Exploring Willingness to Pay for QR Code Labeled Extra-Virgin Olive Oil:
An Application of the Theory of Planned Behavior

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ABSTRACT

Quick Response Code (QR code) is the representative device of a particular branch of marketing called *mobile marketing*. The code is found throughout various productive sectors, including the agro-food sector. This work investigates whether consumers are willing to pay a premium price for extra information on a bottle of extra-virgin olive oil (EVOO) by means of the QR-code. Based on data collected from 1006 interviews conducted in Italy, we implemented the Theory of Planned Behavior (TPB) model to ascertain the factors that could influence consumer's willingness to pay (WTP) for extra QR code information. Empirical results show the influence of attitudes, subjective norms and consumer personal characteristics such as mavenism and motivation for shopping (utilitarian vs. hedonic motivation) in explaining willingness to pay for a bottle of QR code labeled olive oil.

Keywords. Mobile marketing; QR code; Olive oil; Theory of Planned Behavior

1 Introduction

Marketing strategies are constantly changing to adapt to swings in consumer lifestyles (Lamarre et al., 2012). Development of new technologies such as smartphones and tablets has led to the evolution of a particular branch of marketing called *mobile marketing* (Gao et al., 2013; Ryu, 2013). The Mobile Marketing Association formally defined mobile marketing as *'a set of practices that enables organizations to communicate and engage with their audience in an interactive and relevant manner through any mobile device or network'* (Mobile Marketing Association, 2009). The secret of its success is the global level of diffusion of mobile devices together with the ease with which companies and producers, through mobile systems, can spread information and news to consumers whenever and wherever (Unal et al., 2011). A study by Forrester Research showed that 52% of companies that implement mobile marketing strategies aim to increase substantially the number of consumers involved with their products (Tsirulnilk, 2010).

Constant use of mobile phones in the everyday lives both of teenagers and young adults makes mobile marketing information accessible *"anytime and anywhere"* (Lamarre et al., 2012; Cunha et al., 2010; Sundmaeker & Einramhof, 2015). Put differently, mobile marketing represents an alternative way to reach consumers with persuasive and promotional messages in the shortest time (Atkinson, 2013). As well as other productive sectors, the agro-food industry has understood the great potential of implementing mobile devices. With the constant progress in information technologies, application of such mobile devices enables companies to provide additional information to consumers about the whole process

"*from farm to fork*" (Chen & Huang, 2013; Choe et al., 2009). A large number of consumers deem the level of information provided on food labels inadequate and insufficient (Shiang-Yen et al., 2013; Aizaki et al., 2010). Mobile marketing tools enter the scene to satisfy increasing consumer demand for more information on food products (Marotta et al., 2014). Technically, additional information can be included on web servers and conveyed to consumers instantly, using a web access device (Sugiyama, 2009). Among the mobile marketing devices, the Quick Response Code (QR code), which relies on the pull-based approach, is considered by many experts as the future in the trading sector (Batista, 2011).

QR code was created in Japan in 1994 thanks to the Denso Wave Company (Shiang-Yen et al., 2011) and was approved by ISO in 2011 (ISO/IEC18004). It consists of a two-dimensional barcode that can contain substantial amounts of extra information on a product, such as information on its production process and characteristics, as well as promotional and marketing messages. Through mobile tagging technologies, all the messages contained are immediately available for users (Jupiter, 2011; Shiang-Yen et al., 2011).

The widespread use of QR code started in Europe and Asia (Batista, 2011) and spread rapidly in the rest of the technologically advanced countries. The Comscore study of 2011 demonstrated that 6.2% of consumers with smartphones in 2011 (about 14 million) were using QR code to decode bars in magazines or on product packaging. In the same year promotions and advertising using QR code increased by 600% (Tode, 2012). In the agro-food sector, QR code has been used for different purposes: to retrieve product information about genetically modified food (Shiang-Yen et al., 2011); to examine the influence of information about agrochemicals in tomato crops (Aizaki et al., 2010); to identify vineyard and wine origin with QR code printed on transportation containers (Cunha et al., 2010); to obtain extra information such as the geographic location of firms, origin of raw materials, production process technologies; and for information about product traceability and sensory characteristics (Tarjan et al., 2014).

Given the increasing importance of mobile marketing devices and especially of QR code, it is important to understand how consumers would react to the entry of such technology in everyday life. What we set out to investigate is whether consumers are willing to pay a premium price for extra information on a food product by means of QR code. To that end, we took a specific product, namely a bottle of extra-virgin olive oil. Consumers were presented with an *ad hoc* scenario in which additional (not mandatory though relevant to consumers) information was available by consulting web-based labels accessible by means of a QR code reported on its label.

The choice of extra-virgin olive oil is easily explained. Extra-virgin olive oil is one of the most popular products in Mediterranean diet and represents a key ingredient used in Italian cooking (Di Vita et al., 2015). Moreover, recent scandals related to the false origin of olives used in the production process have damaged the reputation of the most famous olive oil brands and, even more importantly, have cast the attention of the mass media and consumers upon the importance of complete information on product packaging. In this regard, in January 2014, The New York Times revealed a scandal involving Italian olive oils, with the striking headline "Extra Virgin suicide: the adulteration of Italian olive oil", underlining the need for analytical methods and statistical tools capable of effectively verifying claims of origin and/or quality (Camin et al., 2016; Tay et al., 2002). Subsequently, in Italy the Public Prosecutor's office opened an investigation on seven of the most famous Italian olive oil brands, including Carapelli, Bertolli and Sasso, with the serious charge of counterfeiting their products (La Repubblica, 2016).

The result of this type of research is far from obvious; recent data have shown that a large number of consumers are not familiar with mobile marketing devices such as QR code and, almost surprisingly, a sizeable number of consumers seem to be completely averse to the use of QR code. Such consumer aversion could be due to individual characteristics in perceiving new technology (Bina et al., 2007; Venkatesh & Davis, 2000). By contrast, taking into account the importance of the level of information provided to consumers, previous studies have demonstrated that individuals are willing to pay a considerable premium price to have a more accurate system of information about food products (Zhang et al., 2010).

Based on data collected from 1006 interviews conducted during Summer 2015, we analyze which factors are able to explain consumers' willingness to pay (WTP) a premium price for a bottle of extra-virgin olive oil provided with a QR code on the label. The model implemented in this study falls within the domain of the Theory of Planned Behavior (TPB) with a Structural Equation Modeling (SEM) system. Through TPB it is possible to evaluate the impact of attitude, social norms, past behavior and Perceived Behavioral Control (PBC) of individuals on the intention to pay an extra price for a bottle of QR code labeled olive oil. Furthermore, in the TPB model implemented, we added some personal characteristics of individuals, such as shopping motivation and level of market mavenism because we hypothesized that they could play a decisive role in developing a positive attitude to the use of QR code.

The paper is organized as follows. In Section 2 a brief explanation of the TPB model and our conceptual model is provided, including a comparison between the TPB and the Technology Acceptance Model (TAM), both used in this research field. In Section 3 the data generating process is explained by illustrating the questionnaire. Section 4 deals with the conceptual framework of our research question; the measures of all variables used in the TPB model are explained in depth. In Section 5, the empirical results are presented, and the final section concludes with a discussion of methodological and marketing implications.

2   Theoretical background

The present research is based on the Theory of Planned Behavior (TPB) framework (Ajzen, 1991). The TPB has received considerable attention in the scientific literature because it was designed to predict behavior across many different contexts (Mathieson, 1991). TPB factors have been shown to be strong predictors in the domain of Internet research to understand several behaviors, such as the use of online services (Bosnjak et al., 2005; Hsu & Chiu, 2004; Hsu et al. 2006; Lau et al., 2001; Lau, Yen, & Chau, 2001; Lee et al., 2007; Kang, Liu & Kim, 2013; Liao et al., 2007; Liao et al., 1999), the adoption of mobile technology (Lu et al., 2001; Luarn & Lin, 2005; Pedersen & Nysveen, 2002), and online shopping behavior (Crespo & Del Bosque, 2008; Gentry & Calantone, 2002; Khalifa & Cheng, 2002; Keen et al., 2004; Limayem et al., 2000).

The Theory of Planned Behavior was developed by Ajzen (1991) starting from the earlier Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980). According to the TRA, individual volitional behaviors are determined by intention, which refers to the person's motivation to engage in a particular behavior. Intentions are, in turn, predicted by positive or negative attitudes to a specific behavior coupled with subjective norms, which concern the perceived social pressures to adopt a certain behavior. The TPB maintains the TRA constructs (attitude and subjective norm as predictors of intention), adding a further concept, namely Perceived Behavioral Control (PBC), which reflects the extent to which a person perceives a sense of control over behavior.

Although TPB was shown to be a predictive model for explaining many consumers' behaviors (Hsu et al., 2006; Mathieson, 1991; Truong, 2009), no studies have tested its application to the consumers' intention concerning the acceptance of QR code. In fact, several previous studies applied a different theory, namely the Technology Acceptance Model (TAM). According to the TAM, intention is explained by attitude, which in turn is predicted by *perceived ease of use*, *perceived usefulness*, and by subjective norms (Davis, 1989; Davis et al., 1989). TAM theory was also used in previous studies to predict intentions to use QR code (Ertekin & Pelton, 2014; Shin et al., 2012, Wang et al., 2006; Higgins et al., 2014). To better illustrate, Erketin & Pelton (2014) showed that intention to scan QR codes on magazine ads was influenced by subjective norms, perceived convenience, entertainment benefits, and "deal proneness".

Shin et al. (2012) showed that attitudes to QR codes were influenced by perceived usefulness and perceived ease of use, finding that behavioral intention to use QR code was determined by attitude. Moreover, they found that actual behavior was positively influenced by intention, perceived interactivity and subjective norms. Higgins et al. (2014) developed a TAM study on US wine consumers to identify the role of QR code in wine purchase decisions: It was shown that the adoption of QR code in relation to the wine purchase decision was related to both the ease of use and the perceived usefulness of the technology.

Despite the relevance of the findings within the TAM framework for explaining the acceptance of the use of QR code, we considered it interesting to apply the TPB model to ascertain consumers' WTP for QR code on an EVOO bottle. Even if TAM and TPB could appear similar, as pointed out by Mathieson (1991), important differences between the two models should be taken into account:

1) TPB proposes specific beliefs, assuming that they are distinct for each context considered and including the search for eventual additional beliefs in its methodology; in contrast, TAM was developed to generalize its beliefs (*perceived ease of use* and *perceived usefulness*). However, in a specific situation, additional factors besides TAM beliefs, such as accessibility of an information system, could be important aspects to investigate.

2) TAM includes no social variables to explain intentions since social norms are considered with only a direct impact on behavior. TPB studies, instead, show that subjective norms explain an additional variance of intentions over and above the other TPB variables. Therefore, social variables in TPB may still capture unique variance in intention about the acceptance of QR code.

3) Behavioral control is considered differently by these models. In this regard, TAM assesses the perceived ease of use construct for measuring individuals' capabilities and skills, which corresponds to internal control factors of users. TPB, instead, differentiates between internal factors based on individual characteristics and external factors that are related to the situation. The latter factors are undoubtedly significant, since they comprise contextual characteristics, such as time and opportunity, which could be important factors in explaining intentions to use QR code.

Starting from these considerations, application of the TPB appears an interesting contribution to the literature, especially to bridge the gap concerning the role of TPB constructs in understanding which specific beliefs are involved in consumer intentions to use QR code. Moreover, TPB constructs have been widely shown to be *per se* a stronger predictor of consumer intentions in several technology adoption contexts (Hsu et al., 2006; Truong, 2009).

3 Methods

This research is based on data collected through a questionnaire survey conducted during summer 2015. A national company that performs market and consumer studies administered the questionnaire to a representative Italian sample. Each questionnaire took approximately 20 minutes to administer and consisted of four sections. The survey resulted in a sample of 1006 Italian respondents. The first section was designed to ascertain the socio-demographic characteristics of the interviewees (Table 1) and their olive oil consumption patterns.

Table1.
Sociodemographic characteristics of respondents - no. obs: 1006

	18-24	11%
	25-34	18%
Age	35-44	24%
	45-54	25%
	55-65	22%
Gender	Male	50%
	Female	50%
	North-West	26%
Italian Region	North-East	19%
	Center	22%
	South	33%
	Primary	10%
Education	Secondary	68%
	Higher	22%
	Missing	15%
Household monthly income	< €1000	13%
	€2001 - 3000	23%
	€3001 - 4000	12%
	> €5000	3%
	Missing	49%

In the second part of the questionnaire, a hypothetical market scenario was presented to respondents to elicit willingness to pay for an EVOO bottle with QR code; the third part concerned attitudes to the use of mobile marketing, subjective norms, and perceived behavioral control; the fourth part of the questionnaire investigated consumers' shopping motivation and market mavenism. Finally, the fifth part focused on ascertaining the additional information consumers wished to read on olive oil labels. Results in table 2 show the seven additional information items that are most requested by Italian olive oil consumers.

Table 2.
Additional information on olive oil requested by Italian consumers

1. Olive cultivar/s and place of origin

2. Information on olive farm

3. Oil acid value and other chemical parameters

4. Olive production techniques

5. Information on olive oil extraction technique

6. Harvest year and date of mill operation

7. Sensory analysis and gastronomic suggestions

4   Conceptual framework

The present research aimed to ascertain the factors which influence consumer willingness to pay a premium price for a QR code labeled bottle of olive oil; willingness to pay represents intentions in the TPB model. Relationships between study variables and related hypotheses are shown in the conceptual model in Figure 1. We included two additional factors in relation to individual characteristics, namely market mavenism and shopping motivations, as determinants of attitudes. Indeed, according to Ajzen (1991), the inclusion of relevant additional factors may increase the predictive validity of the TPB, and several studies have demonstrated the increasing effectiveness of TPB in explaining specific behavior (Crespo & Del Bosque, 2005; Kang et al., 2006; Ismail et al., 2016)

In the present study we hypothesized that Perceived Behavioral Control, together with subjective norms, attitude and past behavior, have an influence on intentions, i.e. on consumers' willingness to pay for QR code (Figure 1). In the following subsections each variable is explained in depth.
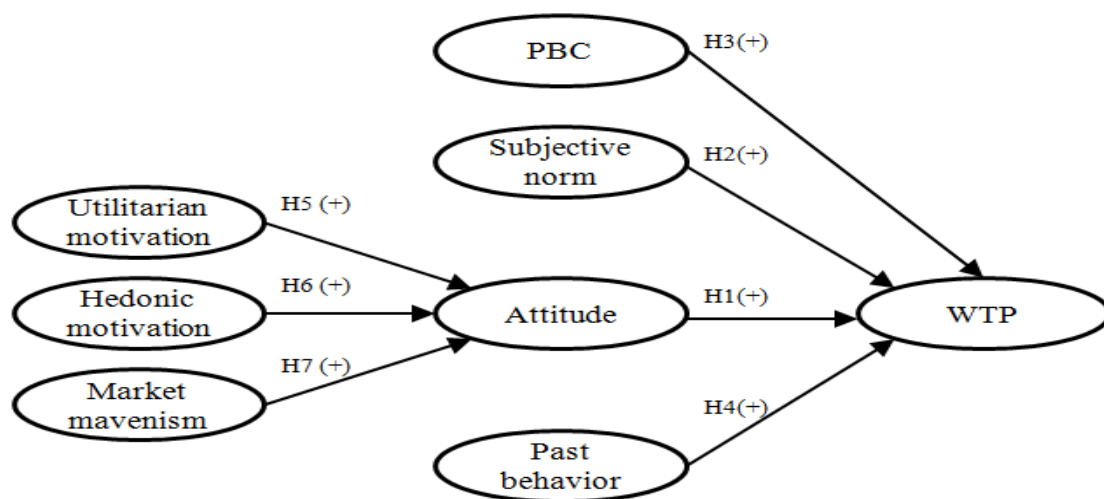

Figure 1. Conceptual model
Note. PBC = Perceived Behavioral Control

4.1. Dependent variable: Willingness to pay for a bottle of extra-virgin olive oil with QR code

Intention expresses the size of the probability of performing a specific behavior (Fishbein and Ajzen, 1975) and it is the proximal cause of volitional behavior. Ajzen and Driven (1992) treated willingness to pay for a non-market good or service as intention in the TPB model. After Ajzen and Driven (1992) other studies used stated WTP as behavioral intentions in contingent valuation exercises (Sauer and Fisher, 2010; Cooper et al., 2004; Ojea and Loureiro, 2007). In our case we elicited consumers' WTP an extra price for a specific attribute, namely the presence of QR code on a bottle of extra-virgin olive oil to access additional information on the product.

The payment scenario was the following:

The label that you find on a bottle of extra-virgin olive oil contains useful information for the consumer. Some of these are mandatory:
- *olive oil types (extra virgin, virgin, etc,)*
- *Name of the producer*
- *Expiry date (18 months after bottling)*
- *Origin of the olives and the oil (EU Member State or non-EU) or any mixture of oils from different sources.*

Others are optional, such as, "Organic olive oil", "Protected Designation of Origin", "Protected Geographical Indication" that can be carried out if properly certified by an independent organization. There may be much more additional information, such as olive cultivars, geographic location of the farm, information on the farm producing olives and/or on the processor, time at which olives were harvested, acid value, production techniques, method to extract oil from the olives, and sensory profile.

The space available on a generic label of a bottle of oil is unable to display all of the optional information that a consumer would like to read. At present, olive oil producers are trying to meet this consumer need through QR code. This way you can get detailed information at the shelf before purchasing. Optional information to be provided in a credible manner to the consumer requires a very strict protocol of traceability and certification that increases costs.

Willingness to pay (WTP) was assessed with one item using a dichotomous response format (Table 3):

Table 3.

Willingness to pay dependent variable

Scale	Frequencies
Willing to pay (WTP) 1. Imagine you are in the place where you usually buy extra-virgin olive oil and find on the shelf the oil bottle that you bought the last time. Imagine also that this time the bottle is equipped with a QR code that allows you to get all the optional information. Would you be willing to pay more for that bottle compared to the price paid the last time?	No = 564 Yes = 442

4.2 Attitude

Attitude represents the individual's evaluation, in positive or negative terms, of performing a specific behavior (Armitage and Conner, 2001). In other words, the more positive is the attitude to behavior, the stronger is the individual's intention to do so. Therefore, we hypothesized that:

H1: Consumers with a positive attitude to QR code use will express a positive WTP.

Attitudes to using QR code were calculated using three items (Tab. 4). These items were defined following Ajzen's (2006) recommendations about the operationalization of TPB variables. The response format ranged from 1 (completely disagree) to 5 (completely agree).

Table 4.
Attitude to QR-code scale

Scale	Mean (SD)	Standardized factor loading	Composite reliability
Attitude			.78
1. QR code use for shopping is good.	2.72 (1.21)	.76	
2. QR code use for shopping is enjoyable.	3.29 (1.19)	.69	
3. QR code use for shopping is useful.	2.99 (1.26)	.75	

4.3 Subjective norm

Another intention predictor is subjective norms, or the perception of social pressure in relation to specific behavior. More specifically, the more individuals think that people who are important for them approve their behavior, the stronger should be the intention to behave so (Ajzen, 1991). A large number of studies have shown the impact of subjective norms on intention to perform a specific behavior (Cheung et al., 2002; Igbaria, et al., 1997; Riemenschneider et al., 2003). For example, Karjaluoto and Alatalo (2007) found that subjective norms are positively related to intention to participate in mobile marketing. Therefore, we hypothesized that:

H2: Consumers with positive subjective norms toward QR code use will express a positive WTP.

Subjective norms are calculated by three items (Table 5). These items were formed in line with the operationalization of the TPB variables (Ajzen, 2006). The response format ranges from 1 (completely disagree) to 5 (completely agree).

Table 5.
Subjective norm scale

Scale	Mean (SD)	Standardized factor loading	Composite reliability
Subjective norm			.92
1. People who are important to me want me to use QR code for shopping.	2.82 (1.31)	.88	
2. People who are important to me approve if I use QR code for shopping.	2.85 (1.29)	.92	
3. People who are important to me think that I should use QR code for shopping.	2.76 (1.28)	.89	

4.4 Perceived behavioral control

Perceived behavioral control (PBC) is the variable added by Ajzen (1991) to the precursor model of TPB, namely the Theory of Reasoned Action (TRA). It is held to influence both intention and behavior (Armitage and Conner, 2001). PBC is the individual perception about financial resources, individual skills and information level possessed to perform the behavior (Giantari et al., 2013). In the domain of mobile marketing, researchers found different results regarding PBC. For example, Merisavo et al. (2007) indicated that PBC was a weak contributor in explaining intention to accept mobile advertising. Along the same lines as Merisavo et al. (2007) the research of Kang et al. (2006) into the effects of PBC on the consumer usage intention of e-coupons indicated that PBC presented a negative impact on intention. On the contrary, Bauer et al. (2005) reported a strong relationship between PBC and the behavioral intention to adopt mobile marketing. Lastly, the research of Karjaluoto and Alatalo (2007) on consumer attitudes

and intention to participate in mobile marketing found that PBC was not associated with intention to participate in mobile marketing. In our research we chose to test the hypothesis:

H3: Consumers with positive perceived behavioral control toward QR code use will express a positive WTP.

Perceived behavioral control was measured by a three-item scale (Giantari et al., 2013) that expresses the respondents' perception about the amount of resources (financial), ability level (skills) and knowledge level (information) possessed, that are useful to perform the specific behavior. The response format ranged from 1 (completely disagree) to 5 (completely agree) (Table 6).

Table 6.
Perceived behavioral control scale

Scale	Mean (SD)	Standardized factor loading	Composite reliability
Perceived behavioral control			.81
1. I have the financial resources to make purchases using QR code.	3.00 (1.26)	.30	
2. I have the ability to make purchases using QR code.	3.44 (1.24)	.92	
3. I have the knowledge to make purchases using QR code.	3.40 (1.22)	.92	

4. Past behavior

In the TPB framework during the last two decades there has been an important debate about the role of past behavior as a predictor of intention. Past behavior could be described as actions or reactions in response to previously occurring external or internal stimuli (Summer, 2011).

Past behavior is widely reported to influence behavioral intention (Conner & Armitage, 1998; Ouellette & Wood, 1998). Therefore, it is useful to ascertain whether past behavior plays a decisive role also in the domain of mobile marketing, specifically on the intention to use QR code.

H4: Consumers who used QR code in the past will express a positive WTP.

Past behavior was measured using one item with a dichotomous response format (Table 7).

Table 7.
Past behavior scale

Scale	Frequencies
Past behavior	
1. Did you use QR code in the past?	No = 540 Yes = 476

4.6 Shopping motivation

To understand the determinants of the consumer's decision to use mobile marketing devices such as QR code, it is also useful to determine some consumer personal characteristics and traits which could influence consumer attitudes to using mobile marketing while shopping. These variables are called "*consumer-based drivers*" (Bauer et al., 2005) and are better at explaining the behavior examined, using TPB.

The most relevant *consumer-based driver* variable in our scenario is the consumer's shopping motivation. The motivation of consumers behind shopping could be driven by *hedonic and utilitarian motivation.*

Utilitarian motivation aims to satisfy an economic need. In other words, shopping is seen as a task that has to be solved (Babin et al., 1994). By contrast, hedonic motivation presents shopping as an emotional and enjoyable experience (Bloch & Richins, 1983; Westbrook & Black, 1985).

The role of utilitarian and hedonic motivations on behavioral intention has been the focus of several studies. For example, Kim and Han (2011) asserted that adoption intention is predicted by utilitarian and hedonic intention to adopt mobile data services. Other studies verified the role of these different approaches on consumer attitudes. Tseng and Chang (2015), using the TPB model, showed that utilitarian and hedonic motivation influence the attitude to consumption of organic products. Starting with these considerations, in our study the hypothesis behind the shopping motivation variable is that different ways of viewing the shopping moment could influence differently the attitude to using a mobile marketing device during shopping.

H5: Consumers with higher hedonic motivations to shopping will express a positive WTP.

H6: Consumers with higher utilitarian motivations will express a positive WTP.

Consumer motivation for shopping was measured with 24 items, comprising 18 items for *hedonic motivation* and 6 items for *utilitarian motivation* (Table 8).

The response format ranged from 1 (completely disagree) to 5 (completely agree).

4.7 Market mavenism

Another personal characteristic of consumers that could influence the intention to use mobile marketing could be market mavenism. "Market mavens" are defined as "*individuals who have information about any kind of products, places and shops, and other facets of markets, and initiate discussions with consumers and respond to request from consumers for market motivation*" (Feick and Price, 1987). In general, a market maven is an individual who seeks not only general information about products but also in-depth information (Feick and Price, 1987). Our hypothesis in relation to the market maven variable is that if an individual is a market maven, he/she is more likely to present a positive attitude to using QR-code while purchasing olive oil.

H7: Market mavens, who tend to search for information on products, will express a positive WTP.

Market mavenism was assessed with six items (Feick and Price, 1987). The response format ranged from 1 (completely disagree) to 5 (completely agree) (Tab.9).

Table 8.
Consumer shopping motivation scale

Scales	Mean (SD)	Standardized factor Loading	Composite reliability
Hedonic motivation			.94
1. To me, shopping is an adventure.	3.01 (1.22)	.54	
2. I find shopping stimulating.	3.01 (1.22)	.77	
3. Shopping makes me feel like I am in my own universe.	3.37 (1.21)	.79	
4. When I'm down, I go shopping to feel better.	3.01 (1.30)	.80	
5. I go shopping when I want to treat myself to something special.	2.89 (1.38)	.81	
6. To me, shopping is a way to relieve stress.	3.05 (1.36)	.80	
7. I like shopping for others because when they feel good I feel good.	3.04 (1.33)	.73	
8. I enjoy shopping for my friends and family.	3.10 (1.27)	.73	
9. I enjoy shopping around to find the perfect gift for someone.	3.29 (1.26)	.64	
10. For the most part, I go shopping when there are sales.	3.42 (1.24)	dropped	
11. I enjoy looking for discounts when I shop.	3.64 (1.40)	.41	
12. I enjoy hunting for bargains when I shop.	3.79 (1.11)	.46	
13. I go shopping with my friends or family to socialize.	3.83 (1.12)	.67	
14. I enjoy socializing with others when I shop.	2.93 (1.30)	.68	
15. Shopping with others is a bonding experience.	3.01 (1.26)	.68	
16. I go shopping to keep up with trends.	3.04 (1.21)	.72	
17. I go shopping to keep up with new fashions.	2.73 (1.32)	.71	
18. I go shopping to see what new products are available.	2.63 (1.31)	.69	
Utilitarian motivation			.71
19. It is important to accomplish what I planned before a particular	3.24 (1.26)	.61	
20. On a particular shopping trip, it is important to find items I am	3.51 (1.13)	.76	
21. It feels good to know that my shopping trip was successful.	4.12 (.98)	dropped	
22. I like to feel smart about my shopping trip.	3.33 (.18)	.65	
23. It is disappointing when I have to go to many stores to complete my	3.33 (1.16)	dropped	
24. A good store visit is when it is over very quickly.	3.45 (1.20)	dropped	

<table>
<tr><td colspan="4" align="center">**Table 9**.
Market mavenism scale</td></tr>
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Scale	Mean (SD)	Standardized factor loading	Composite reliability
Market mavenism			.93
1. I like introducing new brands and products to my friends.	3.55 (1.14)	.80	
2. I like helping people by providing them with information about many kinds of products.	3.36 (1.19)	.81	
3. People ask me for information about products, places to shop, or sales.	3.51 (1.12)	.86	
4. If someone asked where to get the best buy on several types of products, I could tell him or her where to shop.	3.43 (1.18)	.86	
5. My friends think of me as a good source of information when it comes to new products or sales.	3.53 (1.11)	.83	
6. Think about a person who has information about a variety of products and likes to share this information with others. This person knows about new products, sales, stores, and so on, but does not necessarily feel he or she is an expert on one particular product. How well would you say that this description fits you?	3.52 (1.07)	.64	

5   Results

Structural equation modeling (SEM) was performed using Mplus 7 statistical software. A mix of path analysis and confirmatory factor analysis, called a hybrid model, was used (Hancock & Samuelsen, 2007). This model includes a combination of latent and observed variables. Adequacy of fit of the SEM models was verified by the Chi-Squared test, but also with other indexes, such as the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI) and the standardized root mean square residual (SRMR; Iacobucci, 2010). A non-significant Chi-Square suggests that the model fits the data correctly (Iacobucci, 2010).

The hybrid model included eight factors indicating attitude, PBC, subjective norms, hedonic motivation, utilitarian motivation and market mavenism; past behavior and willingness-to-pay were added as observed variables. The dependent variable was willingness-to-pay while other factors were independent variables. Hedonic and utilitarian motivations together with market mavenism were considered predictors of attitude, which in turn was inserted as a predictor of intention with PBC, subjective norms and past behavior. Goodness-of-fit statistics for the model were acceptable (χ^2 = 2689.13, df = 632, p < 0.001; RMSEA = 0.05; CFI = 0.93; TLI = 0.92; SRMR = 0.06). The parameter estimates presented significant acceptable values (from 0.42 to 0.92), except for one item of the hedonic motivation scale (item 10) and three items of the utilitarian motivation scale (item 21, 23 and 24), which were dropped. Although the motivation scales used in the present research are found in the existing literature, these items were dropped since they presented low scores in the measurement model and reduced the goodness of fit indices. This evidence indicated a weak relationship between the observed construct and the factor. It could well suggest that these items measure a different variable from the other items in the scale. That said, the elimination of items with low scores is common in SEM applications, and other studies used this procedure to guarantee the goodness of fit indices (Ertekin & Pelton, 2014; Lassoued & Hobbs, 2015).

Based on the parameter estimates the hypothesized model was accepted (Figure 2). PBC, attitude, subjective norms and past behavior were significant predictors of intention. Specifically, contrary to our hypothesis (H3 and H4), higher PBC (β = -.25; *p* < .001) and past behavior (β = -.03; *p* < .001) reduce the

intention to pay more for the QR-code-labeled bottle of olive oil, while, in line with what we expected (H1 and H2), a higher positive attitude (β = .22; p <.001) and higher subjective norms (β = .18; p < .05) increase consumers' WTP a premium price (table 10).

Table 10.
Regression weight of structural model

Hypotheses	Parameter estimates
H1: attitude -> intention	.22**
H2: subjective norm -> intention	.18*
H3: PBC -> intention	-.25**
H4: past behavior -> intention	-.03**
H5: utilitarian motivation -> attitude	-.14**
H6: hedonic motivation -> attitude	.50**
H7: market mavenism -> attitude	.27**
	χ^2 = 2689.13, df = 632, p < 0.001; RMSEA = 0.05; CFI = 0.93; TLI = 0.92; SRMR = 0.06

*Note. ** p < .001; * p < .05*

A higher positive attitude was determined by higher hedonic motivation and market mavenism (respectively, β = .50, *p* < *.001*; β = .27; *p* < .001) and by lower utilitarian motivation (β = -.14; *p* < .001). Levels of explained variance were significant (*p* < .001) for attitude and intention (respectively R^2 = .43, .04).

Starting from these results, application of the TPB appeared effective in explaining willingness to pay more for a bottle of EVOO with a QR-code. *H1* and *H2* were confirmed, since significant effects of attitude and subjective norms upon WTP were found. This finding suggests that those who consider QR-code use positive, useful and enjoyable are willing to pay more for a QR-code labeled bottle of EVOO. Furthermore, the more others approve QR-code use, the more consumers will be willing to pay a premium price for products displaying a QR-code.

Hypothesis *H3* was rejected since PBC had a direct impact on WTP, but its effect was negative. Consumers who perceived less control on the use of QR-code were willing to pay more for a product displaying the code. Another rejected hypothesis was *H4* since the previous use of QR-code negatively influences willingness to pay more for a QR-code labeled product. Considering the additional variables, the model confirmed their decisive role in determining attitude to QR-code use. Hedonic motivation specifically led to a positive attitude to using QR-code during olive oil purchase, unlike utilitarian motivation.

Therefore, *H5* was confirmed, while *H6* was rejected. Finally, market mavenism played a significant role in predicting a positive attitude. Hence *H7* was confirmed, corroborating the importance of individual identity in determining purchase attitudes.
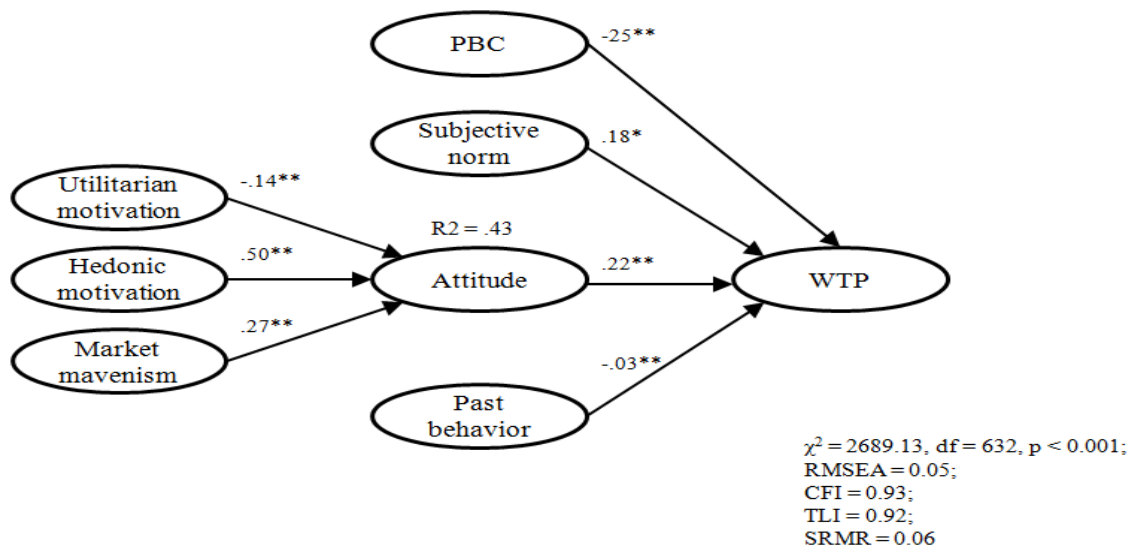
Figure 2. Path model with standardized regression coefficients

6   Discussion and conclusion

The growing pressure of consumers for more detailed information concerning food products and food production processes has led many agro-food companies to adopt mobile marketing devices, especially QR-code on their products, with the aim of benefiting from the trust of their customers. Our TPB results show the factors that are able to influence consumers' willingness to pay a premium price for a bottle of extra-virgin olive oil with QR-code on its label. Starting from attitudes, we show that consumers' positive attitudes to using mobile marketing devices, such as QR code, during shopping, are able to influence positively their willingness to pay for a product equipped with QR code. The evidence of a positive impact of attitude to QR-code on the WTP is consistent with findings in the scientific literature, underlining the positive impact of attitude on consumers' purchase intentions (Smith et al., 2008), and with past studies on the effects of attitudes in changing individuals' intentions (Carfora, Caso & Conner, 2016a).

According to the study of Karjaluoto and Alatalo (2007) on mobile marketing, subjective norms are significant determinants of WTP for a mobile marketing device. In our study subjective norms have a positive influence on the consumer's willingness to pay for olive oil with QR-code: we show that the more people think individuals who are important to them approve their behavior, the stronger should be the intention to do so (Ajzen, 1991). Individuals tend to follow the generally accepted behavior of their connection groups and perceive social pressure of a specific behavior. This suggests the need for agro-food companies to implement marketing strategies to make consumers aware of the potential to make informed and responsible purchases through QR-code implementation.

The negative effect of perceived behavioral control (PBC) on WTP is in line with the results of Kang et al. (2006), who reported the negative effect of PBC on consumer intention to use another mobile marketing tool such as e-coupons. As suggested by Kang et al. (2006), also in the case of QR-code, distributors should improve consumers' ability and perception of control, offering information about how to use QR-code by arranging, for example, some in-store kiosks in markets.

The negative effect of past behavior on WTP, such as previous use of QR-code, could be explained by the erratic mode of operation of many QR-code systems provided by Italian companies: in many cases use of QR-code does not allow users immediate access to additional information of interest on products, but simply takes consumers to the company website. The search for useful information from the website is not easy, especially on a smartphone. Moreover, inside Italian supermarkets the Internet connection is quite often of poor quality. This underlines the need to implement an efficient system of operation of mobile marketing devices that satisfies consumer needs (Sundmaeker & Einramhof, 2015). Importantly, there is a clear need for synergies between different actors such as agro-food firms which want to implement QR-code on their products and supermarkets that should ensure their premises have a fast internet connection.

As regards our results on additional variables such as mavenism and utilitarian and hedonic approaches to shopping, the TPB model confirms their importance in influencing consumer attitudes to use QR-code. A

positive effect of mavenism in predicting attitude toward QR-code is in line with what we expected. Those who perceive themselves as "mavens", defined as individuals who seek not only general information about products but also in-depth information, have positive attitudes to mobile marketing devices, such as QR-code.

A utilitarian motivation for shopping negatively influences consumer attitudes to using QR-code, clearly showing that consumers who see shopping as a simple way to satisfy an economic need have a negative evaluation of QR-code. A higher hedonic shopping motivation increases positive evaluation of QR-code. Thus a positive attitude to QR-code and the willingness to pay more for a QR-code could be influenced only by motivation to spend an enjoyable moment searching for information on products. Indeed, in contrast to utilitarian motivation, hedonistic consumers view shopping as an enjoyable experience full of emotional involvement, regardless of whether or not a purchase is effectively made. An important aspect of hedonic motivation for shopping is its social aspect. This emphasizes the social benefit of shopping with friends and family. Another important side of hedonic motivation for shopping is the importance of gathering information about new trends, fashions, and products. All these aspects are consistent with the results in our model.

Starting from the significant impact of these personal characteristics on consumer attitudes, future research could profitably investigate the effects of different types of consumer self-identities (Carfora, Caso & Conner, 2016b; Caso, Carfora & Conner, 2016) to boost the predictive validity of the TPB model.

Finally, having ascertained the factors which influence willingness to pay for QR-code, it would be important for agro-food companies which wish to implement QR-code on their products to consider the ranking of the most important additional information that consumers wish to know about products (Table 2). In recent years, increasing interest has been focused on analyzing the influence of the numerous attributes of food products on purchasing choices. With regard to an important Italian product, such as extra-virgin olive oil, consumers assign to the "origin factor" not only a national value but, more often, a local territorial value (Del Giudice et al., 2015). For years Italian consumers chose olive oil trusting in the Italian origin of the product while it often consisted of blends of oils from other EU and non-EU countries. Moreover, EU denominations of origin (PDO and PGI) have never fully expressed their expected potential as instruments of product differentiation and protection. For these reasons consumers have continued to look for other signs as guarantees of origin and product traceability. In other words, traceability and related information, reported on the label, are fundamental factors that affect consumer choices (Lombardi et al. 2013; Krystallis et al. 2005). In particular, with regard to extra virgin olive oil, the results of recent research conducted in Italy (Carlucci et al., 2014; Panico et al., 2014) highlight the existence of consumer segments that assign different importance to a series of characteristics tied to quality, such as the origin of olives or adoption of PDO or PGI certification schemes, the presence of specific sensory attributes, and adherence to specific farming methods. Put differently, for the success of QR-code technology, it is extremely important to ensure that such labels include extra information which satisfies consumer demands. Integration of QR-code on product labels entails implementation costs that have to be carefully assessed by the producers in question. According to our results, and consistent with previous studies (Panico et al., 2014), consumers seek information of origin of the raw material, such as in our specific case, olives. They want to know the exact place of origin, techniques and processes used for production and chemical analysis, although more hedonistic information such as gastronomic advice is also gladly accepted.

Starting from the above considerations we are aware that our research has some limitations that could be addressed in further research. In this study we tested only a hypothetical WTP without asking respondents how much they would be willing to pay for a bottle of EVOO with a QR-code label. In other words, we did not ask respondents to choose from different increasing monetary levels of the basic price for a bottle of extra-virgin olive oil. Vice versa, knowing exactly the monetary value that consumers would be willing to pay more for QR-code on their bottle of olive oil could be very important for firms that wish to implement this kind of innovation in their business strategies. Indeed, implementation of QR-code, as stated above, requires additional implementation costs for which firms must make due allowance.

Moreover, to improve this analysis, it would be interesting to include in future research the detection of consumer behavior. Using this information we would be able to estimate a full TPB model and gauge the influence of intention on behavior.

The production and distribution of extra virgin olive oil in Italy has always been characterized by situations where market penetration exists especially for larger companies that have a widespread distribution of the product and can support an aggressive pricing strategy. With regard to small and medium olive oil producers, traditionally oriented to quality and a highly regionalized market share, the importance of

marketing is growing, accompanied by the selection of outlets and training and re-training of the sales force (Marchini & Pampanini, 2010).

The introduction of a mobile marketing strategy such as QR-code, based on accurate information on the production area, origin of olives and the production process, could be a chance for medium and small high quality firms to distinguish themselves efficiently from the masses. Given the strong territorial dimension of this product, often linked to marginal land or at risk of marginalization, the promotion of such innovations could also yield benefits for the areas of origin concerned.

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