



The influence of corporate social responsibility on consumers' attitudes and intentions toward genetically modified foods: evidence from Italy



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ABSTRACT

The genetically modified food industry may contribute to environmental protection and sustainable development. Nevertheless, many consumers are skeptical about genetically modified foods and fear that their diffusion may have detrimental effects on the environment and public health. Given this situation, genetically modified food producers may benefit from understanding how to address such concerns through appropriate corporate social responsibility initiatives. However, there is scarce research investigating this issue. This paper contributes to this research stream by studying how consumers' perceptions about genetically modified food producers' corporate social responsibility initiatives impact said consumers' attitudes toward and intentions to buy such products. This research builds on the well-established model of corporate social responsibility proposed by Carroll (1979) and investigates this issue through a survey study of 260 Italian consumers. The results show that perceptions about producers' philanthropic and legal responsibilities favorably impact Italian consumers' attitudes toward genetically modified foods and their intentions to buy such products, respectively. Managers interested in developing the genetically modified food market could therefore focus on these responsibilities to foster favorable attitudes and intentions toward genetically modified foods.

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1. Introduction

Genetically modified (hereafter GM) foods are produced from genetically modified seeds or ingredients derived from plants or animals whose DNA has been manipulated using genetic engineering methods (Ejnavarzal, 2012; MacDonald and Whellams, 2007; Raybould and Gray, 1993). Since beginning in the mid-90s, the global cultivation of GM crops has increased at an average annual rate of 4%. As of 2014, 18 million farmers in 28 countries managed over 181 million hectares of GM crops (James, 2015).

One of the most intriguing aspects of GM foods involves their controversial nature. On the one hand, there is evidence that GM food crops may contribute to environmental sustainability

(European Commission, 2010; Levidow and Boschert, 2008; Macek et al., 2008). GM crops with improved tolerance to pests and environmental stresses may reduce the use of chemicals in agricultural production (Phipps and Park, 2002; Weisenfeld, 2012), thus limiting environmental pollution (Macek et al., 2008; Moon and Balasubramanian, 2002; Tamis et al., 2009). Furthermore, because of their higher yields, such crops may limit deforestation in developing countries and help preserve biodiversity (e.g., Huang et al., 2005; Qaim and Kouser, 2013).

On the other hand, GM foods have sparked negative reactions among both consumers and organizations (e.g., Non-Governmental Organizations, voluntary associations, etc.). While these products entered U.S. food chains without notable public resistance (Hossain et al., 2003), they met a strong opposition in Europe (Eurobarometer, 2010; Frewer et al., 2013, 2014; Gaskell and Stares, 2013), such that the European Union now allows member states to restrict the cultivation of GM crops in their territories (EU Directive 2015/512).

Italy, the focal setting of the present study, is one such European nation marked by contrasting opinions about GM foods and the

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possible development of a market for these products. First of all, Italian consumers are largely unwilling to consume GM foods (Harrison et al., 2004; Miles et al., 2005): They are skeptical of food-related applications of GM technology (Savadori et al., 2004), strongly support mandatory labeling of GM food (McGarry Wolf et al., 2004), and have an overwhelming preference for traceable food produced according to local traditions and culture (Costa-Font and Gil, 2009; Platania and Pivitera, 2009). Because of such opposition, GM food crops are currently “segregated” from the other cultivations, while several Italian food companies voluntarily label and actively promote their products as “GM-free” (Canavari and Nayga, 2009).

However, amidst consumers' opposition to GM food, some farmers and agricultural organizations in Italy advocate for the introduction of GM foods on a larger scale. They believe that GM technology may sustain agri-food production and help producers in this sector address such challenges as water shortages and the bacterial contamination of food crops (Boccia, 2006; Confagricoltura, 2015). These proponents of GM foods also emphasize that, even though no GM foods are currently distributed in the Italian market, these products reach consumers indirectly because many national products derive from GM-fed animals (Corti, 2011). Moreover, there is presently no labeling requirements for these products and, pursuant to previous European directives (EU Directive 90/219; Regulation (EC) 259/97; EU Directive 2001/18), Italy cannot limit the importation of authorized GM seeds, crops, and animal feed.

In this ambiguous situation, GM food producers need to better understand how they can address consumers' concerns and inspire positive attitudes and buying intentions towards their products. To this end, this study suggests that producers' socially responsible conduct may play a notable role. Past research has shown that companies may elicit positive perceptions among consumers through socially responsible behavior (Sen and Bhattacharya, 2001); such perceptions may then lead to more favorable attitudes and greater purchasing intentions toward their products (Brown and Dacin, 1997; Creyer and Ross, 1996; García de Los Salmones et al., 2005). However, no study to date has investigated whether and how corporate social responsibility (hereafter CSR) – a business approach whereby companies' actions are driven by reasons that go above and beyond mere economic and business interests (e.g., Carroll, 1979, 1991; Lozano and Huisinigh, 2011; Maignan and Ferrell, 2001; Pomeroy and Dolnicar, 2009) – positively affects consumers' attitudes and buying intentions towards GM foods.

This paper fills this gap by examining the effect that Italian consumers' perceptions about GM food producers' CSR approaches has on said consumers' attitudes and purchasing intentions towards GM foods. Operationally, this study uses Carroll's (1979) CSR model, an established model encompassing four main dimensions of responsibility: economic, legal, ethical, and philanthropic (Crane and Matten, 2004; Maignan and Ferrell, 2001). Using this model, the study predicts that Italian consumers' positive perceptions about certain CSR dimensions will positively affect their attitudes toward and intentions to purchase GM foods. This prediction is grounded in the fact that consumers' final decision to consume GM foods seems to be heavily rooted in their attitudes and buying intentions (Kim et al., 2014; Prati et al., 2012; Spence and Townsend, 2006).

This study is the first to investigate the role of CSR in the GM food domain. Unlike most past research, which has mainly focused on consumers' beliefs about the risks and benefits of GM foods (e.g., Grunert et al., 2003; Miles et al., 2005; Rimal et al., 2007), this study proposes that consumers' attitudes and intentions toward these products also depend on consumers' perceptions of GM food

producers as socially responsible entities. Empirically, the study shows that consumers' perceptions about the legal and philanthropic dimensions particularly affect their attitudes and purchasing intentions toward GM foods. Practically, the study provides GM food producers with suggestions about how to prioritize CSR initiatives in order to make GM foods more acceptable, which may ultimately engender positive effects for the environment and broader society.

The article is organized as follows: First, it reviews the literature about both consumers' attitudes toward GM foods as well as CSR. Next, it delineates the tested predictions and accompanying conceptual model. Finally, it presents the obtained results and discusses their implications.

2. Consumers' attitudes toward GM foods

Since the launch of genetically modified, delayed-ripening tomato puree in 1996 (BBC News, 1996), GM foods have become increasingly common in daily food purchases (Bhate, 2007). Nowadays, many food products contain GM ingredients or derive from GM crops (Bawa and Anilakumar, 2013). Nevertheless, GM foods continue to spark lively debate in the public sphere (Kim et al., 2014), marked by contrasting opinions about the production, consumption, and marketing of such products (Frewer et al., 2014; Gaskell and Stares, 2013; Wohlers, 2015).

On one side of the controversy, there are consumers who feel that such products may have beneficial effects for the environment and society at large. They believe that the diffusion of GM foods obtained from herbicide-resistant and pest-resistant GM crops may result in substantial increments in crop yields, reduced reliance on chemicals, lowered risks of pesticide and herbicide runoff into surface and groundwater, and less soil contamination (Raspor, 2006). Such consumers also believe that, compared to traditional foods, GM food products might contain richer nutritional components, be purchased at more affordable prices, and expand the current variety of food products (Grunert et al., 2003; Phillips and Hallman, 2013). As a consequence, they seem confident that the diffusion of GM foods might eventually contribute to more sustainable agri-food practices and the end of starvation in underdeveloped countries (Bawa and Anilakumar, 2013; Kim et al., 2014).

On the other side, there are consumers who fear that genetic technology may alter the natural characteristics of food products (Eurobarometer, 2010; Frewer et al., 2014; MacDonald and Whellams, 2007) and have detrimental effects on both human health and the environment (Finucane and Holup, 2005; Wu et al., 2013). These consumers believe that the potential benefits accruing from GM technology may be overshadowed by the possible adverse effects that such technology might have on human beings, animals, and other living species (Laros and Steenkamp, 2004). They also appear particularly concerned about the lack of transparent information about GM food production (Miles et al., 2005) and GM food producers' compliance with safety regulations (Hossain and Onyango, 2004; see also Clapp, 2008).

The controversial nature of GM production is apparent in some European countries, where consumers' resistance to the introduction and diffusion of GM food crops is stronger than in other areas (Frewer et al., 2013; Onyango and Nayga, 2004; Wohlers, 2015). According to previous research, there is more skepticism in Italy about the application of biotechnology to food production than in Spain, the latter of which exemplifies a “biotech” country (Costa-Font and Gil, 2009). Italian consumers are also more likely to believe that they could experience adverse health effects from consuming GM foods than other European consumers (Miles et al., 2005) and, in contrast to U.S. consumers, they are unwilling to

consume GM foods even when knowing that they might have nutritional benefits (Canavari and Nayga, 2009).

In light of such contrasting views about GM foods, it is important for GM food companies to understand how they can deal with consumers' varying concerns about GM food production and hence act as responsible corporate citizens. To tackle this issue, the present research investigates the impact of GM food producers' CSR initiatives on Italian consumers' attitudes and intentions toward GM foods. This research particularly hypothesizes that favorable perceptions about GM food producers' CSR initiatives might have a positive effect on Italian consumers' attitudes toward and intentions to purchase GM foods. The foundation of this argument depends on two pieces of evidence derived from prior research: First, favorable perceptions of a company's social responsibility have a positive effect on consumers' evaluation of said company's products (Beckman, 2007; Brown and Dacin, 1997; García de Los Salmones et al., 2005) and purchase intentions (Creyer and Ross, 1996; Sen et al., 2006). Second, consumers' attitudes toward GM foods are a significant predictor of their intention to purchase such products (Kim et al., 2014; Prati et al., 2012). Intention, in turn, is considered the best predictor of actual buying behavior (Spence and Townsend, 2006; see also Ajzen, 1985; Fishbein and Ajzen, 1975).

3. Background on CSR and its dimensions

CSR is the continuous commitment by businesses to behave ethically and contribute to economic development while improving the quality of life of not only their employees and their families, but also the local community and society at large (World Business Council for Sustainable Development, 2006). Consumers' knowledge and judgments of a company's business practices affect their perceptions of said company's CSR commitment (Lavorata and Pontier, 2005; Swaen, 2002). Such perceptions may, in turn, influence consumers' attitudes toward the company's products or services (Brown and Dacin, 1997; García de Los Salmones, 2005) as well as their purchasing intentions (Creyer and Ross, 1996; Sen and Bhattacharya, 2001).

To assess consumers' perceptions of CSR, prior research has typically employed either a unidimensional or multidimensional approach (Mohr et al., 2001). Studies adopting a unidimensional approach (see Bigné et al., 2012; Brown and Dacin, 1997; Lichtenstein et al., 2004) postulate that consumers perceive CSR holistically, as a company's general responsibility to improve the wellbeing of the society in which it operates. In contrast, studies adopting a multidimensional approach (see García de Los Salmones et al., 2005; Maignan, 2001; Stanaland et al., 2011) suggest that consumers associate CSR with the diverse initiatives that companies undertake in several domains: from nature protection to the creation of adequate working conditions, and so on. Therefore, consumers' judgments about companies' CSR commitment are based on their subjective assessment of such different initiatives (Pérez et al., 2013). The multidimensional approach has become more widely used for two reasons: One, consumers are able to clearly distinguish between different companies' CSR initiatives, as well as the differing nature and goals of such initiatives (Maignan, 2001). Two, this approach appears to provide a more complete view of consumers' perceptions of CSR (Pérez and Rodríguez del Bosque, 2013). Furthermore, recent research (Alvarado-Herrera et al., in press) has provided empirical evidence of the multidimensionality of this construct.

The studies that have examined consumers' perceptions from a multidimensional perspective have applied three main conceptualizations of CSR (cf. Currás-Pérez et al., 2009; Pérez and Rodríguez del Bosque, 2013) based on: (1) Carroll's (1979) four-dimensional model; (2) the Sustainable Development Theory (United Nations World Commission on Economic Development-UNWCED, 1987;

van Marrewijk, 2003); and (3) the Stakeholder Management Theory (Freeman, 1984). Carroll (1979) modeled CSR as a pyramid encompassing four types of responsibility, namely: *economic responsibility*, whereby companies are expected to produce and sell goods or services at a profit; *legal responsibility*, whereby companies are expected to comply with the requirements imposed by the legal system; *ethical responsibility*, whereby companies are expected to endorse the principles of justice and fairness; and *philanthropic responsibility*, whereby companies are expected to engage in voluntary actions. Meanwhile, the conceptualization based on the Sustainable Development Theory (van Marrewijk, 2003; UNWCED, 1987) sees CSR as the integration of social, economic, and environmental concerns into companies' operations. Economic concerns refer to the creation of value and the company's financial performance; social concerns mainly refer to issues such as the respect of civil rights; environmental concerns refer to the preservation of natural resources. Finally, the conceptualization based on the Stakeholder Management Theory (Freeman, 1984) conceives CSR as the company's ability to make decisions that account for and balance the interests of different stakeholders, including consumers, employees, shareholders, the environment, the market, and society at large (Öberseder et al., 2014; Pérez and Rodríguez Del Bosque, 2013).

Although there is no agreement about which conceptualization is superior (Currás-Pérez et al., 2009), Carroll's (1979) model appears to be more established in the literature, thanks to its applicability to various empirical contexts (Nisim and Benjamin, 2008). Indeed, the last four decades have seen a wide number of theoretical (e.g., Swanson, 1995; Wartick and Cochran, 1985; Wood, 1991) and empirical studies (e.g., Aupperle, 1984; Lee et al., 2012; Smith et al., 2001) adopt this model. It represents a standard reference in CSR literature that has also been widely employed in recent studies (e.g., Agudo Valiente et al., 2012; Lee and Lee, 2015; Park et al., 2014; Stanaland et al., 2011). By contrast, empirical studies have barely adopted the conceptualization based on Sustainable Development Theory and provided no general instruments for applying this theory to multiple contexts (Alvarado-Herrera et al., in press). With regard to the conceptualization based on the Stakeholder Management Theory, there is still no consensus about the stakeholder categories affected by a company's CSR initiatives (Pérez and Del Bosque, 2013; Öberseder et al., 2014). Based on these considerations, the present research adopts Carroll's (1979) model.

Four additional reasons justify the choice of Carroll's (1979) model as the theoretical framework for this research. First, this model is widely recognized as a seminal contribution to CSR knowledge (e.g., Crane and Matten, 2004). Second, Carroll's model represents a parsimonious synthesis of dimensions that have emerged in previous models since the 1950s (see Aguinis and Glavas, 2012; Carroll, 1999). Third, a variety of studies have demonstrated that the four dimensions of this model are meaningful for consumers (Arli and Lasmono, 2010; Maignan, 2001; Ramasamy et al., 2010). Finally, the legal dimension included in Carroll's (1999) model might be particularly relevant in the GM food context, as GM food producers should adhere to specific standards imposed by international regulatory bodies (e.g., the European Food Safety Authority and the Food and Drug Administration).

4. Consumers' perceptions of Carroll's dimensions of CSR, attitudes and intentions toward GM foods

This research embraces two general ideas: one, that CSR initiatives may differ in their visibility to consumers (Burke and Logsdon, 1996; Torres et al., 2012), and two, that consumers' perceptions

about companies are mainly grounded on information and actions that are immediately observable (Bravo et al., 2012; Singh et al., 2008). Based on these ideas, this paper advances that particular dimensions of Carroll's model are more or less easily noticed by consumers. Specifically, legal and philanthropic initiatives are more noticeable than economic and ethical ones, and thus are more relevant to consumers' attitude and intention development. For example, GM food producers' failure to follow regulatory standards (legal responsibility) is more likely to be noticed by consumers than GM food producers' failure to control production costs (economic responsibility). Similarly, GM food producers' decision to devote money to a philanthropic initiative (philanthropic responsibility) is more likely to be noticed by consumers than GM food producers' general tendency to prioritize ethical goals over economic ones (ethical responsibility).

Given this reasoning, the present research predicts that Italian consumers' perceptions of legal and philanthropic responsibilities will more likely have a positive effect on their attitudes and buying intentions toward GM food than their perceptions of economic and ethical responsibilities.

4.1. Consumers' perceptions of legal and philanthropic responsibilities

This study hypothesizes that consumers' perceptions about GM food producers' legal responsibility is positively associated with consumers' intentions to buy GM foods. This prediction is based on the idea that consumers generally correlate the safety and quality of GM foods with producers' respect for legal standards and regulations (Emiroğlu, 2002). In reality, consumers know little about the safety and quality of GM foods (Bawa and Anilakumar, 2013; Gaskell and Stares, 2013) and are concerned about the lack of transparency and information regarding the production process (Lang and Hallman, 2005; Legge and Durant, 2010; Miles et al., 2005). Indeed, when making purchase decisions, consumers normally look for quality certifications, which are observable aspects of producers' compliance with legal standards (Singh et al., 2008). Thus, one could reasonably argue that GM food companies' compliance with legal standards may exert a positive influence on consumers' intentions to purchase GM foods.

Likewise, there may be a positive link between consumers' perceptions about GM food producers' philanthropic responsibility and their attitudes toward GM foods. By contributing to social causes, GM food producers can demonstrate their commitment to a role that extends beyond their core business activity (Chang, 2008; Creyer and Ross, 1996). Through these discretionary or voluntary actions, GM food producers may incline consumers to see that their motives reach beyond profitability to encompass the wellbeing of a society and its people. This conduct, in turn, might engender positive attitudes toward their products (cf. Brown and Dacin, 1997; Chang et al., 2009).

The idea that consumers' perceptions about legal and philanthropic responsibilities might affect different outcomes – purchasing intentions and attitudes toward GM foods, respectively – is based on previous studies that highlight the differing nature of these two dimensions (e.g., Creyer and Ross, 1996; Singh et al., 2008). In particular, legal responsibility is essentially associated with companies' production activities and what consumers purchase, while philanthropic responsibility is associated with the role that companies play in the society, which shapes their image and reputation.

4.2. Consumers' perceptions of economic and ethical responsibilities

This research supposes that consumers' perceptions of economic and ethical responsibilities are less likely to affect their

attitudes and purchasing intentions toward GM foods. As indicated above, consumers are less likely to notice initiatives related to these two CSR dimensions (Singh et al., 2008). However, one could expect that these dimensions are less effective for additional reasons. For instance, consumers are not particularly interested in, and thus are generally unaware of, companies' economic performances (Öberseder et al., 2014). This means that consumers' attitudes and purchasing intentions toward companies' products are unlikely to be influenced by CSR initiatives in the economic dimension (García de Los Salmones et al., 2005; see also Maignan and Ferrell, 2001). In the specific case of GM foods, consumers likely expect that GM food companies seek to be profitable, efficient and economically sustainable in the long term. As a result, perceived economic responsibility may only play a marginal role in influencing consumers' attitudes and purchasing intentions.

Meanwhile, past research (e.g., Arli and Lasmono, 2010; Singh et al., 2008) has shown that consumers consider CSR initiatives in the ethical dimension to be less relevant to their attitude formation than initiatives in the other dimensions. In the case of GM food consumption, previous research has shown that ethical issues have a weaker capacity to shape consumers' beliefs about GM foods than other aspects, such as the perceived safety of these products (Hossain et al., 2003; Rimal et al., 2007; Vilella-Vila et al., 2005). It therefore seems plausible to argue that consumers might be more concerned with the observable aspects of GM food production and less so with whether GM food companies adopt behaviors that are ethically correct, but not imposed by codified rules (Clarkson, 1995).

Granted, it may seem that ethical and philanthropic behaviors are similar enough to assume a shared degree of influence. However, while both indeed represent high-order components in the CSR pyramid, these two dimensions substantially differ from each other. Whereas the philanthropic dimension refers to the extent to which GM food producers contribute to solving social problems beyond their core businesses, the ethical dimension refers to the extent to which GM food producers run their core business in line with the general principles of justice and fairness (Carroll, 1991). Because such principles are typically uncodified, one could argue that GM food producers' ethical CSR initiatives might be less immediately relevant for consumers and hence less likely to influence their attitudes and intentions toward GM foods (Burke and Logsdon, 1996; Creyer and Ross, 1996; Torres et al., 2012).

The proposed conceptual framework is represented in Fig. 1. This model predicts: (1) a positive relationship between consumers' perceptions of GM food producers' legal responsibility and their intentions to buy GM foods; and (2) a positive relationship between consumers' perceptions of producers' philanthropic responsibility and their attitudes toward GM foods, which subsequently impacts their buying intentions.

5. Methods

The following sections describe the surveyed sample and the questionnaire used to collect data.

5.1. Sample

An online survey was employed to test the aforementioned predictions. The survey study was conducted through a structured questionnaire that was administered to a sample of 1600 Italian respondents. Such respondents were recruited from a national consumer panel and contacted via e-mail. Two hundred and sixty participants out of the 1600 contacted filled in the questionnaire (response rate = 16%; 56.5% females, 43.5% males; $M_{Age} = 42$ years, $SD_{Age} = 20.48$).

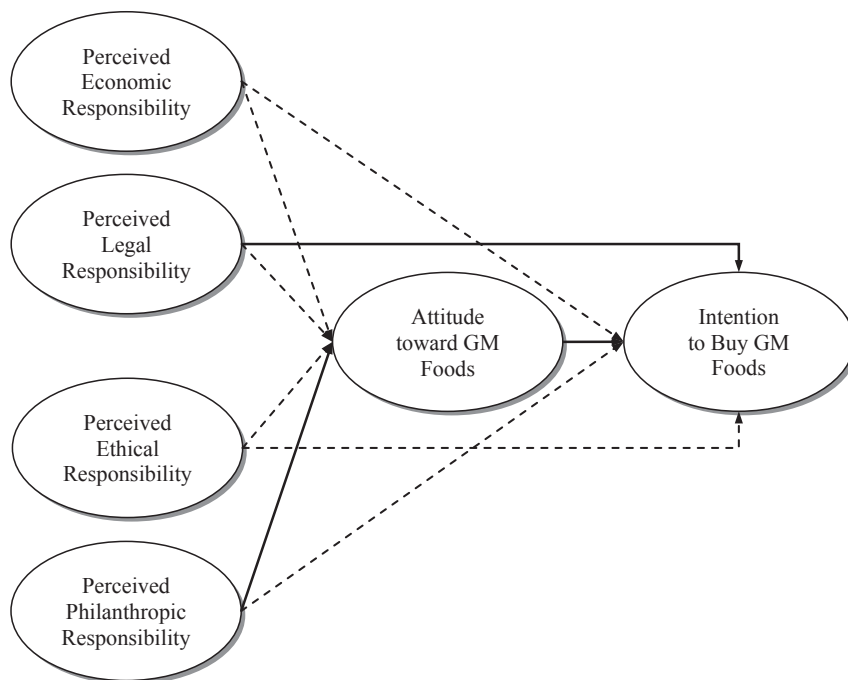


Fig. 1. Effects of perceived legal and philanthropic responsibility on consumers' attitudes and intentions toward GM food. Dotted arrows indicate predicted non-significant relationships.

5.2. Measures

The questionnaire started with a brief definition of GM foods and continued with four sets of questions designed to assess the investigated constructs. The first set of questions formed a perceived CSR scale, developed by Maignan (2001) and subsequently applied by a number of other scholars (e.g., Arli and Lasmono, 2010; Ramasamy et al., 2010). This scale consists of 16 items assessing consumers' perceptions about how socially responsible GM food producers are according to Carroll's (1979) four dimensions. All these items were assessed on seven-point scales (1 = strongly disagree, 7 = strongly agree).

A second set of three items assessed consumers' attitudes toward GM foods. These items were derived from Honkanen and Verplanken (2004) and measured on seven-point bipolar scales ("foolish/wise", "unreasonable/reasonable", and "negative/positive"). Another set of three items, also drawn from Honkanen and Verplanken (2004), assessed consumers' intentions to buy GM food products on seven-point scales (1 = certainly not, 7 = certainly) (see Table 1 for a full list of all items used in the survey). Finally, a fourth set of questions collected data regarding respondents' gender and age.

6. Results

The following sections illustrate the results obtained from the statistical analysis of the collected data.

6.1. Reliability analysis

Chronbach's α coefficient was used to check measures for internal consistency. The 16-item scale assessing GM food producers' perceived social responsibility exhibited adequate degrees of internal consistency, both at a global level and a subdimensional level. At a global level, the overall scale exhibited a Chronbach's α of 0.88, which exceeds the recommended threshold of 0.7 (Zeng et al.,

2010). At a subdimensional level, the four subscales (each of which included a subset of four items that assessed a specific CSR dimension) exhibited α coefficients of 0.88 or higher. These results confirmed the internal consistency of the employed CSR scale. Further evidence of internal consistency emerged for both the three-item scale of consumers' attitudes toward GM food ($\alpha = 0.94$) and the three-item scale of their intentions to buy GM food ($\alpha = 0.89$).

6.2. Measurement validity analysis

In order to validate the measures used in the questionnaire, a confirmatory factor analysis using the maximum likelihood method was performed on all three sets of items (e.g., the four perceived CSR dimensions, respondents' attitudes toward GM food products, and their purchasing intentions). To this end, a measurement model was developed in which each item was treated as an observed variable associated with a specific latent construct. For example, the four items assessing respondents' perceptions of GM food producers' economic responsibility served as observed variables that were related to a latent construct denoting perceived economic responsibility. The same process was applied to the other perceptions of CSR (e.g., legal, ethical, philanthropic), as well as to the two sets of items respectively involving attitude toward and intention to buy GM foods.

The results summarized in Table 1 indicate that the confirmatory factor analysis returned acceptable fit statistics: $\chi^2(189) = 351.001$, $p < 0.001$, $\chi^2/d.f. = 1.857$; Goodness of Fit Index (GFI) = 0.894; Comparative Fit Index (CFI) = 0.967; Normed Fit Index (NFI) = 0.932; Standardized Root Mean Square Residual (SRMR) = 0.054 (Hu and Bentler, 1998). Factor loadings were higher than 0.70, whereas latent constructs exhibited composite reliability coefficients higher than 0.80 and average variance extracted coefficients higher than 0.60. All these indices were above the recommended thresholds employed in recent research (e.g., Biswas

Table 1
Results of the confirmatory factor analysis.

Factor/Item	Factor loadings
I. Perceived Economic Responsibility (CR = 0.91; AVE = 0.72)	
I believe that GM food producers	
maximize profits	0.87 ^{n.a.}
control their production costs strictly	0.78*
plan for their long-term success	0.82*
always improve economic performance	0.92*
II. Perceived Legal Responsibility (CR = 0.88; AVE = 0.65)	
I believe that GM food producers	
ensure that their employees act within the standards defined by the law	0.76 ^{n.a.}
refrain from putting aside their contractual obligations	0.78*
refrain from bending the law even this helps improve performance	0.83*
always submit to the principles defined by the regulatory system	0.86*
III. Perceived Ethical Responsibility (CR = 0.88; AVE = 0.64)	
I believe that GM food producers	
permit ethical concerns to negatively affect economic performance	0.78 ^{n.a.}
ensure that the respect of ethical principles has priority over economic performance	0.73*
are committed to well-defined ethical principles	0.93*
avoid compromising ethical standards in order to achieve corporate goals	0.74*
IV. Perceived Philanthropic Responsibility (CR = 0.90; AVE = 0.68)	
I believe that GM food producers	
help solve social problems	0.86 ^{n.a.}
participate in the management of public affairs	0.78*
allocate some of their resource to philanthropic activities	0.85*
play a role in our society that goes beyond the mere generation of profits	0.82*
V. Attitude toward GM Food Product (CR = 0.96; AVE = 0.89)	
I believe that eating GM food is	
foolish/wise	0.91*
unreasonable/reasonable	0.92*
negative/positive	0.94 ^{n.a.}
VI. Intention to Buy GM Food Products (CR = 0.95; AVE = 0.81)	
Are you going to buy GM food?	0.94*
Are you going to buy GM food if the quality is better compared to traditional food?	0.86*
Are you going to buy GM food if it is cheaper than traditional food?	0.78 ^{n.a.}

$n = 260$. * significant at 0.001 level. n.a. = not applicable. $\chi^2(189) = 351.001$, $p < 0.001$; $\chi^2/d.f. = 1.857$; GFI = 0.894; CFI = 0.967; NFI = 0.932; SRMR = 0.054. CR = Construct Reliability; AVE = Average Variance Extracted.

and Roy, 2015), thus ensuring convergent validity for the measurement model.

Discriminant validity was inspected by means of Anderson and Gerbing's (1988) procedure: The proposed unconstrained measurement model was contrasted against a series of alternative constrained measurement models in which pairwise correlations between latent constructs were fixed at 1. The χ^2 difference tests were all significant ($p < 0.001$), suggesting that the unconstrained model performed better than the constrained ones, thus confirming discriminant validity.

6.3. Hypotheses testing

The predicted effects (summarized in Fig. 1) were tested by estimating a model in which the structural parameters of the hypothesized linkages (Perceived Legal Responsibility → Intention to buy GM foods; Perceived Philanthropic Responsibility → Attitudes toward GM foods; Attitudes toward GM foods → Intention to buy

GM foods) were free to vary, whereas the remaining structural parameters were constrained to 0. The item-parceling procedure was followed in order to obtain more precise structural estimates and better model fit (Bandalos, 2002; Nasser and Wisenbaker, 2003). Consistent with this procedure, each construct in the model was treated as a latent variable measured through a single observed variable. Each observed variable was, in turn, determined by a composite indicator obtained by combining individual item scores. Coffman and MacCallum's (2005) procedure was followed in order to increase the reliability of the structural estimates. According to this procedure, the error variance of each observed variable was fixed at one minus the composite reliability index obtained for the corresponding latent construct. Meanwhile, the parameter regarding the linkage between the observed variable and the corresponding latent construct was set to a value equal to the square-root of the composite reliability index.

The results summarized in Table 2 indicate adequate fit statistics: $\chi^2(6) = 5.354$, $p = 0.499$, $\chi^2/d.f. = 0.892$; GFI = 0.993;

Table 2
Standardized estimates.

Path	R ²	Std. estimate	p-value
<i>Direct path</i>			
Perceived Philanthropic Responsibility → Attitude toward GM Food	0.38	0.61	0.001
Attitude toward GM Food → Intention to Buy GM Food	0.68	0.77	0.001
Perceived Legal Responsibility → Intention to Buy GM Food		0.11	0.008
<i>Indirect path</i>			
Perceived Philanthropic Responsibility → Intention to Buy GM Food		0.47	0.001

$n = 260$. Fit statistics: $\chi^2(6) = 5.354$, $p = 0.499$; $\chi^2/d.f. = 0.892$; GFI = 0.993; CFI = 1.000; NFI = 0.993; SRMR = 0.024.

CFI = 1.000; NFI = 0.993; SRMR = 0.024 (Hu and Bentler, 1998). As expected, the results revealed a positive relationship between consumers' perceptions of GM food producers' philanthropic responsibility and their own attitudes toward GM foods (path parameter = 0.61, $p = 0.001$). The relationship between perceived legal responsibility and intention to buy GM foods was also positive and significant (path parameter = 0.11, $p = 0.008$). Furthermore, the results showed a positive relationship between consumers' attitudes toward GM food products and their intentions to buy them (path parameter = 0.77, $p = 0.001$). The bootstrap method was employed to test the significance of the indirect relationship between perceived philanthropic responsibility and consumers' intentions to buy GM foods (Zhao et al., 2010). The obtained results showed that such an indirect relationship is positive and significant (indirect path parameter = $0.61 \times 0.77 = 0.47$, $p = 0.001$). This indicates that perceived philanthropic responsibility indirectly impacts consumers' intentions to purchase GM food via their attitudes.

Finally, in order to ensure that the proposed model adequately represented the data, said model was compared against a full model in which all structural parameters were free to vary. Fit statistics for the full model seemed acceptable: $\chi^2(1) = 1.781$, $p = 0.182$, $\chi^2/\text{d.f.} = 1.781$; GFI = 0.998; CFI = 0.999; NFI = 0.998; SRMR = 0.028. However, all the structural relationships that were set to 0 in the proposed model were non-significant in the full model. To confirm the proposed model's superiority over the full model, the Akaike's Information Criterion (AIC) was used. The AIC is a fit index typically employed to evaluate which of two or more rival models works better, with lower values on this index indicating a better fit (Byrne, 2009). The AIC obtained for the proposed model was 35.354, whereas the AIC for the full model was 41.781. Thus, the proposed model performed better.

7. Discussion and conclusions

The present study examined the impact of Italian consumers' perceptions about GM food producers' CSR approaches on said consumers' attitudes and purchasing intentions toward GM foods. The results showed that consumers' perceptions regarding producers' philanthropic and legal responsibilities affect their attitudes toward and intentions to purchase GM foods. In particular, perceived philanthropic responsibility positively affected the participants' attitudes toward GM foods, whereas perceived legal responsibility positively affected their intentions to buy GM foods.

Because consumers' perceptions of CSR may be culturally specific, these results are mainly applicable to the Italian market and cannot be fully generalized to other countries. Nonetheless, they offer a relevant contribution to the literature on GM foods and CSR. While most past work has primarily focused on the perceived risks and benefits of GM foods, this research shows that consumers' attitudes and intentions toward such products are influenced by their perceptions of GM food producers' CSR initiatives. In particular, Italian consumers' perceptions about philanthropic and legal initiatives are more likely to impact their attitudes and purchasing intentions toward GM food, respectively, than perceptions about initiatives regarding the economic and ethical responsibilities. These previously unexplored effects suggest that GM food producers should not overlook the utility of CSR initiatives and that initiatives that fall within different domains may differently affect consumers' attitudes and intentions toward GM food.

Operationally, these findings might help GM food producers identify and address critical aspects of CSR management, thereby improving their image as good corporate citizens, fostering favorable attitudes toward GM foods, and increasing consumers' intentions to buy them. Specifically, GM food producers could give

careful attention to respecting legal standards and committing to philanthropic initiatives. Indeed, compliance with legal standards (which might be achieved, for instance, through the control of greenhouse gas emissions, adherence to traceability and safety standards, respecting workers' rights, etc.) may have a positive influence on consumers' intentions to buy GM foods. On the other hand, GM food companies' commitment to philanthropic initiatives (e.g., scholarship programs, donations aimed at improving the livelihood of local communities, support of voluntary agencies, etc.) could favorably affect consumers' attitudes toward GM foods, which, in turn, could raise their intention to purchase these products. Major companies operating in the GM food industry offer good examples of such initiatives: DuPont, for instance, has recently been named a "Green Enterprise" for its efforts in complying with environmental regulations, while Syngenta supports medical missions through its donations. Of course, companies should consider CSR initiatives that are actually good for both the environment and the society, rather than simply for their marketing strategies.

This study possesses some limitations that present fruitful areas for future investigations. First, it should be acknowledged that Carroll's model and the survey instrument used in this research, like any theoretical representation of social phenomena, may not fully capture the complexity of CSR issues. Thus, future research could develop additional instruments that provide a more in-depth analysis of perceived CSR dimensions. Second, the use of an online survey only allows a partial assessment of consumers' beliefs about a given research issue. Future studies could verify whether the results of this research hold across different modes of data collection. For example, in-depth interviews or experimental manipulations could help to enrich the current understanding of why certain CSR initiatives are more effective than others in fostering favorable attitudes and purchasing intentions toward GM foods. Finally, future studies could examine whether the effects observed in this research can be moderated by consumers' chronic dispositions toward GM foods. This would help to disentangle the effects that various initiatives have on different consumer segments – from those who are radically against GM products, to those who are radically in favor, and everyone in between. One might indeed hypothesize that legal and philanthropic initiatives have a limited impact on consumers maintaining a radical position, but a significant impact on consumers with a balanced view.

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