



# Mobile augmented reality as an internationalization tool in the “Made In Italy” food and beverage industry

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## Abstract

In marketing studies, many researches have already investigated consumers' responses towards mobile augmented reality (MAR) and the enhancement of user experience. Notwithstanding, little is known on how MAR creates value for consumers and companies, boosting the internationalization process. Therefore, this study aims to investigate the perceived usefulness and value creation of MAR, evaluating both suppliers'/retailers' and consumers' sides in the “Made in Italy” Food and Beverage context. To reach this aim, data were gathered using 5 semi-structured interviews with suppliers/retailers and an online survey administered to 361 consumers. Following a mixed-approach, data were triangulated to enhance generalisation of data. Findings indicate a particular usefulness of MAR for product traceability and communication of nutritional information for consumers. In addition, MAR may help identify falsification for the “Made in” products, especially in international markets such as China and the US. Despite these interesting insights, MAR usage and application are still limited for “Made in Italy” products. Thus, this paper provides new and fresh insights in marketing theory related to new technologies adoption, highlighting interesting implications for marketers working in international contexts.

**Keywords** Digitalization · Mobile augmented reality · Made in Italy · Internationalization · Food and beverage · Consumer experience

## 1 Introduction

Augmented reality (AR) is a smart technology that adds value to both suppliers and retailers, thus influencing consumer decisions (Pantano 2015). As AR experiences have become widely available on mobile devices, mobile AR (MAR) is important in providing many benefits to both smart consumers and suppliers/

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retailers, such as personal promotional tools (Woods 2009), consumer satisfaction, experiential value (Chou 2009), positive and immersive consumer-brand relationships (Owyang 2010). Moreover, it can increase customers' loyalty (Bulearca and Tamarjan 2010), improve the engagement with the retailers, and lead to a greater willingness to shop in "augmented stores" (Bonetti et al. 2019; Pantano 2015; McCormick et al. 2014).

Several studies have focused on MAR as a tool to provide additional information (Höllner et al. 1999), expand users experience (Tussyadiah et al. 2018; Kounavis et al. 2012; Riva et al. 2016), change brand attitude (Rauschnabel et al. 2019), enhance shopping applications (Dacko 2017; Ahn et al. 2015), increase emotions for tourists (Kourouthanassis et al. 2015; Tom Dieck and Jung 2018), and improve education (Jamali et al. 2015; Bacca et al. 2015). However, the literature on how MAR contributes to generating different types of value for consumers and companies is limited, with most studies focused on tools such as smart glasses (Bulearca and Tamarjan 2010) or virtual mirror applications (Eyüboğlu 2011) and on industries such as retailing, tourism and cultural heritage, education, and entertainment and gaming (Rese et al. 2017), while the food and beverage (F&B) industry remains largely under-investigated.

Consequently, this paper aims to determine the impact of MAR on "Made in Italy" F&B products, focusing on how MAR can create value for consumers and suppliers/retailers. On the consumer side, consumers' perceptions and evaluations of the usefulness and value created using MAR for "Made in Italy" F&B products are addressed, whereas on the supplier/retail side, the main goal is understanding the perceived benefits of MAR and its potential role in the valorization of products within national and international markets (Marcoz et al. 2016). This paper also aims to determine if this technology can influence the internationalization strategies of "Made in Italy" F&B products (Testa 2011; Pascucci et al. 2017).

Generally, "Made in Italy" products are characterized as being beautiful, chic, and genuine at the international level (Cerrato and Piva 2012; Lees-Maffei and Fallan 2014; Paulicelli 2015). In business-to-consumer markets (B2C), "Made in Italy" represents three sectors, also called the "3Fs": fashion (textile/clothing, footwear, leather goods, eyewear, jewelry), food (e.g., pasta, pizza, olive oil, wine, beer), furniture (e.g., lighting articles, ceramic tiles, home faucets), in which the creation of consumer experiences is becoming increasingly important. Therefore, the potential emerging from the usage of MAR is indeed significant, due the relationship between products and country image, as well as the specific area of origin. The knowledge of the origin enhances the perceived value (Marcoz et al. 2016) of consumers, thus reducing the risk perception in food consumption. For "Made in Italy" F&B products, the origin increases the experiential and emotional benefits of value creation, since F&B products elicit a wide variety of emotional responses in consumers (Cardello et al. 2012). Country image also has a significant impact on Italian consumers' intentions to repurchase products (Matrazzo et al. 2018) and on international consumers that value the "Made in Italy" brand. Moreover, in international markets, the knowledge of the country and origin could drive competitiveness in the F&B industry (Bertoli and Resciniti 2013).

To address these issues and advance MAR marketing literature, this paper focuses on how MAR affects “Made in Italy” F&B products? Specifically, we answer to the following related RQs:

RQ1: What type of consumer experiential value can MAR enhance for “Made in Italy” F&B products?

RQ2: How do the suppliers and retailers of “Made in Italy” F&B products perceive the MAR value drivers?

RQ3: Which are MAR’s main limits in its application to “Made in Italy” F&B products in the opinion of suppliers and retailers?

For RQ1, we first conducted an exploratory analysis on 361 Italian young consumers based on a questionnaire created according to Dacko’s (2017) and Saarijärvi et al.’s (2014) frameworks. This phase aims to understand the contribution of MAR to the experiential value during the different stages of the purchase journey and identify the most important value drivers for the valorization of “Made in Italy” products.

Then, to answer to RQ2 and RQ3, the authors interviewed four companies and one association operating in the “Made in Italy” F&B industry. This sheds lights on the limitations in the application of this tool, as well as the benefits in term of value creation and of protecting the national brand image of “Made in Italy” against the risk of falsification, especially in international markets.

Following the approaches of Creswell (2003), Johnson and Onwuegbuzie (2004), and Tashakkori and Teddlie (1998), we analyzed the data using a mixed approach, that is a combination of qualitative and quantitative methods. This method is useful to analyze a phenomenon under different facets, providing more robust and rigorous results compared to a single method analysis (Tashakkori and Teddlie 2010).

Our study makes the following contributions to the literature. First, we add to the AR marketing literature by providing insights on the way MAR can increase consumer value for “Made in Italy” F&B products, investigating its utilitarian, hedonic, and emotional benefits. Second, we provide a rich context for the study of the value drivers provided by these digital tools from the suppliers/retailers side.

In addition to the theoretical implications, this study provides some managerial implications by identifying the consumer experiential value of MAR that companies may leverage, together with the main difficulties in its application and usage for “Made in Italy” F&B products. Moreover, it helps understand the potential role of MAR in promoting the “Made in Italy” image on international markets.

The remainder of this paper is organized as follow. The second section explains the state of AR, paying attention to its main characteristics and implementation in relation to mobile usage. Then, based on the MAR marketing literature, we propose a theoretical framework referring to experiential marketing and consumer experiential value (with a synthetic focus on country image value) to carry out the explorative research. In section three, we explain the research design and methodology used. Then, section four describes the main empirical findings of the two-phase research study, followed by a discussion of the outcomes in section five. Finally, section six concludes drawing academic and managerial implications

stemming from the business marketing conceptual frameworks, along with the results of the empirical analysis.

## 2 Literature review

### 2.1 MAR

Technology has advanced regarding the significance of AR as a smart instrument that can “augment the real world” using virtual objects (Milgram and Kishino 1994). In this way, AR can blend the boundaries between the physical and virtual worlds (Huang and Liao 2015; Carmigniani and Furht 2011; Zhou et al. 2008) by the use of virtual content such as images, textual information, and videos in real time (Carmigniani et al. 2011). When capturing such content using a digital camera (Bonetti et al. 2018) into devices such as tablets or smartphones (handheld devices), wearables, projectors, or fixed interactive screens, AR draws consumers’ and users’ attention by giving them the possibility to interact with virtual objects (McCormick et al. 2014; Reitmayr and Drummond 2006).

As a result, the product simulation and richness of the media create an experiential value for consumers (McCormick et al. 2014). Hence, their shopping experience becomes an interaction with virtual items, therewith improving their subsequent image of the brand and increasing their purchase intention (Kim and Forsythe 2008).

From 1992, when the term was coined by Caudell and Mizell (1992), new technologies developed considerably. One example are smartphones, which have become user interface devices due to the developing of mobile applications (Olsson and Salo 2011; Wither et al. 2009). In this context, AR has recently become present in consumers’ daily routines, with the development of Android and iOS platforms. Therefore, MAR technologies have become a current and hot topic in the digitalization context. In this paper, we define MAR as a handy (Höllerer et al. 1999) AR expansion (Li and Fang 2020) that allows users to explore the world in a more interactive and dynamic way using a mobile device (Kounavis et al. 2012).

MAR thus becomes a new form of touch point into the purchase journey (Lemon and Verhoef 2016), affecting consumers’ choices (Brinker et al. 2012; Husson et al. 2014) in terms of, for instance, showrooming (Gensler et al. 2017) and offering them the possibility to compare prices and the quality of materials.

For example, consumers can scan the label of a product and read instructions on disposal modalities by using the QR-codes on the packaging (Pence 2010; Okazaki et al. 2012), can read receipts by the use of pop-codes (Choi et al. 2014), see how the product has been produced and where (Dacko 2017), and receive offers in real time, thanks to Beacons (Andrews et al. 2016; Grewal et al. 2016). Among the different MAR technologies, the usage of QR-codes and mobile applications (apps) is increasing and can provide different benefits to consumers and suppliers/retailers, which is worth analyzing.

## 2.2 MAR and consumer experiential value

MAR technologies have been perceived as a form of experiential marketing (Eyüboğlu 2011) that may enhance consumer experience and create different types of value for consumers. Their role has changed from simple promotional tools to instruments that enable brands to create experiences for consumers in forms of participation, entertainment, and interaction (Yuan and Wu 2008), thus contributing to the development of a good relationship between brands and consumers (Owyang 2010; Bulearca and Tamarjan 2010).

As consumers are becoming increasingly interested to participate in and interact with firms by the use of various collaborative and participative tools, such as social media, for generating content and becoming engaged (Kaplan and Haenlein 2010), they tend to pay more attention to experiences over products, so creating valuable experiences has become a vital challenge for companies seeking to satisfy consumers' needs.

In this sense, MAR may generate meaningful experiences to consumers by creating different types of value. Value is in fact a complex construct, where the traditional functional, utilitarian dimensions interplay with other "higher order abstractions" (Zeithaml 1988), such as socio-psychological (prestige, hedonism, novelty, social interactions) and emotional dimensions (pleasure, affection).

First, MAR helps extend the product information (Poushneh and Vasquez-Paraga 2017) that enables consumers to better evaluate the targeted products, especially regarding their functional value (e.g., perceived price, quality, utility, reliability); this is particularly important when a consumer is evaluating his/her choices before purchasing (Bulearca and Tamarjan 2010). MAR has the power to put the brand in the hands of consumers, giving them the opportunity to test products many times before purchase (Owyang 2010). In this sense, by assisting in the information searching process of consumers, such applications are both time saving and practical (Eyüboğlu 2011).

Second, MAR may enhance the level of interactivity with the brand and other users. In this sense, AR and MAR in particular facilitate consumer involvement, improving the hedonic value of experiences (Kim and Forsythe 2008) by providing users the ability to share such experiences on their social networks and thus increase the social value of a product (Wang et al. 2018; Muzellec and O'Raghallaigh 2018). Therefore, MAR tools, by enhancing the social value of products related to specific social groups (Sheth et al. 1991), may help firms to generate user-user engagement by enabling consumers to interact with other consumers.

Third, these tools may also be useful in creating pleasurable experiences and increasing enjoyment levels, which many academics consider one of the most important types of emotional value (Bulearca and Tamarjan 2010). Consumer experience is nowadays increasingly influenced by psychological and emotional factors, with the experience becoming "an end" itself (Williams and Soutar 2000). The pleasure emerging from the emotional significance attached to the products, together with the novelty, originality, multi-sensorial elements, and social interactions related to the consumed products play an important role in shaping consumers' value perceptions, attitude, and preferences towards brands. MAR, in particular, allows firms to create

immersive brand narratives and enables consumers to experience products in new and innovative ways (Scholz and Smith 2016) that can sometimes generate a “WOW effect” (Eyüboğlu 2011). Marketers must then be able to transform this effect in long-term enjoyment, which contributes to the development of a brand attitude and to consumer satisfaction.

In terms of the consumer journey (pre-purchase, purchase, and post-purchase), smartphones and MAR influence all these stages by providing different experiential values to consumers (Patterson and Spreng 1997; Cronin et al. 2000).

During the pre-purchase and purchase stages, MAR is useful for increasing the “functional value” of products, in terms of simplified information searching to attain lower prices, experiencing smart-shopper feelings such as bargains (Verhoef et al. 2007), and enhancing and deepening the available information for the purchasing decision. Then, in the purchase stage, showrooming takes place, where consumers search directly on their mobile device the store with the best online offer (Rapp et al. 2015). Also in this case, even if the psychological factor of being a smart consumer is important, MAR boosts the functional value of products.

Finally, in the post-purchase stage, if consumers are satisfied with the product and service, they may repurchase or begin the process anew, re-entering the purchasing phase (Lemon and Verhoef 2016). MAR could thus facilitate this flow of information, creating a holistic experience for consumers with no boundaries between physical products and online content (e.g., traceability, information on materials, reviews of the products). In this case, social and emotional values are prevalent and able to arouse feelings or affective states (Sheth et al. 1991), such as pleasure, fun, love.

### 2.3 MAR and valorization of “Made in Italy” F&B products

MAR can help consumers obtain information about the country of origin (COO) of a product, thus protecting and supporting the image of a country. The COO is one of the most important topics in the international marketing literature on consumer behavior (Bertoli and Resciniti 2013), with studies aiming to understand the role of COO in shaping consumers’ perceptions, preferences, and purchase behaviors (Pharr 2005; Dekhili and Achabou 2015). The COO is connected to a country’s image (Matarazzo et al. 2017; Oberecker and Diamantopoulos 2011; Pappu and Qvester 2010; Pappu et al. 2007): the country image depends on the fact that consumers have developed a preference for products with a particular origin based on psychological concepts such as consumer ethnocentrism, self-image, and status. In this sense, the country image stimulates the psychological and hedonistic benefits related to the beliefs and perceptions a consumer has about the quality of products made in a particular country (Pappu et al. 2007; Knight and Calantone 2000). As such, many consumers use COO stereotypes to evaluate products. For these reasons, COO labeling, particularly the label “Made in,” serves as an indicator of the quality and superiority of a product or a brand based on consumers’ perception of that country (Bilkey and Nes 1982).

“Made in Italy” thus represents a universally recognized standard of excellence (Massa and Testa 2010), which has gradually assumed a more important meaning

than a simple label of origin (Fortis 2005). It has become a brand itself, which valorizes the related products. MAR technologies can enhance the information about the traceability and authenticity of products, which is especially important for F&B products and their recognizability as “Made in Italy”. Demonstrating where (and how) a product has been produced (Dacko 2017; Poushneh and Vasquez-Parraga 2017), MAR extends the product information “from farm to fork” (Chen & Huang 2013; Choe et al. 2009), enabling consumers to better evaluate the target products.

Integrating MAR based on labels helps provide information on COO and “Made in Italy” and is useful against product falsification (Italian sounding), especially in high-value markets such as China, the US, or Canada.

Moreover, “Made in Italy” F&B products are acquired not only based on a utilitarian motivation but also on a hedonic one to gain emotionally enjoyable experiences, such as social benefits. In this vein, the literature has demonstrated that emotional information can be included on web servers and instantly conveyed to consumers using a web access device (Sugiyama 2009). When a consumer presents a higher hedonic motivation, he/she tends to use QR-codes for selecting F&B products with an increased frequency (Lombardi et al. 2017).

### 3 Research design and methodology

To answer to research questions, we carried out a two-phase research study (mixed method) based on quantitative and qualitative approaches. Using multiple methods to study a phenomenon produces more robust and compelling results than single-method studies. Such multiple methods studies may employ two or more qualitative methods, two or more quantitative methods, or a combination of qualitative and quantitative methods, in what is called a mixed methods approach. Such a mixed method research design (combination of quantitative and qualitative methods) is advocated by several studies (Creswell 2003; Johnson and Onwuegbuzie 2004; Tashakkori and Teddlie 1998). Similarly, Tashakkori and Teddlie (2010) underlines the importance of using various methods at different stages in the research process. Particularly, in our research, the consumer side has been investigated using a quantitative approach, while the supplier/retailer side has been investigated using a qualitative approach. Figure 1 presents the research design, identifying the steps and roles of the mixed methods.

#### 3.1 Quantitative approach

The quantitative approach is used to understand the benefits, in terms of consumer experiential value, of MAR during the different stages of the purchase journey and identify the most significant drivers for the valorization of “Made in Italy” products at an international level (RQ1). This quantitative approach has been applied on a sample of 361 young Italian consumers by means of an online questionnaire created using Survey Monkey.

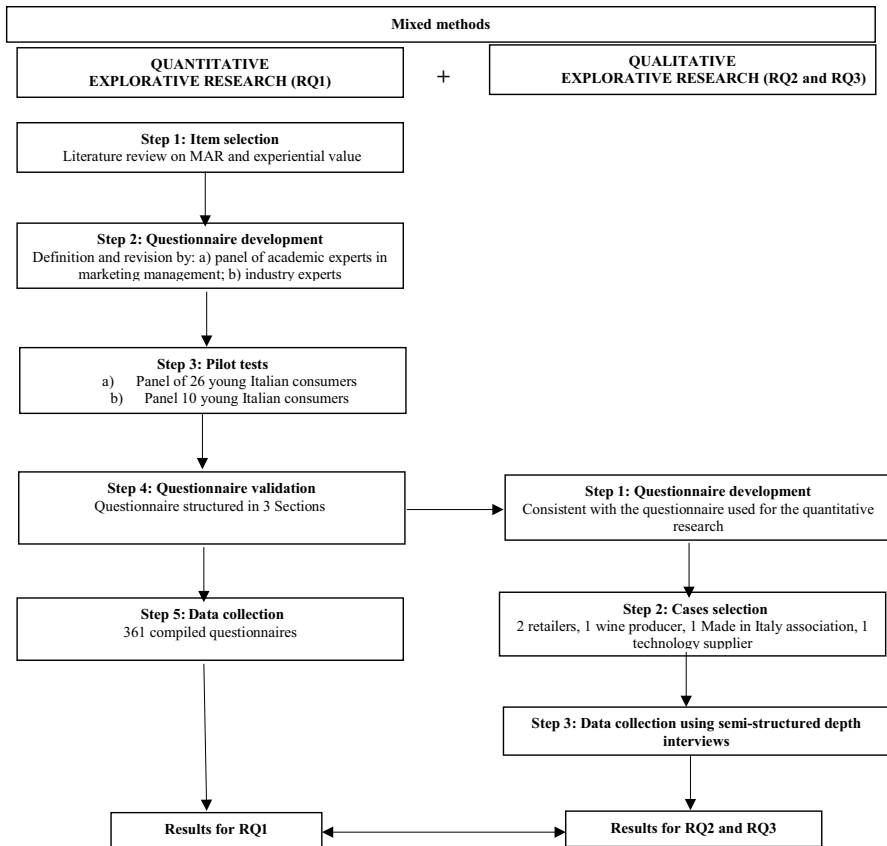


Fig. 1 The research design

### 3.1.1 Step 1: Selection of items

The identification of the items included in the questionnaire was based on the literature review of MAR (Dacko 2017; Bonetti et al. 2019; Pantano 2015; McCormick et al. 2014) and marketing management related to consumer value (Zeithaml 1988), considering the characteristics of “Made and Italy” F&B products.

### 3.1.2 Step 2: Questionnaire development

The structure of the questionnaire was based on the literature review of MAR, experiential value, and consumer behavior. The questionnaire was repeatedly revised in accordance to the feedback received from a panel of academic experts in marketing management and industry experts. Finally, the questionnaire was pre-tested in two different stages.



### 3.1.3 Step 3: Pilot tests

The first draft of the survey was pre-tested on a panel of 26 young Italian consumers in the fall of 2018. The questionnaire was then revised based on the feedback received. Subsequently, another pilot test has been carried out on other 10 young Italian consumers in October 2018. The respondents were asked to comment on the questionnaire in term of clarity, readability, and accessibility, but no changes were made to the items in this stage.

### 3.1.4 Step 4: Questionnaire validation

The final questionnaire includes three main sections. The first inquires on the socio-demographic characteristics of respondents (e.g., gender, age, education) and also the usage of digital tools to measure the technology attitude of respondents (Qualizza and Sambri 2013). The second section is focused on the “Made in Italy” brand for the F&B industry and respondents’ willingness to buy these products in their daily routine and the types of outlets they use to buy them. In the third section, we assess the effects of QR-codes and apps in enhancing product value during the purchasing journey. Each statement is based on the literature on MAR and consumer value using a five-point Likert-type scale (from 5: strongly agree to 1: strongly disagree) to investigate consumers’ attitudes (Likert 1932).

### 3.1.5 Step 5: Data collection

The final version of the questionnaire was administered online through Survey Monkey to young Italian consumers selected through social media (Quarantino and Mazzei 2018). The sample size was not determined a priori; the research strategy was to define a “time window” of 3 months (October–December 2018) to gather the data. Overall, 361 individuals participated in the survey and constituted our final sample. To avoid cross-cultural bias, this explorative survey focuses on Italy and on young individuals, considered the main users of digital content (Comscore 2017) and the potential new target consumers of “Made in Italy” products.

## 3.2 Qualitative approach

The qualitative approach is based on a multiple case study design (Yin 1994; Cunningham 1997; Eisenhardt and Graebner 2007; Eisenhardt 1989). The case study methodology was adopted because qualitative approaches are the most appropriate for investigating and understanding complex phenomena such as the perceived value drivers of suppliers/retailers and main limitations to the diffusion of MAR technologies (RQ2 and RQ3). Therefore, direct contact with companies is essential to understand the potential uses, benefits, and limitations of MAR technology. Moreover, multiple cases enable us to build a more generalizable and

robust theory than single cases (Dezi et al. 2018; Eisenhardt and Graebner 2007). The multiple-case study method follows the guidelines for qualitative methodologies in the literature (Eisenhardt 1989; Yin 2003; Pratt 2009).

### 3.2.1 Step 1: Questionnaire development

Data collection was primarily carried out using a semi-structured questionnaire consistent with the one used for the quantitative research in terms of the perceived consumer value drivers. The semi-structured questionnaire consists of 11 questions, structured into five sections: (a) company/association data, (b) use and introduction of QR-codes, (c) use and introduction of mobile applications, (d) utility of QR-codes and mobile applications over the three steps of the consumer journey, and (e) evaluation of consumer experience and implications for the valorization of “Made in Italy” products.

### 3.2.2 Step 2: Cases selection

The questionnaire was then used for in-depth interviews with the senior managers of four companies and one association operating in the “Made in Italy” F&B industry, also promoting the brand at an international level. They were selected based on their understanding of the supplier/retailer viewpoint on the use of MAR in the “Made in Italy” F&B industry, as all are using MAR technologies and are active in the internationalization process.

Therefore, five cases based on these interviews are presented in the following. In line with the exploratory research scope, the cases have been selected not because they form a representative sample in statistical terms but because they provide significant insights concerning the potential relationship between digitalization and international opportunities. In this vein, considering the role of retailers in promoting innovation among suppliers, we have included in our sample cases two big retailers (Companies 1 and 2). According to Kumar Basu (2015), five cases are appropriate to research the strategic applications of new technology.

### 3.2.3 Step 3: Data collection via semi-structured in-depth interviews

The semi-structured in-depth interviews have been carried out from November 2018 to February 2019 and they were tape recorded and transcribed verbatim. Then, each interview was translated into English by a professional translator. When necessary, we followed-up with the firm via e-mail and/or telephone. In addition to the primary data from the interviews, secondary data from documents (e.g., business publications, corporate presentations, blogs about food issues) were gathered. We triangulated these data with the primary data derived from the interviews and analyzed the results.

## 4 Results

### 4.1 QR-codes and apps for “Made in Italy” F&B products: Consumers’ viewpoint

According to the research design, the first explorative analysis focuses on the consumers that completed the online questionnaire. Tables 1 and 2 show the socio-demographic and behavioral characteristics (towards “Made in Italy” F&B products) of the sample.

Regarding their buying behaviors, the respondents consider the “Made in Italy” brand as important (41%) or essential (24%) for the selection of “F&B” products, buying “Made in Italy” products mostly from supermarkets/hypermarkets (often:

**Table 1** Demographics

	Percentage of respondents (%)
Gender	
Male	39.3
Female	60.7
Age (years)	
18–24	70.1
25–34	29.9
Marital status	
Single	82.0
Married	6.1
Widowed	0.0
Separated/divorced	1.9
Engaged	10.0
Income	
<25.000	56.2
25.000–50.000	14.1
50.000–75.000	3.0
> 75.000	3.0
No answer	23.8
Employment status	
Student	77.6
Employed	16.1
Self employed	4.2
Not employed	2.2
Education	
Elementary	6.1
High school	47.4
University	46.0
PhD/Post-doctorate	0.6

*Source:* Elaborated by the authors

**Table 2** Respondents' behaviors towards "Made in Italy" F&B products (%)

Importance of Made in Italy for F&B products	Not important	Moderately important	Important	Very important	Essential
	2.2	8.0	24.7	41.0	24.1
Where do you buy Made in Italy F&B products?	Never	Seldom	Sometimes	Often	Always
At the supermarket/hypermarket	0.6	4.2	14.1	49.3	31.9
At the local market	23.3	26.9	28.3	17.5	4.2
At fairs/fairs of agri-food products	23.3	38.2	26.6	9.7	2.2
At small traditional shops (wine shops, butchers, delicatessen, cheese shops)	10.5	21.3	33.5	24.9	9.7
At "typical manifold" sales points such as Eataly	44.6	31.9	16.6	5.3	1.7
Directly from the producer (cellars, cheese-makers, breweries, etc.)	34.6	32.4	20.8	9.7	2.8

Source: Elaborated by the authors

49%; always: 31%). Consistent with the structure of Italian retail industry, small traditional stores remain competitive and 24.93% of respondents buy often these products from traditional shops, while 9.70% always do so.

The respondents were also asked about the potential utility of smartphones for scanning product labels using QR-code technology (Pence 2010; Okazaki et al. 2012). The diffusion of this technology is modest, with only 42% of respondents having heard about the possibility of being provided additional information on the products through this technology. Further, 27% were not aware of this technology at all, while only 2.8% of the sample declared always using personal smartphones to collect information from QR-codes or apps. The results on the level of agreement on the potential consumer experiential value emerging both from QR-codes or apps are respectively presented in Tables 3 and 4.

Table 3 shows the level of agreement of respondents towards QR-code usefulness in improving the collection of information on “Made in Italy” products, especially origin (mean=3.79), certification (mean=3.68), traceability (mean=3.65), and nutritional information (mean=3.65). Apps (Table 4) are considered important in enhancing the “Made in Italy” value of F&B products at the international level by showcasing the origin and tradition of producing these (mean=3.69), while social utility is considered less important (upload and download: mean=2.23).

The different levels of importance for QR-codes and apps during the consumer purchasing journey have been determined using bivariate analysis. Considering consumers tend to dedicate a limited amount of time and effort for buying F&B items, the pre-purchase and purchase phases tend to coincide (Lemon and Verhoef 2016; Howard and Sheth 1969; Neslin et al. 2006; Puccinelli et al. 2009) regarding the use of QR-code scanning tools.

Around 90% of respondents stated QR-codes can influence these initial phases by providing additional information on health, nutritional values, origin, certification and traceability. In the post-purchase phase, QR-codes are useful to “Receive supplementary information about products, such as recipes or using methods not related to F&B (for example, honey to prepare face masks, oil for hair)” (45.7%).

However, especially during the post purchase phase, apps provide the possibility to access content anywhere and anytime (Saarijärvi et al. 2014), thus creating social and experiential benefits (i.e., register for cooking classes or product tastings, upload or download photos).

To evaluate the strengths and direction of the relationship between the consumers’ perceived QR-code utility and their experiential value of MAR in terms of functional, emotional, and social benefits, a correlation analysis was carried out. Only moderate associations have been identified between perceived utility and consumer value (Table 5). That is, the people that consider QR-codes useful for the health, nutritional, origin, and certification information on “Made in Italy” F&B products agree that MAR technologies are especially useful for extending their knowledge (Spearman’s rho: 0.424; 0.377; 0.395; 0.348). As such, they tend to valorize the functional consumer value of MAR (Poushneh and Vasquez-Parraga 2017; Bulearca and Tamarjan 2010).

Moreover, there is also a moderate association between QR-codes’ utility for providing information on the health, nutritional, and traceability of products and

**Table 3** QR-code utility for “Made in Italy” food products: percentage (%) of respondents and average grades of items

	Health information (absence of GMOs, pesticides, antioxidants)	Nutritional information (energy, fat, cholesterol, sugars)	Origin information (territory of origin, characteristics of the production process, etc.)	Recipes or other usage information (e.g., honey for face masks, oil for hair)	Certifications (IGP, DOC, DOP, etc.)	Traceability information	Value of “Made in Italy”: product and geographical area
1	Strongly disagree	1.9	0.8	2.5	1.7	2.2	1.9
2	↓	6.4	3.3	16.9	3.6	10.2	7.5
3							
4		36.6	30.7	36.0	35.7	30.7	32.7
		40.7	46.0	31.0	42.7	33.8	38.5
5	Strongly agree	14.7	19.1	13.6	16.3	23.0	19.4
	Mean	100.0	100.0	100.0	100.0	100.0	100.0
		3.6	3.79	3.36	3.68	3.65	3.65

*Source:* Elaborated by the authors

**Table 4** App utility for “Made in Italy” food products: percentage (%) of respondents and average grades of items

	Instruction for use/recipes (download information and/or recipes or how to use the product)	Purchase product online (by linking to the e-commerce site)	Getting real time offers/promotion of products (for example: “Piedmont at the table,” “the wines of Trentino,” “the flavors of Liguria”)	Getting cooking courses or product tasting	Download games with themes	Upload and download photos (related to the product or its use to be shared with the community)	Playing virtual reality (you can see the places of production and make them interactive)	Improving “Made in Italy” (area of origin and typical tradition)	
1	Strongly disagree	1.1	3.9	3.3	5.3	25.5	10.5	5.8	1.4
2	Disagree	15.2	18.0	13.0	33.8	41.8	29.4	24.4	8.6
3	Neutral	31.9	38.2	38.2	34.3	19.4	34.9	39.1	31.3
4	Agree	40.2	31.6	35.2	22.2	10.5	19.9	23.8	36.3
5	Strongly agree	11.6	8.3	10.2	4.4	2.8	5.3	6.9	22.4
	Mean	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Standard deviation	3.46	3.22	3.36	2.87	2.23	2.8	3.01	3.69

Source: Elaborated by the authors

**Table 5** Correlation coefficients between QR-Code utilities for “Made in Italy” and customer value benefits

<i>QR-code utility</i>	MAR: Customer value							
	Allowed to know food characteristics	“Personal growth”: new competencies	Pleasure experience	Better use	Sharing experience	Inclusion in the community	Makes me feel smarter and digital user	Provide better knowledge of “Made in Italy” areas
Health information	0.425**	0.368**	0.334**	0.280**	0.228**	0.201**	0.122*	0.247**
Nutritional information	0.377**	0.343**	0.326**	0.255**	0.175**	0.151**	0.084	0.188**
Origin information	0.395**	0.298**	0.314**	0.272**	0.179**	0.105*	0.038	0.268**
Recipes and usage information	0.201**	0.266**	0.292**	0.245**	0.289**	0.227**	0.136**	0.220**
Certification traceability	0.348**	0.283**	0.294**	0.253**	0.227**	0.159**	0.084	0.239**
Value of “Made in Italy” (product and area)	0.313**	0.335**	0.301**	0.224**	0.165**	0.136**	0.082	0.292**
	0.319**	0.311**	0.302**	0.277**	0.203**	0.169**	0.069	0.313**

\* and \*\* represent the statistical significance of Spearman’s rho correlation coefficient at the 5% and 1% levels, respectively

Source: Elaborated by the authors



the MAR benefits connected to “personal growth,” since MAR helps increase the level of knowledge about new topics. Hence, the potential of QR-code technology is mostly related to the functional dimension of consumer value, while the experiential and emotional values seem less important.

Correlation analysis was also conducted for app perceived utility and consumers’ value dimensions (Table 6). The strongest positive correlation coefficients have been found between the app utility in improving the “Made in Italy” brand and the perceived benefits of MAR in enhancing the knowledge level on the origin of products (Spearman’s rho: 0.481). As apps tend also to be associated with emotional and socio-psychological benefits (Williams and Soutar 2000), using mobile apps to upload and download pictures is strictly associated to three types of benefits: (a) “sharing experiences” with others on the web (Spearman’s rho: 0.440), (b) “feeling like a smart digital user” by creating and posting interesting content (Spearman’s rho: 0.399), and (c) “being included in a community” online (Spearman’s rho: 0.369).

From Table 6, the data on the acquisition of instructions and recipes and real time offers/promotions for “Made in Italy” F&B products are correlated with acquiring new knowledge (Spearman’s rho: 0.388 and 0.367, respectively). Indeed, the flow of information and media through these digital tools may enhance consumer knowledge and experience on a product (McCormick et al. 2014), as well as valorize it from the supplier/retailer perspective (Marcoz et al. 2016). The shopping experience thus creates a connection between the real world and virtual items, enhancing the image of the company (Kim and Forsythe 2008) and consumers’ relationships with the brand (Owyang 2010; Bulearca and Tamarjan 2010).

## **4.2 QR-codes and apps for “Made in Italy” F&B products: Suppliers’/retailers’ viewpoint**

### **4.2.1 Case profiles**

We begin our analysis of the suppliers’/retailers’ viewpoint with the description of the five cases.

### **4.2.2 Company 1**

Is an Italian grocery retail store brand and one of the largest supermarket chains in Italy. It is a group of cooperatives of entrepreneurs focused on retailing. Company 1 offers a selection of “Made in Italy” products, under a premium brand (private label), which is considered a source of differentiation and growth at the international level as well. In 2015, Company 1 opened five new supermarkets in China offering a selection of nearly 250 Italian products of this premium brand. While being a leader in Italy in the large-scale distribution industry, it also targets an increasing number of foreign markets for internationalization under its own brand. For example, in Helsinki, a project aimed at the internationalization of private-label products was launched, together with a maxi-policy for the purchases of food products in Europe.

**Table 6** Correlation coefficients between app utilities for “Made in Italy” and customer value benefits

App utility	MAR: Customer value									
	Allowed to know food characteristics	New knowledge and personal growth	Pleasure experience	Better use	Sharing experience	Inclusion in the community	Makes me feel smarter and digital user	Provide better knowledge of “Made in Italy” areas		
Instruction for use/recipes	0.341**	0.388**	0.343**	0.253**	0.296**	0.203**	0.109*	0.221**		
Purchase product online	0.306**	0.345**	0.351**	0.242**	0.312**	0.306**	0.254**	0.252**		
Get real time offers/promotion of products	0.307**	0.367**	0.286**	0.280**	0.257**	0.268**	0.228**	0.318**		
Getting cooking course or product tasting	0.133*	0.300**	0.220**	0.184**	0.321**	0.274**	0.243**	0.193**		
Download games and themes	0.006	0.173**	0.111*	0.034	0.221**	0.294**	0.352**	0.089		
Upload and download pictures	0.139**	0.256**	0.258**	0.190**	0.440**	0.369**	0.399**	0.171**		
Virtual reality	0.165**	0.276**	0.261**	0.211**	0.230**	0.180**	0.159**	0.249**		
Improve “Made in Italy”	0.371**	0.296**	0.325**	0.365**	0.252**	0.145**	0.076	0.481**		

\* and \*\* represent the statistical significance of Spearman’s rho correlation coefficient at the 5% and 1% levels, respectively  
 Source: Elaborated by the authors

At the same time, its activities in Hong Kong are being strengthened to extend its non-food presence.

#### 4.2.3 Company 2

Is the market leader of the Italian grocery retail industry. It is actually a consortia of cooperatives (among consumers) operating in all Italian regions. Company 2 offers a selection of “Made in Italy” products, under different premium brands (private labels), focusing on products with complete origin traceability. As such, it stands as a reference point for Italy’s “country system,” concentrating on safety and quality. Consumers’ health and commitment to environmental protection have always been part of Company 2 institutional strategy. This company has subsidiaries in both Europe (France, Germany, Switzerland, Albany, Malta) and Asia (Honk-Kong and Southern China). Additionally, Company 2 has also been internationalized due to its business model based on distribution centers and private labels, which allowed for greater marginality and differentiation, the latter characteristic representing 25% of the strength of the foreign offer.

#### 4.2.4 Company 3

Is a recently formed Italian small high-tech company specialized in blockchain-based solutions for consumer goods and the retail industry. Their technologies allow manufacturers to generate and store product ID’s on the blockchain, thus guaranteeing traceability and authenticity verification for consumers, especially in international markets. Their QR-codes or the special AR-code they created are usually applied on food or liquor items imported in both the Asian and US markets and they are already working with over 500 European manufacturers.

#### 4.2.5 Company 4

Is a family business operating in the wine industry. Since 1968, the first year after the recognition of the designation of origin Franciacorta, the vineyards have been pre-planted, with the idea of specializing in wine with this denomination. Therefore, this company has been one of the pioneers of Franciacorta. The main strength of Company 4 is represented by the entire production chain, from grapes to bottling. In terms of positioning, the company has turned to the Horeca channel. As the wines belong to a premium range, the market is mainly the Italian one, but the company is starting the process of internationalization. To enhance the relationship between the value of the product and origin, they rely on hospitality and on food and wine tourism, as they have many cellars and a structure that allows them to focus on hospitality and catering.

#### 4.2.6 Company 5

Is an association focused on cultural promotion and food education, which valorizes the “Made in Italy” products and their territories of origins. It operates in 150

countries and was born in Piedmont, where the owners are also members. The basic idea is to establish a culture of participation, sharing, valorization, inclusion, and openness to the outside world. Everything stems from their mission, understood as the value of biodiversity in the food sector, with interest in all human biodiversity. It does not have a specific core business, other than to enhance its message through events, all with a view to safeguarding biodiversity and enhancing the world's gastronomic heritage. It represents several small businesses operating in the F&B segment of "Made in Italy," collaborating with them to promote products and areas at the national and international levels. This company is present in 150 countries worldwide, such as Burkina Faso, China, Georgia, Canada, Liberia.

#### 4.2.7 The interviews

The data from the interviews confirm that all the companies consider QR-codes and apps as technological tools aimed at creating value for consumers, thus helping companies in the relationship with the final market; however, the level of diffusion and usage of QR-codes and apps is still low.

The QR-code technology shows a growing interest among companies. Its potential value drivers are perceived highly, especially in terms of information (i.e., "health attributes of the product, such as absence of GMOs, pesticides, antioxidants"), traceability, and valorization of the products for the consumers.

According to Companies 1 and 5, QR-codes add value thanks to the following two aspects:

- (a) giving additional information on the origin of the product, enhancing the value of "Made in Italy" (e.g., origin, characteristics of the production process); and
- (b) illustrating the traceability of the entire supply chain.

Company 1 argued that the application of QR-codes on fresh food could also increase their traceability, being useful for the fresh food specialties that are prepared, served, and sold in supermarkets and hypermarkets. Traceability thus becomes important in terms of transparency of the product and of the raw materials used.

According to Company 5, it is good practice to have information on the origin of the raw materials, the way they are processed, the working conditions of people employed, and the wages they are paid: "We have a project called narrating label. We want as much information on the packaging as possible. And we've launched a project called 'source price' for inserting on the products the price at which the raw material is paid. The main thing is to have a lot of information on the label. Apps and QR-codes are good tools, but we have to work to make sure that the supermarket has as much information on the packaging as possible" (Press Office Manager of Company 5).

Company 3 stated this technological solution allows manufacturers to guarantee the traceability and authenticity of their products, especially abroad, and ensures importers that the products they are buying are authentic. QR-codes may be applied on every single food or liquor item. Every QR-code is unique and linked to an online

smart contract system that stores it on a blockchain-based, decentralized database. The final consumer, when buying the products, can access the Authenticity Certificate by scanning the QR-code with his/her smartphone. QR-codes are thus important tools that help consumers and manufactures: (a) guarantee the traceability of the “Made in Italy” products and against falsification (Italian sounding products), which may be high at the international level; and (b) share functional, social, and emotional information. In other words, they are marketing tools that create a direct interaction between consumers and their favorite brands.

In China, for example, there are many falsified products. Moreover, Chinese consumers are used to use smartphones for payment in retail stores. In this vein, consumers (especially high-income ones that consider the “Made in Italy” a sign of distinctiveness) are used to collect information about the authenticity of products during shopping. Company 3 has in fact estimated that the scanning rate of the QR-tagged products in China is close to 80%. Recently, Company 3 has created a new tool, the AR-code, where each product is tagged with an individual AR-code that carries specific information such as (A) official distributor, (B) facility of origin, (C) date of shipping, and (D) batch number tagging.

In terms of marketing, an AR-code helps valorize “Made in Italy” products by showing the story of the product, the producing firm, and origin: “It is an important tool for the internationalization of ‘Made in Italy’ products, especially in countries where the Italian sounding products are a threat” (CEO of Company 3).

Company 2, a grocery retailer, uses QR-codes on promotional fliers, but their actual benefits are considered limited. First, QR-codes refer to each flyer and not to each category of products. According to the interviewed manager, this should be changed, as “most manufacturers don’t apply QR-codes on their products. The Italian producers are not ready ... they don’t perceive the relevance of this technology in terms of marketing and supply chain control” (Manager of Company 2). Second, for the retailer, the real value driver could be the creation of QR-codes for each category of products or each line of premium private label products (e.g., brands focused on regional specialties, or on biological products): “in this way, we could promote in an unitary way the category of ‘Made in Italy’ products in the national and international markets” (Manager of Company 2).

All interviews demonstrated that the diffusion of QR-codes is very low despite the importance of the quality and traceability of F&B products. Unfortunately, the Italian F&B industry is not sensitive and proactive towards this technology, especially for fresh products. However, for Company 1, retailers should stimulate the application of QR-codes on single products, starting with their private labels. Moreover, Italian consumers are not used to make purchases using their smartphones and the consumer viewpoints in our study confirm this.

This fact is best demonstrated by Company 4. A decade ago, Company 4 chose to adopt various communication tools apart from social media channels (i.e., Facebook, Twitter, YouTube, and Instagram), such as the first mobile application with AR technology to read labels and QR-codes to show videos of their products on YouTube, where producers described products, their characteristics, and how to match them: “The use of the QR-code can be very interesting and powerful, because you can add many things, you can create links with interesting external resources,

you can link the history of wine, the territory and the possibility to visit it” (Manager of Company 4). However, it ultimately decided to quit this approach: “The QR-Code is a very important and powerful tool, but we could not carry on with our project of implementation. The main reason is due to our target market, where the time was not ripe for the introduction of these kinds of technologies” (Manager of Company 4).

Due to this environment which is still not “ready” for the acceptance on these technologies, Company 5 does not use QR-code technology or AR, but has a project called “narrative label,” useful especially for promoting the “Made in Italy” products on international markets. The aim of this project is to provide on the packaging the most information on the product, enhancing its transparency. A second project the association has launched is called “source price,” where the price of the raw material is signaled on these branded products. The idea is to give the highest level of information to the consumer, who often does not use QR-codes or apps while shopping due to time limitations.

Regarding the consumers’ shopping journey, all companies considered QR-codes important, especially in the pre-purchasing and purchasing phases, which coincide according to most of the interviewed managers, since consumers tend to not spend a lot of effort and time for acquiring preliminary information on F&B products. In terms of the usage of these technologies, the interviewed manager of Company 4, for example, stated they are more useful in the pre-purchase and during the purchase phases, because their aim is to help the consumer during the decision-making process with as much as possible information about the product. Indeed, according to Company 4: “More than being a marketing strategy, these technologies are a good tool to create a greater awareness of the importance of choices during the purchase step.”

Regarding mobile apps, the potential benefits are as follows.

For Company 1, the most actual important benefit is related to the fidelity card and the development of e-commerce. Company 2 offers two apps; one groups the following services: e-commerce, fidelity card, promotional flyer, grocery shopping memo; the other refers to food and beverage products, allowing to verify the traceability of private label products and create additional value by enhancing the knowledge on the products (“It is very important for the valorization of our private labels oriented to organic products and Made in Italy”, said the manager of Company 2).

For Company 4, apps are perceived as useful for increasing the socio-psychological value of consumers and in the post-purchase phase: “My impression is that mobile applications could be more useful after purchase, when the product is consumed” (Manager of Company 4). Company 4 was the pioneer in the creation of a mobile app with AR technology, which allowed consumers to access on different information on the wine they selected and also showed photographs and videos that could suggest emotions and experiences related to the wine. This AR app was used from 2012 to 2016, and then it was discontinued because it was not being used by adult consumers, the target of the business. The app was seen more like a hedonistic instrument than a utilitarian one for sharing information and content with the users. Now, they focus their marketing activities to the visits to the cellar and in their stores. From their negative experience with the introduction of AR, they state that

these technologies can be of greater added value if used after purchase, for enriching the consumer relationship.

Company 5 promotes several apps for sharing information about products, events, and culture of the “Made in Italy” F&B products and also for e-commerce. Companies 4 and 5 are aware that to promote “Made in Italy” products abroad, digital tools such as mobile applications could be very effective: “There are some very interesting apps, able to help the consumer to get into the structure of the product, regarding the health and the environmental impact aspects. I think it is a good tool more useful to create a greater culture of awareness than advertising” (Press Office Manager of Company 5).

## 5 Discussion

Our analysis provides evidence that MAR technologies may indeed create value for suppliers, retailers, and consumers. Particularly, from the consumers’ viewpoint (RQ1), the experiential value created by MAR may differ by the tool used.

As such, the potential of QR-code technology is mostly related to the functional/utilitarian dimension of consumer value, while experiential, emotional, or socio-psychological values seem less important. Most respondents to the questionnaire agree that QR-codes can influence consumer experience by providing information on health, nutritional values, origin, certification, and traceability.

This finding is in line with previous studies, which consider QR-code technology being used on the packaging (Pence 2010; Okazaki et al. 2012) to show how the product has been produced and where (Dacko 2017). Additionally, Poushneh and Vasquez-Parraga (2017) consider QR-codes as a useful tool in extending product information, thus enabling consumers to better evaluate the targeted products. In particular, around 65% of the interviewed consumers agree that QR-codes are important for obtaining information about the origin (area, characteristics of the production process, etc.), with a mean of 3.79. Similar results are obtained for the valorization of “Made in Italy” products and origin (60%; mean 3.65).

Further, consumers recognize that an app helps to valorize “Made in Italy” products (origin and tradition) with a mean of 3.69, associating these tools with the emotional and socio-psychological values (Williams and Soutar 2000). The functional value, even if important, is embedded with the psychological dimension, such as novelty, prestige, and hedonism (Zeithaml 1988; Sheth et al. 1991), and social value. In this sense, apps are perceived as related to social functions, as they can help share experiences (75% of respondents agree) and become part of a community (59.3%).

These results are consistent with the suppliers’/retailer’s viewpoints (RQ2); in this case, the potential benefits are mostly related to the information on the traceability of the supply chain and the origin of the product (area, characteristics of the production process, etc.), especially for Companies 1 and 2. The traceability of “Made in Italy” F&B products is important to prevent the falsification of “Made in Italy” branded products (compared to Italian sounding ones), which is diffuse at an international level, especially in high-value markets such as China, the USA, and Canada (Company 3).

Additionally, suppliers and retailers agree on the fact that QR-codes are particularly important in the pre-purchase stage, when consumers are evaluating their choices before the purchase decision (Bulearca and Tamarjan 2010), as they increase the variety of available information.

In accordance with consumers, suppliers and retailers perceive apps as MAR technologies that increase the socio-psychological value of consumers, especially in the post-purchase phase (Company 4). An app provides the possibility to access content anywhere and anytime (Saarijärvi et al. 2014), build a long-term relationship with consumers, and are especially important in the post-purchase phase, increasing social and experiential benefits (i.e., register for cooking classes or product tastings, upload and download photos related to the product or its use to be shared with the community) (Companies 4 and 5).

In terms of the valorization of products “Made in Italy,” especially in international markets, QR-codes and apps are complementary, namely a QR-code helps protect products against falsification, while an app supports the user experience of “Made in Italy” F&B products. If the perceived utility of MAR in the “Made in Italy” F&B industry is evident both from the consumer and supplier/retailer viewpoints, the actual use of these technologies proved rather limited, thus addressing RQ3.

On one hand, the Italian F&B context is still not mature enough for the fruition of the full potential of MAR technologies. Italian consumers are not used to make purchases by smartphone, which is not the case in countries such as US or China, where the application and implementation of digital technologies, such as QR-codes, is very diffused. This aspect does not stimulate firms to adopt these technologies. On the other hand, the Italian industry is not sensitive or proactive towards the adoption of these technologies. Therefore, the role of retailers in stimulating the use of MAR could be relevant, since they seem more sensitive and innovative.

## 6 Conclusions

This paper contributes to the existing MAR marketing literature by identifying the perceived usefulness and value creation of MAR by integrating consumers’ and suppliers/retailers’ viewpoints under a mixed method study. We addressed the “Made in Italy” context, with a focus on the F&B industry.

On the consumer side, the quantitative analysis helps understand consumers’ perceptions of the usefulness and experiential value creation of using MAR for “Made in Italy” F&B products, whereas on the supplier/retail side, the qualitative analysis on five case studies revealed the perceived benefits of MAR and its potential role in the valorization of products within the national and international markets (Marcoz et al. 2016), together with the limitations in terms of diffusion and usage of such technologies.

The results show how MAR (particularly through QR-codes and apps) could provide different benefits to consumers and suppliers/retailers. The data also show their importance for companies (especially retailers) in sharing information on the nutrition and health attributes of products, along with their origin (Wang et al. 2018;



Muzellec and O'Raghallaigh 2018). This aspect could enhance the value perceived by consumers for "Made in Italy" products, thus increasing their loyalty towards this brand (Marcoz et al. 2016).

The QR-code technology also allows consumers to verify product quality and traceability. Consistently, companies consider QR-codes able to guarantee these characteristics, providing advantages to excellent Italian products in terms of traceability especially in international markets such as China and the US.

Apps, instead, are considered useful for creating a strong relationship with consumers: they allow retailers/suppliers to provide several additional services and information to consumers, who will become increasingly engaged with the product and service co-creation process (Bonetti et al. 2019; Pantano 2015). Particularly, they increase the social and experiential benefits, being most useful in the post-purchase phase.

Unfortunately, despite consumers and retailers/suppliers recognizing the rich contribution of MAR to consumer value creation (Poushneh and Vasquez-Parraga 2017; Bulearca and Tamarjan 2010), its application and usage are still limited for "Made in Italy" F&B products.

First, the producers of F&B products are mainly small businesses, in which the importance of quality and the level of traceability for F&B products through QR-codes is not well perceived. Second, when they operate only at the national level, they do not face the problem of falsification and of other Italian sounding products, which is instead important on international markets. Finally, regarding promotional activities, the lack of homogenization of marketing activities penalizes the effectiveness of MAR instruments.

This study has several theoretical and practical implications as follows. From a theoretical standpoint, our results contribute to the literature in several ways. First, we enhance the AR marketing literature by providing insights on the ways MAR can increase consumer value for "Made in Italy" F&B products. We do this by integrating both the consumer and supplier/retailer perspectives, while almost all previous studies focus on either one or the other. Moreover, we focus on how MAR may help the internationalization process of "Made in Italy" F&B products.

From a managerial viewpoint, the introduction of MAR technologies has three main implications: (a) the creation of a higher guarantee for the traceability of a famous brand ("Made in Italy") by emphasizing its genuineness; (b) the sharing of information into the community helps avoid frauds or international falsification, guaranteeing a higher level of transparency; and (c) by giving additional information in term of health, recipes, and traceability, these technologies contribute to co-creating value with consumers (Tardivo et al. 2017).

## 6.1 Despite its contributions, this paper is not without limitations

First, the novelty of this topic means consumers and retailers are just starting to adopt such technologies. Second, the multiple case study methodology introduces limitations regarding the reliability, validity, and generalizability of the results. Thus, while this exploratory research constitutes an important starting point for

further researches, future studies should investigate the motivations of the scarce use of these tools by retailers, suppliers, and consumers in more details, extending the analysis to the use of MAR for F&B products with other origins, while making comparisons with Italy; this would allow understanding if the cultural context of a country can affect the introduction and usage of MAR.

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