

Review

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Relevant Attributes Influencing Consumers' Tomato Acceptance: A Systematic Review and Research Agenda

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Abstract: During the last two decades several studies were developed to understand the attributes able to affect consumer vegetable choice over the world. Focusing on fresh and processed tomato product, this study proposes a systematic literature review to systematize and critically apprise the current body of knowledge in this research field. In order to discover suggestions useful to enhance market strategies and policies about vegetable intake, the discovered tomato attributes were categorized, according the Search Experience and Credence logic, into: price, product features, packaging, convenience, brand, sensory properties, sustainability, origin, safety and health, production processes. By synthesizing the review findings, a multi-dimensional integrative content framework was conceived with the aim to maps the extant literature with multiple levels of analysis: antecedent, phenomenon and consequences. As part of the review, a future research agenda, theoretical and practical implications were discussed.

Keywords: consumer preference, consumer behavior, food choice, food pattern, vegetable consumption, SEC framework

1 Introduction

Consumers behavior about food is changing over time, due to its direct relation to changes in the macro-environment context. An example of this, is the vary responses of consumers to the COVID-19 pandemic condition: some of them

feel worried, recurring to the panic-buying of essential goods also through e-commerce (Jia et al. 2021); others remain indifferent and continue their usual behaviors, despite the government and health professionals guidelines (Campbell et al. 2020). Thus consumers food behavior is viewed as a complex process involving issues able to influence them when choose, purchase, use or dispose products (Hynes and Wilson 2016). The increased sensitivity of people awareness about their own well-being, health, safety and environmental issues represented a stimuli for agri-food system in developing products with healthy, safe and environmental friendly connotations (Ballen, Evans, and Parra-Acosta 2021; Bougherara, Ropars-Collet, and Saint-Gilles 2020; Hatanaka 2020; Kozup, Creyer, and Burton 2003; Panzone, Lemke, and Petersen 2016; Ratliff, Vassalos, and Hu 2020; Reczek et al. 2018). Particularly, the food–health linkage is becoming the focus of the modern consumer attention, because elevate the role of food from fuel for the body feed to a tool for the prevention and treatment of diseases (Cornil, Gomez, and Vasiljevic 2020; Papachristos and Adamides 2016; Skallerud and Wien 2019). In this sense vegetable and fruits categories are at the center of consumers food choices (Aschemann-Witzel and Stangherlin 2021). However vegetable intakes in Europe, United States of America, and across the world remain below World Health Organization recommendations (Dinnella et al. 2016). Among vegetables, tomato is, in terms of production volume, the fifth most cultivated crop at global level, with 160 million tons per year, and the eighth in the European continent, representing a pillar of the global food system (Baldi et al. 2021; Šugrova et al. 2020). Tomatoes, fresh and also processed, are consumed everywhere and they are recognized as high-quality products in terms of nutrient contents, absence of chemical contaminants, ecological footprint, ethical concerns (Baldi et al. 2021; Formoso et al. 2020; Rezitis and Pachis 2016; Rocha et al. 2013; Šugrova et al. 2020). Given these evidences and considering the broad availability of the product category in the marketplace (Maimaran and Fishbach 2014; Spinelli et al. 2019), tomato

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was chosen as the research object of the present study. With the scope to increase the consumption level of this product, public policies and marketing strategies able to foster the consumer awareness about the product quality are needed. Researchers had widely studied consumers preferences, identifying several food attributes able to affect the tomato purchasing choice for consumers over the world. However, at the best of our knowledge, no study proposes a systematization of the main findings discovered in this research field. Based on this reality, the aim of this study is to fill this emerging gap, proposing a systematic literature review through which increasing the understanding of consumer preferences about tomato. Thus, the purpose statement of the present study is composed by the following points: (i) to systematically review and critically analyze the current consumer preferences in tomato; (ii) to synthesize the review findings into a multi-dimensional integrative content framework, and (iii) to identify knowledge gaps, envisaging a future research agenda. Our results refine and extend the findings of past studies in several disciplines (e.g., marketing, food policy, agricultural economics) providing an overall picture of the consumer decision process in relation to tomato.

2 Methodology

2.1 Choosing a Review Methodology

An exhaustive review methodology is fundamental for analyzing systematically the body of knowledge of a specific topic (Crossan and Apaydin 2010). We chose to apply the systematic literature review methodology to identify, select, critically evaluate and synthesize the extant literature (Dias, Rodrigues, and Ferreira 2019). Through a transparent and replicable procedure, it allows us to discover the main findings of the reviewed research area (Tranfield, Denyer, and Smart 2003a; Vrontis and Christofi 2021). It was applied in studies focused on the discovering how products attributes could affect consumer behaviors and related implications (e.g., Samoggia and Riedel 2018; Symmank 2019). Among the several kinds of systematic literature review proposed by Paul and Criado (2020), we choose a domain-based review, and following the suggestions outlined by Crossan and Apaydin (2010); Leonidou et al. (2020); Snyder 2019; and Tranfield et al. (2003a, 2003b) it involves the following steps: (1) question formulation; (2) defining the protocols for review; (3) analysis of the results through thematic analysis and data synthesis. We concluded the review process identifying the key research gaps and the directions for future research with

reference to theory, context and methodology (Paul and Criado 2020).

2.2 Question Formulation

Assuring the quality of the review, the process starts with the definition of the review questions (Nguyen, de Leeuw, and Dullaert 2018). According to the research premise debated in the Introduction section, the following review question was defined: *“What are the quality attributes that the consumer considers important for tomatoes, referring to search, experience and credence quality attributes?”*. Since quality attributes are able to affect the consumer purchasing decision making represent a relevant aspect to consider in marketing and policy communication strategies.

2.3 Definition of the Review Protocol

To identify the relevant and quality studies that compose the sample of analysis, we define a review protocol according to the guidelines proposed by PRISMA (Moher et al. 2009). Keyword searches were used to identify the relevant literature and could be combined through Boolean operators to improve the accuracy of the selected sample. The search boundaries were set as Scopus electronic database (<http://www.scopus.com>), managed by Elsevier publishing, because its comprehensive journal coverage for business, marketing and food policy fields. Given the defined review question and using the Boolean operator, the following search formula was structured: *(“consumer behaviour” OR “consumer behavior” OR “food preference” OR “food choice” OR “food pattern” OR “consumer consumption”) AND “tomato”*). In this scheme, the first group of search terms contained item representative of consumer behavior and food choice field, connected to each other by means of the OR operator. The second one was composed by a single term, referred to the product concerned, and related to the first group using AND operator. The research was up to date as of March 2021 in Title, Abstract and Keyword fields of Scopus, due to these fields usually contain the terms representative of the work (Christofi, Leonidou, and Vrontis 2017; Vrontis and Christofi 2021). In order to capture all relevant literature, we did not limit our search with a specific coverage period. The initial sample, composed by 254 papers, was subject to additional evaluation, based on various exclusion criteria. As first, the search was focused on research article and review (document type) published in peer-reviewed academic journals (source title), with the aim to exclude non-academic

source, such as book chapters, editorial, extended abstract, book reviews and conference papers ($n = 19$ papers excluded per document type and three papers excluded per source title). Then, we excluded articles not available in English ($n = 11$ papers) and papers not available to the download ($n = 15$ papers). These exclusion criteria led to a usable sample of 206 articles that was further evaluated through the analysis of titles and abstract of the articles establishing if the study was useful for the purpose of the review. In this phase, we followed an elastic and inclusive approach no paying attention to whether the study focused totally or partially on the review question (Vrontis and Christofi 2021). A sample of 38 appeared eligible and was evaluated analyzing the full text of the study. In this phase, we accepted only the papers that were clearly related to the review topic and providing significant contribution to the body of knowledge of consumer preference about tomato' quality attributes. After this second round of review a final sample of 32 articles was selected.

2.4 Extraction, Analysis and Synthesis

Thematic analysis was conducted by applying content analysis, that is a “careful, detailed, systematic examination and interpretation of a particular body of material in an effort to identify patterns, themes, biases, and

meanings” (Lune and Berg 2016, 338). Specifically, qualitative content analysis was used and a data extraction form was conceived to extract and summarize useful data from the selected studies (Leonidou et al. 2020; Llorent-Bedmar, Cobano-Delgado Palma, and Navarro-Granados 2021; Nguyen, de Leeuw, and Dullaert 2018; Vrontis and Christofi 2021). The Review protocol used in this study was supplied as supplementary material. A training phase of authors was made in order to avoid differences in coding and abstraction (Snyder 2019), minimize human error and increase the procedure replicability (Leonidou et al. 2020; Nguyen, de Leeuw, and Dullaert 2018). Figure 1 summarizes the literature search strategy and the related findings.

3 Results

The sample of analysis was analyzed to identify the tomato attributes that consumers considered important during purchase and consumption. An overview of the analysis sample is supplied in Table 1, where for each retrieved attributes were reported: the references which address the attribute, the percentage of papers that considers the attribute within the sample and, the profile of consumers most influenced by the attribute. Specifically, the consumer profile was built starting from the analysis of available information reported in “sample information” column of the

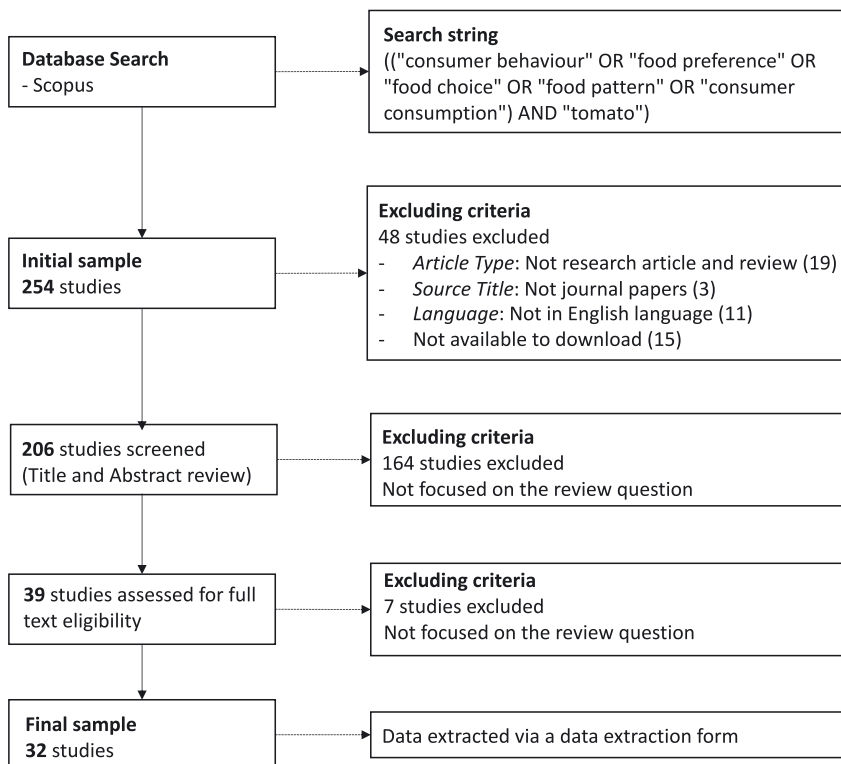


Figure 1: Literature search STRATEGY

Table 1: Overview of the papers classification per ATTRIBUTE.

Attributes	References that address attributes	Sample percentage	Consumer profile
<i>Product features</i>	(Jürkenbeck and Spiller 2021; Flax et al. 2021; Timpanaro et al. 2020; Jaeger et al. 2018; Frez-Muñoz, Steenbekkers, and Fogliano 2016; Alamanos, Bourlakis, e Tzimitra-Kalogianni 2013; Martínez-Carrasco et al. 2012; Tobler, Visschers, e Siegrist 2011a; Verbeke et al. 2008; Babicz-Zielinska 1999)	31.25%	Women, with an average age of 40, with a secondary level of education and a medium range of monthly income
<i>Price</i>	(Akgüngör, Miran, and Abay 2001; Babicz-Zielinska 1999; Baldi et al. 2021; Exenberger, Bucko, and Rabatin 2020; Flax et al. 2021; Hoek et al. 2017; Jürkenbeck and Spiller 2021; Jürkenbeck, Spiller, and Meyerding 2019; Martínez-Carrasco et al. 2012; Meyerding 2016; Skreli et al. 2017; Šugrova et al. 2020; Timpanaro et al. 2020; Utami, Sadeli, and Perdana 2016; Verbeke et al. 2008)	46.88%	Women, with an average age of 52, with a secondary level of education and a medium range of monthly income
<i>Packaging and label design</i>	(Frez-Muñoz, Steenbekkers, and Fogliano 2016; Jürkenbeck e Spiller 2021; Meyerding 2016; Šugrova et al. 2020; Tobler, Visschers, and Siegrist 2011a; Utami, Sadeli, and Perdana 2016; Verbeke et al. 2008)	21.88%	Women, with an average age of 45
<i>Brand</i>	(Frez-Muñoz, Steenbekkers, and Fogliano 2016; Martínez-Carrasco et al. 2012; Šugrova et al. 2020; Timpanaro et al. 2020; Utami, Sadeli, and Perdana 2016; Verbeke et al. 2008)	18.75%	Women, with an average age of 43 and a secondary level of education
<i>Convenience features</i>	(Alamanos, Bourlakis, and Tzimitra-Kalogianni 2013; Babicz-Zielinska 1999; Hershko et al. 2020; Spinelli et al. 2019; Šugrova et al. 2020)	15.63%	Women with an average age of 34 and with secondary level of education
<i>Sensory properties</i>	(Alamanos, Bourlakis, and Tzimitra-Kalogianni 2013; Babicz-Zielinska 1999; Días et al. 2019; Dinnella et al. 2016; Exenberger, Bucko, and Rabatin 2020; Flax et al. 2021; Frez-Muñoz, Steenbekkers, and Fogliano 2016; Hershko et al. 2020; Jaeger et al. 2018; Jürkenbeck and Spiller 2021; Jürkenbeck, Spiller, and Meyerding 2019; Oltman, Jervis, and Drake 2014; Rocha et al. 2013; Spinelli et al. 2019; Šugrova et al. 2020; Van Stokkom et al. 2018; Verbeke et al. 2008; Zhao et al. 2007)	53.13%	Women, with an average age of 36 and with secondary level of education
<i>Safety and Health</i>	(Akgüngör, Miran, and Abay 2001; Alamanos, Bourlakis, and Tzimitra-Kalogianni 2013; Babicz-Zielinska 1999; Días et al. 2019; Flax et al. 2021; Hoek et al. 2017; Martínez-Carrasco et al. 2012; Oltman, Jervis, and Drake 2014; Spinelli et al. 2019; Šugrova et al. 2020; Timpanaro et al. 2020; Tobler, Visschers, and Siegrist 2011a; Verbeke et al. 2008)	40.63%	Women, with an average age of 33 and with secondary level of education
<i>Origin</i>	(Baldi et al. 2021; Días et al. 2019; Frez-Muñoz, Steenbekkers, and Fogliano 2016; Jürkenbeck and Spiller 2021; Jürkenbeck, Spiller, and Meyerding 2019; Martínez-Carrasco et al. 2012; Meyerding 2016; Skreli et al. 2017; Šugrova et al. 2020; Timpanaro et al. 2020; Tobler, Visschers, and Siegrist 2011a; Verbeke et al. 2008)	37.50%	Women, with an average age of 41, with a secondary level of education and a medium range of monthly income
<i>Environmental Sustainability</i>	(Baldi et al. 2021; Días et al. 2019; Hoek et al. 2017; Jaeger et al. 2018; Tobler, Visschers, and Siegrist 2011a; Verbeke et al. 2008)	18.75%	Women, with an average age of 37, secondary level of education and a medium range of monthly income
<i>Production processes</i>	(Días et al. 2019; Frez-Muñoz, Steenbekkers, and Fogliano 2016; Gokalp Goktolga and Esengun 2009; Skreli et al. 2017; Tobler, Visschers, and Siegrist 2011a; Zhao et al. 2007)	18.75%	Women and with an average age of 35

“extraction form” (see Supplementary Material), with the aim to recognize which characteristics have the consumer most influenced by each attribute during own food choices. In the following table age was expressed as average value and income is referred to the monthly income. Finally, with the aim to follow the information economy approach, exploring the level of quality that a consumer can discover at several stages, the attributes discovered through the current review (listed in Table 1) were shown according the Search, Experience, Credence (SEC) framework.

3.1 Search and Experience Attributes

3.1.1 Product Features

Product features resulted moderately analyzed in the selected sample, as shown in Table 1. During the food choice process consumer is faced with more products, and each product is characterized by a multiplicity of features able to influence them: variety, conservation characteristics, availability, storage shelf-life. In their study, Jürkenbeck and Spiller (2021) considered variety as tomato attribute and hypothesized that this information enhances consumers to purchase the product with the desired taste. Analyzing four varieties of tomato (cocktail tomato, roma tomato, beefsteak tomato, salad tomato), authors discovered that variety attribute was negligible for three clusters of German consumers on four. However, it emerged that consumers belonged to the price-sensitive cluster tended to select tomatoes of the cocktail variety. Conversely, Martínez-Carrasco et al. (2012) declared that variety attribute was the observable variable that contributed the most toward explaining the product guarantee for UK consumers. At last, Spinelli et al. (2019), considering processed tomato varieties introduced in the marketplace, such as canned cherry, tomato puree and datterini tomatoes (with or without skin), studied if the consumer perceives the sensory variety related to the several tomato species assigning to this perception different uses and emotions. The authors discovered that even if the several varieties not differing in liking, consumers assigned different emotions (e.g., reassurance for tomato puree, curiosity for peeled datterini). Referring to conservation aspects (deep-frozen, un-chilled storage, unpacked), Tobler, Visschers, and Siegrist (2011b) discovered that consumers prefer the deep-frozen foods. Accessibility and easy to storage were rating as factors with a medium impact in vegetable choices of Poland consumers (Babicz-Zielinska, 1999). Finally, according to Verbeke et al. (2008) shelf-life and availability, was the most

influencing attributes able to conditioning the choices also of consumers unaware about tomatoes.

3.1.2 Price

Price attribute resulted widely analyzed in the selected sample, as shown in Table 1. It is recognized that a significant amount of consumers is price-oriented (Jürkenbeck and Spiller 2021) and companies often adopt marketing strategies based on discount and sale to stimulate purchases (Kienzler and Kowalkowski 2017). Confirming the relevance, 15 studies of the sample investigated the price attribute. Price resulted the most important attribute of tomato for German consumers (Jürkenbeck and Spiller 2021; Jürkenbeck, Spiller, and Meyerding 2019), Australian consumers (Hoek et al. 2017), Poland consumers (Babicz-Zielinska 1999) and Malawi mothers (Flax et al. 2021). Jürkenbeck and Spiller (2021) found a cluster of consumers totally price-oriented and other consumers segmentations price-sensitive which implied that German consumers preferred to purchase when tomatoes were offered at low prices, confirming the previous results of Jürkenbeck, Spiller, and Meyerding (2019). However, it is interesting to note that Meyerding (2016), investigating German consumers, found that price is ranked 12th in the importance of the characteristics of purchasing tomatoes, even if it resulted the most important characteristic of the vine tomatoes variety. Hoek et al. (2017), in the comparison of fresh and canned tomatoes, observed a small shift choice under the influence of price changes: when the price difference between the two types of products was reduced, the choice for fresh tomatoes increased to 33%. Albanian consumers were characterized by a price sensitive cluster and another cluster in which consumers interpreted the price as signal of quality (Skreli et al. 2017). This second trend was also discovered by Verbeke et al. (2008) among the Belgium consumers which were aware of the *Flandria* tomato variety or not. The price sensitivity was discovered also by Flax et al. (2021) for Malawian mothers which shifted to less expensive tomatoes or bought smaller quantities when prices increased. Exenberger, Bucko, and Rabatin (2020) discovered that the knowledge of the price affects Slovak consumers behavior: the perception of the quality by the university students was significantly influenced by whether they knew the prices of tomatoes being tested or not. But, Šugrova et al. (2020) found that the position of the young Slovak consumers were neutral, since this generation resulted not price-sensitive concerning the purchase of tomatoes. For Italian consumers, it was found a willing to pay a premium price for tomato with sustainable and origin characteristics (Baldi et al. 2021) or

for biofortified tomatoes even if the informed consumer on this specific product represented a small market segment (Timpanaro et al. 2020). Similarly, Indonesian consumers recognized a higher price for brand and packaging attributes (Utami, Sadeli, and Perdana 2016) and in Poland market existed a potential segment composed by individuals willing to pay a price premium of 2% over the unlabeled products (Akgüngör, Miran, and Abay 2001). Even if the research proposed by Martínez-Carrasco et al. (2012) revealed that the price had a declared importance superior to the average (3.88 in a five-level Likert scale), the authors concluded that the role of price in perceived quality of tomato was doubtful, because the price reflected the seasonality of the product and the length of the distribution chain.

3.1.3 Packaging and Label Design

Packaging and label design resulted low analyzed in the selected sample, as shown in Table 1. Packaging is an important product attribute in quality evaluation (Ulaga and Chacour 2001) which consumer needs and values during the food choice (Utami, Sadeli, and Perdana 2016). It is capable to differentiate perishable consumer goods and it is designed to increase the product perceived quality. Similarly, label is increasingly used to communicate the product features to the consumer (Deliza, Rosenthal, and Silva 2003), especially for those that are not easy to verify by consumer (Jürkenbeck, Spiller, and Meyerding 2019). In our sample of analysis, we discovered five studies that considered the role of packaging and label design in consumer food choice. Particularly, Utami, Sadeli, and Perdana (2016) and Verbeke et al. (2008) found a positive effect of packaging on creating value of tomato. Utami, Sadeli, and Perdana (2016) suggested the need to educate farmers of premium quality tomatoes regarding the importance of packaging to enhance the customer value of their product. Frez-Muñoz, Steenbekkers, and Fogliano (2016) and Tobler et al., (2011) focusing the attention on the packaging material. According to Frez-Muñoz, Steenbekkers, and Fogliano (2016), packaging material was the most important extrinsic quality attribute for Chileans and Netherlands referring respectively to a glass container and a can with easy open system. In contrast, for Italians, it was one of the least relevant attributes during vegetable purchasing, especially when the product familiarity was high. Looking at metal, plastic and glass packaging, the results proposed by Tobler et al. (2011a, 2011b) shown that consumers seemed to attribute more environmental harm to packaging than was done in life cycle assessment (LCA). The authors considered this overrating of packaging

related to the outcome generated by the media campaign that promote recycling behavior. The results of Šugrova et al. (2020) were discordant: the decision-making process of young Slovak consumers when buying tomatoes was least influenced by packaging and information on the packaging.

3.1.4 Brand

Brand resulted low analyzed in the selected sample, as shown in Table 1. During choice and purchasing act having food with brand on label is important for consumers due to their perceived trust (Khamitov, Wang, and Thomson 2019). That fact leads companies to find suitable and efficient ways of showing consumers this trust (Dzyabura and Peres 2021). From Šugrova et al. (2020) the preference about tomatoes choice of the young Slovak consumers emerge: young consumers buy tomatoes once a week or several times a month, demonstrating a good familiarity with the product and their brand, but most of them not demonstrate a brand loyalty. According to Frez-Muñoz, Steenbekkers, and Fogliano (2016) brand attribute was able to influence Italians, Netherlands and Chileans consumers choices and familiarity about tomatoes: Chileans had low familiarity because shopped processed tomatoes only in big supermarkets with few brands; Netherlands had a medium familiarity because the product is known as well as their brands and presence in every supermarket; Italians had an high familiarity due to they regularly consumption of processed tomatoes and the presence of them in every supermarket or small grocery shops with a wide range of brands. Downline these evidences the authors found that for Netherlands and Chileans brand was the least attribute in terms of importance, particularly Chileans preferred a known brand because linked to the perception of a high quality product; on the contrary, for Italians brand was one of the most important attributes, preferring the farmer's brand (Frez-Muñoz, Steenbekkers, and Fogliano 2016). The same importance was detected by Utami, Sadeli, and Perdana (2016) for Indonesian people who consider branding able to provide significant contribution to customer value, influencing personal food choice. Particularly, for Indonesian consumers, branded tomatoes were perceived with an higher value rather than the generic vegetable mostly sold in the market (Utami, Sadeli, and Perdana 2016). On the contrary, for Belgium and Spanish consumers, Verbeke et al. (2008) and Martínez-Carrasco et al. (2012) found that brand attribute, about fresh tomatoes, was not significant for consumers. Verbeke et al. (2008) stated that brand or label claims not influence the belief of Belgium consumers in health benefits from eating *Flandria* tomatoes. For

Spanish consumers, brand was the lowest in terms of importance due to the absence of recognized brands in the fresh tomato sector (Martínez-Carrasco et al. 2012).

3.1.5 Convenience Features

Convenience features resulted low analyzed in the selected sample, as shown in Table 1. After the review of several definitions, Buckley et al. (2005) explained that the convenience is associated with the possibility to reduce the inputs (time, efforts, etc.) required by consumer in food shopping, cooking and consumption. Among the papers that composed the analyzed sample, we retrieved several attributes that can be considered convenience features: convenience, attractiveness, discount, sale, habits, advertising, fashion, accessibility, availability and so on. An effective way to positively affect food choices consisted in adding convenient (to be seen, picked up and consumed) or attractive (a nice packaging, a catchy brand name or a reasonable price) elements in products (Wansink 2015). For example, it was discovered that lifestyle and habits influenced the consumption of packed vegetable as the main reasons for selecting these products are convenience and saving time. Hershko et al. (2020) and Babicz-Zielinska (1999) confirmed that attractiveness and convenience cues affected the appeal of foods. According to Alamanos, Boursakis, and Tzimitra-Kalogianni, (2013) eating habits were one of the main factors able to influence the consumption of fresh tomatoes, but they were considered to have medium impact by Babicz-Zielinska (1999); and Šugrova et al. (2020). Moreover, Babicz-Zielinska (1999) showed a medium impact of accessibility and popular use and a low impact of fashion, advertising and easy to store on the consumption of fresh tomatoes. Šugrova et al. (2020) evaluated also the impact of discount and sale showing a medium impact on consumer behaviors. At last, Verbeke et al. (2008) considered information availability about food as a convenience component detecting a medium impact on the consumption of tomatoes.

3.1.6 Sensory Properties

Sensory properties resulted widely analyzed in the selected sample as shown in Table 1. The several sensory properties, discussed below, were grouped into three main categories: appearance, taste and flavor, smell. Appearance category encompassed the sensory properties that involve the sense of sight. Generally, all authors found a positive relationship between color and tomato sensory qualities. Jürkenbeck, Spiller, and Meyerding (2019) found that the color for fresh tomato was the most important attribute for three out

six clusters of German consumers. However, the authors debated that green and yellow tomatoes were rejected by all segments. It emerges that an attractive tomato was red (Jürkenbeck, Spiller, and Meyerding 2019; Oltman, Jervis, and Drake 2014; Rocha et al. 2013) with even and intense color (Oltman, Yates, and Drake 2016). These results were confirmed also for processed tomato. Indeed, Frez-Muñoz, Steenbekkers, and Fogliano (2016) retrieved for all segments of customers the preference of red and light red, accompanied by the preference of a glass packaging that allowed consumer to evaluate the color during the purchase of processed tomato. Also, the brightness of the color was perceived as an important attribute (Rocha et al. 2013; Verbeke et al. 2008). Referring to tomato size we discovered a dispute: some studies shown that it was not perceived as key quality attributes (Frez-Muñoz, Steenbekkers, and Fogliano 2016; Jürkenbeck, Spiller, and Meyerding 2019; Oltman, Yates, and Drake 2016; Rocha et al. 2013) and others considered the size an important external factor related to appearance (Martínez-Carrasco et al. 2012; Oltman, Jervis, and Drake 2014; Verbeke et al. 2008). Particularly, Oltman, Jervis, and Drake (2014) affirmed that an attractive tomato was medium/small sized. The general appearance or presentation of tomato was a factor able to affect the consumer choice of people (Verbeke et al. 2008) or young people (Dinnella et al. 2016; Šugrova et al. 2020) representing a quality indicator also for mothers (Flax et al. 2021). It represented an exception to this trend the study proposed by Rocha et al. (2013) according to which no significant differences were found referring to beautiful tomatoes. Several studies (Frez-Muñoz, Steenbekkers, and Fogliano 2016; Oltman, Jervis, and Drake 2014; Oltman, Yates, and Drake 2016; Rocha et al. 2013) shown the presence of a consumers' cluster that considered firmness one the most important quality attributes, representing a driver of tomatoes purchase intention (Rocha et al. 2013). On the contrary, from the results shown by Jürkenbeck, Spiller, and Meyerding (2019) and Martínez-Carrasco et al. (2012), firmness was considered one of the least important attributes respectively for German and Spanish consumers. In comparison with the other sensory attributes, the skin attribute had no significant influence on the consumers (Jürkenbeck, Spiller, and Meyerding 2019; Oltman, Jervis, and Drake 2014; Oltman, Yates, and Drake 2016; Rocha et al. 2013). Moreover, it was found out that most young consumers (Šugrova et al. 2020), mothers (Flax et al. 2021) and consumers in general (Babicz-Zielinska 1999) were mostly influenced by freshness during the food choice especially for fruits and vegetables. At last, it was discovered as quality (Šugrova et al. 2020) and external damage

(Martínez-Carrasco et al. 2012) were able to affect consumer food choice referring to tomato product.

Taste and flavor category, encompasses the sensory properties that involve the sense of taste. Several studies discussed that better flavor (Alamanos, Bourlakis, and Tzimitra-Kalogianni 2013; Dinnella et al. 2016; Martínez-Carrasco et al. 2012; Oltman, Jervis, and Drake 2014; Oltman, Yates, and Drake 2016; Rocha et al. 2013) and taste (Babicz-Zielinska 1999; Dinnella et al. 2016; Flax et al. 2021; Jürkenbeck, Spiller, and Meyerding 2019; Verbeke et al. 2008) were strategic elements in fresh tomatoes consumption. Particularly, Jürkenbeck, Spiller, and Meyerding (2019) found a cluster of consumers that base the tomatoes choice principally on taste, and another cluster that considered important this attribute. The consumers of this study gave less importance to flavor. Dinnella et al. (2016), in a cross-countries study (Denmark, France, Italy, UK), discovered the presence of consumers, regardless of nationality, that preferred tomatoes with delicate flavor. Ripe flavor, and sweet and umami tastes were drivers of liking for tomatoes at consumption for consumers of Raleigh (USA) (Oltman, Yates, and Drake 2016). It is interesting to note that flavor not represented a strategical element in distinguish conventional or organic tomato (Zhao et al. 2007) and had a low influence in the food choice of young consumers (Šugrova et al. 2020). Studying the relationship between taste and flavor cues, Van Stokkom et al. (2018) discovered that the combined use of these cues with smell cues increase the consumer identification of vegetable in the Netherlands. Particularly, referring to a specific taste of tomatoes, it emerged the presence of groups of consumers who preferred sweetness (Frez-Muñoz, Steenbekkers, and Fogliano 2016; Jürkenbeck and Spiller 2021; Rocha et al. 2013), aromatic (Jürkenbeck and Spiller 2021), seeds presence (Frez-Muñoz, Steenbekkers, and Fogliano 2016; Oltman, Yates, and Drake 2016), juiciness (Frez-Muñoz, Steenbekkers, and Fogliano 2016; Verbeke et al. 2008), consistency and acidity (Frez-Muñoz, Steenbekkers, e Fogliano 2016), soft and smooth (Rocha et al. 2013). Any specific preference emerges for sour (Jürkenbeck and Spiller 2021), salty, thick, few seeds, acidity, and crunchy (Rocha et al. 2013).

Smell category, encompasses the sensory properties that involve the sense of smell. Several studies discovered that nice aroma was a strategical factor in tomato food choice (Alamanos, Bourlakis, and Tzimitra-Kalogianni 2013; Šugrova et al. 2020; Yamada et al. 2014). Martínez-Carrasco et al. (2012), even if declared a good importance for aroma, sustained that this attribute obtained a less relative weight comparing with other sensory attributes (firmness, flavor). It was interesting to underlie the

presence of two studies that aimed to establish linkages between consumers' sensory tomato perceptions and: i) emotional association (Jaeger et al. 2018; Spinelli et al. 2019) and ii) consumer's experience (Spinelli et al. 2019). Particularly, Jaeger et al. (2018) considered the relationship between color, appearance, skin, sweetness, sourness, salty, taste, flavor, creamy, thick, watery, bitter, seed presence, fragrant, odor and emotional associations. The authors found that customized vocabularies of modest length able to describe sensory information were desirable when seeking to establish linkages between emotional associations and sensory characteristics of food/beverage stimuli. Spinelli et al. (2019) studied the relationship between color, appearance, skin, sweetness, sourness, salty, taste, flavor, creamy, thick, watery, bitter, dried, seed, odor and customers' emotional associations and experiences. The results shown that consumers perceived the products as different in terms of sensory properties and that these sensory properties were associated with different uses, emotions, and functional conceptualizations: "peeled datterini were also perceived as more cheerful, more associated to surprise and curiosity" (Spinelli et al. 2019 p. 22).

3.2 Credence Attributes

3.2.1 Safety and Health

Safety and Health resulted moderately analyzed in the selected sample, as shown in Table 1. In recent years, consumer choice was influenced by increasing attention on the food health and safety (Timpanaro et al. 2020). Consumers over the world are available to spend more for food perceived as healthy and safe: Malawian mothers intended to spend more for healthy food (Flax et al. 2021); Turkish consumers were willing to pay for the presence of a food safety label (Akgüngör, Miran, and Abay 2001); miscellaneous country consumers, engaged through web in Timpanaro et al. (2020) study, demonstrated a high willingness to pay of functional food. The presence of information related to safety and health, was detected as determinant also by Mesías Díaz et al. (2012), who confirmed that consumers value organic food positively for its health and safety qualities. Also for Swiss consumers organic tomatoes were rated positively, especially in healthiness for the environment (Tobler, Visschers, and Siegrist 2011a). The relation between health and environment was recognized also by Hoek et al. who found that consumer prefer product with a combination of a health and environment logos compared to individual label (Hoek et al. 2017). Label, particularly guarantee label, was recognized by

Martínez-Carrasco et al. (2012) to have less weight as influencing factor among Spanish consumers food choice. Oltman, Jervis, and Drake (2014) and Verbeke et al. (2008) found that health claim on label not influence respectively USA and Belgium consumers food choice. On the contrary, during vegetable choice, “good for health” claim seemed to influence Polish university students, more women than men (Babicz-Zielinska 1999). The aspect of perceived healthiness of food was remarked also by Alamanos, Bourlakis, and Tzimitra-Kalogianni (2013); Babicz-Zielinska (1999); Timpanaro et al. (2020); and Verbeke et al. (2008) according to which the nutritional content of food is considered as one of health attribute. Timpanaro et al. (2020) consider nutritional knowledge with a high power to fight the against malnutrition and diseases. From this perspective nutritional content attribute evaluation was able to elevate the perception of food by consumers, shifting from a source for the body’s nutritional needs to a tool for the prevention and treatment of diseases. The consumers which perform that kind of evaluation were segmented by Timpanaro et al. (2020) and Alamanos, Bourlakis, and Tzimitra-Kalogianni (2013) as “health-conscious”, who was consumers which preferred to select vegetables basing on nutritional value. Particularly, from Verbeke et al. (2008) study it emerged that consumers, who consider relevant nutritional content value, have strong beliefs in the health benefits from eating tomatoes. Also, Babicz-Zielinska (1999) confirmed this importance.

3.2.2 Origin

Origin resulted moderately analyzed in the selected sample, as shown in Table 1. By using a regional or origin indication, companies are able to create in consumers associations between the product and the provenance region, enriching the product with an image. Verbeke et al. (2008) found that Belgium consumers perceived differently the quality of *Flandria* tomatoes and other tomatoes because guarantying of origin and provenience. Tobler, Visschers, and Siegrist (2011b) found that Swiss consumers evaluated domestic product (local product) more favorably, and were inclined to associate products from less developed countries with lower in quality and performance. Baldi et al. (2021) found that for Italians and British consumers, the origin was the most preferred attribute during the tomato’s choice with strong preference for the South European provenience and negatively affected by tomatoes from Extra Europe. The Italians attention to origin attribute was confirmed also by Frez-Muñoz, Steenbekkers, and Fogliano (2016) which found that the country of origin was the most important parameter for Italians. Moreover,

Italians were the only group of consumers, among Netherlands and Chileans ones, which preferred product with the Product Designation of Origin (PDO) certification, independently of the country of origin. On the contrary, Netherlands preferred product with specific provenience (Mediterranean origin) and Chilean consumers preferred organic product with local origin (Frez-Muñoz, Steenbekkers, and Fogliano 2016). For Germans consumers, origin attribute was the second in terms of importance (Jürkenbeck and Spiller 2021), but if linked to regionality loses importance, may be due to the different meanings to different consumers of regionality, and no legal agreement about the term’s definition in Germany. On the other side, in several studies (Martínez-Carrasco et al. 2012; Skreli et al. 2017; Šugrova et al. 2020; Timpanaro et al. 2020), the origin attribute emerged as not so important for consumers. It was interesting to note that for Albanians origin attribute, in general, not seem to be significant on food choices but gained relevance if Lushnja and Korça regions were specified as location of provenience (Skreli et al. 2017). Slovak consumer not cared about country of origin and particularly they preferred Slovak tomatoes (Šugrova et al. 2020). Referring to functional tomatoes, origin was important not only if referred to final food but also of the functional ingredient because regulated by Regulation (EC) 1925/2006, particularly about the addition of vitamins, minerals and certain other substances with beneficial properties (Timpanaro et al. 2020).

3.2.3 Environmental Sustainability

Environmental Sustainability resulted low analyzed in the selected sample, as shown in Table 1. This attribute represents the impact that the food production generates on the environment in terms of pollution, resource exploitation and waste. A new and growing environmental awareness is remodeling food consumption behaviors (Baldi et al. 2021; Grunert, Hieke, and Wills 2014; Tobler, Visschers, and Siegrist 2011b). In this context the farming activity could have a big impact on sustainability doing the difference in terms of resources preserving during cultivation phases. Baldi et al. (2021) in their study considered the fresh tomatoes as analysis object precisely for its non-negligible environmental impact in terms of resource usage efficiency. Italian consumers were available to spend more for fresh sustainable tomatoes produced in Southern Europe with a low quantity of water. Thus, country-origin attribute was detected as strictly connected to the sustainability attribute (Baldi et al. 2021; Meyerding, Schaffmann, and Lehberger 2019). Meyerding, Schaffmann, and Lehberger (2019) found that German consumers preferred

first and foremost an economic, safe and healthy product and only after that were they willing to pay for, respectively, first social and second climate issues. Indeed, climate issues were few perceived because consumers believe that climate issues cannot be controlled through tomatoes purchasing. On the contrary, environment logos or information were able to affect the choice of Australian consumers among a product and their sustainable alternatives and that this choice was linked to the alternative similarity, the familiarity with them and the liking of them (Hoek et al. 2017). About sustainability attribute, Tobler et al. (2011a, 2011b) analyzed the preferences of Swiss consumers within environmental friendliness context, but comparing preferences with LCA requirements for 10 vegetables. In contrast to the LCA results, Tobler et al. (2011a, 2011b) found that Swiss consumers perceived (i) transportation distance rather than transportation mode as more impactful on environment and (ii) organic production as much more important for the environmental friendliness. Moreover, fair trade attribute was rated as relatively among Swiss consumers, giving an input to LCA experts in order to consider social issues together with sustainability ones. Tobler et al. (2011a, 2011b) and Mesías Díaz et al. (2012) findings suggested that the current product information about sustainability context were still insufficient for judging their environmental friendliness. An high willingness to pay for organic food (perceived by Spanish more environmental friendly than the conventional ones) was recovered among informed consumers with regular access to organic food (Mesías Díaz et al. 2012). Verbeke et al. (2008) found that for Belgium consumers the *Flandria* quality label of tomatoes stands in the first place for high quality also because produced through an environmentally friendly production process.

3.2.4 Production Processes

Production processes resulted low analyzed in the selected sample, as shown in Table 1. The production processes information influenced consumers preference. Even if in some cases production processes regards also elements related to environmental sustainability, we choose to consider this attribute as independent one, since production processes involve other aspects besides the environmental one, such ethical or economic issues. Knowing if a tomato is grown ecologically or conventionally could made the difference on consumers food choice (Zhao et al. 2007). This information played a strategic role also in Mesías Díaz et al. (2012) study where although the consumers revealed to know what an organic food was, contrasted with their lack of knowledge about their features able to differentiate it from

conventional one. Particularly, a high portion of participants revealed to know that organic foods were products with a common logo, that they were free of genetically modified organisms (GMO) and that they were supervised by regulatory boards, but most consumers still believe that organic food were only fresh food or produced by means of traditional farming practices (Mesías Díaz et al. 2012). Information about food production process resulted relevant for Swiss, Chileans, Netherlands and Italians consumers, since they perceived organic production as very relevant due their low impact in the environment (Frez-Muñoz, Steenbekkers, and Fogliano 2016; Tobler, Visschers, and Siegrist 2011a). According to Skreli et al., Albanian consumers could be clustered into four groups, for two of them production system was the most important attribute. Particularly, open field tomatoes were strongly preferred to greenhouse tomatoes (Skreli et al. 2017). From Gokalp Goktolga and Esengun (2009), Turkish consumers' willingness to pay for non-GMO products was most influenced by household size, monthly income and food expenditure.

3.3 An Integrative Conceptual Framework

The integrative conceptual framework in Figure 2 is derived from a synthesis of the findings of the present systematic literature review, with the aim to explicate the influence of quality attributes in consumers food choice for tomato product. The framework was conceived following the antecedents-consequences logic (Christofi, Vrontis, and Cadogan 2021a, 2021b; Vrontis et al. 2021). Antecedents represent the reason why the studies of the sample were carried out and were systematized in three categories: the reasons to investigate consumers behaviors during the tomato purchasing process; the reasons to investigate the impact of food choice on health and dietary; the reasons to investigate new products and species to satisfy emerging consumers' needs. Similarly, consequences represent the elements that the authors of the sample envisaged as outcomes of tomato food choice analysis. The retrieved consequences were systematized in three categories: strategies useful to tomato company to increase the product value (market); strategies useful to governments to support the industry development and enhance consumer protection (policy); strategies useful in both of the above directions. The list of discovered attributes and their relationship with the consumer characteristics reported in Table 1, were also summarized in Figure 2.

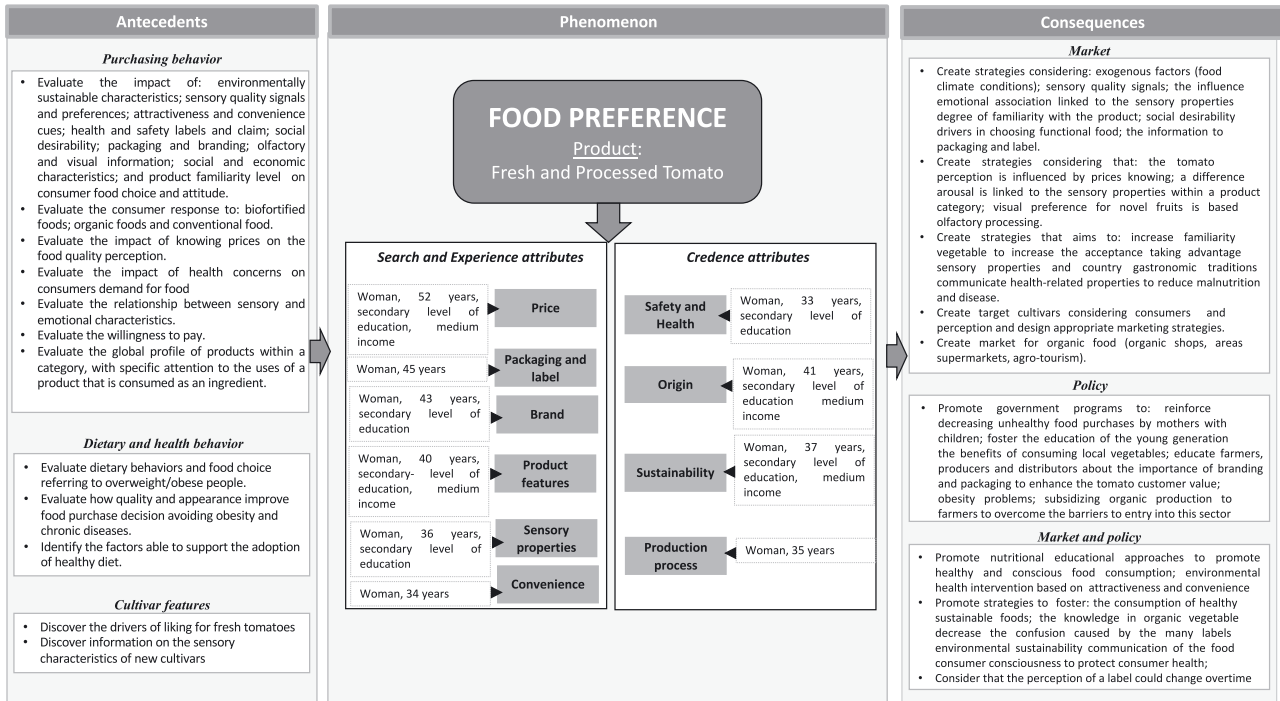


Figure 2: Integrative conceptual FRAMEWORK OF tomato food PREFERENCES.

The framework represented, in a single view, the complex interaction between consumer needs and company offers. Policy makers and food companies could find in this framework a stimulus to consider in a wide range of issue before developing, respectively, their tomato policies and market strategies. It was not an exhaustive framework, but rather meant as a multidimensional, integrative one to which other stakeholders can incorporate knowledge or modify in the future the trends retrieved in this review. In this view, it can serve as building block to guide future research efforts in a more systemic and constructive way.

4 Future Research Agenda

With the aim to provide clearer and more valuable research directions, leveraging on the identified limitation of extant literature, we propose the following research agenda.

Starting with the focus on the *product type*, we discovered that transformed tomato was little investigated then the fresh tomato underling a deeper gap for this type of product. From *consumer perspective*, the increased sensitivity in well-being, health and sustainability impacts, put fruits and vegetable at the center of food choices (Formoso et al. 2020; Verbeke 2005), because these products represent a healthy choice, source of nutritional elements (lycopene and vitamins

A and C) (Bryce et al. 2003). Moreover, the production of horticultural crop has a non-negligible environmental impact (Baldi et al. 2021) and ethical concerns referred to the employee working conditions. Thus, analyze the consumer preference about tomato and identify the several attributes able to affect the consumer choice appear to be promising enough to warrant in-deep investigation with the aim to provide to: (i) tomato industry more guidelines in marketing strategies; (ii) policy maker interesting points of reflection about the paths that food policy could or should take and (iii) consumers the possibility to make conscious food choice. From the *geographical perspective*, consumer behavior research is strongly influenced by cultural, habits and diet (Moore, Wilkie, and Desrochers 2016). For example, tomato is an iconic product in Italy, symbol of its food culture and diet over the world (Choudhary et al. 2019; Garibaldi and Pozzi 2018). This was also confirmed by our analysis in which we found that Italy was the most analyzed country. Indeed, it emerged that the research has principally focused on consumers within the market context of Italy, United States, Germany, United Kingdom, Turkey, Slovenia and Spain. Figure 3 summarizes the overall geographical distribution of the analyzed study, in which the circle size represents the number of studies per locations.

Given the presence of the product in a worldwide scenario, an important consideration for future research is

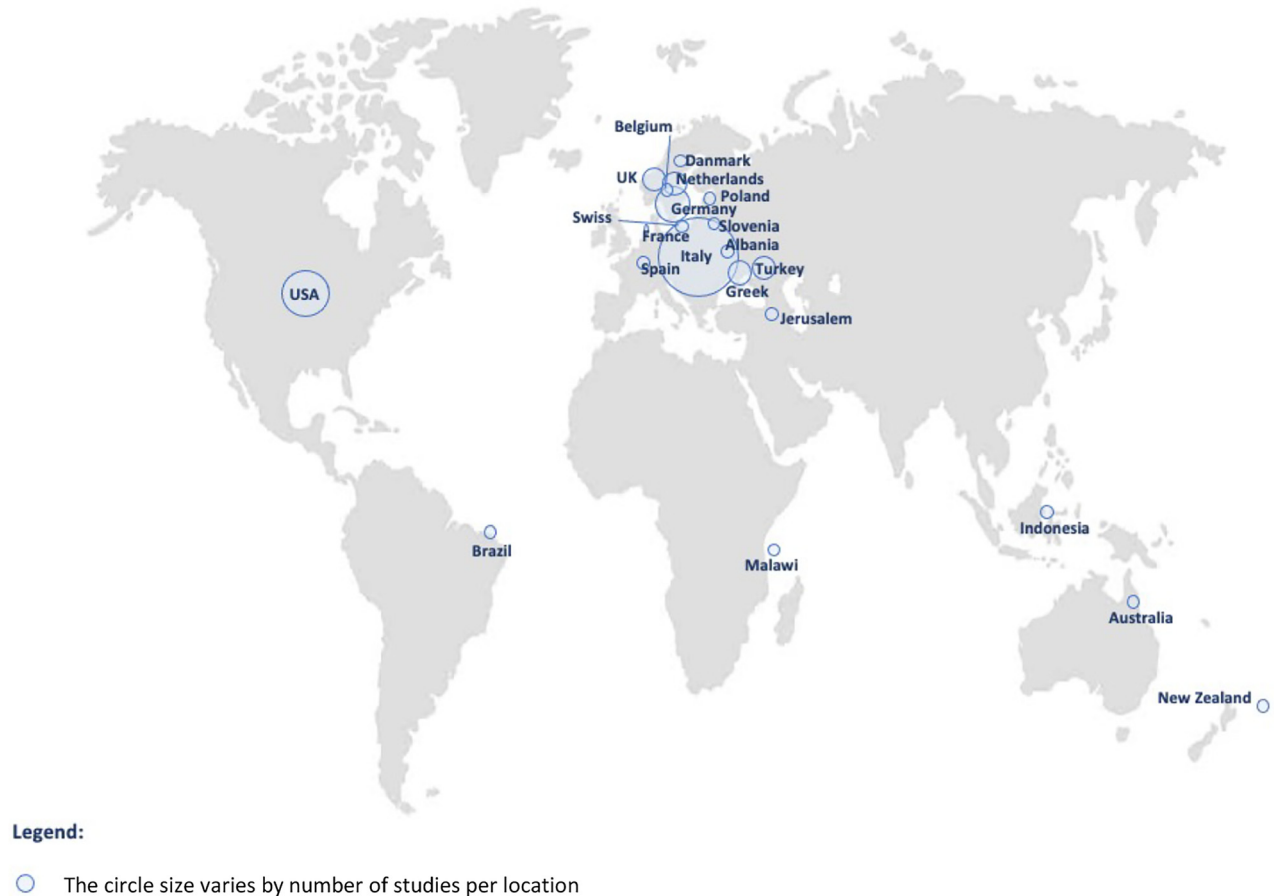


Figure 3: Geographical distribution of ANALYSED STUDIES.

the expansion of the geographic coverage to assess the consumer food choice in both developed and emerging countries overcoming the current gap and create a possibility to avoid misleading findings generalization for other countries. These studies could be helpful for companies that want to export the tomato product and need to adapt their marketing strategies to the several cultures or policy makers to enhance regulations for business internationalization. Moreover, looking for cross-countries studies we found that four studies compare the preference of tomatoes among several countries (Baldi et al. 2021; Dinnella et al. 2016; Frez-Muñoz, Steenbekkers, and Fogliano 2016; Jaeger et al. 2018). Cross-countries analysis are useful to discover country-specific behaviors in tomato food choice, discussing as these could be related to culture, habits, country social policies or country market trends. Probably, conducting this kind of analysis could be useful to understand the disputes underlined during the thematic analysis, such as the discordant perception of brand, firmness, environmental logo. No study realized a longitudinal analysis, that is essential to identify how the

consumer behavior change overtime. These issues opening new research routes related to methodology applications in consumer behavior studies.

From the *attribute perspective*, it emerged that some categories were more studied than others highlighting some thematic gaps. Sensory properties category was the most addressed, followed by price, safety and health, origin (as shown in Table 1). On the other hand, brand, sustainability, convenience, packaging and production process resulted less studied underling research routes along these directions. Particularly, among sensory properties, the ones related to smell are few addressed comparing with appearance, taste and flavors attributes, although the literature considers smell one of the organoleptic characteristics able to allow consumer in tomato distinction and selection (Asensio et al. 2019). Moreover, if for appearance, taste and flavors attributes our review can be verticalized toward specific characteristics (such as), for smell it not happens. So, for the researches who want explore the sensory aspects we suggest to address the effort investigating smell attributes, focusing on the peripheric

characteristics of smell attribute, both for fresh and processed tomato, such as it happens for other food products like olive and olive oil, grape and wine (Coste, Sousa, and Malfeito-Ferreira 2018; Ilak Peršurić 2020). Looking among the categories of tomato properties less studied, we consider the sustainability category an interesting viewpoint to be contemplated in the research agenda. Over the last few decades, academy has paid considerable attention to sustainability practices in companies, especially in the agri-food, with the aim to develop strategies to help companies in natural resource protection respecting the governments guidelines (Rugman and Verbeke 1998). However, this first vision of sustainability, strictly related to the environmental impact was overcome in the 2002 during the United Nations World Summit on Sustainable development, in which three sustainability dimensions were underlined: economic, environmental and social (Moldan, Janoušková, and Hák 2012). Focusing on the tomato sustainability attributes discussed we discovered a high interest of the sample in environmental sustainability, investigating attributes related the reduction of fertilizer, water, input, transportation and greenhouse during the production of tomatoes, the presence of environmental label, the impairment of biodiversity. No attention was paid to social and economic sustainability, except for fair trade attribute that is considered by Tobler, Visschers, and Siegrist (2011b) as social aspect with increasing interest of LCA. Exploring sustainability also from social and economic viewpoints represents a research route of high strategic importance. Indeed, the business community has already recognized these dimensions in the Triple Bottom Line (TBL) paradigm, according to which companies should achieve simultaneously better financial performance, environmental protection goals and equity for societies (Elkington 1998). This means that social, economic and environmental sustainability features could be related to the product qualities and it is interesting to understand how consumer perceive these sustainability qualities. Tomato companies, leveraging on this information, will be able to provide to consumer more details about sustainability practices, overcoming the current lack of information already declared by Tobler, Visschers, and Siegrist (2011b) and Mesías Díaz et al. (2012). Considering production process category, authors compare organic, conventional production and greenhouse methods and, field and GMO-free production systems. This represented a gap in the category, since there are other methods and systems that could be explored in the future by researchers in terms of consumer preferences: intensive agriculture, biodynamic agriculture, integrated production, synergistic agriculture and so on as production methods; aquaponics

production, hydroponics production, intercropping production, aeroponics production and so on as production methods. The study of these new methods and systems will enrich the literature background about the consumer preferences about tomato product giving to companies interesting suggestion about the production methods and systems to implement. Moreover, results suggested that the consumer preferences about production methods and systems are frequently analyzed referring to the environmental impact that these generate, as shown in (Tezer and Bodur 2020). Also, in this point we discover a lack along the other two sustainability dimensions. So, we propose as research route to investigate about the perception of consumer about the social and economic dimensions of sustainability in production processes, also to provide to the policy makers information useful to guide the policies of adopting alternative and sustainable production methods. It is interesting to note that the organic attribute appeared related to several categories: sustainability, health and safety and production processes. This revealed a complex perception around this attribute, that underlie the need to deepen its analysis in order to understand if the consumer perceive it along all these directions or not, and if one or more directions are more capable of influencing consumer choices. Referring to packaging category, we found studies focused on identify the right size and material for the tomato packaging. Less attention was paid to packaging attractiveness and label design. This represented a gap and in the research agenda, we propose to consider the role of packaging and label design evaluating the consumer preferences about packaging and labels designed according various principles (e.g., consumer-centric design). In this context packaging and label represented an intermediary able to declare the product features. According to Fernqvist and Hunter (2012), this function assume more importance when the label communicate credence attributes, since it is able to transform these in search attributes, allowing the consumer a more informed choice. Moreover, we noted a total absence of studies that analyze the consumer preference in labelling strategies based on technologies. QRcode, augmented reality and other technologies are already applied in marketing strategies to improve the attractiveness of the food product, creating smart labels able to interact with consumer and providing more quality information about food (Bataf 2021; Dacko 2017; Zhang et al. 2016). We suggest to explore the preferences about these technologies since they could represent the future of the food communication models in order to provide to the tomato companies useful elements to foster their market strategies and to the policy maker useful elements to foster the regulation in agri-food digitalization

process (Frewer et al. 2011; Jiang and Stylos 2021). Among the papers that compose the analyzed sample, we retrieved several attributes that can be considered convenience features: convenience, attractiveness, discount, sale, habits, advertising, fashion, accessibility, availability and so on. From these results, emerged that the research field analyzed the convenience features of tomatoes adopting a product-base view and not enlarge to the services related to the products. Food, in developed countries, was no longer a basic need, but become a “lifestyle” based on new food philosophies. This change in consumers’ needs generated a servitization of agri-food industry. In this context we detected a gap in analyzing the consumer preferences about the services related to food product and specifically to tomato. These services could be delivery services, online selling, services useful to provide more information about the product, service oriented to the creation of a food community, service oriented to the creation of contents (e.g., receipts, health advices) and so on. This was a not exhaustive or conclusive list of suggested research routes, to be understood as starting point to increase the knowledge base about the consumer preferences in convenience attributes.

5 Implications and Limitations

Leveraging on the findings highlighted in the integrative content framework and in the future research agenda, theoretical and practical implications were synthesized. Limitations of the study closes this section.

5.1 Theoretical Implications

The current study presents important implications for researchers. At the best of our knowledge, this study is the first to provide a systematic overview and critical appraise of the extant literature in consumer tomato preference. It provides a unique and general insights allowing for a more integrate and complete picture of the topic. Furthermore, by applying a rigorous and well-designed review methodology, this study identifies and summarizes the finding of the research field in an integrative conceptual framework, with the aim to explicates the influence of quality attributes in consumers food choice for tomato product. The proposed framework incorporates the key antecedents, the building blocks that compose the phenomenon studied and the key consequences. This integration provides new insights that can guide the future research in this area. Indeed, the review shed light on several research gaps that provided interesting avenues for the future research

agenda. These arguments may represent a foundation on which future research efforts can build representing valid contributions to enriching and extending the analyzed research field as the business research field as a whole.

5.2 Practical Implications

This study also provides several practical implications for food policy makers, food companies and general public interested in applying strategies to enhance conscious and sustainable food choice. By synthesizing the current body of literature, it emerges a high complexity of tomato food choice with many attributes often perceived in different ways from different consumers. This could generate a low understanding of marketers and policy makers about the possibility to correctly leverage on these attributes in order to enhance, respectively, the current marketing strategies and food policies. Our integrative framework helps marketing practitioners and policy makers to assume a more holist view of the problem providing a guideline in formulating persuasive and effectiveness marketing campaigns and policies. It emerges that successful strategies for tomato product could consider: the relevance of exogenous factors such as food habits or climate conditions; the influence of sensory quality signals able to generate emotional association in the consumer; the significance of the familiarity degree with the product; the prominence of social desirability; the impact that specific information in packaging and label could generate; the influence on tomato quality perception of consumer price knowing; the link between the difference in arousal and the sensory properties or between the visual preference for novel fruits and olfactory elements. For example, marketers could find strategies to increase the familiarity levels for consumers (differentiating between children and adult) taking advantage by sensory properties or country gastronomic traditions, and to better communicate the tomato health properties to reduce malnutrition and disease increasing consumer awareness. The emerged relevance of organic food and its sustainability, healthy and quality perception suggests to marketers to create a structured offer around this concept leveraging on organic shops, areas in supermarkets, agro-tourism and so on. The companies involved in tomato production could consider the perception of consumers and chefs to create new target cultivars and collaborate with marketers in creating appropriate communication strategies. Comprising the diversity in food choices generated by cultural elements, habits and contextual stimuli represents, for the tomato companies the first step in an internationalization business path. Several implications emerged also in the food policy context, in their efforts to develop legislation,

standards, common framework and information campaigns aiming at fostering conscious and sustainable food choice. The results of our study shown an emergent need of national and international government programs able to reinforce people healthy and to reduce the obesity problems which, albeit with different levels of intensity, concern many European and non-European countries. It is desirable that food policy makers focusing their efforts in educational programs to encourage mothers with young children to abandon unhealthy food purchases behaviors promoting the adoption of a healthy lifestyle for the whole family. A second line of government programs should concern the education of the young generation about the benefits of consuming local vegetables with the aim of raising awareness of this segment about the improvement of health conditions that a diet rich in fruit and vegetables can bring, the reduced environmental impact of a local food and the economic support provided to the local rural community. The last set of food policy interventions should relate farmers and food companies. It emerged the need to educate farmers, producers and distributors about the importance of branding and packaging to enhance the tomato customer value but also to reduce the environmental impact related to this product. Moreover, regulations and subsidies to encourage the organic production could help farmers to overcome the barriers to entry into this sector and promote the placing on the market of healthy and sustainable food. For the customers, the findings of this study could help them to make better informed decision on whether to buy or consume fresh and transformed tomato or not, and to make choices better in line with their current preferences.

5.3 Limitations

Despite the research methodology being well established also with the aim to assure the work replicability, this study presents some limits generally related to literature review. Firstly, the choice of keywords and search scheme affects and characterizes the results obtained. Secondly, Scopus database was used and, although it is recognized as complete and quality scientific databases, they might have missed articles relevant to our topic. Thirdly, also the adopted selection process might not have located all potentially relevant studies. At last, the content analysis generates a limit linked to the interpretation of the contents by the researchers. However, we are confident that the meticulous methodology, the reference checks, and the numerous comparisons between the researchers to harmonize the interpretation of the results, are sufficient to guarantee the quality of the findings.

6 Closing Remarks

This systematic literature review offers a comprehensive outlook on the state-of-the art research on consumer tomato preferences referring to search, experience and credence quality attributes. The proposed integrated conceptual framework synthetizes the main findings underling antecedents, consequences and describing the phenomenon through the following building blocks: search, experience and credence attributes, the consumer characteristics, the types of products. It represents the complex interaction between consumer needs and company offer, allows (i) food companies to enhance marketing communication for tomato product; (ii) policy maker to foster legislation, standards, common framework and information campaigns, and (iii) general public, and particularly consumer, to realize a conscious food choice. From our analysis a research agenda emerged, stimulating the discussion from business research perspective. It is not to be considered exhaustive or conclusive, but represent an idea to expand the international research boundaries of consumer tomato preferences and enhance the findings generalization and adoption.

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