et al.*, 2008), as explained by the Theory of Planned Behaviour (TPB).

With this in the mind, the present work aims at a triple purpose: (i) to understand which are the main practices and initiatives of environmental sustainability adopted at firm level; (ii) to identify the main stakeholders that affect the choices of managers and owners to orient the firms towards the adoption of practices aimed at greater environmental sustainability; and (iii) to identify the personal drivers that most influence the managers' orientation towards a lower impact on the environment.

In pursuing the aims of the paper, the study uses an electronic survey, developed on a theoretical approach based on the SHT and the TPB, to outline the most common practices and business operation, and the main drivers (intended as stakeholders and personal factors) that encourage wineries managers to adopt practices aimed at reducing the negative effects of firm operations on the environment, and to develop strategies of environmental sustainability.

## **THEORETICAL FRAMEWORK**

In order to understand the orientation of wineries towards the introduction of practices and initiatives of environmental sustainability, the theoretical approach developed in this paper uses two theories, the SHT and the TPB.

The first theory, the SHT, developed by Freeman (1984), suggests that business success depends on relationship of the firm with stakeholders. The latter are defined as groups or individuals who are able to influence or be influenced by the achievement of the organization's objectives (Freeman, 1984). In this direction, several works focus on the influence of stakeholders on the adoption of environmental sustainability practices at the firm level (González-Benito *et al.*, 2011; Marshall *et al.*, 2010; Sarkis *et al.*, 2010). González-Benito *et al.* (2011), analyzing the effects of the stakeholders pressure on the environmental behaviours of several firms in different industrial sectors, notice that the implementation of environmental management systems under the pressures of stakeholders reduce the divergence between what the organization does and what it should do. Marshall *et al.* (2010) observe in the wine industry of New Zealand and United States that internal stakeholders play a much less significant role than expectations in adopting environmentally sustainable practices by wineries managers, while external stakeholders play a rather marginal role. Sarkis *et al.* (2010), instead, by focusing on the Spanish automotive industry, reveal a clear and strong link between stakeholder pressures and the adoption of environmental practices. The stakeholders can be distinguished in primary stakeholders and secondary stakeholders (Wheeler and Sillanpää, 1997; Clarkson, 1995). The first are those without whose participation the organization could not survive. This category includes customers, employees and suppliers, as well as the communities and governments that respectively provide the infrastructures and the rules that regulate the markets. The latter are subjects who do not hold direct control of the organization, but they influence or are influenced by the organization. This category of stakeholders is able to positively or negatively influence the performance of an organization thanks to the ability to sensitize public opinion, influencing the orientation of the organization's programs and corporate strategies towards the expectations and needs of the interest groups. This influence is expressed in the creation of externalities that influence internal and external actors, which can express interests that can influence organization practices through direct or indirect pressures (Galati *et al.*, 2015). Another distinction concerns the classification in internal and external stakeholders. In this case, the subjects operating within the organization's physical boundaries (shareholders, managers and employees) are internal stakeholders, while those who influence the organization from outside represent the external stakeholders, which can be divided into societal (business associations, trade unions and other social actors), regulatory (governments and institutions), and value chain (suppliers and consumers) stakeholders (Ferrón Vilchez *et al.*, 2017).

The second theoretical approach is based on the TPB proposed by Ajzen (1985; 1987; 1991) and derived from the Theory of Reasoned Action (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975). The TPB introduces a new variable, the perceived behavioural control, that is the perception that an

individual has of being able to implement the desired behaviour. This control influences the intention to implement a given behaviour and the actual behaviour itself. The theory states that an individual's intentions and the behaviours depend on attitude towards behaviour, subjective norms and perceived behavioural control. In this sense, the perceived behavioural control reflects, on the one hand, motivational factors that have an indirect effect on behaviour through intentions; on the other hand, it reflects the actual control. (Madden *et al.*, 1992). This theory is well suited to analyze the individual factors that influence the decisions of the manager in adopting practices and strategies aimed at greater environmental sustainability in the organization and, in this sense, it has been used in some works to explain the environmental behaviour of managers (Wauters *et al.*, 2010; Fielding *et al.*, 2008). In particular, Fielding *et al.* (2008) analyze the main factors affecting the engagement in sustainable agricultural practices in the horticultural firms of the Queensland, in Australia. Their results show that the perceived behavioural control and the attitudes are significant factors in adoption of sustainable agricultural practices. The study by Wauters *et al.* (2010) contrasts partially to the previous one. The Authors, in fact, investigating the adoption of conservative practices for the soil management among Belgian farmers in the loam and silt-loam belt, find that attitude is the most explaining factor in the adoption of soil conservative practices, while the perceived behavioural control is a not significant variable in the intention to perform this environmental behaviour.

## MATERIALS AND METHODS

### *Object and area of study*

The study was conducted in the Canton of Ticino, in the south of Switzerland. The area is particularly suited to the cultivation of vines, and the viticulture is the branch of the Ticino agricultural sector that showed a significant rate of growth in recent years, rising from a gross production of 30,710.3 million Swiss francs in 2004 to 36,024.7 million in 2016 (USTAT, 2018), witnessing the remarkable economic vitality of the sector. In the same year the wine-producing holdings were 486, with a total utilised agricultural area of 807.1 ha. Among these, the firms where the viticulture is the main activity were 253 with a total utilised agricultural area of 647.9 ha (USTAT, 2018). The average farm size is pulverized, and this is well suited to assess the influence of the choices of winegrowers and wineries managers in guiding the farm towards greater environmental sustainability, given that owners and managers play a decisive role in decision-making processes in small firm (Marshall *et al.*, 2010: 405). Recently, the viticulture of the Ticino shows an orientation towards actionable solutions aimed at reconciling the benefits of the economic activities with the environmental impact that they cause, in order to achieve: (i) an

**efficient use of the water resources; (ii) healthy, safe and pesticide-free food production; (iii) maintenance of soil fertility, with an optimal humus content and microbiological activity; (iv) a correct remuneration of the labour and a fair trade (Haldemann, 2014). The Swiss Confederation encourages agricultural productions that are environmentally sustainable and market-oriented, contributing effectively to the food security of the population, safeguarding the natural processes of the environment and the rural landscape, and guaranteeing employment decentralized on the territory, as provided by the Federal Constitution (Swiss Confederation, 1999).**

### *Questionnaire and measures*

For the preparation of the questionnaire, to be sent to the firms, and its items, we have based on previous works, appropriately modified and integrated for this study (Garini *et al.* 2017; Marshall *et al.*, 2010; Marshall *et al.*, 2005).

The questionnaire was structured in four parts.

In the first section, it was asked to indicate the role played by the respondent in the winery, and the general characteristics of the firm, such as year of establishment, production capacity, farm land, type of management, and number of permanent or seasonal employees.

Subsequently, it was asked to indicate the main practices adopted in the winery to reduce the impact on the environment of business operations.

In the third section, in order to identify the most influential stakeholders related to the adoption of sustainable environmental practices in the firm, 14 items were proposed with a Likert-type scoring system that ranged from 1 (not at all) to 5 (very much).

In the last section, in order to identify the main factors affecting the decision-making process of winegrowers and wineries managers in adopting sustainable practices, we used 13 items. The managers were asked to respond using a Likert-type scoring system that ranged from 1 (not at all) to 5 (very much).

### *Data collection and sample description*

The reference population for our empirical survey included firms operating in the Ticino wine industry, which produce wine and commercialize bottled wine of own production. Consulting the list of firms present on different websites, as Associazione Viticoltori Vinificatori Ticinesi (AVVT, 2018) and Ticinowine (2018), 84 wineries met the requirements of the research, constituting the target population of reference. At the end of this phase, an online questionnaire has been sent to each of these wineries via e-mail, in order to understand which are the drivers (in terms of stakeholders and factors) that most influence the managers' orientation towards greater environmental sustainability in the farm. The survey was designed taking into account the main empirical studies on the orientation

of firms towards greater environmental sustainability and adapting it in the specific case to the wine industry (Garini *et al.* 2017; Marshall *et al.*, 2010; Marshall *et al.*, 2005).

Data collection was conducted in February-March 2018. The wineries have had a month to complete the questionnaire. At the end of this period, 23 questionnaires were received, but only 17 were complete in their entirety for the analysis, thus recording a response rate of 20.2%.

Table 1 briefly presents the characteristics of the analyzed sample.

Table 1. General characteristics of the sample analyzed

Variable	Obs	Mean	Std. Dev.	Min	Max
Year of establishment	17	1990	18.1	1950	2017
Manager' age	17	22.1	59.1	0	250
Production capacity	17	44500	56247.8	1500	170000
Permanent employees	17	4.2	4.1	1	15
Seasonal workers	17	3.1	7.2	0	30
Total employees	17	7.3	10.4	1	45
Type of management					
Conventional agriculture	3				
Integrated agriculture	13				
Biological agriculture	1				

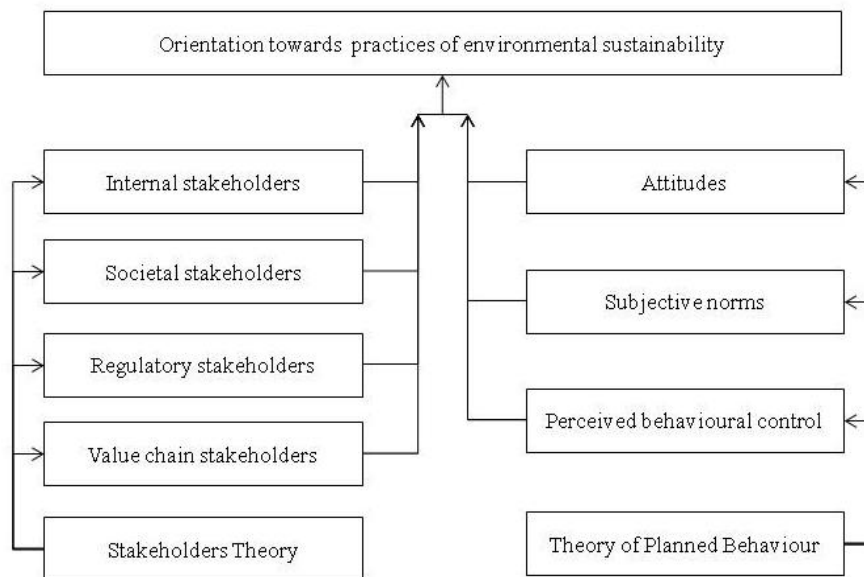


Figure 1. Theoretical model of the research.

### Methodology

Based on the two theoretical approaches analyzed, the SHT and the TPB, we adopted a descriptive approach to analyze the orientation of wineries managers towards the adoption of practices of environmental sustainability. On the one hand, through the SHT, the main internal, societal, regulatory, and value chain stakeholders able to affect the proactive environmental behaviour were observed; on

the other hand, through the TPB the main attitude, subjective norms, and perceived behavioural control able to direct managers towards greater sustainability in the wineries were examined. Figure 1 shows the proposed model in the research.

## RESULTS AND DISCUSSIONS

The results of the survey conducted among the wineries of the Canton of Ticino that commercialize wine produced in their firms identify the main practices aimed at reducing the impact of business operations on the environment and natural ecosystems (Table 2). The analysis shows that the most common practice of environmental sustainability among the Ticino wineries examined is related to the reduction of chemical products (adopted by 70.6% of the wineries). Through the organic fertilization and the sowing of nitrogen-fixing crops, in fact, the soil fertility is improved, and through the mechanical or manual mowing of rows, the use of chemical products, that could be harmful to the ecosystem and the human health, is avoided. The 52.9% of the wineries, instead, makes less soil workings with the aim of reducing the use of mechanical means in the field and favouring natural processes of the soil, such as humification, through total or partial grassing and mowing. With a diffusion of 47.1% among the wineries of the sample there are respectively the management of waste materials (stalks, wine marc, and wine less) by composting and subsequent use as organic fertilizer in vineyards, and the use of sustainable packaging produced with recycled and/or recyclable materials. An efficient use of water resources at firm level is adopted in 35.3% of the cases observed through localized irrigation systems, such as micro-irrigation and the sub-irrigation, and investment in performing machinery and pipes. The less adopted practices of environmental sustainability are those linked to the use of materials, processes and means of sustainable winemaking (adopted by the 29.4% of the samples observed), such as the limited use of sulphites, the use of natural yeasts, the distillation of wine marc, and the introduction of manual mechanical machines, and the reuse of the waste water for the irrigation of the vineyard (17.6% of the wineries).

Table 2. Main practice of environmental sustainability adopted

Environmental sustainability practice	No.	%	Actions
Reduction of chemical inputs	12	70.6	Organic fertilization, sowing of nitrogen-fixing crops, and mechanical or manual mowing of sub-rows.
Reduction of soil working	9	52.9	Total or partial grassing, and mowing.
Management and reuse of waste materials	8	47.1	recycling, and composting of organic waste and its use as organic fertilizer in the vineyard.
Sustainable packaging	8	47.1	Use of cork stoppers, recyclable packaging, use of recycled glass bottles, non-plasticized labels, no capsules, no scotch in packaging, use of biodegradable materials.
Efficient use of water resources	6	35.3	Performing machinery, micro-irrigation and sub-irrigation.

Sustainable winemaking	5	29.4	Limited use of sulphites, limitation of barriques and introduction of amphorae, press and other small non-electrical mechanical machines, distillation of grape marc, use of natural yeasts.
Management and use of waste water	3	17.6	Waste water treatment and their use for irrigation.

Our results also show the main stakeholders that influence the choices of owners and wineries managers to direct the firms towards the adoption of sustainable practices, and the main personal drivers that most influence the managers' orientation towards greater environmental sustainability.

In relation to the main stakeholders that affect owners and wineries managers in introducing sustainable environmental practices into the firm, the results do not show great differences between the different categories of stakeholders, as can be seen from the Table 3. Regulatory stakeholders (2.8), societal stakeholders (2.7), and value chain stakeholders (2.6) are the most influential stakeholders; on the contrary, internal stakeholders are those that have less impact on the adoption of environmental practices in the wineries analyzed. Going in detail, according to the survey conducted, the regulatory stakeholders play a primary role thanks to their task to regulate the market and the production processes. Regarding the societal stakeholders, the internal differences between this category of stakeholders is slight, with the mass media covering a greater influence (2.9), followed by environmental associations (2.8), the trade associations and the local community in which the winery operates (2.7). Value chain stakeholders include consumers who, thanks to their purchasing power, represent the group of interest that has the greatest impact on guiding wineries towards greater sustainability in production processes (3.3). Finally, with regard to internal stakeholders, it is possible to observe a reversal of the hierarchical structure in orientating corporate strategies towards greater environmental sustainability, with greater weight covered by employees (2.7) compared to managers of business operations (2.4) and top manager (1.9). Our results show the considerable influence associated with the pressures exerted by the stakeholders (especially external) on the adoption of environmental practices, and they are in line with the research results carried out in other sectors, where a direct effect between the introduction of environmental practices and the pressure of stakeholders it was observed (González-Benito (2011; Sarkis *et al.*, 2010). Despite this, the greater influence of external stakeholders, with respect to internal ones, that emerges in our results, is in contrast with what was highlighted by Marshall *et al.* (2010), according to which in the United States and New Zealand wine industry internal stakeholders would represent significant drivers of adoption of environmental practices compared to external ones.

Table 3. Stakeholders affecting the orientation towards the environmental sustainability (range from 1 to 5)

Internal stakeholders	2.3	Regulatory stakeholders	2.8
Employees	2.7	Governments/regulations	2.8
Managers of business operations	2.4	Value chain stakeholders	2.6

Top manager	1.9	Consumers	3.3
Societal stakeholders	2.7	Retailers	2.7
Media/Press	2.9	Local competitors	2.5
Environmental associations	2.8	Foreign competitors	2.4
Industry associations	2.7	Suppliers	2.4
Local communities	2.7	Wholesalers	2.2

Table 4 shows the most influential drivers that push owners and wineries managers towards practices with a lower impact on the environment based on the TPB. In this case, behaviour control perceived by managers (3.3) plays a major role in the adoption of environmentally sustainable practices, compared to the managers' subjective norms (3.1), and to the attitudes pursued in the wineries (2.6). In particular, the manager's perception on environmental issues (3.5), the influence of potential future regulations, compared to the current ones, on business decisions towards greater environmental sustainability (3.4), and the difficulty associated with the management of sustainable practices and innovations aimed at greater sustainability (3.4) are the main factors among the behaviour control perceived by manager. As part of subjective norms, personal satisfaction (3.4), choice of life (3.3), and environmental values (3.1) of owner or wineries manager are the most influential factors. Finally, regarding the attitudes pursued in the wineries observed, the wine quality (3.3), the employee welfare (3.2), aimed at reducing the risks of exposure of workers with substances harmful to their health, such as chemicals, and the spread of the environmental awareness among employees (3.1) are the most important factors. The results also show that the attitudes linked to the requests coming from the market, such as responding to the demand for healthy (2.7) and differentiated products (2.5) have a secondary importance, while those related to economic purposes, such as cost savings (2.1) and the increase in profits (1.8), assume a marginal weight.

These results are partly confirmed by other researches. Fielding *et al.* (2008), for example, showed that the main factors affecting the engagement in sustainable agricultural practices in the horticultural firms of the Queensland (Australia) are the perceived behavioural control and the attitudes. In contrast, Wauters *et al.* (2010), investigating the adoption of conservative practices for the soil management among farms of the Belgium, found that perceived behavioural control was a not significant variable.

Table 4. Factors affecting the orientation towards the environmental sustainability (range from 1 to 5)

Attitudes	2.6	Subjective norms	3.1
Improvement of wine quality	3.3	Personal satisfaction	3.4
Employee welfare	3.2	Choice of life	3.3
Spread environmental awareness among employees	3.1	Environmental value	3.1
Comply with regulations	2.8	Relevance of environmental issues	2.7
Respond to the demand for healthy products	2.7	Perceived behaviour control	3.3
Market differentiation	2.5	Manager's perception on environmental issues	3.5
Costs savings	2.1	Influence of potential future regulations on the orientation	3.4



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		towards greater environmental sustainability	
Respond to the pressures of interest groups	1.9	Difficulty associated with the management of sustainable practices	3.4
Increase profits	1.8	Influence of the adoption of sustainable practices on the level of approval or disapproval of the stakeholders	2.7

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## CONCLUSION

Environmental sustainability is a value that in recent years is becoming increasingly important in agriculture and mainly in viticulture. This work is inserted in this context and it provides some information about the most common practices of environmental sustainability, the main stakeholders and the most influential personal drivers that guide the owners and wineries managers to orient their firm towards a lower impact of the business operations on the environment.

From the results it emerges that the most adopted practices among the wineries of the Canton of Ticino are connected to the attention of the safety and the health of the employees, together with the will to produce wines of quality and respectful of the environment, through actions such as the reduction of chemical products and the diminution in soil working.

The research also reveals that regulatory, societal, and value chain stakeholders are the most influential interests groups orienting the wineries towards sustainable initiatives and practices, while the internal stakeholders play a marginal role.

The paper highlights the personal factors for adopting more environmentally sustainable practices for the wineries, based on the three categories of the TPB: the attitude pursued, the subjective norms, and the perceived behaviour control by the manager. According to this approach the behaviour control perceived by the manager plays a decisive role in the adoption by wineries of environmental sustainability practices.

This study provides some theoretical, managerial and political implications.

From a theoretical point of view, the study enriches the existing literature using the SHT and the TPB as a theoretical basis to investigate the main factors and stakeholders able to direct the wineries managers towards a more sustainable viticulture.

From a managerial perspective, the research provides interesting tools to owners and wineries managers who wish to orient their firm towards greater environmental sustainability through practices that reduce the impact on the natural ecosystems. In particular, wineries managers could use the results of this study to better plan their business strategies, in order to correctly balance the costs and benefits resulting from the adoption of actions aimed to minimize the impact of business operations on the environment.

From a political point of view, Governments should promote the adoption and the use of practices and tools by farms aimed at greater protection of the environment and natural ecosystems, and they

should invest more in technologies and innovation, encouraging the spread of the green economy and environmental sustainability in agriculture.

The main limitation of the research lies in the reduced number of samples observed, which does not allow generalizing the results of the study, but at the same time it is able to provide some useful suggestions for winegrowers and wineries managers.

Taking into account these limitations, future research could develop the present study, increasing the size of the reference sample in order to obtain results that can be generalized, and it could address the same topic in other sectors of the agriculture in order to evaluate similarities or differences in the analyzed results.

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