



Research article

Understanding consumption choices of innovative products: an outlook on the Italian functional food market

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Abstract: Nowadays, the interest towards functional food has increased; however, several factors jeopardize their diffusion on the market. In fact, functional foods do not have either a specific regulatory framework or a statutory definition in Europe. A functional food with any nutrition and health claim related to vitamins, minerals, or other substances in their labeling have to meet only the specific requirements established by the Regulation (EC) 1924/2006. Consequently, these products are not uniquely recognizable and the perception of consumers towards them remains a confusing concept. In this scenario, this paper investigates knowledge and factors affecting consumers' consumption intention towards functional food in Italy. For this purpose, a survey was designed, and a logit model was used to explain motivators for the consumption of functional products. The result indicates that consumers are still confused about the concept of functional foods. An important motive for the consumption of functional food is the maintenance of good nutrition, health conditions as well as well-being. An additional factor in the success of functional products is the familiarity and the knowledge of the effects of a particular product on health conditions. The probability of the consumption of a functional product increases when the consumer associates the knows of the functional characteristic and the healthful properties with the consequences of their consumption. Results are useful to verify the opportunities for further expansion of these products on the Italian market.

Keywords: functional foods; healthy eating; consumer consumption intention; logit model; Italian market

1. Introduction

Functional foods represent one of the most interesting areas of research and innovation in the food sector [1–3]. The interest in the food industry for functional food may be associated with the interest of consumers in the improvement of life quality with healthier food products. Functional foods are associated with health benefits and reducing the risk of diseases, opening a promising avenue for consumers to pursue a healthier life as well as extending their life expectancy [4]. Consequently, this provides a great market opportunity for the food sector that has to develop these innovative products. Innovations introduced in the food industry in recent years mainly refer to new scientific and technical approaches in food processing, and to the introduction of novel foods. In this regard, functional food plays an outstanding role, as demonstrated by their increasing demand [5].

At the global level, the market of functional food is concentrated in three main regions: The United States and Japan, which represent the leading markets, and Europe. In these three areas, more than 90% of functional food product sales occur. In particular, in Europe, functional food sales have grown significantly. The main countries within the European functional food market are represented by Germany, France, United Kingdom, and the Netherlands. Even though it is estimated that growth rates will keep rising and more new products will be launched, the functional food market is experiencing several difficulties. This is especially due to the issues concerning the definition of functional food and the regulatory framework that are still under discussion.

Relating to the first aspect, a large number of definitions exist worldwide for functional foods [6]. While some definitions are quite simple, others are much more complex. Some definitions suggest that any food, if marketed with the appropriate positioning, is a functional food [7,8]. Others maintain that only fortified, enriched, or enhanced foods with a component having a health benefit beyond basic nutrition can be considered [9]. Some definitions indicate that if a health claim can be applied, food is functional [10,11]. At the European level, in the second half of the 1990s, the European Commission funded an activity to establish a science-based approach to explore the concept of functional foods. This concerted action, called ‘Functional Food Science in Europe’ (FUFOSE), involved many European experts in nutrition and related sciences; it produced a consensus report that has become widely used as a basis for discussion and further evolution of thinking on this topic. The report also proposed the following working definition of functional foods: *“a food that beneficially affects one or more target functions in the body beyond adequate nutritional effects in a way that is relevant to either an improved state of health and well-being and/or reduction of risk of disease. It is consumed as part of a normal food pattern. It is not a pill, a capsule or any form of dietary supplement”*. In the last 20 years, different attempts have been made to propose a commonly agreed definition [12]. The last proposal was presented by the Functional Food Center (FFC) in 2018, describing functional foods as *“natural or processed foods that contain biologically active compounds; which, in defined, effective, and non-toxic amounts, provide a clinically proven and documented health benefit utilizing specific biomarkers for the prevention, management, or treatment of a chronic disease or its symptoms”*. However, such a definition is not fully accepted, and other authors continue to propose other definitions for the functional food [13].

Relating to the second aspect, the regulatory framework, each country has a different approach on this issue. Because the European legislation does not consider functional foods as a specific food category, but rather a concept [14–16], the rules to be applied are numerous and depend on the nature of the foodstuff. The General Food Law Regulation [17] is applicable to all foods. In addition,

legislation on dietetic food, genetically modified organisms (GMOs), food supplements, or on novel foods may also be applicable to functional foods depending on the nature of the product and on their use. In the EU, rather than regulating the product group per se, legislative efforts currently being developed are directed towards restricting the use of claims on packages and in marketing [18,19]. Regulation (EC) 1924/2006 [20] defines a claim as “*any message or representation, which is not mandatory under Community or national legislation, including pictorial, graphic, or symbolic representation, in any form, which states, suggests or implies that a food has particular characteristics*”. Claims must be in accordance with good dietary practices and accepted principles of nutrition and health, without encouraging any excessive consumption since a varied and balanced diet provides the adequate amounts of nutrients that the organism requires. The use of claims in any food commercial communication (labeling, presentation, or advertising), will be authorized under strict conditions. In detail, Article 2.2 of Regulation (EC) 1924/2006 establishes three categories of claims:

- nutrition claims: state, suggest, or imply that a food has specific beneficial nutritional properties due to its caloric value, the nutrients or other substances, that it contains in a reduced or increased proportion, or directly that it does not have (i.e. “high in vitamins” or “low in calories”);
- health claims: affirm, suggest, or imply that there is a relation between a food category, a food, or one of its components, and health. Any claim which describes or suggests a new health-related benefit for the human organism is required to go through a pre-marketing approval reduction of disease risk claims. The approval process of new health claims is complex as these claims must be based on strong scientific evidence, which implies a harmonized evaluation by the European Food Safety Authority (EFSA) prior to their authorization.
- reduction of disease risk claims: they are health claims that state, suggest, or imply that the consumption of a food category, a food, or one of its components, can significantly reduce a risk factor in the development of a human illness.

In this scenario, the lack of an official definition of the term “functional foods” and the different regulations between different countries generate confusion and ambiguity about what functional foods are, creating confused and uninformed consumers. The literature collects a lot of research on the preferences and acceptance of the consumers for functional foods [21–25]. The researches vary widely in terms of their objectives (consumer awareness of the concept, attitude, acceptance, choice towards functional foods), their methodologies used (qualitative or exploratory vs. quantitative or conclusive) and their results. Understanding consumer attitudes can be used to better perceive consumer behavior about a product, service or idea [26]. In addition, for a company, knowing consumer behaviors is at the base of successful marketing strategies for the price, the positioning, the design and the promotion of a product [27–29]. To date, many food companies, due to increased margins and the growing global market about foods with health-enhancing properties, have been developing new foods fortified with vitamins, minerals, probiotics, or fiber [30]. However, contrary to these market estimates, there is a high risk of product failure as nearly 70–90% of novel functional food products leave the market within the first two years of their placing [31–33]. One of the reasons for the high failure rates is that companies are often more focused on technical feasibility [34] when designing their product and neglect consumers’ preferences and acceptance [35]. By using this approach, companies produce new health-enhancing products in the market with features that do not meet consumer needs [36].

In Italy, the demand for functional foods is constantly increasing and the Italian market for this type of product is relatively new and still not widespread. In fact, compared to other European countries, the Italian market size of the functional food does not reach the size of the others Member States. Most of the Italian functional food market (81%) refers to three main types of food: approximately 47% for fermented milk, 20% for fruit drinks and 15% for milk. The rest of the market includes baked goods, sports drinks, and confectionery products [37]. Since functional food comprises a novel category of food in the Italian market, attitudes toward them are still forming. In addition, to date, empirical studies on profiling consumer-behavior intention towards functional food, particularly in the Italian context, are limited. Most of the previous studies have been conducted in countries such as the United States and in other European countries.

The aim of this research is to investigate the factors which influence consumers' consumption of functional food products, focusing on the Italian market. For this purpose, a survey was designed, and a logit model was used to explain motivators for the consumption of functional products. In order to accomplish the above-mentioned objective, we have structured this work into 5 sections, including the current introduction. In Section 2, we describe the method employed. The main results and the discussion of our research are outlined in sections 3 and 4. The final section includes our conclusions and the implications of the study.

2. Materials and methods

2.1. Consumers questionnaire design

This analysis was performed by using a survey-based approach with an online questionnaire. The questionnaire contains a total of 42 questions and is structured into 4 sections. The first section evaluates the behaviour of consumers with regard to nutrition, their health and lifestyles. In particular, the respondents were asked to indicate whether they are usually attentive to their own diet and if they follow a specific diet and, if so, specify the reason why they follow it. Then, to assess the health of consumers, they were asked to indicate whether they suffer from food allergies and/or intolerances (for example gluten, lactose, etc) and if they suffer from diseases related to poor nutrition (such as diabetes, cholesterol, obesity, hypertension, etc.). Finally, to evaluate lifestyles, the interviewee was asked if he/she practices physical activity and if he/she buys food supplements and how often. The second section comprises questions devoted to evaluating consumer purchasing behaviour towards the label. Initially, the interviewee was asked if he/she is used to check the label. Subsequently, the consumers' importance towards nutritional and health claims was surveyed on the basis of a Likert Scale of scores 1–5 (where: 1: Not important at all; 2: Not important; 3: Important; 4: Very important; 5: Extremely important).

Section 3 represents the core of the questionnaire and it was organised into three different parts:

- Consumers' knowledge of functional foods. In particular, in order to evaluate the level of consumers' knowledge, the interviewees were asked if they have ever heard of functional foods. Then, they were asked to provide their definition of functional foods in order to assess whether they really know a definition of this concept. Next, the following definition of functional foods was provided in the questionnaire: "*Functional foods are defined as natural or supplemented foods that contain biologically-active compounds which, in certain quantities, provide a scientifically proven*

benefit to human health”¹ along with a more detailed explanation of them and some examples of commercially available functional foods (such as yogurt with probiotics, fermented milk drinks with probiotics or with plant sterols, cereals enriched with vitamins and minerals, fruit juices enriched with vitamins and minerals, milk with omega 3 and/or with vitamins and minerals, iodized salt, etc.). The “functional foods” definition was given to better clarify these products to all interviewees, in order to reduce the probability of errors in compiling subsequent questions;

- Consumers’ consumption habits including motivations for the consumption, where they buy functional food and the type of functional foods consumed (yogurt, water, biscuits etc);
- Consumers’ attitude towards functional foods.

Consumer attitudes have been a widely researched topic in literature. Attitudes have been studied in a variety of contexts, from advertising to new product development and brand management. Nowadays functional food comprises a novel category of food, and attitudes toward them are still forming. For the measurement of the consumers’ attitude, it has been used attitudes scales already existing in literature, which have been largely demonstrated by previous research, in order to guarantee the validity of the content [38]. In detail, regarding to the measurement of attitude towards functional foods, the literature uses measurement scales developed in the field of generic foods. Alongside this, there are certain specific contributions, such as the Functional Food Scale (FFS) proposed by Urala and Lähteenmäki (2007) [39], which is also originally based on three other scales that are the most used when studying the attitudes of consumers towards food in general: General Health Interest (GHI) Scale, Natural Product Interest (NPI) Scale [40] and Food Neophobia Scale (FNS) [41]. Due to the specificity of its application, the present investigation will follow the FFS scale which, in addition, is the review of several scales previously published by the same authors [42,43]. In addition, this scale was implemented with other statements related to various factors influencing the food selection choice among consumers, such as healthfulness, taste or sensory appeal, natural content, price, convenience and familiarity. These factors were derived from the study of Steptoe et al., in 1995 [44], aimed at developing the “Food Choice Questionnaire” to measure the motivations behind the choice of food by consumers, and Ferrão et al., in 2019 [45]. All the statements derived from the different scales were pre-tested using 30 students and staff members from the Università Politecnica delle Marche. Based on the pre-test results, some statements were discarded and others were reformulated. Altogether, there were 47 questions corresponding to the functional food-related statements, listed randomly in the final questionnaire (i.e.: Functional products keep me healthy; Functional products are not expensive; The brand is important to me when I choose functional food, etc)². Table 1 shows all the statements utilized in this study, corresponding to the different motivations for functional food choices, and the references. All statements were measured on five-point scales. The respondents were required to assign a score, from 1 (Completely disagree) to 5 (Completely agree) for each question.

¹ Functional Food Center (FFC)

² Cronbach's alpha coefficients were used to examine the internal consistency of the items, and items with an adequate Cronbach's alphas were retained for the scales. The unidimensionality and convergent validity of the constructs were assessed by the composite reliability (CR) measure and the average variance extracted (AVE), respectively. Because the CR satisfies the criteria of 0.6 and the AVE satisfies the criteria of 0.50, the validity is confirmed.

Table 1. Number of statements regarding attitudes and motivation for functional foods choices.

Variables	Motivations	N ° of State- ments	Statements	References
HM	Health	3	<i>Keeps me healthy (HM1)</i> <i>Is nutritious (HM2)</i> <i>Is good for my skin/teeth/hair/nails etc (HM3)</i>	<i>Step toe et al., 1995</i>
CVM	Convenience	2	<i>Can be bought in shops close to where I live or work (CVM1)</i> <i>Is easily available in shops and supermarkets (CVM2)</i>	<i>Step toe et al., 1995</i>
SAM	Sensory appeal	3	<i>Smells nice (SAM1)</i> <i>Looks nice (SAM2)</i> <i>Tastes good (SAM3)</i>	<i>Step toe et al., 1995</i>
NCM	Natural content	3	<i>Contains no additives (NCM1)</i> <i>Contains natural ingredients (NCM2)</i> <i>Contains no artificial ingredients (NCM3)</i>	<i>Step toe et al., 1995</i>
PM	Price	3	<i>Is not expensive (PM1)</i> <i>Is cheap (PM2)</i> <i>Is good value for money (PM3)</i>	<i>Step toe et al., 1995</i>
FM	Familiarity	2	<i>Is what I usually eat (FM1)</i> <i>Is familiar (FM2)</i>	<i>Step toe et al., 1995</i>
RM	Reward from using functional food	8	<i>Functional foods help to improve my mood (RM1)</i> <i>My performance improves when I eat functional foods (RM2)</i> <i>Functional foods make it easier to follow a healthy lifestyle (RM3)</i> <i>I can prevent disease by eating functional foods regularly (RM4)</i> <i>The idea that I can take care of my health by eating functional foods gives me pleasure (RM5)</i> <i>Functional foods can repair the damage caused by an unhealthy diet (RM6)</i> <i>I am prepared to compromise on the taste of a food if the product is functional (RM7)</i> <i>I actively seek out information about functional foods (RM8)</i>	<i>Urala and L ähteenmäki, 2007</i>
CM	Confidence	4	<i>Functional foods promote my well-being (CM1)</i> <i>The safety of functional foods has been very thoroughly studied (CM2)</i> <i>I believe that functional foods fulfil their promises (CM3)</i> <i>Functional foods are science-based top products (CM4)</i>	<i>Urala and L ähteenmäki, 2007</i>

Continued on next page

Variables	Motivations	N ° of Statements	Statements	References
NM	Necessity	9	<p><i>Functional foods are completely unnecessary (NM1)</i></p> <p><i>Functional foods are a total sham (NM2)</i></p> <p><i>The growing number of functional foods on the market is a bad trend for the future (NM3)</i></p> <p><i>For a healthy person it is worthless to use functional foods (NM4)</i></p> <p><i>It is great that modern technology allows the development of functional foods (NM5)</i></p> <p><i>I only want to eat foods that do not have any medicine-like effects (NM6)</i></p> <p><i>Health effects are not appropriate in delicacies (NM7)</i></p> <p><i>Functional foods are consumed mostly by people who have no need for them (NM8)</i></p> <p><i>It is pointless to add health effects to otherwise unhealthy foods (NM9)</i></p>	Urala and Lähteenmäki, 2007
SM	Safety	5	<p><i>If used in excess, functional foods can be harmful to health (SM1)</i></p> <p><i>In some cases functional foods may be harmful for healthy people (SM2)</i></p> <p><i>Using functional foods is completely safe (SM3)</i></p> <p><i>The new properties of functional foods carry unforeseen risks (SM4)</i></p> <p><i>Exaggerated information is given about health effects (SM5)</i></p>	Urala and Lähteenmäki, 2007
MCM	Marketing and commercial	5	<p><i>I usually buy food that spontaneously appeals to me (e.g. situated at eye level, appealing colours, pleasant packaging) (MCM1)</i></p> <p><i>I eat what I eat, because I recognize them from advertisements or have seen it on TV (MCM2)</i></p> <p><i>Brands are important to me when making food choices, (MCM3)</i></p> <p><i>Food advertising campaigns increases my desire to eat certain foods (MCM4)</i></p> <p><i>When I go shopping, I prefer to read food labels rather than to believe in advertising campaigns (MCM5)</i></p>	Ferrão et al., 2019

Finally, in the last section, the interviewee was asked for some personal and socio-demographic information such as: gender, age, educational qualification, family income, family unit and the

possible presence of children. Relating to the last aspect in the questionnaire, participants were asked if they had children and, in the case of a positive answer, if the children had less than 13 years. In fact, the literature evidence that the presence of young (children, below 13 years) in the household could influence the consumption of functional foods. In families with young children, parents feel great responsibilities toward the health of their children, and for this reason they have a greater tendency to stay informed and gain more knowledge about diet, health and nutrition [46]. More in detail, according to Verbeke et al. [47], the presence of young children may impact food choice because of its potential association with higher food risk aversion or higher quality consciousness, as exemplified for instance for fresh meat after the BSE³ crisis. Furthermore, parenting triggers focus on nutrition, which yields a search for nurturing benefits through the provision of wholesome foods that lay a strong foundation of health for children [48]. Thus, shoppers with children are believed to be more likely to look for functional food.

2.2. Data collection

The questionnaire was designed using Google Forms and distributed online through a link. Collecting research data through traditional approaches (face-to-face or telephone surveys) can be costly and time-consuming. The emerging data collection approach based on internet and e-based technologies (e.g. online platforms and email), is a relatively cost-effective survey alternative. These data collection strategies can collect large amounts of data from participants in a short time frame [49]. In particular, participants were reached via different social media networks, which are becoming a popular means of gathering participants in social sciences research, especially for convenience reasons [50]. In fact, the use of the Internet makes it as convenient as possible for participants to take part in the survey, and allows reaching a high number of participants from all the Italian regions. Thus, the link of questionnaire was posted on Twitter, LinkedIn, and Facebook pages and also distributed by instant messaging (WhatsApp and Facebook Messenger). As sampling in Internet research studies is not random and could generate selection bias, to minimize this possible problem, we posted the questionnaire link on pages and online groups with a general and specific target audience. The use of an online survey brings with it numerous advantages such as the speed of diffusion, the ease of creating the database with the answers, and the ease of processing; on the other hand, it makes it impossible to reach people who do not have this technology [51]. In addition to this risk, it is possible that the sample is not very representative of the reference population (consumer universe), but through a wide sample, we were able to collect the main characteristics of the population [52]. Finally, respondents were sent a unique link to the website on which they simply had to click to start the online survey. This unique link ensured that the same person could not participate more than once. Before the survey was launched online, the questionnaire was pre-tested. The pre-test was conducted through a small focus group of 25 people of the Department of Agricultural, Food and Environmental Sciences (D3A), who was gathered to discuss the understanding of the questionnaire and to evaluate its effectiveness before making the questionnaire available online and so avoiding subsequent revisions and adjustments. The purpose of the pre-test

³ Bovine Spongiform Encephalopathy (BSE), commonly known as “mad cow disease”, is a neurodegenerative disease of cattle, generally fatal. A huge crisis developed and spread between 1980 and 1990 in the UK, leading to the loss of consumers’ trust toward producers and institutions.

was to assess whether any changes need to be made to the designed questionnaire in order to make it clearer and more understandable. Based on the pre-test, some questions of the survey were restructured and reviewed.

2.3. Model specification

A logit model was employed in order to pursue the objectives of the work and in particular to analyse the factors that influence consumers' consumption of functional foods. For this study, the results were interpreted using the odds ratio, which is the exponential coefficient of the logit regression results. In general, the binary logit model can be specified as:

$$\log(p/(1-p)) = x\beta \quad (1)$$

where, $x\beta$ is the vector of the independent variables and the estimated parameters, and $(p/1-p)$ is called the odds ratio. The logistic coefficient is interpreted as the change in the logit that is associated with a one-unit change in the independent variable, while holding all the other variables constant. The exponential of the logistic coefficient is the effect on the odds rather than probability. It is interpreted as a one-unit change in the independent variable; the odds are expected to change by a factor of $\exp(\beta)$ when other things are equal [53]. Because the aim of this study was on consumers' intention to consume, the dependent variable represents the probability of the consumers consuming functional foods. The variable is a 0-1-type dependent variable and it was coded as 1 if the consumers consume functional food and zero if it was otherwise. The independent variables in the choice model represented the factors that might have an influence on the consumers' choice behaviour. In details, the choices of variables included in this study derive from a literature review on consumers' consumption behaviour towards functional food, and they were converted into questions. In order to take an overview of the variables considered in previous studies on consumers' consumption behaviour for functional foods, we have classified the multiple factors that affect them in two main groups:

- consumers-related-characteristics category, that comprehends: personal factors (as age, gender, income and education, family unit, presence of children) and psychological factors (as health and nutritional motivation);
- product-related-characteristics category, derived from the 47 functional food-related statements identified from the measurement scales of the consumers' attitude.

The explanatory variables (independent variables) included in the models can be grouped into four main areas:

1. variables connecting to socio-demographic characteristics of the sample:
 - Female: dummy variable that takes value 1 if the respondent is female and 0 otherwise;
 - Age: in 7 groups (1 = <18; 2 = 18–25; 3 = 26–35; 4 = 36–45; 5 = 46–55; 6 = 56–65; 7 => 65);
 - Education: a variable that takes values from 1 to 6 and corresponds from lower to higher education (1 = No formal education; 2 = Elementary school; 3 = Middle school; 4 = Highschool; 5 = University; 6 = Ph.D. or higher);
 - Family unit: the number of family members of the respondent;

- Income range: the variable that takes value from 1 to 6 and corresponds to increasingly high-income brackets (1 = < 10,000 EUR; 2 = 11,000–20,000 EUR; 3 = 21,000–35,000 EUR; 4 = 36,000–50,000 EUR; 5 = 51,000–75,000 EUR; 6 = >75,000 EUR);

- Children under 13 years old: dummy variable that takes value 1 if there are children in the family unit and 0 otherwise.

2. variables about consumers' health and nutrition:

- Diet: dummy variable that takes value 1 if the respondent follows a diet and 0 otherwise;

- Food allergies or intolerances: variable that takes value 1 if the respondent has a food allergy/intolerance and 0 otherwise;

- Pathologies: variable that takes value 1 if the respondent suffers from a nutrition or metabolism disease and 0 otherwise;

- Nutrition and health information: a variable that takes value 1 if the respondent pays attention to nutrition and health information presented on food labels and 0 otherwise.

3. Variables related to respondent purchasing behaviour of functional foods:

- Knowledge: dummy variable that takes value 1 if the respondent knows functional foods and 0 otherwise.

4. Variables that include attitudes and motivation for functional foods choices. They assume values from 1 to 5 (on a 5-point Likert scale): Health motivations; Convenience motivations; Sensory appeal motivations, Natural content motivation; Price motivations; Familiarity motivations; Reward from using functional food motivations; Confidence motivations; Necessity motivations; Safety motivations; Marketing and commercial motivations (See Table 1).

The specific equation of the logit model can be presented as follows:

$$\text{logit}(\text{model}) = \beta_0 + \beta_1 \chi_{\text{socio-demographic}} + \beta_2 \chi_{\text{health and nutrition}} + \beta_3 \chi_{\text{purchase}} + \beta_4 \chi_{\text{attitudes}} + \varepsilon_i \quad (2)$$

where β_0 is the constant and β_i is the coefficient of χ_i . Descriptive statistics were used to identify respondents background, consumption behaviour, and whether respondents are able to recognize functional food. Logit procedures were used to determine which factors influenced the respondent's consumption of functional food. This study used STATA software (version 14.0) for the regression analysis.

3. Results

In the following section, the main results obtained from the online survey questionnaire, are examined.

3.1. Descriptive analysis

The final sample is represented by 427 Italian consumers interviewed between October and December 2020. The sample is distributed throughout the national territory, with a particular

concentration in the centre of Italy. The sample profile and reference population figures are given in Table 2.

Table 2. Socio-economic characteristics of the sample.

Variables	Description	%
<i>Age</i>	<18	1%
	18–25	32%
	26–35	32%
	36–45	11%
	46–55	14%
	56–65	8%
	>65	2%
<i>Children < 13 years</i>	Yes	19%
	No	81%
<i>Household income</i>	<10,000 €	10%
	11,000–20,000 €	20%
	21,000–35,000 €	32%
	36,000–50,000 €	21%
	51,000–75,000 €	13%
	>75,000 €	4%
<i>Family unit</i>	1	10%
	2	21%
	3	23%
	4	32%
	5	9%
	6	3%
	7	2%
<i>Education level</i>	No formal education	-
	Elementary school	-
	Middle school	4%
	High school	33%
	University	57%
<i>Gender</i>	Ph.D or higer	6%
	Male	30%
	Female	70%

The data indicate that consumers are mainly females (70%), with a good level of education (57% university), with people of varying ages, and with medium families (three or four persons per family). In addition, only 19% of respondents have at least one child under 13 years in their family unit. About the annual average household income, 32% of respondents are in the range between € 21,000-€ 35,000.

Relating to the behavior of consumers with regard to nutrition, it results that 89% of respondents are usually attentive to eat. Despite the respondents are attentive to eat; only 25% of the sample declares to follow a specific diet. These respondents declare to follow a specific diet in order to stay fit (56%), for health problems such as diseases, allergies and/or food intolerances (21%) and

to feel better (11%). As regards the health status, about 17% of respondents suffers from food allergies and/or intolerances. In particular, 59% of them are lactose intolerant, while 11% are intolerant to gluten and 8% are allergic to nuts (almonds, hazelnuts, walnuts, etc.). In addition, 16% of the sample suffers from any pathology related to poor nutrition, mainly 36% of obesity and overweight, 19% of increased cholesterol and blood triglycerides (metabolic diseases) and 13% of arterial hypertension. Finally, analyzing consumers' purchasing behavior towards the nutrition and health information on a label, 87% of people checks this information when buying a food product and 34% of these checks it often. Subsequently, it was asked the importance of a series of nutritional and health claims present on the packaging of a food product, and for each of them was asked to assign a score on a Likert scale from 1 to 5. From this analysis, it has emerged that the sample considers mainly nutritional claim about the sugar and fat content while, among the healthy claim, people consider especially claims referring to children's health and development.

Examining the answers regarding functional foods, it turns out that 60% of the sample has never heard about functional foods. It is important to know that, after being given a definition of functional food and some commercially available products, 87% of the sample stated that they or a component of their family, have eaten functional foods at least once. Among 87% of the sample who have tried this type of product, most of respondents declared that they mainly consume yogurt with probiotics. However, functional foods are consumed occasionally (29%), and they are mainly purchased in supermarkets (90%). Among those who have never consumed functional foods, in 18% of the cases they did so because they don't feel the need and 16% because they are not interested in this type of product.

In order to better understand how consumers perceive functional foods and analyses consumers' attitude towards them, they were asked to rank, on a five-point Likert scale (from 1 = Completely disagree to 5 = Completely agree), their level of agreement with several statements about functional foods. Figure 1 shows the results of consumer attitudes towards functional foods choices.



Figure 1. Level of agreement with the statements about functional food.

Results were classified and grouped into the main factors and dimensions that the functional food statements referred to (See Table 1). More specifically, it emerged that most of the factors regarding attitudes for functional foods choices by consumers are related to convenience (3.6) and health motivations (3.1).

3.2. The Model Results

In order to understand which factors influence consumers' consumption of functional foods, a logit model was used. The estimate of the first model in an enlarged form, that is, in which all the explanatory variables listed above are inserted, has shown that some of these variables are not statistically significant. They were, therefore, eliminated obtaining a better restricted model. The final model is represented in Table 3 in which it is possible to distinguish the variables which exert a significant influence on the consumption of functional foods.

Table 3. Model results.

COST	Coef.	St.Err.	t-value	p-value	[95% Confidence Interval]		Odds ratio	Sig
FEM	0.34	0.408	0.83	0.405	-0.46	1.139	1.404392	
AGE	-0.116	0.156	-0.74	0.457	-0.422	0.19	0.8905423	
EDU	0.374	0.321	1.17	0.243	-0.255	1.004	1.454221	
FAM	0.441	0.164	2.69	0.007	0.12	0.762	1.554274	***
INC	-0.149	0.158	-0.94	0.346	-0.46	0.161	0.8614252	
CHI	0.48	0.516	0.93	0.352	-0.532	1.492	1.616061	
ALL	0.546	0.583	0.94	0.349	-0.597	1.688	1.725546	
PAT	1.277	0.567	2.25	0.024	0.166	2.388	3.585293	**
INF	-0.725	0.55	-1.32	0.187	-1.804	0.353	0.4841786	
KNOW	0.874	0.518	1.69	0.092	-0.141	1.89	2.397439	*
FM1	0.654	0.265	2.47	0.014	0.134	1.174	1.92391	**
FM2	0.585	0.235	2.50	0.013	0.126	1.045	1.795677	**
RM2	-0.557	0.247	-2.25	0.024	-1.043	-0.072	0.5726496	**
CM1	0.861	0.23	3.74	0	0.41	1.312	2.365256	***
MCM3	0.379	0.189	2.01	0.045	0.009	0.75	1.461537	**
Constant	-5.14	2.168	-2.37	0.018	-9.389	-0.89	0.0058582	**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Among the socio-demographic variables, only the variable related to the number of components of the family (FAM) exerts a significant influence, while between variables related to consumers' health and nutrition, those who suffer from a nutrition or metabolism disease (PAT) have a significant influence. In addition, the variable related to the knowledge of functional foods (KNOW) is significant. Concerning variables that include attitudes and motivation for functional foods choices, it was found that the variables that may affect consumers' consumption are: usually eat (FM1); familiarity (FM2); improve performance (RM2); promote my well-being (CM1) and brand (MCM3). In addition, from Table 3 it is obvious that the sign of FAM, PAT, KNOW, FM1, FM2, CM1 and MCM3 variables is positive. These results show that families with a high number of components,

those who suffer from a nutrition or metabolism disease, those who usually know and eat functional food as well as consider them a familiar product, those who believe that functional food promotes their well-being and consumers that think the brand is important in selecting a functional food, are more likely to consume functional food. On the contrary, it seems that those who believe that functional food improves their performance (RM2) are less likely to consume functional food (this variable is statistically significant but negative). In addition, in order to better understand the results of the econometric model, it was calculated the odds ratio (OR). Odds ratio measures how the dependent variable changes in terms of probability following a unit change in the regressor. When the odds ratio is equal to 1, the effect of a unit change of the regressor on the dependent variable is zero. The greater the deviation from the unit value, the greater the effect of the regressor on the dependent variable will be. Thus, using the odd ratios, the presence of a nutrition or metabolism disease was 3.58 times more likely to cause consumers to consume functional food.

4. Discussion

Our explorative analysis highlights, as already pointed out by the literature, that consumers are still confused about the concept of functional foods, and they often confused them with other types of products [54–56]. These aspects were highlighted by the functional food definitions received in section 3 of the questionnaire (Consumers' knowledge of functional foods). In particular, in most of the cases, the respondents were unable to provide a correct definition of functional food. In addition, Italian consumers declare that were confused due to the ambiguity of what functional food products were, despite having a high level of interest in the nutritional and health aspects of their food choices. However, it is interesting to note that consumers, after reading a definition of functional food and seeing some pictures of commercially available products, stated that they or a component of their family have consumed functional foods at least once. Furthermore, according to the literature, consumers do not perceive functional foods as a homogeneous group and therefore their attitudes influence differently the intention to consume different functional products [57]. Consumer's misunderstanding may be due probably to the lack of clear legislation with an official definition of functional foods, but also to a fragmented variety of products currently available on the market and a large amount of general uncoordinated marketing and educational messages.

From our analysis, aimed at understanding which factors influence consumers' consumption of functional foods, emerged that several variables are significant. In particular, among the variables related to consumers' health and nutrition, it seems that those suffering from a *nutrition or metabolism disease* have a significant influence and, among others, this is the main variable associated with the consumption of functional food. The result is in accordance with several studies [58], which identified that the state of health and the presence of diseases (such as diabetes, hypertension, and obesity) are some of the main factors that affect the decision to consume functional foods. According to Sirò et al., 2008 [59], the state of health is much more decisive than socio-demographic factors in influencing the demand for functional foods.

Among variables related to functional foods, it seems that those who think the *brand* is important in selecting a functional food, have a significant influence on consumers' consumption of functional foods. In general, the brand is one of the most significant extrinsic product characteristics in affecting consumers' food decision-making process [60,61]. In particular, different studies showed that consumers are positively influenced to buy functional foods from a recognized brand; on the

contrary, they are more skeptical of functional foods from less famous brands [62]. A study conducted by Annunziata and Vecchio (2013) [63] illustrated that the brand influences consumers' decision process for probiotics yogurts among a group of Italian consumers, and they found also that brand's influence on consumer choices increases with consumers' familiarity with the brand itself. In addition, the study conducted by Barrena & Sanchez (2010) [64] pointed out that consumers' familiarity with the brand is one of the characteristics of the products affecting families' decisions to buy probiotic dairy products.

From this analysis emerged that those who *know functional foods*, who *usually eat* these products, and those who are *familiar* with them are more likely to consume them. This evidence is in line with the literature [65,66]. According to Labrecque et al. (2006) [67] knowledge has a positive impact on the acceptance of functional foods. More in detail, consumers' knowledge and familiarity with a product are fundamental in order to choose functional foods over conventional foods, and consumers can do this only if they are aware of and know enough about them [68]. Similarly, the low consumption of functional foods could be attributed to a lack of knowledge [69]. Consequently, the development of the market of functional food is influenced by the degree of familiarity and acceptance of these products. According to surveys in different European countries, consumers often do not know the term "Functional Food" or similar wordings but show a rather high agreement to the concept [70].

In addition, those consumers who think that functional foods promote their *well-being* tend to buy these products. Consumers judge food products not only in terms of taste and nutritional needs but also in terms of the ability to improve their health and well-being. Because functional foods exert a beneficial influence on body functions, they can help improve well-being and health and/or reduce the risk of diseases [71,72]. The perceived reward from using functional foods, such as improving personal well-being, is the strongest dimension underlying consumers' willingness to consume functional foods because it describes the pleasure of individuals and the positive effects that derive from their use [73,74]. So functional foods can represent a new convenient tool for taking care of oneself. However, consumers who believe that functional foods improve their *performance* will be less willing to buy them. This could be due to the fact that although some functional foods could potentially be helpful for health, there is not sufficient scientific evidence for improving performance. A key challenge to ensure the bright future of functional foods is to provide solid guarantees to consumers about their performance as well as their promises about better health, safety, development or growth [75].

Finally, among the socio-demographic variables, only the variable related to the number of components of the *family* seems to exert a significant influence on the consumption of functional foods. However, it is well known in the literature that the family is one of the main factors that influence the purchasing behaviour of consumers [76–78]. Furthermore, the study conducted by Verbeke (2005) [79] states that the presence of a family member with a specific health disease influences positively functional foods' acceptance.

5. Conclusions

In Italy, the demand for functional foods is constantly increasing and the Italian market for this type of product is relatively new and still not widespread. Since functional food represents a novelty in the Italian market, the knowledge of the factors influencing the consumption is useful, especially in Italy, where empirical studies on profiling consumer behavior are limited. Results derived from

this study provide interesting insights that may contribute to deepen the factors affecting consumers' consumption intention. In particular, consumption is determined by a host of factors, such as the presence of nutrition or metabolism disease, the consumers' knowledge and familiarity with the functional food and the feelings of well-being derived from the functional ingredients, as well as knowledge and awareness of the health effects. In addition, a trusted brand with sound market recognition helps in building consumer confidence in buying these products.

However, this research suggests that consumers do not have generally heard about functional foods. Only after being given a definition of functional food and some example of commercially available products, most of the sample stated that they or a component of their family have consumed functional foods at least once. This may be explained by the lack of unanimously accepted definitions of functional food, by the very fragmented European market and by the not homogeneously scattered over all segments of the food and drinks market of these types of food products (presently, the European market of functional food is dominated by gut health products, in particular, probiotics).

Consequently, due to the limited consumers' knowledge and awareness of the health effects of functional ingredients, there are strong needs for specific information and communication activities to consumers. However, the aware consumers of today believe in food products that promote health benefits and they are becoming increasingly aware of the link between diet and health. If consumer interest in the relationship between diet and health continues, the functional food sector is set to become an important branch of the European agri-food sector, offering attractive profit margins for food actors. Considering the explorative nature of this study, these results should be evaluated only as a springboard for future research. More in-depth analyses are still required.

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Conflict of interest

All authors declare no conflicts of interest in this paper.

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