

Article

Information Behaviour of Food Consumers: A Systematic Literature Review and a Future Research Agenda

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Abstract: Food communication is the main way for businesses to inform customers and guide purchasing behaviour. However, the value consumers perceive from such information remains unclear, and a complete understanding of the food information behaviour is still missing. For this reason, this paper outlines the results of a systematic literature review to identify, evaluate and synthesize the scientific food information behaviour domain according to the perceived value for consumers. The analysis shows that the current scientific literature is essentially centred on studying consumers and their behaviour in the food consumption process. Still, it lacks studies about the impact of the information on the overall perceived value of consumer food experience. The emergence and diffusion of personalized information services make this kind of study particularly suitable. In light of the fast pace of widespread technological evolution in the food sector, this issue represents a topic to be addressed in the following years.

Keywords: consumer behaviour; systematic literature review; food consumption process; perceived information value; information behaviour



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1. Introduction

Food communication has always played an essential role in shaping consumers' knowledge, beliefs, skills and values [1]. Food communication is generally intended to provide a message that impacts the emotional and functional behaviour of a consumer, involved before, during, or after a food consumption activity [2]. In particular, food marketing communication focuses on any way (e.g., advertising, promotions, nutrition and health claims, branding and direct contact) an organization communicates food-related messages to consumers, informing, reminding and persuading them to influence their food perceived value [3].

During the last decade, the landscape of food marketing communications has structurally changed. For a long time, food producers, distributors and other companies represented the leading providers of food-related communications in the constant effort to sell more and more products to more customers in more areas of the world. However, food producers and distributors along the supply chain often emphasized some product characteristics to pursue their marketing goal, often neglecting other product features. Changes in consumer interests recently pushed other food-related stakeholders to engage in increasingly wide and savvy communication and media use. Governments and other public authorities aim to reduce market information asymmetry and promote national nutritional, health and other environmental related objectives. To this end, they have made efforts in advertising and labelling controls, and public information campaigns against overweight, obesity and other lifestyle-related disease risks [4].

Other not-for-profit and for-profit food information businesses (e.g., third parties, food product certifiers, environmental, health, and educational organizations, ethical movements, information practitioners) are increasingly involved in food literacy promotion, with the aim to achieve broader societal goals [5]. Lastly, due to the increased availability

of social media tools, traditional communication paradigms have radically changed: “mass information consumers” are shifting to “food information producers” [6]. With the rise of social media platforms, individuals are able to share information and communicate with one another in ways that were not previously possible. As a result, the traditional way of consuming information, where a select group of gatekeepers controlled what information was disseminated to the general public, has shifted. Now, individuals have the ability to produce and share their own information, including information about food. This has led to a democratization of information where anyone can share their experiences, thoughts, and opinions about food, rather than relying solely on traditional sources, such as food critics or journalists. Consequently, conventional sources of information are progressively losing their centrality in a food communication landscape where many food writers (gastro-reporters, foodies, bloggers), food photographers, trendsetters and influencers operate frequently. Even consumers themselves can generate and spread food messages on social media [7]. The rise of social media has led to an increase in third-party food information providers, such as food bloggers and recommender systems, but it has also raised concerns about the reliability of the information being shared [8].

Significant changes in lifestyles, economic conditions, and ethical/environmental values give food consumers greater importance to the quality of life, well-being, and the renewed interest in local food culture and heritage. This reflects in new food communication expectations and preferences [9]. Consequently, food producers, distributors and other food organizations have established new patterns of marketing communication; they have changed communication messages and interactions to align the perception of their food products with emerging consumer values and beliefs [10].

In this new communication landscape, three dimensions of the consumer’s perceived value of food communication emerge from the information value, the hedonic/entertainment value, and the social value. The first represents the extent to which food communication is perceived as an opportunity to satisfy the consumer’s need for food information. In contrast, the second and third refer to the satisfaction of the consumer’s need for enjoyment/entertainment and social acceptance, respectively. This paper delves deeply into the consumer information value of food marketing communications, as the consumer interest in the informational and rational component of food communication is increasing. Several studies have been conducted to investigate the role of food information and the food consumption process. However, the studies currently available in the literature deal with specific aspects of the interaction between consumers and food information. In particular, the literature lacks a comprehensive understanding of the factors that shape consumers’ perceptions of the value of information in food marketing communications.

Hence, this paper intends to fill these gaps through a systematic literature review of scientific research that combines knowledge on food consumers’ and food information users’ behaviour [11]. The systematic literature review highlights the research topics in the informational perspective of food consumer behaviour, as fundamental entities valuable for consumers when involved in food-related activities.

Some studies adopted approaches based on a systematic literature review to investigate the food consumer behaviour. For example, in [12], the authors investigated the link between consumer behaviour and purchasing intention for organic food, discussing factors that influence consumer decisions to buy such products, such as personal values, knowledge and perceptions of price and quality. Another study [13] provided a systematic review on the motives for purchasing organic food, including concerns about health, the environment and animal welfare, while barriers include higher cost, limited availability and a lack of trust in organic food labels. Some studies reviewed the existing literature on the causes and consequences of food waste, including factors, such as consumer behaviour, supply chain management and government policies [14,15]. Only a few studies systematically addressed the study of the information behaviour of food consumers. However, these studies are mainly aimed at investigating how the information on labels can influence the behaviour of food consumers [16,17]. To the our best knowledge, no systematic

literature review on the impact of information on the food consumer life cycle are provided in the literature.

As such, our work aims to fill this gap, with the following objectives:

- To identify trends and patterns in the literature, providing a holistic account of the literature on food information consumer behaviour, based on current knowledge about a set of key research themes;
- To suggest an agenda addressing new research directions in this field of study.

The rest of this paper is organized as follows. Section 2 describes the methodological approach we adopted to carry out the systematic review, while Section 3 includes a descriptive and thematic analysis of the findings. Section 4 provides a research agenda on the consumer's food information behaviour domain. Lastly, in Section 5 we point to this review's contribution, identifying our study's implications and limitations.

2. Methodology

In this paper, we carried out a theme-based systematic literature review to provide a complete and exhaustive summary of intrinsic and extrinsic entities characterizing the consumers' perceived value of food information when she/he is involved in a food information usage process. The theme-based review is a widely adopted approach in managerial studies (e.g., [18–20]).

According to the indication provided by Denyer et al. [21] regarding the formulation of a review question, we defined the following research question:

What do we know about consumers' perceived value of food information? Which promising and underdeveloped research lines can be identified to address gaps and future developments?

To identify elements characterizing food information value perception, we made the basic assumption that what is essential (valuable) for the consumer has been already addressed in the scientific literature. We adopted a methodology of SLR for inductive theory building proposed by Durach et al. [22]. According to the suggestions provided by Ammirato et al. [23], the steps of the methodology have been summarized into three main phases, namely paper location and selection, paper analysis and definition of themes. Figure 1 describes the research process we adopted.

2.1. Paper Location and Selection

Elsevier Scopus was chosen as the scientific database we used to perform our search [24,25]. We initialized two sets of keywords, namely:

- The set *I*, including terms related to the *theoretical domain*, i.e., human information behaviour (e.g., “information need arousal”, “need for information”, “information seeking”, “information behaviour”, “consumer behaviour”, as well as synonymous, and other broader/more broad terms). These terms were defined in the extant literature on information usage [11];
- The set *F*, including terms related to the *application domain*, i.e., the term “food”, other terms used for major food groups and categories, and terms related to main activities along the food consumption process (e.g., food purchasing, storage, cooking, eating, disposal) [26].

We built a research string using Boolean operators and wildcards. The research string was structured as follows: the search must contain at least one keyword from the theoretical domain (set *I*) and one from the application domain (set *F*) in the title, abstract and keywords. The investigation was performed at the beginning of February 2022.

Following the approach adopted in [27], we manually analysed the title and abstract to decide whether (or not) each work matched our study's focus. Moreover, as represented in Figure 1, Set *I* and *F* were expanded by adding new words discovered among the author keywords of each paper. The activity was iteratively performed until no recent articles, or newer keywords were found. We initially we found 235 studies. Following

suggestions provided in [28], in order to select relevant studies, we adopted the following inclusion criteria:

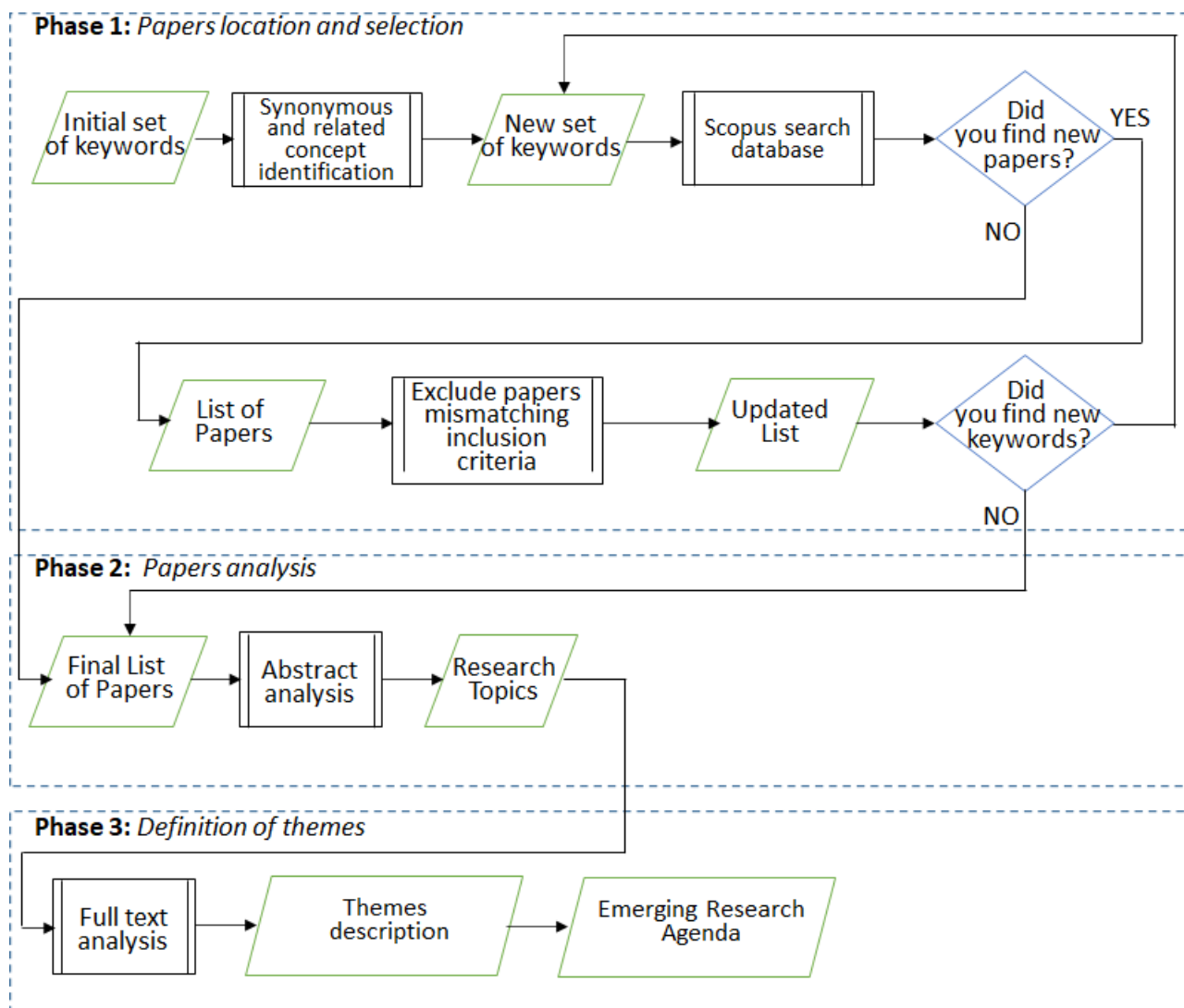


Figure 1. The research workflow.

Quality criteria:

- Articles indexed in Scopus: Scopus is one the most relevant and comprehensive databases for scientific papers, particularly for managerial studies [29,30];
- Articles published in peer-reviewed journals. This selection criterion was already adopted in many organizational studies (e.g., [23–25]), where authors agree that excluding papers that could have less scientific rigour (such as monographs, book chapters, conference proceedings) will ensure better content quality;

Fit-for-purpose criteria:

- Language: we selected only papers written in English;
- Subject area: we considered papers published in a journal indexed at least in one of the following subject areas: business, management and accounting; engineering; economics, econometrics and finance; decision sciences;
- Conceptual boundaries: the paper is focused on aspects characterizing the interaction between consumers and food information.

The process was carried out through a collaborative platform for carrying out systematic literature reviews, namely MySLR software [23]. All authors have participated in the paper selection activity. Each paper was included in the dataset only when all authors agreed that it met all inclusion criteria. One hundred and twenty articles that did not match the inclusion criteria were excluded from the search. At the end of the process, we found a total of 105 papers from 26 journals. Most articles were published in journals devoted explicitly to the food sector and the marketing domain, particularly those that offer a greater focus on consumer behaviour. As shown in Table 1, the *British Food Journal* and *International Journal of Consumer Studies* have the highest number of articles included in this review. A significant number of articles concern studies published in a journal with a specific focus towards the ethical-environmental aspects related to the consumption process, e.g., *Journal of Cleaner Production*, *Sustainability* and *Ecological Economics*. As we expected, most of the journals deal with specific areas of food and marketing.

Table 1. Journals included in the sample.

Journal	No. Papers
<i>British Food Journal</i>	28
<i>International Journal of Consumer Studies</i>	13
<i>Journal of Food Products Marketing</i>	8
<i>Food Quality and Preference</i>	6
<i>Appetite</i>	5
<i>International Journal of Retail & Distribution Management</i>	4
<i>Journal of Cleaner Production</i>	4
<i>Sustainability</i>	4
<i>Food Policy</i>	4
<i>Ecological Economics</i>	3
<i>Food Control</i>	3
<i>Food Research International</i>	3
<i>Journal of Consumer Marketing</i>	3
<i>Journal of Retailing and Consumer Services</i>	3
<i>Computers in Human Behavior</i>	2
<i>Journal of Islamic Marketing</i>	2
<i>International Journal of food science & technology</i>	1
<i>Journal of Agricultural and Environmental ethics</i>	1
<i>Journal of International Food & Agribusiness Marketing</i>	1
<i>Journal of Marketing Communications</i>	1
<i>Journal of Marketing Management</i>	1
<i>Journal of the Academy of Marketing Science</i>	1
<i>Psychology and Marketing</i>	1
<i>Risk Analysis</i>	1
<i>The European Journal of Health Economics</i>	1
<i>Trends in Food Science and Technology</i>	1

2.2. Papers Analysis

In line with [22], this phase is aimed at refining the theoretical framework, using evidence from the final sample of papers. We adopted an inductive research approach. We read the abstract of the documents to identify common words, terms and concepts to identify first-order categories of codes reflecting the paper perspective. The second step consisted of the examination of relevant keywords, allowing the identification of links and patterns among them. This yielded the identification of second-order constructs, representing theoretically distinct topics arising from the combination of first-order categories. As a final step, we combined the second-order concepts into aggregate dimensions to investigate the relationships between them. In particular as a final step, we organized research topics we identified according to the typical phases of the information usage process already identified by several authors in the scientific literature [31,32], namely:

- Information need arousal: the process of information need arousal begins when consumers realize that they have an immediate food-related need or a specific lack of knowledge in the food domain. This prompts consumers to seek out information in order to fulfil that need. Consumers then formulate an information-related question that is specific to a particular stage of food consumption, such as purchasing, storing, preparing, consuming, or disposing of food, in order to make an informed choice;
- Information seeking: in this stage, consumers are actively and deliberately engaged in the process of acquiring information. From a decision-making perspective, individuals must select the most suitable information channel and source to fulfil their food-related information needs;
- Information contextualization and use: after the appropriate food information has been selected, consumers can use it to make informed decisions related to food-related activities. The meaning and use of this information is determined by the specific context in which it is being utilized.

Figure 2 shows the interrelation between keywords, topics and phases of the food information usage process.

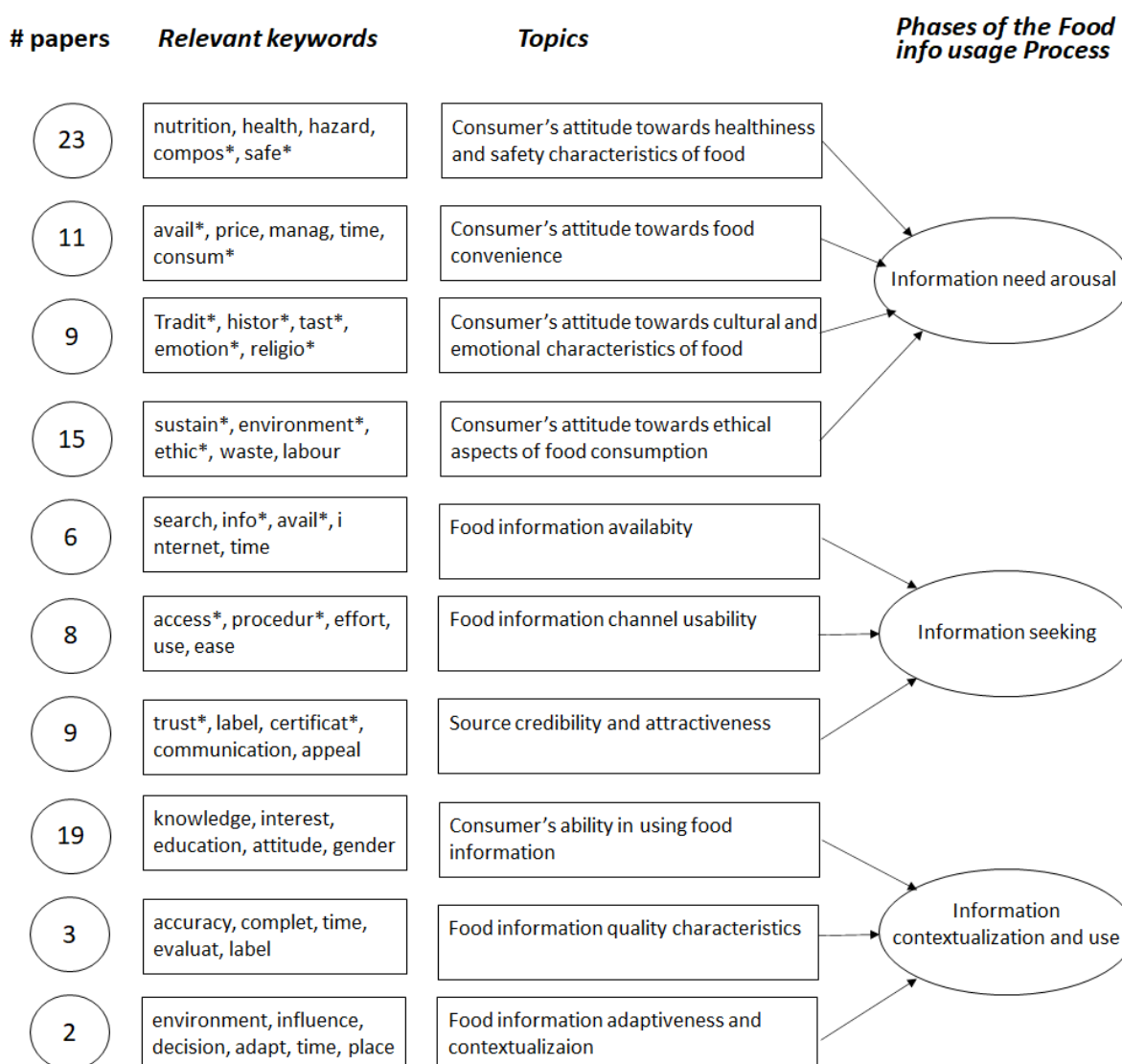


Figure 2. The interrelation between keywords, topics and phases of the food information usage process. "*" is a wildcard character used to substitute all the possible characters from that point on in the search keyword.

3. Results

In what follows, we provide a description of the main topics emerged from the systematic literature review.

3.1. *The Role of Consumers' Attitudes and Motivations in Information Need Arousal*

Extant works attempt to put in evidence and explain the link between the so-called “rational consumer” and his/her willingness to be engaged in a food decision-making process. As specified in several existing studies, the involvement of consumers in a food consumption activity is influenced by some consumer attributes (attitudes, interests, experiences) [33]. Most of the studies we identified in our systematic literature review (58 out of 105) focused on identifying attitudes and motivations guiding food consumer decisions concerning purchasing behaviour. Studies mainly adopted empirical approaches to determine such influential factors in food consumer decision-making. Several studies are based on applications of the theory of planned behaviour in food consumer decisions [34–37], while other works are based on the attitude-behaviour-context theory [38–40].

In our analysis, we grouped consumer attitudes and motivations into four classes of food characteristics, namely, healthiness and safety, convenience, cultural, emotional and ethical.

- *Healthiness and safety (T1).* Some studies emphasized the role of health and safety factors as the main motives behind consumers' food decisions [41–44]. All of these studies have in common that they have been focused on the behaviour of consumers towards organic food. Recently, Rana and Paul [45] carried out a meta-analytic review to investigate health-related motives influencing the organic food purchasing decision. Although the degree of correlation identified in most of the analysed studies differed, health factors are positively correlated with consumer attitudes towards organic food, undoubtedly representing a fundamental element in their purchasing behaviour. From an information-oriented perspective, some survey-based researchers found that consumers with health and safety-related interests have a continuous and more intense need for information about food [46]. We have identified that information sought by this type of consumer mainly concerns nutritional aspects (e.g., calories, fat, protein, carbs) [1], nutritional and wellness related properties (e.g., anticancer, anti-ageing) [47] and the presence of microbiological and chemical contaminants in food products [48]. In this last paper, the authors found that consumers expressed higher interest towards chemical contaminants (as compared with microbial), as they are associated with potentially severe long-term consequences;
- *Convenience.* Some studies addressed convenience as the primary motivation guiding consumer choices along the food consumption process [49]. According to Hjelmar [50], convenience behaviour is a typical characteristic of pragmatic consumers. Raimundo et al. [51] found that a convenience attitude negatively correlates with health consciousness and cooking enjoyment. Information needs arising in consumers whose primary interest is towards food costs and convenience deal with utilitarian benefits during food-related activities, e.g., finding the nearest food store, buying food at a lower price [52], how to reduce time and manage a budget [51];
- *Cultural and emotional:* some studies are explicitly devoted to investigating the relationship between related cultural aspects and food consumption behaviour. There is a stream of literature related to religious prescriptions and consumer behaviour. Razzaque and Chaudhry [53] found that religious commitment is an antecedent forming Muslim consumers' purchasing decisions. Similar results were found by Della Corte et al. [54], where differences in food consumption behaviour between religious and non-religious people towards halal and kosher food, respectively, have been investigated. Cultural interests and consumers' behaviours towards food have mainly been studied in the literature. Elements attributable to tradition and food culture have proven to be very important in the decision-making process of some categories of consumers. In contrast, other attributes widely used in the marketing strategies of

consumer products (e.g., advertising, labelling and packaging) did not prove to be decisive for the final choice of the consumer [55,56]. In this case, the association between food and territory feeds a positive cognitive process towards the perception of food quality [57]. Unfortunately, there is limited research on the impact of cultural factors and attitudes towards food-related information needs. Some studies have attempted to connect these interests to individuals who are particularly interested in food (referred to as “foodies”) and have a constant desire for self-education [58,59]. Additionally, a few studies have specifically examined the connection between the enjoyment of food and the arousal of information needs, exploring the emotions associated with food and how they influence information seeking behaviours [60];

- *Ethical*: several studies addressed consumers’ attitudes towards ethical aspects of food consumption. These studies tackled consumers’ attention towards social and environmental concerns, i.e., ethical consumerism. Many of these studies concern consumers’ attention to food loss and waste reduction [61,62]. Some studies have delved into the examination of consumers’ preferences and needs for information regarding ethical and sustainable food practices, such as fair-trade certification, integration of disabled individuals, fair pricing for farmers, protection of biodiversity, animal welfare and protection against child labour [63]. Additionally, other research has explored consumers’ interest in information related to environmentally sustainable practices, such as reducing greenhouse gas emissions and protecting tropical rainforests [64].

3.2. Features of Information Channels for Food Information Seeking

When consumers are consciously involved in acquiring food-related information, they have selected a set of appropriate information channels and information sources to meet their food information needs [65]. Research on consumer behaviour in food information-seeking attempted to understand factors affecting selecting and evaluating information sources and channels. We found 23 papers out of 105 dealing with consumer behaviour in food information seeking. The extant literature has been devoted mainly to the identification of benefits that are linked to information channel availability, the channel’s ability to reduce consumers’ effort (namely information channel usability, and the importance of source trustworthiness and attractiveness in influencing food information-seeking behaviour).

- *Food Information Availability*: this topic includes papers focused on identifying benefits linked to information channel availability, in terms of time and place. In particular, the use of the internet and mobile channels have the potential to move past certain limitations of traditional information sources, such as product labels, radio and television, as they allow consumers to retrieve information at any time and location [66]. Some studies have demonstrated the influence of channel availability on consumers’ choices of information source [67,68];
- *Food information channel usability*: this topic deals with research addressing how some information channels can reduce cognitive and physical efforts of food consumers in information seeking [69,70]. Some studies investigated consumers’ intentions to search for food information through social media platforms, compared to traditional media, concerning several categories of information cues, e.g., safety [71] or health [72]. Sfodera et al. [73] found that social networks influence food consumers’ decisions since peer-to-peer information exchange reduces risk perception concerning traditional sources;
- *Source credibility and attractiveness*: much research recognized source credibility as the main determinant influencing consumers’ choices of food information sources. Some empirical studies identified factors affecting the credibility of a food information source. Two central aspects were identified: perceived expertise (i.e., the degree to which a recipient perceives the source as having capabilities and experience to provide accurate information [74]; and trustworthiness (i.e., the confidence that a source provides objective and correct information) [75]. Empirical based research has been

devoted to investigating the level of trust that consumers have in food information sources and the factors that influence this trust. [76,77]. Most of the studies focus on the role of labelling and certification in increasing consumers' trustworthiness towards food products and producers [78–81]. Moreover, we found few studies explicitly focusing on information source attractiveness, i.e., the extent to which an information source is able to capture the attention of consumers through the use of physical or technology-mediated communication methods. Few recent studies emphasized the role of influencers in food-related communication. They mainly focused their communication on the beauty, the healthiness and the taste of food. Through social networks, food companies aim to involve enthusiastic and committed followers with the support and testimonials of influencers [82]. Ragelienė and Grønhøj [83] confirmed that the impact of famous persons is still significant for the development of consumption behaviours and food preferences.

3.3. Consumer Behaviour in Food Information Contextualization and Use

Several studies have been conducted on consumers' behaviours in using information along a food consumption process. We found 24 papers out of 105 dealing with this phase of the information usage process. However, in most cases, such studies limited their scope to some aspect of information usage. Many studies have focused on investigating factors influencing consumers' interpretation, evaluation and use of a food information cue, namely the consumer's ability in using food information. We found few studies addressing other aspects related to food information quality characteristics and food information adaptiveness and contextualization.

- *Consumer's ability in using food information*: this research topic includes papers focused on identifying factors influencing the ability of consumers to give meaning and contextualize food information cues when they are involved in some food consumption activities. Most of the studies we found focused on consumers' abilities to use label information to carry out purchasing decisions and/or dietary changes [84–87]. Some studies provided evidence for the role of demographic characteristics (such as age, gender, ethnicity) in shaping consumers' abilities to use food information [88,89], as well as culture, education and knowledge [90–93];
- *Food information quality characteristics*: we found only three papers examining how much food information used depends on the information quality (e.g., accuracy, completeness, timeless) a consumer receives. Van der Merve et al. [94] focused on consumer preferences about information content format. Akram et al. [95] delved into the importance of accuracy, up-to-datedness and attractiveness of food information in influencing consumer behaviour of fast-food mobile commerce services. Very recently, Wu et al. [96] investigated the effect of perceived information quality on purchasing intention behaviour towards organic food;
- *Food Information adaptiveness and contextualization*: we found two studies that highlight, albeit indirectly, the importance of information content dynamically adaptable to the context in which consumers make decisions. These studies refer to the consumer's acceptance of intelligent packages capable of detecting food data and providing context-based information (e.g., temperature, humidity, food spoilage) [97,98].

4. Discussion and Emerging Research Agenda

The studies identified through our systematic literature review comprehensively clarify the relationship between consumers and their behaviours in the food consumption process in terms of antecedents, attitudes, motivations and personal characteristics.

Studies on the link between the “rational consumer” and their food decision-making process have shown that it is influenced by consumer attributes (attitudes, interests, experiences). fifty-eight out of 105 works reviewed focused on identifying attitudes and motivations guiding food consumer decisions concerning purchasing behaviour. Theories applied include the theory of planned behaviour and attitude-behaviour-context theory.

Unfortunately, the literature lacks a deeper understanding of how consumers' perceptions of food quality influences the perceived value of their food experience, especially before food purchasing and consumption.

Channel features for food information-seeking are concerned with understanding factors that influence the selection and evaluation of information sources and channels. Research has mainly focused on the benefits of channel availability, channel usability and source credibility and attractiveness. Channel availability, such as the use of the internet and mobile devices, allows for the retrieval of information at any time and location. Channel usability reduces the cognitive and physical effort of consumers. Source credibility is a main determinant in consumers' choices of food information sources and factors affecting this credibility include perceived expertise and trustworthiness. Research has also shown the role of information source attractiveness, such as the impact of influencers in food-related communication, in capturing the attention of consumers. Extant research addresses challenges and implications of current approaches to provide food information to consumers, including conflicting goals of different stakeholders and information asymmetry in the food chain. Research is mainly addressed towards the traditional method of food labelling. Such approaches are characterized by some limitations and do not completely solve the problem of asymmetric information. Advancements in the IoT technologies and smart food applications clearly call for research on how these technologies offer potential solutions for improving the provision of food information, offering a new reality where consumers can collaborate and enhance the transparency in the food supply chain. Moreover, while the research emphasizes the importance of some characteristics of the aspects related to technologies and channels for information provision, there is little insight into how companies can exploit them to offer profitable information services. In this sense, research on emerging business models in the field of food information deserves further study.

Extant research on consumers' behaviours in using information during the food consumption process has been mainly focused on consumers' abilities to use food information, such as food labels to make purchasing decisions and dietary changes. Some studies addressed the role of demographic characteristics and education in shaping consumers' abilities to use food information. Only a few papers have examined the influence of food information quality (e.g., accuracy, completeness, timeless) on consumers. Just two studies have shown the importance of information that is dynamically adaptable to the context in which consumers make decisions. Our review highlights that context-based features during the food information usage process are under-investigated. Given the advancements in context-sensitive technology, it is crucial to explore and understand the significance of contextualizing information in the process of utilizing food-related information. This is crucial not only in allowing consumers to make informed decisions in regard to their food consumption, but also in facilitating their informal learning experiences that shape their future behaviours.

Table 2 provide a summary of emerging research directions for each of the themes identified in the literature. The following subsections provide a description of the emerging research directions we identified (falling in five theoretical domains) that deserve to be developed through further research.

4.1. The Role of Food Information in Assessing Food Consumption Experiences: A Cue Utilization Theory Perspective

According to the "*cue utilization theory*", consumers infer product quality using quality cues [99]. Two cues are considered influential in shaping consumers' perceptions of product quality, namely "*predictive value*" (how well product quality can be truly predicted) and "*confidence value*" (consumers' confidence in using cues) [100]. Consumer perceived food qualities are at the core of the perceived value that a consumer assesses in a food experience. Multifaceted quality attributes characterize food products, profoundly affecting the consumer's value assessment: some food attributes can be evaluated before food

purchasing (search qualities), other food attributes can be determined after purchasing and consumption (experience qualities), while other characteristics cannot be resolved even after consumption (credence or quasi-search qualities) [101]. Consumers are aware of search qualities through information cues; they perceive credence qualities based on their beliefs gained from food information cues; they perceive experience qualities based on sensory signals arising in their interactions with food and use information cues to give their sensations interpretation and meaning. In any case, food information deeply affects consumer perception of food quality. This implies some consequences in perceived food value and the behaviour of consumers along a food consumption process. Hence, we can evaluate the perceived quality of a food consumption experience through predictive and confidence values. For example, by applying cue utilization theory, researchers might answer questions, such as “How can food information influence consumers’ evaluation of a food consumption experience?”.

Table 2. Emerging research directions in consumers’ food information behaviour.

Main Research Themes in the Literature	Emerging Research Direction	Theoretical Domain	Research Question
The role of consumers’ attitudes and motivations in stimulating information need	The role of food information in assessing food consumption experiences	Cue utilization theory	<i>How can food information influence consumers’ evaluation of a consumption experience?</i>
Features of information channels for food information seeking	Intelligent food services for information asymmetry reduction and consumer empowerment	Principal-agent theory	<i>Could intelligent food services contribute to reducing information asymmetries, empowering consumers in their food consumption activities? How do intelligent food services impact consumers’ perceptions of food information concerning traditional information services?</i>
Features of information channels for food information seeking	Business model innovation in the food information provision market	Business model innovation	<i>Which are the stakeholders in food supply chains interested in providing food information services? What is the value proposition they release? What value do these services have for the business of each stakeholder (which value is captured)? What is the role of consumers in the food information provision ecosystem?</i>
Consumer behaviour in food information contextualization and use	Consumers’ readiness towards emerging food information services	Innovation adoption and technology acceptance	<i>Are food consumers ready to use and accept intelligent food services?</i>
Consumer behaviour in food information contextualization and use	A model framework of consumer perceived information value of food marketing communications	Perceived information value	<i>Which characteristics of food information services impact consumers’ value perception of food information? Is there a relationship between consumer characteristics and the relevance of some categories of food information?”</i>

4.2. Intelligent Food Services for Information Asymmetry Reduction and Consumer Empowerment

The emerging panorama in food information also has several implications from the point of view of the principal-agent theory [102].

Many organizations, including public authorities, food companies and other stakeholders in the food supply chain provide consumers with food-related information in an effort to influence their behaviour or guide their decision-making. However, these actors often have distinct goals that may complement or conflict with one another. Providing food information to consumers is a complex task due to the diversity of consumer interests, the large number of attributes associated with food products and the various national and international regulations that must be adhered to. The challenge has been further complicated by the widespread availability of information in modern society, particularly information related to making healthier or more environmentally conscious food choices. This has led to a situation of information asymmetry throughout the food chain, which has a significant impact on both business and consumer decision-making. The main consequences of asymmetric information include moral hazard, where a food producer takes greater risks (such as false labelling or food adulteration) because consumers bear the burden of those risks, and adverse selection, where producers hide certain information in a transaction, leading to poor decision-making by consumers [103]. According to the principal-agent theory, we view consumers as principals and companies (food information providers) as agents. For a long time, mandatory food-labelling was the main institutional answer to alleviate asymmetric information problems occurring along food chains [104]. A broad stream of literature focuses on exploring information asymmetries related to hidden action (moral hazard), addressed by employing certifications or product labelling [105–107].

However, this kind of solution to reduce asymmetries seems not to solve the problem completely. Despite the fact that food labelling remains a crucial way of providing information to consumers during the decision-making process, traditional food information provision through food labels is beset by numerous obstacles which impede effective communication of food-related information. As it emerges from our literature review, the interrelation between the behaviour of food consumers and the behaviour of food information users has been investigated without fully considering the current internet of food and collaborative food consumption models.

As reported in our review, some studies highlight information asymmetry in food consumption and the role of the web and mobile-based platforms in shaping consumers' purchasing intentions [68]. Advances in the IoT technologies could help consumers reduce information asymmetry regarding food value-laden information [108]. In order to foster the growth of food information services providing a higher value to consumers, new research challenges must be addressed. The recent convergence between the "internet of things", "social networking platforms" and the widespread use of mobile devices has paved the way for a new generation of context-aware services. The proliferation of new, cutting-edge smart food applications and devices (such as scanners for food analysis) clearly indicates that the time is ripe for developing innovative approaches to food information provision that empower users in food information presumption [109]. According to Volpentesta et al. [110], these emerging approaches are referred to as "intelligent food services", since they are able to perform smart functions, such as food data acquisition, food analysis, reasoning and tailored food information provision. Smart food technologies, social networking and blockchain-based approaches are disclosing a new reality where consumers can communicate, interact and collaborate in an open, loose, flexible and effective way to enhance transparency within food supply chains through a collective and distributed approach [111,112]. The principal-agent theory provides a new lens on the role of emerging technologies in reducing asymmetries between actors providing food information and consumers involved in food consumption decisions. The following research questions can be addressed:

"Could intelligent food services contribute to reducing information asymmetries, empowering consumers in their food consumption activities? How do smart food services impact consumers' perception of food information concerning traditional information services?"

4.3. Business Model Innovation in the Food Information Provision Market

The integration of cutting-edge technology in the realm of the internet of food (IoF), such as the utilization of big data, analytical systems and mobile applications equipped with sensors, is providing a boost to tech startups as they enter the food information market. These startups are leveraging the benefits of the IoF to face the changing needs and expectations of consumers, bridging the gap in transparency within food supply chains, and offering highly personalized and context-specific information services. However, the implementation of the IoT solutions in the food sector is a complex process, shaped by various technological, organizational, personal and environmental factors that impact the emergence of new businesses in this field. Business model innovation represents a strategy allowing companies to optimize the value proposition they create and deliver to their stakeholders [113]. Business model effectiveness relies on the ability of enterprises to plan the behaviour complex systems, dynamically controlling business key variables, to adhere to changes in consumers' food behaviour [114]. Emerging research in business model design highlights the system's dynamic contribution as a tool to capture the dynamic aspect of complex business systems [115]. Although these approaches, at the moment, have not found wide application in the market domain of food information, they could support the provision of formal and conceptual representations of how organizations operate and create value within this market. Research in the business model domain could address the following questions:

“Which stakeholders in food supply chains are interested in providing food information services? What is the value proposition they release? What value do these services have for the business of each stakeholder (which value capture)? What is the role of consumers in the food information provision ecosystem?”

4.4. Consumers' Readiness towards Emerging Food Information Services

The emergence of these intelligent food services let today's consumers access a wide range of food information (e.g., nutrition advice, food traceability, recipes). These new services would empower consumers to have control over their food and be responsive to their contextualized expectations and information needs. According to a consumer perspective on innovation adoption behaviour, it is interesting to investigate the context of consumer behaviour in adopting these technologies. The decision to accept and adopt a novel technology in food products is a mental process during which an individual or organization obtains information to decrease uncertainty about the innovation's expected consequences gradually. Innovation adoption depends on several characteristics that go beyond the innovation features itself. For example, adopter characteristics and the information accompanying the innovation may have an impact on innovation adoption [101]. In scientific and technological research, different approaches have found wide application in explaining adoption and technology diffusion, e.g., technology acceptance model (TAM) and unified theory of acceptance and use of technology [116,117]. This research line can be devoted to understanding producers'/consumers' behaviours in the context of innovation adoption by employing a model based on an adaptation of the TAM and its evolutions, and designing appropriate actions to support the adoption process of food information technologies [118–120]. The main question related to consumers' behaviours towards the adoption of food innovation is *“Are food consumers ready to use and accept intelligent food services?”*

4.5. A Model Framework of Consumer Perceived Information Value of Food Marketing Communications

A second theoretical perspective concerns the consumer's information perceived value. The information management field of study provides various theoretical frameworks for understanding the perceived quality of information, which are primarily derived from the literature on the reliability and accuracy of data [121–123].

The concept of “fitness for use”, traditionally related to product quality and product value, can be extended to include the overall utility that a consumer derives from utilizing

an information service [124,125]. The literature within the field of information management provides a range of conceptual models that pertain to the perceived quality of information, which have been primarily derived from research on data quality. This is particularly relevant in the context of food-related decisions, as the consumer, who is actively engaged in various food consumption activities, requires access to pertinent information to aid in their decision-making process or learning journey.

When a consumer acquires information before/during/after a food experience, the value of the food experience may fluctuate. Food Information must be helpful and add value to the tasks of a food consumer along a food consumption process. It is reasonable to refer to the perceived value of information as the change—positive or negative—that occurs in the consumer's perception of food value when the information is available to her/him. The rate of this change is the value of the information. In other words, the value that a consumer perceives as an information user in a food consumption process refers to an assessment of benefits and costs deriving from the interaction between consumers and information. Therefore, food information providers have to face a trade-off between their business-related objectives and the opportunity to meet consumers' information needs.

To enhance the overall experience of consuming food, it is crucial for providers of food-related information to comprehend how individuals subjectively perceive the quality of that information.

Surprisingly, few studies have conceptualized the construct of perceived quality of food information services.

The extant literature in perceived information quality distinguishes characteristics related to the quality of the output of an information service and the user's perception about the quality of the interaction with the information processing system [122]. Many researchers agree that three main dimensions characterize information quality: intrinsic dimension, contextual dimension and representational dimension [126–128]. Our systematic literature review opened a new perspective on the consumer's behaviour towards food information. It allowed us to identify fundamental entities valuable for consumers when involved in food-related activities. We hypothesize that the 10 research topics we found may represent functional components in food information services and can be reorganized according to the main dimension of information quality already available in the information system literature. Hence, review results can introduce a framework that characterizes the main value dimensions of food information services. To address this gap, researchers may aim to conceptualize and measure the concept of perceived food information value and examine the mechanism through which information influences consumers' food experience. Researchers might answer questions, such as *"Which characteristics of food information services impact on consumers' value perception of food information?"*

Although value perception varies from one consumer to another, the specific dimensions that influence that perception can be objectively determined. In evaluating perceived value, consumers will assess the significance of each dimension and its sub-components based on their personal priorities and the context in which they are making their decision.

A set of utility dimensions, therefore, characterizes the information value of food communication. Consumers assess the utility they receive during the three phases of the food information usage process. *"Is there a relationship between consumer characteristics and the relevance of some categories of food information?"*

From a marketing standpoint, the framework could serve as a beneficial tool for positioning food-related information offerings in the market. The aim is to both examine the value proposition of food information services from the perspective of consumers, and identify any current gap in existing offerings. Additionally, this framework can be easily modified and applied to conduct surveys and provide insight into the current state of mobile app-based information services across various food industries.

5. Conclusions

The consumer interest in the informational and rational component of food communication is continuously gaining importance. Food consumers are more and more careful and demanding concerning information supporting the food decision-making process.

From a theoretical point of view, our research was intended to shed light on aspects characterizing consumers' perceptions of food information value. We put in evidence that the informational perspective of consumers' behaviours during a food consumption experience is under investigation in the literature. It is worth highlighting that although researchers have shown a great interest in some aspects related to the consumer's food information behaviour, results arising from our literature review confirm that the identified research directions reflect a classical marketing perspective, without considering the currently available internet of food frameworks and new paradigms for collaborative food consumption. This calls for further research to foster the rise of a new generation of food information services.

By synthesizing and critically evaluating the existing research on consumers' food information behaviours, we tried to understand this research topic better, offering a new perspective on consumer behaviour studies. In particular, we identified five emerging research directions fostering cross-fertilization among marketing, information systems and innovation management disciplines.

This study has several implications for policy makers, institutions and companies. Providing food information to consumers is a complex task due to the diversity of consumer interests, the large number of attributes associated with food products and the various national and international regulations that must be adhered to. The widespread availability of information has led to a situation of information asymmetry throughout the food chain, which has a significant impact on both business and consumer decision-making. This may cause moral hazard and adverse selection in the food industry, where food producers take greater risks and hide certain information in a transaction, leading to poor decision-making by consumers. The findings of the study show that consumer attitudes and motivations play a significant role in information need arousal, and that factors, such as healthiness and safety, convenience, and cultural, emotional and ethical considerations all play a role in shaping consumer decisions about food. Results suggest that public campaigns should not be generalised but should target specific consumer attitudes and motivations. People may not understand the information provided in a public campaign due to limited literacy or numerical skills, or due to the complexity of the information presented. Public health campaigns and policies that focus on increasing the availability of food information, improving the usability of food information channels, and building trust in food information sources can help to improve the effectiveness of public health interventions. Media institutions can use this information to create more effective strategies for disseminating food-related information. Moreover, there are some trust-related issues due to conflicting information from other sources, characterized by a greater attractiveness from a marketing related perspective. Home economics has been confidently and knowledgeably dealing with the food literacy for many years, but only recently wellbeing, health, nutrition, sustainability and animal welfare issues have become sharply relevant in consumers' learning in order to build the capability to understand food and to create good, healthy food, as well as life skills for independent living. With mobile learning is increasingly identified as a means for facilitating dialogue in situated and distanced learning in informal settings, there is an opportunity for mobile learning to support public food literacy and extend existing understandings to a wider beginner population.

The widespread availability of food information services, such as nutrition advice and food traceability, is giving consumers more control and responsiveness to their information needs. Companies can improve their innovation adoption by understanding the factors that influence consumers' decision-making and using models, such as the technology acceptance model (TAM), to guide the adoption process. The integration of technology, such as big data and analytical systems, in the internet of food (IoF) is providing opportunities for tech

startups to enter the food information market, but it also requires companies to innovate their business models and adapt to changes in consumer behaviours.

Limitations

Our paper suffers from some limitations. First, the primary assumption characterising this work is that the relevant aspect of the food information usage process has been investigated in the scientific literature. It could happen that some relevant aspects concerning what the actual business practice has been neglected or at least under-investigated in the literature. Second, we carried out our systematic literature review using Elsevier Scopus as the scientific database in which we performed our search. Although Elsevier Scopus is one of the most relevant and comprehensive databases for scientific papers for managerial studies, the systematic approach adopted does not preclude the existence of some additional pertinent studies for this review. Anyway, considering the appropriate amount of paper we retrieved, we believe that our approach (already adopted by other researchers in several previous studies) would not alter the results of our review. In any case, future research could explore other databases to find different papers. Finally, as typically happens in systematic literature research, the findings are influenced by the definition of the initial set of keywords and the adopted search formula [129]. We tried to overcome this limitation by adopting a recursive approach that allowed for extending the sets of keywords, by considering keywords applied in the papers found in our review.

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