Public Trust in Agriculture and Food: Literature and Case Studies

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Introduction

Public trust in agriculture or food has been shown to be related to many decisions to buy or not buy certain agricultural products. Public trust or social license in agricultural or food production is considered to be a factor in the length of consumer and market responses to food safety incidents and a factor in public concerns about the use of technology in the food industry. Agriculture is not the only sector where public trust is of concern, forestry and mining also have concerns that public trust in their industries generates problems related to acceptance of production practices. Issues around public trust are providing incentives for industries to change the way they do business and the way they interact with their publics.

There are many definitions for trust in the literature and the most widely used definition of trust is by Rousseau et al. (1998, p. 395) which states that trust is '… a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another'. Most definitions emphasize the vulnerability of one of party (in this case the public) to the actions of the other party (in this case the agriculture and food industry).

In this paper, the objectives are (i) to provide a literature review on the effects of consumer or the general public's trust through perceptions, attitudes, intentions and behaviour on actions taken by individuals, firms and regulators, in the context of food and agriculture. (ii) to provide case studies focused on building, rebuilding or maintaining trust in agriculture and food.

The main criteria for selecting the studies was that they focused on trust in the context of agriculture and food. The studies are from different countries, including Canada. Most of the studies were searched in databases such as GOOGLE Scholar, ScienceDirect and Wiley Online Library. However, the literature on trust from books and studies that did not focus on agriculture

and food, but have relevant information, are also included in this paper. In the first section, the importance of trust and multicriteria definitions of trust are provided, followed by a section of theories on trust, then empirical studies related to agriculture and food, case studies on trust and conclusions.

Background

The objective of this section is to provide information on the importance of trust and definitions of different types of trust from the literature. The rationale for a focus on the different definitions of trust is to ensure that the multiple characteristics of trust are completely identified. It is difficult to imagine that anyone could not provide their own definition of trust, in individuals, in groups or in institutions but unless we understand all of the components of trust that have been identified in the literature it will be difficult to identify the best characteristics to focus on in specific instances that require trust rebuilding.

Trust is an element of social capital (Newman and Briggeman, 2016) and it has been found to be important in risk communication and management (Earle et al., 2007), interactions between people, the dynamics of groups, civic engagement and society overall (Robbins, 2016). Trust enables cooperation and interactions or connections between members of a society (Hogg, 2007; Robbins, 2016; Slovic, 1999). According to Bromiley and Harris (2006), trust is important in facilitating business relationships and economics transactions. Trust has been found to be important in relationships within and between organisations including the performance of strategic alliances and supply chains (Bromiley and Harris, 2006; Fearne, 1998). Trust is critical in situations where there is perceived risk and/or lack of knowledge (Wilson et al., 2013). Public trust is thus important in interactions between the public and the agriculture and food industry, in

areas such as the adoption (and communication about) of unfamiliar technologies, nutritional impacts and food safety events.

Trust is important in the acquisition of information and exchange of knowledge and it facilitates the transformation of available passive information into information that is usable (Fisher 2013) in decision making. Trust is also important in influencing attitudes and purchasing decisions for food products, and in influencing acceptance of technologies used in food production and processing (Hobbs and Goddard, 2015). Institutions in both the private and public sectors find their activities are easier in an environment of public trust especially if breakdowns occur in the smooth operations of markets (Hobbs and Goddard, 2015). Trust was important in accepting science after the BSE (bovine spongiform encephalopathy) events in the UK, in Japan in 2001 and in Canada in 2003. In Japan, policy negotiators stressed the importance of science in enhancing food safety and building trust in the food industry (Tanaka, 2008).

Trust in the food system is important since the distance (social, physical and temporal) between production and consumption have increased (Thorsøe and Kjeldsen, 2016) as a result of developments in transportation, other technologies, refrigeration, internationally coordinated food standards and international trade agreements, for example. According to Thorsøe and Kjeldsen (2016), although food production is increasingly uncertain (for example, in terms of food safety events, weather and climate changes), trust allows people to continue to support the food system. The magnitude of market level impacts of lack of trust can be large, for example, sixty percent of consumers are refusing to purchase products from companies they do not trust and 90% of millennials have a higher probability of purchasing products from companies that help with local issues than from companies they feel do not support local issues (Searle, 2019). Trust is also important for the acceptance of novel products such as functional foods (Meijboom,

2007) and the acceptance of the use of new technologies in production or processing (Poortinga and Pidgeon, 2005; Bieberstein et al, 2013). Companies can face trust issues when they introduce new products, for example, the aggressive marketing of products that are considered unhealthy by the food industry may have led to a negative impact on consumer trust in new initiatives, such as probiotics, by those same companies (Cutler, 2019).

According to Savadori et al. (2007), there are three types of trust including individual trust, system oriented or structural trust (similar to social trust) and relational trust (Savadori et al., 2007). Individual trust focuses on attitudes by an individual towards a product, which leads to the decision to consume the product. In the context of food, system-oriented trust focuses on trust in the overall food industry and government institutions in terms of their ability to provide adequate food safety levels (or other regulatory oversight such as regulation on the use of technologies). Lack of system oriented trust may lead to consumers avoiding a product, political activism or the creation of alternative markets (Savadori et al., 2007). Relational trust relates to trust in other individuals such as other consumers, friends, relatives or sellers and can result from personal interactions, for example, when consumers purchase food products directly from farms or farmers' markets (Savadori et al., 2007). In the same context, Prigent-Simonin and Hérault-Fournier (2005) found relational trust (direct, perhaps social, interactions between producers and consumers) in addition to broader constructs of credibility, integrity and benevolence to be important in the demand for local food.

According to Earle et al. (2007), trust can be characterized into two categories, including within group trust (trust in institutions which depends on limited information and interpersonal trust which depends on repeated interactions between individuals or groups, for example) and across group trust which involves trust in strangers (generalized trust). Uslaner (2007)

distinguishes between two trust categories as (i) moralistic trust (based on values) and strategic trust (based on experience) and (ii) generalized trust (judgments regarding trust in most people) and particularized trust (trusting people who are like yourself).

In summary, trust is defined by relationships – between yourself and others (whether you know the others or not), between yourself and institutions (which can include firms and the government). There are many linkages which can be broken and those breaks will have more or less effect depending on trust. The different types of trust as defined by various authors have common strands. For example, the different studies focus on relationships between individuals (interpersonal or relational) which can include strangers or closer relationships. Trust between individuals can be related to frequency of interactions (or none in the case of strangers) and can be linked through moral characteristics (values) or strategic characteristics (developed through experience). In the case of trust between individuals and institutions (system wide) there can be issues of information asymmetry (lack of knowledge) and lack of clarity about institutional objectives which can impede trust.

A break in trust in a firm due to a food safety outbreak, misleading information, or use of technologies unfamiliar to the consuming public, for example, can have ramifications for how and where people purchase food, affecting sales, revenues, profits and long run sustainability. In addition, breaks in trust can be accompanied by other actions taken by people such as activism or public protests about institutions that have become distrusted or individual and group efforts to create alternative food systems where the objectives and actions are clear to people. Public demands for labeling may arise in situations where individuals feel there is inadequate information and they distrust the objectives of firms or institutions.

Dimensions of trust

In the literature, there are still debates regarding what constitutes trust (the dimensions of trust). For example, Renn and Levine (1991) identify competence, objectivity, fairness, consistency and faith as the five dimensions of trust while Kasperson et al. (1992) identify commitment, competence, caring and predictability as the four dimensions of trust. In the specific context of food safety, de Jonge et al. (2008a) (see also de Jonge, 2008, for example) found that there are two main dimensions of trust (competence and commitment). Two statements for the competence dimension assessed people's perceptions about the competence and knowledge of food agents (the government, the food industry, retailers and farmers) in providing safe food (de Jonge et al., 2008a). The commitment dimension was based on people's perceptions about the care, attentiveness, openness and honesty of the same food agents in providing safe food (de Jonge et al., 2008a). Thus, perceptions of competence, care and honesty were found to be important dimensions of trust (de Jonge, 2008a). McKitterick et al. (2019) identified three dimensions of trust (knowledge, local embeddedness and empathy). In summary, different dimensions of trust are analysed in the literature but the two main dimensions in many studies are competence (knowledge is a key component) and the commitment (empathy, care or fiducial responsibility for example, Sapp et al., 2009; de Jonge et al., 2008a).

Table 1: Comparison of dimensions of trust identified in the literature

Study	**Renn and Levine (1991)**	**Kasperson et al (1992)**	**de Jonge et al (2008a)**	**McKitterick et al (2019)**	**Sapp et al (2009)**
Competence	√	√	√ ***Competence*** ***Knowledge***	√ ***Knowledge***	√
Commitment	***Objectivity*** ***Fairness*** ***Consistency***	√	√ ***Attentiveness*** ***Openness*** ***Honesty***		

Caring	√	√	***Care***	***Empathy***	
Faith	√				
Predictability		√			
Local Embeddedness				√	
Fiducial Responsibility					√

From Table 1, it is clear that although the actual words used in this partial description of the literature differ, the intent behind some of the words is very similar. Over and over again the emphasis is placed on actual 'competence' and on 'commitment' by the trustee. Clearly there are also issues of transparency and of caring (described in different ways) that enhance trust. These dimensions of trust are independent of whether relational trust or institutional trust is being discussed.

Psychological and sociological models of how trust affects decision making or choices

Different theories have been developed to analyse trust and its effects on decision making in different contexts. Below, these theoretical models on trust from the literature are described. The models provide a basis for the analysis of the effects of trust on attitudes, perceptions, intentions and behavior, in general, but with some discussion of these variables and their links to agriculture and food. The theories have been used in a number of studies that are focused on different types of risky situations and some of those studies are further described in the empirical section that follows.

The Consensus Approach

The consensus approach within social science is described in Earle (2010) and it has been applied in the context of organisational trust (Earle, 2010). In the consensus approach, there are two forms of trust, that are, relational trust which is concerned with intentions (of trustee) and confidence (in food products for example) which focuses on the abilities of the trustee (for example food agents) (Earle, 2010). When an individual is assessing their relational trust and confidence, they may use heuristics with relational trust being evaluated using choice heuristics such as value similarity and affect (emotions) while confidence can be evaluated using inferential heuristics such as comparing fewer alternatives rather than the complete set of options (Earle, 2010).

The Trust, Confidence and Cooperation (TCC) Model

The TCC model of cooperation which was developed by Earle, Siegrist and Gutscher (2007) describes the differences between trust and confidence and explains how trust and confidence influence cooperation, for example, in the context of risk management. Earle et al. (2007, pp.4) define trust as "the willingness, in expectation of beneficial outcomes, to make oneself vulnerable to another based on a judgement of similarity of intentions or values. On the other hand, confidence is defined as "the belief, based on experience or evidence that certain future events will occur as expected (Earle et al., 2007, pp. 4). According to Earle et al. (2007), confidence is often based on performance (i.e., past performance or institutions that control performance in the future) while trust is based on shared values or social relations (morality) and both trust and confidence lead to cooperation. General trust influences shared values while general confidences influences judgements regarding past performance (Earle et al., 2007). The TCC model is consistent with the consensus model since it focuses on both relational trust and

confidence but it also includes cooperation which is not included in the consensus model. The TCC model has been applied in the context of food additives (Earle et al., 2007).

Causal Chain Model

In the causal chain model, trust influences risk perceptions and risk perceptions influence the acceptance of technologies or activities (Eiser et al., 2002; Poortinga and Pidgeon, 2005). According to Poortinga and Pigdeon (2005), the causal chain model is widely used in terms of explaining the strong relationships between trust, risk perceptions and acceptability of GM foods.

The Associationist Model

In the associationist model, technology acceptance is assumed to influence trust and risk perceptions (Earle, 2010; Eiser et al., 2002; Poortinga and Pidgeon, 2005). Therefore, trust is a consequence of acceptability of a technology or activity, or trust is an indicator of a more general attitude regarding the technology or activity (Poortinga and Pidgeon, 2005). Researchers have compared the associationist model to the causal chain model (e.g., Eiser et al., 2002; Poortinga and Pidgeon, 2005). For example, in their study regarding genetically modified (GM) food, Poortinga and Pidgeon (2005) found that controlling for acceptability highly reduced the correlations between trust and perceived risk, controlling for perceived risk minimally decreased the correlations between trust and acceptability of GM foods and controlling for trust also led to minimal reductions in the correlations between perceived risk and acceptability of GM foods. Eiser et al. (2002) also found that their results on the relationships between trust, perceived risk and attitudes towards food technologies supported the associationist view more than the causal chain model of trust. Earle (2010) concluded that the associationist model focuses on confidence specifically not trust, more broadly.

The Integrative Model

The integrative model of trust (Earle, 2010) combines the dimensional approach (where the dimensions of trust are analysed), the salient value similarity approach and the associationist view of trust (Poortinga and Pidgeon, 2006). The salient value similarity approach (Earle and Cvetkovich, 1995) shows that perceived value similarity (whether the individual perceives that the other person/organisation understands the situation in the same way) influences trust (Poortinga and Pidgeon, 2006). In the integrative model, prior attitudes (affect) influence value similarity and value similarity influences general trust and skepticism which in turn influences trust in risk regulation (Earle, 2010; Poortinga and Pidgeon, 2006). Trust in risk regulation influences acceptability of foods, GM foods, for example (Portinga and Pidgeon, 2006). According to Earle (2010), the integrative model is similar to the consensus model in that it includes both relational and calculative trust. The integrative model has been used in the context of food (GM foods (Poorting and Pidgeopn, 2006)).

The Consumer Confidence Model

The consumer confidence model (Earle, 2010) was developed by de Jonge (2008) and it shows that consumers' trust in the government, the food industry, retailers and farmers (measured using 6 items that are competence, knowledge, openness, honesty, care and attention) influences their confidence in the safety of food. Confidence is related to people's pessimism (worry and suspicions) and optimism (satisfaction) regarding the safety of food (de Jonge, 2008). de Jonge (2008) assessed both trust and confidence separately. The consumer confidence model is consistent with the consensus model and the TCC model since it focuses on both relational and calculative trust with relational trust influencing confidence (Earle, 2010). However, it does not

link trust and confidence to perceived risk and acceptability of foods as in the associationist and causal chain models. de Jonge et al (2008a) applied the consumer confidence model to examining attitudes towards food safety in the context of BSE and beef consumption in Canada (and the Netherlands).

Social Trust, Epistemic Trust and Antagonism

Sjöberg and Herber (2008) show the relationship between three trust variables (social trust, epistemic trust and antagonism) and perceived risk (Earle, 2010). Social trust refers to trust in individuals or organisations (Sjöberg and Herber (2008), antagonism refers to value similarity while epistemic trust refers to confidence (Earle, 2010). Sjöberg and Herber (2008) found that epistemic trust and antagonism had a greater effect on perceived risk as compared to social trust in the context of siting a repository for waste from nuclear technology.

The Structural Cognitive Model of Trust

The structural cognitive model of trust which was developed by Robbins (2016) is a synthetic model that analyses the causes and impacts of trust. There are four sources of trust (those relating to the attributes of the truster (preferences, emotions and genetics, for example), those relating to the attributes of the trustee (benevolence, status and reputation, for example), those relating to the attributes of the exchange relationship (social identity, power and dependence, for example) and those that relate to external social attributes (geographic, physical and social constraints, for example) (Robbins, 2016). Trust influences perceived risk and uncertainty which in turn influence the decision to take risk (Robbins, 2016). Lastly, the decision to take risks influences cooperation and exchange.

The SPARTA model

The SPARTA model involves the integration of risk perceptions and trust in the theory of planned behaviour and SPARTA stands for "subjective norms (S), perceived behavioral control (P), attitudes (A), risk perception (R), trust and alia (A)" (Mazzocchi et al. (2008, pp. 5). "A" stands for other variables such as demographic variables (Mazzocchi et al., 2008). The SPARTA model has been used in a number of studies including Mazzocchi et al. (2008) where it was used to analyse the effect of trust in different food information sources and other factors on consumers purchasing decisions in the case of a food scare (Salmonella in chicken). In the SPARTA model, trust is linked to risk perceptions which is similar to the causal chain model.

The Recreancy Theorem

The recreancy theory is based on the sociological view that citizens depend on instead of control technologies, risk is constructed socially and trust is a reflection of competence and fiducial responsibility of institutional actors (Sapp et al., 2009). People's risk perceptions are based on their evaluation of the responsibility of institutions and quantitative evaluations by experts (Sapp et al., 2009). Recreancy implies "a failure to behave according to normative expectations" (Sapp et al., 2009, pp. 530). Sapp et al. (2009) developed a causal model that included the recreancy theorem in their analysis of consumers' trust in the food system in the United States. It is assumed that trust is influenced by competence and fiducial responsibility and trust in turn influences willingness to support. Control variables influence both trust and willingness to support recommendations by institutions (Sapp et al., 2009). The summaries for the models are provided in Table 2. There are some differences and similarities across the models in most cases which are also included in the table.

Table 2: Summary of the dimensions of trust from different conceptual models

Model	Description	Similarities and differences with other models
Consensus approach	There are two forms of trust defined as relational trust and confidence	The consensus model does not link relational trust and confidence to any other variable.
TCC model	The TCC model also has trust and confidence and these two variables are linked to cooperation	The TCC model is similar to the consensus model because it includes relational trust and confidence but an outcome of trust, in this case cooperation, is added to the TCC model.
Causal chain model	Trust influences risk perceptions and risk perceptions influence acceptance of technologies	In this original causal chain model trust is not separated into relational trust and confidence as in the case of the consensus approach or the TCC model.
Associationist model	Technology acceptance influences trust and risk perceptions.	In the original associationist model, trust is not separated into relational trust and confidence as in the case of the consensus approach or the TCC model. The associationist model is different from the causal chain model since trust is influenced by acceptance.
Integrative model	The integrative model combines the dimensional approach, the salient value approach and the associationist view of trust	The integrative model is like the consensus approach and the TCC model in that relational trust and confidence are included as dimensions, as is similarity of values. It also includes an associationist approach to trust. It is different from the causal chain approach where trust influences risk perceptions and risk perceptions influence technology acceptance
Consumer confidence model	Consumers trust influences their confidence	Trust is multidimensional as in the consensus, TCC model and the integrative model. The difference from other models is that trust is a precursor to confidence (pessimism and optimism).
Social trust, epistemic trust and antagonism	Three trust variables (social trust, epistemic trust and antagonism) are linked to perceived risk	Trust influences perceived risk which is consistent with the causal chain model and relational trust and confidence are included (like the consensus approach, the TCC model, the integrative model and the consumer confidence model)
Structural cognitive model of trust	Trust influences perceived risk and uncertainty which in turn influence the decision to take risk and the decision to take risk	Relational trust and confidence are not identified. However, trust is linked to the decision to take risks which is consistent with the causal chain model

	influences cooperation and exchange	
The SPARTA model	Risk perceptions and trust are integrated in the theory of planned behaviour	Forms of trust are not specified as in models such as the consensus approach but trust is linked to risk as in the causal chain model
Recreancy theorem	Competence and fiducial responsibility influence trust and trust influences willingness to support	Two dimensions of trust are analysed which is consistent with the consensus approach. Trust is linked to willingness to support which is consistent with the TCC model.

Previous studies on the effect of trust on different outcomes in relation to food

Several empirical studies have been conducted that analyse the effects of trust on perceptions, attitudes and behaviour in the context of food production, distribution and consumption. In this section, major findings from empirical studies that assessed the effects of trust in different countries are reported. Different methods are used in data collection (for example online surveys and interviews) and data analysis (regressions, structural equation modeling, among others). More information on the majority of the studies is provided in the Table A1 in Appendix A.

Allum (2007) used a model similar to the consensus model whereby public trust in scientists working on GM foods is separated into competence and care dimensions. Results show that there is a negative relationship between the trust dimension of competence and risk perceptions about GM food (Allum, 2007). Shared values had a greater effect on risk perceptions than the care and competence dimensions of trust (Allum, 2007).

Knight and Warland found (2005) linked trust to risk perceptions which is consistent to the causal chain model. Results showed that people's trust in the food system was negatively related to risk perceptions about pesticides, *Salmonella* and fat (Knight and Warland, 2005). Chen (2013) assessed the effect of generalized trust and trust in food agents (measured using

trust items similar to the once from the consumer confidence model by de Jonge (2008)) on perceptions of food safety by consumers. Results showed that generalized (relational) trust influenced trust in farmers and food manufacturers but it did not significantly influence trust in the government, retailers and consumers' association (Chen, 2013). Industry-specific trust (i.e., trust in the government and consumer association) significantly positively influenced firm–level trust (trust in retailers, food manufacturers and farmers) and trust in food manufacturers and retailers positively influence food safety perceptions (Chen, 2013). Mazzocchi et al. (2008) used the SPARTA model in their study and results showed that trust in information about food safety from experts and food agents reduced risk perceptions about *Salmonella* in chicken while the opposite was true for alternative sources of information such as consumer, environmental and environmental groups. Runge et al. (2018) analysed the effect of trust on risk perceptions which is consistent with the causal chain model. Results showed that trust in for-profit institutions regarding food safety reduced risk perceptions about food and meat while trust in the media had an opposite effect. Yang and Goddard (2011a) found that the quantity and quality of messages about BSE from the media influenced consumers' and producers' beef risk perceptions in Canada. Given the well-established links between trust in the food system and food safety risk perceptions it is possible to infer that media coverage of BSE also influenced overall trust in the food system (de Jonge et al (2004) found links between media coverage of food safety and consumer confidence in food). Tonsor et al. (2009) also analysed the effect of trust on risk perceptions, an approach which is consistent with the causal chain model of trust. Trust was found to influence beef safety risk perceptions in Canada, Japan and the United States but there were some cross-country differences in the results (Tonsor et al., 2009). Trust in doctors also had a robust negative effect on beef risk perceptions across the three countries (Tonsor et al., 2009).

In their analysis, Muringai and Goddard (2016) used data for the same households from two surveys conducted in 2008 and 2011 and found that changes in people's trust in the governments had a significant effect on risk perceptions about beef consumption only, while changes in trust in food manufacturers and farmers significantly influenced changes in both risk perceptions and risk attitudes about beef consumption. The items for trust in food agents used by Muringai and Goddard (2016) were adopted from the consumer confidence model by de Jonge et al. (2008) and trust (generalized trust and trust in food agents) is linked to risk perceptions which is consistent with the causal chain model. Risk perceptions and risk attitudes are important because they have been found to influence consumer behaviour. For example, Yang and Goddard (2011b) found that both risk perceptions and risk attitudes regarding the consumption of beef significantly influenced beef purchasing decisions with risk attitudes having a greater effect than risk perceptions (and the inference from Muringai and Goddard (2016) and Yang and Goddard (2011b), who used related datasets, is that trust in different food agents influences risks perceptions/risk attitudes which subsequently influence consumption). General trust (relational trust, trust in most people) was also found to influence behaviour in other contexts (nanotechnology (Matin et al., 2012) and importance of traceability (Myae and Goddard, 2012)). In a study by Cattermole et al. (2011), consumers were willing to pay a premium for a National Trust brand of beef and lamb that was characterized by quality assurance, traceability and sustainability.

Trust in food agents was found to influence consumers' confidence in the safety of food (de Jonge et al., 2008a, b) with trust in food manufacturers having a greater impact as compared to trust in the government, retailers and farmers (de Jonge et al., 2008b). In the study by de Jonge et al. (2008b), the care dimension of trust was found to have a greater effect on consumers'

confidence in the safety of food as compared to competence and openness. The studies by de Jonge above also fall under the consumer confidence model framework. Trust has been found to influence consumer choices in other contexts (e.g., functional food (Ding et al., 2015; Huang et al., 2019), food production attributes (Muringai et al., 2017; Roosen et al., 2015), confidence in the quality and safety of brands (Lang, 2013), demand for GM labelling (DeLong and Grebitus, 2018), and acceptance of or attitudes towards technologies (e.g., Eiser et al., 2002; Peters et al., 2007; Ricci et al., 2018; Siegrist, 2000; Siegrist et al., 2007)). Muringai et al. (2017) found that both high and low trusting consumers preferred government certification of traditionally raised pork as compared to industry certification for the same trait in Canada. Muringai et al (20017) used the consumer confidence model with trust in food agents items from de Jonge (2008) and also included generalized trust in the analysis. Konuk (2019) found that trust in the fair-trade label (related to agreement with the statements stating that the respondents trusts and relies on the label and they perceive the label to be honest) was positively related to a willingness to purchase and willingness to pay for fair trade food in Turkey. Konuk (2019) also used the dimensional approach and the inclusion of trust is consistent with the TCC model. In the context of food traceability, trust was found to be negatively related to consumers' fears of exploitation by sellers and perceived information asymmetry in Korea (Choe et al., 2009). Myae (2015) found that generalized trust (whether people can be trusted) and trust in the government (statements adopted from the consumer confidence model by de Jonge (2008)) influenced consumers' preference for food safety attributes (traceability and animal testing) in the context of chronic wasting disease (CWD). Aubeeluck (2010) used the consumer confidence model from de Jonge (2008) to analyze the effects of trust in food agents on consumers' confidence (optimism and pessimism about food safety) in food safety in Canada and Japan and trust generally did

influence consumers' confidence in the safety of food. Aubeeluck (2010) also showed that trust influenced the demand for beef traceability and BSE animal testing in Canada and Japan (using generalized trust as an explanatory variable) with more trusting people having a lower demand for traceability and animal testing in Japan and a higher demand for both in Canada.

Although there were some variations in results, trust was also been found to influence risk perceptions about animal diseases such as BSE and CWD (e.g., Muringai and Goddard, 2018; Setbon et al., 2005). In their study in Australia, Tonkin et al. (2016) found that labelling of food is used by consumers as a surrogate for interactions with actors in the food system. Although labelling enhanced consumer perceptions about the competence of food system actors, it undermined their perceptions about the goodwill and the fiducial responsibility of the food system actors. Goddard et al. (2018) found that generalized trust in people and trust in food agents generally negatively influenced food integrity (residues such as antibiotics and pesticides) and technology concerns (in the context of GM technology and nanotechnology) but trust in advocacy groups had an opposite effect in Canada. The approach used by Goddard et al. (2018) is also consistent with causal chain model. Depending upon the specific agent, trust can have different influences on acceptance of technology or technology applications. Trust was also found to influence information seeking behavior regarding GM with trust in organisations having a positive effect and trust in regulators having a negative effect on demand for information (Hanssen et al., 2018).

Some studies have analysed the role of trust in the context of supply chains. For example, Ariyawardana et al. (2017) found that respondents who trusted domestic suppliers were more likely to pay a premium for domestic fresh and processed vegetable products but trust in imports had a negative effect on premiums for domestic produce. Coveney (2007) also found that trust in

food was strengthened if produce was from Australia (domestic). In these cases, being 'local' may be a heuristic for 'safer' or 'higher quality' food. In their study in the United Kingdom, de Krom and Mol (2010) found that consumer disposition, the physical settings in the shop and the relationship between customers and food actors influenced consumers' trust in poultry products with some consumers preferring face to face interactions while other consumers preferred commitments (for example, labeling of free-range products) on labels. Giampietri et al. (2018) found that trust in short food supply chains is important for consumers' decisions about buying food and their approach is also consistent with the TCC model. Hartmann et al. (2015) found that general trust in cause related marketing (CrM) was positively related to trust in a retailers' CrM campaign which in turn positively influenced brand loyalty. Kang and Hustvedt (2014) found that consumer beliefs about the transparency of the corporations and their social responsibility significantly influenced trust in the corporations in the United States. Corporate social responsibility was also found to influence consumers' trust in retailers (Lombart and Louis 2014) and organic food (Pivato et al., 2008). Sen and Battacharya (2001) found that negative information regarding corporate social responsibility influenced evaluations of companies more than positive information. Sapp et al. (2009) used the recreancy theorem in their study and the results showed that fiducial responsibility was found to influence trust in the food system in the United States more than competence (Sapp et al., 2009). Meijboom et al (2006) found that transparency, traceability, corporate social responsibility and corporate social responsiveness were important in building trust in the case of pork safety after swine flu or influenza. In the literature, different types of explanatory variables have been used and although most studies do not explicitly state the theoretical model used, the constructs described in the theoretical models

are directly being applied. In Table 3, a summary of the trust dimensions used in the empirical studies are provided.

Table 3: Studies using various trust dimensions

Dimension	Study
Competence	Allum (2007); Aubeeluck (2010); Chen (2013); de Jonge et al. (2008a, b); DeLong and Grebitus (2017); Ding et al (2015); Muringai and Goddard (2016, 2018); Muringai et al. (2017); Myae (2015); Peters et al. (2007); Sapp et al. (2009)
Knowledge	Aubeeluck (2010); Chen (2013); de Jonge et al. (2008a, b); DeLong and Grebitus (2017); Ding et al (2015); Muringai and Goddard (2016, 2018); Muringai et al. (2017); Myae (2015); Hansen et al. (2018); Lang (2013)
Care	Allum (2007); Aubeeluck (2010); Chen (2013); de Jonge et al. (2008a, b); DeLong and Grebitus (2017); Ding et al (2015); Muringai and Goddard (2016, 2018); Muringai et al. (2017); Myae (2015)
Attention	Aubeeluck (2010); de Jonge et al. (2008a, b); Chen (2013)DeLong and Grebitus (2017); Ding et al (2015); Muringai and Goddard (2016, 2018); Muringai et al. (2017); Myae (2015)
Honesty	Ariyawarda et al. (2017); Aubeeluck (2010); Chen (2013); de Jonge et al. (2008a, b); DeLong and Grebitus (2017); Ding et al (2015); Muringai and Goddard (2016, 2018); Muringai et al. (2017); Myae (2015); Lang (2013); Lombart and Louis (2014)
Openness	Aubeeluck (2010); Jonge et al. (2008a, b); DeLong and Grebitus (2017); Ding et al (2015); Muringai and Goddard (2016, 2018); Muringai et al. (2017); Myae (2015)
Objectivity	Choe et al. (2005)
Considers interests	Hansen et al. (2018)
Confidence	Aubeeluck (2010); Hansen et al. (2018); de Jonge et al. (2004, 2008a, 2008b)
Reliable	Hartmann (2015); Lassoued and Hobbs (2015); Newmann and Briggeman (2016); Pivato et al. (2008)
Keeps promises	Kang and Hustvedt (2014)
Credible	Newmann and Briggeman (2016)
Self-orientation	Newmann and Briggeman (2016)
Intimacy	Newmann and Briggeman (2016)
Fiducial responsibility	Sapp et al. (2009)
Do what is best	Peters et al. (2007)

Recommendations for building or maintaining trust from the previous studies

From the previous literature outlined above, there can be drawn recommendations on building trust in firms or institutions in different contexts. Some of the strategies that have been proposed for building or maintaining trust are informing people about the competence of scientists and risk

managers and their shared values with the public (Allum, 2007), transparency of corporations (for example, of labour or safety conditions) to consumers (Kang and Hustvedt, 2014; Yue et al., 2017), improving food country-of-origin labelling standards (Ariyawardana et al., 2017), truthful communication by the food industry to consumers (Chen, 2013; Newman and Briggeman, 2016; Walravens, 2017; Arnot et al., 2016), evidence of compliance with food safety regulations (both domestic and international food regulations) (Chen, 2013). Thorsøe and Kjeldsen (2016) found that repeated interaction and open and continuous communication is important for trust in the context of alternative food networks. Quality of communication between retailers and suppliers of organic food was found to be more important than frequency and form of communication while no communication reduced trust in the relationships between buyers and sellers (Kottila and Rönni, 2008). Other strategies for maintaining or building trust include face-to-face interactions with consumers in the context of short food supply chains (Giampietri et al., 2018), third party certification (Bozic, 2017; Hartmann et al., 2015; Muringai et al., 2017), quality assurance schemes (Yee et al., 2005), early involvement of stakeholders such as customers, the local community, regulators and the media (Arnot et al., 2016) and use of social networks in the context of local food (Roy et al., 2017). Bonini et al. (2008) focused on consumer concerns about climate change in different countries and they found that the food and beverage industry had high ratings for trust by consumers, but the study respondents stated there is room for improvement for the food and beverage industry in the areas of health and safety, the environment and sustainability. Light (2019) outlines five principle for creating trust and these are providing tangible evidence of claims such as those for iconic products, participating actively in debates around big issues (for example production technologies, environment), openness, trustworthiness about information and being a good citizen in terms of transparency and

sustainability, for example. The distinctiveness of a brand was found to be important in the ratings of restaurant sector with the quality of food and service being some of the important factors (Klein, 2019). Al-Hakim et al. (2014) found that for cross border collaborations between beef organisations in Australia and Singapore to be successful in the context of ICT diffusion, relationships in the exchange of information were more important than technology. Together with competency and honesty, companies could use voluntary self-sanctioning measures (hostage posting) in order to build trust in the case of adverse events (for example, food safety events (Nakayachi and Watabe, 2005)). Trust and confidence in certification procedures positively influence attitudes towards the quality certified products or foods (Botonaki et al., 2006). Perceptions of credibility of information by the public was found to be important in influencing food choices and some consumers ignored some food information because of confusion and being overwhelmed (Ward et al., 2011). Credibility is one of the dimensions of trust identified in the overall trust literature. The UK Consumers Association reported that a science-based approach was sufficient in reaching decisions that are socially acceptable in risk communication, but openness and transparency of the government were also important in the communication of risks (Masood, 1999). According to Hobbs and Goddard (2015), honesty, transparency and communication are important in building trust with the public in the context of food, based on a number of studies. In the context of organic food, Hamzaoui-Essoussi et al. (2013) found that trust is maintained or enhanced by certification labels, traceability, branding and the reputation of the store.

Food companies were challenged by public reaction to farm level use of technology, particularly in the GM space. The challenges related to the fact that the public did not just react in terms of consumer purchases, they looked for mechanisms to exert pressure in a regulatory

space, sometimes with government but sometimes directly with multinational firms they felt might be responsive to their needs as citizens. Unilever attempted to deal with this new model of consumer-citizens through engagement with non-governmental organisations in dialogues regarding the commercialization of GM foods between 1994 and 2001 and supporting research on the evolving consumer interests (Doubleday, 2004). As understanding about the tensions in the acceptance of the GM technologies rested partly in the responsibilities individuals feel about their own purchasing and their responsibility for protecting the environment and the broader food system (citizen role), Unilever tried different strategies for addressing these concerns. They were dealing with a public that distrusted science and regulation due to their inability to influence the processes and by extension had trust issues with the companies wanting to use products of the new technologies. Unilever wanting to deal with the mistrust of their company with openness and transparency and inclusion of the public in the adoption of innovation. However, the results were mixed. Goddard et al. (2019) found that generalized trust and trust in food agents significantly influenced consumers' buying and citizen voting decisions (in the context of pork, milk and yoghurt innovations around disease resilience and environmental sustainability).

In summary, the models have similar elements, the models are often tested with data collected through surveys and trying to link trust (and its causal antecedents) to behavioral intentions and/or acceptability of certain foods, technologies used in food production, interventions to enhance food safety, information to allow consumers more data with respect to their purchases, among others. Transparency, credibility and competence are important ways of enhancing trust. However simple rules, or direct conversation with the public as consumers, are sometimes inadequate for building trust around complex issues and in particular, around issues where the public feels they have multiple roles, with consumers/citizens being one example of

multiple roles. Multiple roles on the part of the public necessitate more complex approaches and transparency and openness across a broader range of topics if trust in corporations or institutions is to be retained.

Case studies on building or rebuilding trust in relation to food

In the literature, there are many case studies on building, rebuilding and creating trust in the context of food. More information about the majority of the case studies in provided in Table A2 in Appendix A. Bozic et al. (2018) focused on how transgressing and blameless organisations repaired trust after the horse meat scandal (2013) in the United Kingdom. It is important to note that even retailers who did not sell any horse meat containing products needed to rebuild trust with their customers since the public may have felt that the example problem implied there might be other problems with other products. The study focuses on two transgressing organisations (Tesco and Asda) that were directly involved in the horsemeat scandal and two blameless companies (Waitrose and Morrisons) that were indirectly involved as a result of spillover effects. A narrative analysis of publicly available information from sources such as newspapers, media sources (BBC news) and reports was conducted. The information collected related to trust repair efforts made by the companies. In general, transgressing companies acknowledged the problem, apologized and got rid of the products, engaged in testing the products, changed their sourcing of products to more local suppliers, got rid of the suppliers who were involved in the scandal and they put in place new contractual requirements for suppliers. On the other hand, blameless organisations distanced themselves from the transgressing companies (through advertising or other information provided) and put more emphasis on their high standards and their locally based supply chains. However, both the transgressing and blameless retailers wrote a joint letter

explaining their non-acceptance of situations in which consumers' trust is breached and that they were going to take measures to regain consumers' confidence. Some industry wide strategies were also put in place by the government, serving as a new base for all firms to operate from.

Lees and Nuthall (2015) used semi-structured interviews to analyse the case of supplier commitment in the context of beef, lamb and venison value supplier chains in New Zealand. Their results showed that higher levels of trust (as evidenced by willingness to do business) in suppliers resulted from openness, transparency and confidence in company personnel's character. Ezezika et al. (2012a) also found that together with early engagement of farmers and effective technology, openness and transparency were important in building trust with farmers in the context of their use of Bt Maize in South Africa. For the Water Efficient for Africa Project, a social audit model that was aimed at creating transparency, improving accountability and mobilizing the voices of stakeholders and the public, for example, was successful in building trust in the project by stakeholders (Ezezika et al., 2013). In the case of stacked traits (multiple traits, for example herbicide resistance and enhanced nutritional content) in biotech crops, Ezezika et al. (2012b) states that it is important to publicly address concerns of all stakeholders early in order to build trust in the use of technology. Stacked traits are important in meeting the different needs of consumers and producers.

Due to the recurrent food scandals, in order to restore trust in food sources in the context of local food systems in Europe, measures were taken which involved communications about a certain label that emphasized the local nature of the products, the environmental sustainability of production and product quality and use of farmers' markets and direct sale (Facilitating Alternative Agro-food Networks (FAAN), 2010). In that study, in-depth interviews, focus

groups, workshops and other sources of data were used. Producers were found to have made close and trust-based personal relationships with consumers (FAAN, 2010).

Hart and Johnson (1999) focused their analysis on different businesses including insurance companies and they found that total trust goes beyond customer satisfaction and delight but includes fairness, confidence, reliability, competence and ethical business dealings. Shared values between customers and companies were also found to be important in building trust in business dealings.

Labbrand (2008) state that public trust in milk in China (Mengniu tainted infant milk case) could be restored through the transparency in production and processing of milk. According to Labbrand (2008) the company made mistakes when they adopted export policies that disadvantaged people in China in terms of product quality, prices were cut after the incident which signified reduced quality of the milk for some consumers and the company made a request to Chinese consumers to support national brands. The government enforced new quality standard tests for milk (Labbrand, 2008). Lindgreen (2003) mainly used data from in-depth interviews with suppliers, processors and retailers and qualitative analysis in their study of the ways in which trust was built in the Danish-British bacon supply chain. The strategies used by companies to build trust with their business partners were delivering products in a timely manner, reliability and knowledge of production requirements.

Pang (2017) used a textual analysis of information from the news and press releases to analyse the management of a bacterial contamination in 2013 by Fonterra in New Zealand in the context of restoring reputation across markets. Eventually the contamination was not found to cause botulism, but the company's reputation was already negatively affected in New Zealand and China. Results show that the delays in response by the company were problematic but

corrective action (assuring stakeholders that the crisis will not happen in the future) in China was effective in changing trust. It is recommended that bad news should be communicated early by the company, there is a need to consider cultural differences and it is important to ensure that rhetoric and actions taken by the problem company are consistent. Communication through social media and news releases in addition to the main stream media were also recommended. The company's response in the beginning was regarded as not persuasive but later they improved in their communication efforts regarding the crisis.

Richards et al. (2011) focused their study on supermarkets and agro-industrial foods and they find that trust can be built through enhancement of reputation through private standards between businesses, privately certified quality claims and discursive claims. Savadori et al. (2007) also found that effective communication, drastic measures such as recalls and discontinuation of products and shared values are important in the case of food safety events. Sodano et al. (2008) also found that transparency and confidence increased trust in the context of policies for safety standards (both by private and third parties). Steffen and Doppler (2019) used an organic food retailer as a case study and they found that trust in organic foods can be built through communication of the company's understanding of sustainability.

Wilson et al. (2017) used semi structured interviews with people who work in the media, the food industry and food regulation in their analysis of the strategies for building or rebuilding consumer trust in the food system after or during a food safety event in Australia, New Zealand and the United Kingdom. Ten strategy statements were identified including transparency, protocols and procedures, credibility, proactivity, putting consumers first, collaborating with stakeholders, consistency, educating consumers and stakeholders, building reputation and keeping promises (Wilson et al., 2017). Electronic interviews with consumers were used to

evaluate the accuracy of the ten strategy statements and the results were used to develop the theoretical model illustrated in Figure 1. The final strategies for building or rebuilding trust in the food system are transparency, proactivity, protocols and procedures, considering consumers and collaboration with stakeholders (Wilson et al., 2017).

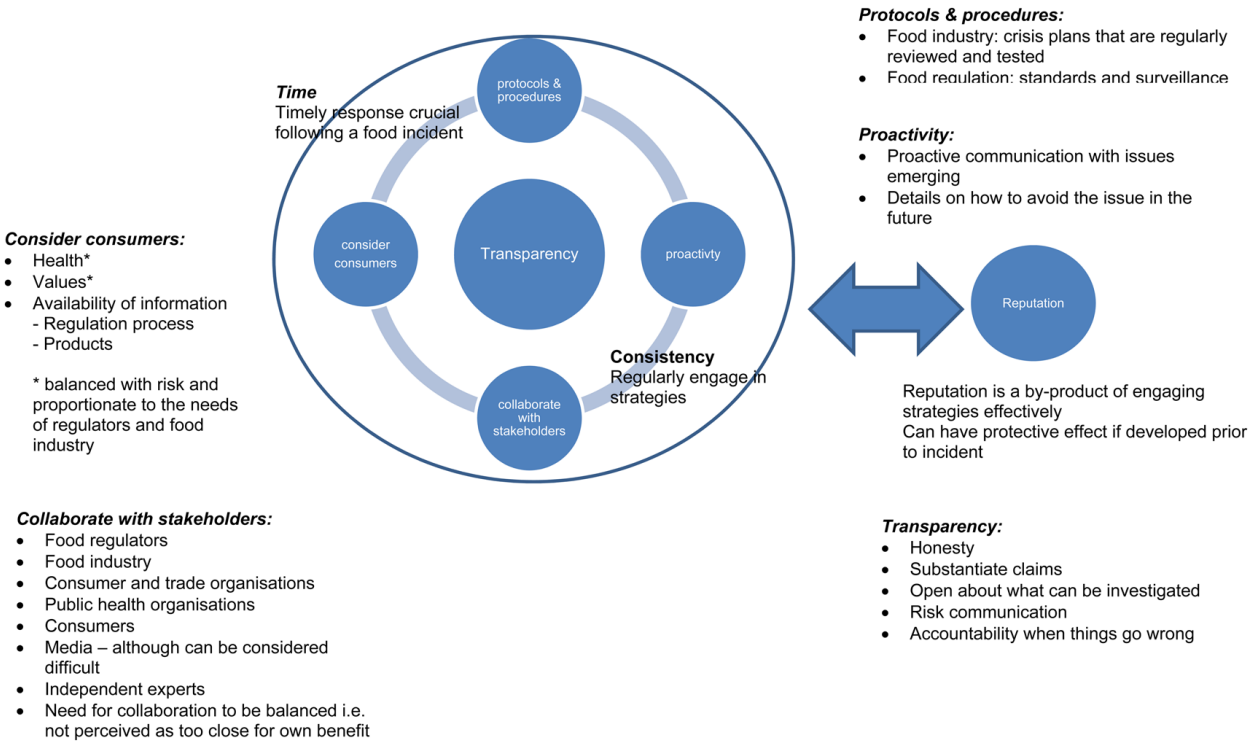

Figure 1 Proposed model for (re)building consumer trust in the food system after a food incident. Health Promotion International, Volume 32, Issue 6, December 2017, Pages 988–1000, https://doi.org/10.1093/heapro/daw024 . This picture may be subject to copyright.

After a food safety incident, transparency (for example, communication with consumers) was found to be the most important strategy for building or rebuilding trust in the food system (Wilson et al., 2017). There were some differences in the meaning of transparency across the actors, for example, transparency involved open and honest responses to queries and good communication for food regulators and people in the food industry while it referred to the citation of information sources for people working within the media (Wilson et al., 2017).

Although transparency was found to be most important in building or rebuilding trust, it is important to use multiple strategies to ensure trust enhancement, for example, being proactive and collaborating with stakeholders (Wilson et al., 2017).

Tonkin et al. (2019) tested the model developed by Wilson et al. (2017 described above) with a sample of consumers in South Australia, in order to assess the extent to which the model is in line with consumers' perceptions of the strategies that are important for maintaining trust in the case of a food safety event. A food safety event involving black pepper was used in the study. Vignette (narrative scenario) discussions were conducted in May 2018 and involved two-day sessions with 15 people. Participants were assigned to two groups and they developed a list of strategies that are important for maintaining trust and ranked them. Participants also matched the strategies to the ones in the model developed by Wilson et al. (2017). In summary, the results showed that there was general consistency in the strategies for maintaining trust during an incident where food safety is compromised for the two groups of participants and the model developed by Wilson et al. (2017). Transparency (full disclosure) was rated by the two groups of participants as the most important strategy for maintaining trust and this is consistent with the model.

The European Union wants to build trust through transparency in the European Food Safety Agency's approval process as a result of people's concerns about the handling of the issue of glyphosate whereby people state that regulators caved to pressure from Monsanto (Askew, 2019a). Initiatives (promoting responsible investment in agriculture) are being put in place for building trust between companies and communities in Africa as a result of land disputes between sugar companies and communities (Suliman, 2019).

Maple Leaf Foods in Canada is one of the case studies where risk communication efforts were successful in maintaining the reputation of the company after a major food safety event, *Listeriosis* that killed 22 people (Greenberg and Elliot, 2009). In 2008, there was a listeria outbreak in cold cut meats from Maple Leaf Foods and the company's CEO publicly apologized in a timely manner, accepted responsibility and promised to do better. The company closed the plant and television news teams visited the plant and they were shown areas where the outbreak happened, and the risk communication efforts were successful in repairing the reputation of the company (Greenberg and Elliot, 2009). Although this case had clear outcomes in terms of public response and relatively fast return to 'normal' purchasing patterns after the serious food safety breach, other studies (Fuoli et al, 2017) have shown the best corporate response may be context specific. In their study of corporate corruption, denial was found to work better than apology, if the 'evidence' against the company is weak, "denial was also found to outperform apology in repairing perceptions of the company's integrity and benevolence even in the face of strong evidence" (Fuoli et al, 2017, pg 645).

McDermont (2012) used in-depth and semi-structured interviews with different stakeholders including the forest industry and First Nations in the assessment of the role of trust in forest certification with the Forest Stewardship Council in British Columbia. In the analysis, the influence of shared values, competence, integrity and benevolence on trust in forest certification was evaluated. Results showed that shared visions had a strong impact on trust in certifiers for environmentalists and all certifiers were regarded as being competent.

Davenport et al. (2007) analyzed ways of building trust in natural resource management using the Midewin National Tallgrass Prairie as a case study. In-depth interviews and qualitative analysis were used in the study. Results showed that the Forest Service was trusted by most

community members. The dimensions of trust were institutional trust (in management processes and outcomes) and interpersonal trust in the personnel of the agency. The constraints to trust were communication that is not clear, limited engagement of the community, limited community power, historical resentment, conflicting values, slow progress, lack of community awareness and staff turnover. In summary, it is recommended that there is need for the agency to promote repeated interactions with the community and honest and consistent communication is important for building trust.

In other contexts that do not include food, Post (2019) outlines six case studies on building consumer trust. The first one is Lexus where trust in built by conversation whereby reviews are important for credibility and promoting engagement of customers. The second one is the use of value in retargeting in order to bring back customers (for example One King's Lane company). The third one is Burberry's Art of the Trench a clothing company whereby the company wants to know the interests of the audience (also engagement) through their website People share pictures of themselves wearing clothes made by the company and people can also provide comments. The fourth one is Target's (retailer) pledge to support education which is important given that young people want companies to support social issues. The fifth one is the Coffee For less Company's improvements in its reviews and comments section for its products given that research found that majority of customers trust peer reviews. The sixth one is the case of McDonald's who revitalized their brand (for example changing the menu and communication) in the United Kingdom when consumers' trust in their products declined. Macdonald's also developed a "trust" campaign using consumers' feedback in Ireland when their trust score declined in Ireland (their scores were lowest in 2011) (Cawley NeaTBWA & MediaWorks (2014)). For example, consumers wanted to know more about the source of beef and its

production (Cawley NeaTBWA & MediaWorks (2014)). Dietz and Gillespie (2012) outline case studies on organisational failures and how trust was repaired outside the context of agriculture and food (with examples including Siemens, Mattel, Toyota, BAE Systems, the BBC and Seven Trent). For example, Siemens changed their structures, leadership, processes and culture in 2006 after the company was accused of bribery.

There is always an interaction between regulators, companies (institutions) and the public for any food issue whether the issue relates to food safety or to acceptance of technology or regulations such as labeling. In recognizing this, it is worth remembering that serious breaches of trust (for example BSE in the UK) have often been accompanied by restructuring in the regulatory space, for example creation of the Food Standards Agency in the UK post BSE. This was seen (Wales et al, 2004) as an integration and centralization of responsibility for food safety (away from ministries of agriculture and health) but also as an attempt to adhere to "principles of independence from government, include consumer representation, and enhance openness and transparency as significant institutional innovations" (Wales et al, 2004, pg 191). Although the original creation (1997) of the Canadian Food Inspection Agency was likely the result of a need to create costs savings and efficiencies (Prince, 2000) it is possible that the recent housing of the Canadian Food Inspection Agency fully within Health Canada rather than the jointly within Agriculture and Agri-food Canada and Health Canada may have resulted from a similar (to the UK) desire to distance the food safety regulator from agriculture (in many cases the industry being regulated). As referred to above, the European Union recently revised the European Food Safety legislation to "try and increase transparency in the food safety risk assessment processes" (Askew, 2019b, pg 1) in response to demands by consumer-citizens.

In summary, case studies for ways to build trust have been conducted in different contexts including food and agriculture. Most studies identify transparency and communication as important in building or maintaining trust but other interactions (eg. perceptions of care) are also important. In the case of food safety events, timely response is important. Communication of shared values with consumers and positive relationships with regulators were also found to be important in building trust. There are some inconsistencies within the empirical literature related to trust and food (while circumstances can clearly threaten trust, are publics with higher and lower levels of trust in the food system responding as, a priori, they might be expected to?). Frequently serious breaches of trust result in changes in the regulatory structure as well as in responses by corporations and institutions dealing with their own business outlooks. Coordinated efforts (rather than public debate) have also been found to be important to building trust. The BSE crisis in Canada (from 2003) is often seen as an example of an incident that did not shake public trust in beef or food. However it is important to recognize that there was a public demand for more rules (farm to fork traceability and BSE animal testing) even from the trusting public (traceability initiatives through to final consumer have still not been satisfied throughout the Canadian food system although efforts like the Verified Beef Production Plus program are working to provide detailed information to final consumers).

Conclusions

Trust is, as is well known, easy to lose and somewhat difficult to rebuild. There is something of a consensus in the literature reviewed on the core elements of trust – confidence and commitment – which seem to apply broadly regardless of the two major types of context – food safety and/ or adoption of unfamiliar technologies in food. The components that lead to

confidence and commitment are described in various different ways but in general they have a focus on relationships between individuals, between individuals and firms or institutions. In building or rebuilding trust, taking responsibility, apologizing if such an apology is necessary, being open and transparent and ensuring that verification of credence attributes is provided by independent authorities can all contribute. However, not all consumers or members of the public necessarily respond to the same triggers. For example, corporate social responsibility is more important to certain demographic sectors than to others. Creating shared values between farm/firm/ institution and consumers is seen by many to be critical to building trust but values vary by demographic and by culture so approaches must be context and culture specific. However, approaches to creating shared values that encompass the entire supply chain (the Canadian Roundtable for Sustainable Beef) may have more success in building trust around issues such as sustainability than a shared value approach by an individual element of the supply chain might be able to do. Using the entire supply chain might allow individuals more points of contact and connection with institutions trying to describe shared values. It is critical to remember that trust can be shaken in your organisation without any action on your part so proactive responses are necessary. Regulators are a key element of quality and safety verification in most food markets. Working with regulators rather than publicly debating policies or regulations is likely a better way to build trust (particularly as compared to being seen to be in conflict with regulators). There is an increasing move to ensure that the public or consumers or both can be more involved in the food regulatory system – something that could enhance transparency and hopefully engender more trust in food industry oversight. This is an approach used in particular in the UK and in the EU. It is not well advanced in Canada and might be helpful should any serious incidents occur in the Canadian food industry in the future. Farmers

do have the trust of the majority of Canadians in most food related issues, however the question of how they can connect to the broad Canadian public or even to the broad cross section of consumers is problematic. That particular aspect of relational trust has been shown to be particularly important in the context of technologies used by farmers in food production, but also in the demand for local food and other selective markets. Is it reasonable to expect that somehow trusted farmers can handle increased demands for communication with the public? The answer is probably not given already taxing demands on time so creative solutions to allow this proactive flow to take place need to be developed. In most countries, including Canada, the public has the conviction that their domestic food system is the best (better than those found in other countries exporting to their country), which is an advantage that does seem to reduce the impact of negative food safety situations and to allow companies facing those events to recover. In time, given interactions with the trusted members of the food supply chain attitudes towards the use of new technologies may be affected by the same advantage.

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Appendix A

Table A1: Summaries of empirical studies trust in food and agriculture

Article	Context	Types of trust measured	Measurement of trust	Data	Analytical methods	Findings	Recommendations for building trust (if any)
Allum (2007)	GM food risk perceptions in the United Kingdom	Trust in scientists	*Competence* -Scientists working on GM foods have the necessary expertise to make the right decisions -Scientists working on GM foods have a good understanding of all the issues relevant to the research -Scientists working on GM foods are good at looking at the evidence about safety and judging what to do *Care* -Scientists working on GM foods are usually honest with the public -Scientists working on GM foods don't care about what happens to ordinary people Responses are as follows (1 = strongly disagree, 5 = strongly agree) *Shared values* - On a scale of 1 to 7, to what extent do you think that scientists working on GM food think like you or think differently to you - On a scale of 1 to 7, to what extent do you think that scientists working on GM food have similar or different values to you? For shared values, 1 = very different values to mine and 7 = very similar values to mine	Online survey in November 2002 (N =1,142)	Structural equation modeling	Perceptions about competence of scientists influence GM food risk perceptions (negative) while care had no impact -Shared values were more important in influencing GM risk perceptions as compared to care and competence -Respondents who perceived scientists to be competent were also likely to consider them as caring (i.e. honest and responsible)	With respect to GM and maybe other controversial technologies, it might be important to convince people about the competence of scientists and other risk managers and their shared values with the public in order to reduce risk perceptions about the technologies
Ariyawardana et al. (2017)	Intentions to pay a price premium for domestically produced vegetables in Australia	Trust in vegetable supply chain members (e.g., growers, processors, retailers)	-I trust Australian growers produce safe vegetables -I trust imported vegetables are safe and meet proper standards -I trust processors honestly convey the country of origin of the product/ingredients -I trust that retailers honestly convey the country of origin of the product/ingredients	Surveys were distributed through organizations (N=854)	Ordered logistic regression analysis	Domestic growers were more trusted for growing safer vegetables while people had lower levels of trust in imported vegetables	-The industry could respond by enhancing labelling standards -Trustworthy information is important and there is need for the

			-I trust the food inspection schemes adopted by the Australian government -I trust the food safety standards adopted in Australia			-Respondents were willing to pay a price premium for vegetables grown in Australia	industry to build consumer confidence
Aubeeluck (2010)	Consumer confidence in food safety	Trust in food agents (retailers, food manufacturers, farmers and the government	Adopted from de Jonge (2008)	Online surveys in Canada (N = 1,716) and Japan (N = 1,940)	Confirmatory factor analysis	Trust in food agents generally influence consumers'	
Chen (2013)	Food safety perceptions by consumers in China	General trust, industry-level specific trust (the government and consumer association) and firm-level trust (food manufactures, farmers and food retailers)	*General trust (1 = strongly disagree … 5 = strongly agree)* - If given a chance, most people would try to take advantage of you - Most of the time people try to be helpful -Generally speaking, most people can be trusted *Trust in food agents* Questions were adopted from de Jonge et al. (2008a)	Customer survey at 10 supermarkets from June to July 2010 (N = 1,165)	Partial least squares	-General trust positively influences trust in farmers and food manufacturers only -Industry-level specific trust (in the government and consumer association) influences firm-level trust -Trust in food manufacturers and retailers positively influence food safety perceptions	Maintaining and building trust in food manufacturers and retailers is important e.g., through complying with food safety regulation and truthful communication in the case of a food safety incident
Choe et al. (2009)	Food traceability in Korea		-The traceability system provides objective information on agro-products sufficiently -Information provided by the traceability system is trustworthy -I expect the traceability system to provide accurate information trustfully	Paper based survey (N = 491)	Partial least squares method	Trust was negatively related to fears of seller opportunism and perceived information asymmetry	
Coveney (2007)	Food in Australia	Consumer trust in food		In-depth qualitative research interviews and focus groups (N = 24)	First and second order analysis	-Trust in the food system was challenged by media coverage of food safety events and personal	

						experiences -Poor food handling and questionable marketing actions decrease trust -Trust was strengthened by buying produce made in Australia	
De Krom and Mol (2010)	Avian influenza in the United Kingdom	Trust in food		Qualitative interviews at retail setting in June 2007 (N = 52)	Qualitative analysis	-Trust is influenced by consumer dispositions, physical settings in shops and relations between people and food system actors -Some consumer prefers trust relations based on facework commitments with vendors while others prefer faceless commitments e.g., mediated by labels	-Information that refer to roles of food system actors contributes to trust -Trust may be maintained by facilitating meaningful relations food actors and consumers
DeLong and Grebitus (2017)	GM labeling of sugar and sugar in soft drinks in the United States	Trust in institutions	Trust in institutions was measured using questions similar to de Jonge et al (2008a)	Online surveys in April 2013 (N = 566)	Bivariate ordered probit model	-Seventy- five percent of respondents wanted GM labelling for the products -Trust in the government and food manufacturers was negatively related to the desire of GM labelling	The education regarding GM can be targeted at individuals who have lower levels of trust in institutions regarding food safety
de Jonge et al.	Confidence	Trust in food	- Using farmers as an example, the questions	Online surveys	Structural	-The final model	

(2008a)	(optimism and pessimism) in food safety in Canada and the Netherlands	agents (the government, farmers, retailers and food manufacturers)	were as follows: (i) Farmers have the competence to control the safety of food. (ii) Farmers have sufficient knowledge to guarantee the safety of food products. (iii) Farmers are honest about the safety of food. (iv) Farmers are sufficiently open about the safety of food. (v) Farmers take good care of the safety of our food. (vi) Farmers give special attention to the safety of food. Responses are as follows: 1. ... 5. strongly agree.	in Canada in June 2006 (N = 528) and in November to December 2005 in the Netherlands (N = 628)	equation modeling	did not include the competence items because including them led to multi-collinearity problems in the data for the Netherlands - Trust in all four food agents positively influenced optimism in food safety while trust in food manufacturers was negatively related with pessimism with food safety	
de Jonge et al. (2008b)	Confidence in the safety of food (optimism and pessimism) in the Netherlands	Trust in food agents (the government, farmers, retailers and food manufacturers)	Similar to de Jonge et al. (2008a)	Surveys in the Netherlands (N = 2,892)	Decompositio nal regression analysis	-Trust in food agents) (especially trust in food manufacturers) is positively related to confidence in the safety of food - Care was found to be the most significant trust dimension	Regulators need stress that they are concerned about the well-being of the public and that they are paying attention to food safety
Ding et al. (2015)	Choices of a functional food: Canola oil in Canada	Generalized trust in people and trust in the food system (government, food manufacturers, farmers and retailers	-Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people. The responses are most people can be trusted, cannot be too careful in dealing with people and don't know - You cannot trust strangers anymore,'' using a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). -Trust in the food system are similar to de Jonge et al. (2008a)	Online survey in Canada in 2009(N = 1,009)	Conditional logit model	Trust influences consumer choice of a functional food (i.e. assessment of the risky attribute in this case GM)	Trust can be maintained through policies and actions by firms aimed at avoiding negative experiences by consumers
Eiser et al. (2002)	Perceived risk and acceptance of	Trust in information	-Study 1: This information is trustworthy (9-point scale ranging from disagree completely to	Experiments in 1995 (N = 184),	Correlations	Trust and perceived risk	Information regarding

	food technologies in the United Kingdom		agree completely) -Study 2 and 3: I very much trust the information I have just read	1994 (N = 160 in study 2 and N = 260 in study 3)		might be a result of previous attitudes towards the technology	technologies might activate prior attitudes regarding the technology thus positively or negatively influencing the acceptance of the technology
Giampietri et al. (2018)	Food purchasing decisions in Italy	Trust in short food supply chains (SFSCs)	-I perceive purchasing at SFSCs to be reliable -Purchasing at SFSCs appears trustable to me -I trust in purchasing food at SFSCs	Online survey in 2016 (N = 260)	Structural equation modeling	-Trust is important for consumers' decisions for buying food at SFSC	Trust might be established by direct interactions between producers and consumers (face to face interactions)
Goddard et al. (2018)	Concerns about food integrity and food technology in Canada		-Generally speaking, would you say that most people can be trusted? The responses are people can be trusted, cannot be too careful in dealing with people or do not know -How much trust do you have in the following groups or institutions regarding their responsibility for food production in Canada? Responses 1. no trust … 5. absolute trust. The organizations are farmers, food processors or manufacturers, research organizations or universities, pharmaceutical industry which provides drugs to treat animals, government agencies or public authorities, retailers, advocacy consumer organizations, advocacy environmental organizations, and advocacy organizations for animal welfare	Online surveys in 2016 (n = 1,795) and 2017 (1,814)	Tobit and ordered probit regression models	Generalized trust and trust in food agents generally reduces food integrity and food technology concerns while the opposite is true for trust in advocacy groups	
Hamzaoui-Essoussi et al. (2013)	Organic food distribution channels in Canada and France			In-depth interviews with superstore managers, specialty stores, farmers' markets and producers in	Content analysis	-There were differences in results between the two countries due to product life cycle, structure of the industries and consumption	-Trust can be increased by the following distribution strategies: pricing, education, quality, communication and knowledge about

				Canada (N = 58) and France (N = 22)		culture and pattern -Trust is related to production methods, certification, store manager, labelling, pricing, traceability, branding and quality	the producer
Hanssen et al. (2018)	Attitudes regrading GM applications and information seeking behavior regarding GM	Trust in governance, GM organizations and GM regulations	*Trust in governance (5-point scale from completely disagree to completely agree)* -I trust that the government is capable in its decision-making on genetic modification to take into account the interests of the public. -Civil society organizations (such as Greenpeace, WWF, Consumer, Animal Protection organizations or others) must have a large impact on decisions about genetic modification. -The government has sufficient knowledge about safety issues of genetic modification. -Civil society organizations have sufficient knowledge about safety issues of genetic modification. -I am not confident that businesses decisions on genetic modification sufficiently take into account the interests of the public. -I do not trust that civil society organizations decisions on genetic modification sufficiently take into account the interests of the public. *Trust in organizations (5-point scale from completely distrust to completely trust)* -Newspapers, magazines, radio or television that report on genetic modification. -Companies that make new products with the use of genetic modification. -Universities that do research into new possibilities of genetic modification. -Environmental protection organizations campaigning on genetic modification. -Consumer organizations that test genetically	Online survey (N = 809) and telephone interviews (N = 399) between March 11, 2015 and April 3, 2015	Correlation and regression analysis	-Trust in governance, organizations and regulations significantly (positively) influences attitudes towards GM applications -Only trust in organizations (positively) and trust in regulations (negatively) influences information seeking regarding GM	

			modified products. General practitioners who advise on new medical tests and new medicines made with genetic modification. -Government agencies that monitor the use of genetic modification. -Church leaders who indicate moral limits for the use of genetic modification. -Social media users who send messages about genetic modification. *Trust in regulations (5-point scale from completely disagree to completely agree)* -The current regulations in the Netherlands protect consumers against potential dangers or risks of genetically modified products. -There is law enforcement and supervision of companies and research institutes that work with genetic modification or with genetically modified organisms. -The current regulations in the Netherlands protect the personal data and the autonomy of patients. -There are procedures to ensure that everyone who doesn't want to buy genetically modified products can do this safely.				
Hartmann et al. (2015)	German's retail sector – Cause related marketing (CrM)	Consumers' trust	*General trust in CrM* -I perceive CrM to be meaningful -I perceive CrM to be good -CrM strengthens my trust in the company *Trust in retailer's (X) campaign 'Heart of Farmers'* -I perceive the 'Heart for farmers' campaign of X to be reliable - I perceive the 'Heart for farmers' campaign of X to be good - The 'Heart for farmers' campaign of X appears trustable to me	Online survey in Germany (N = 483)	Structural equation modelling	General trust in CrM positively influences trust in retailer's CrM campaign which positively influences customer loyalty to the retail store	-Third party CrM labels could increase trust in institutions -Consumers trust in CrM campaigns could be increased by providing them with information regarding the true impact of their charitable buying decisions
Huang et al. (2019)	Purchase of functional foods in China	Trust in governments, food manufacturers	How much trust do you have in the following institutions regarding their responsibility in the functional foods domain (1= not at all to 5 = absolutely	In person interviews (N=1,144) in January to	Correlation and confirmatory analysis	Trust positively influences intentions to purchase functional	

		and food retailers		March, 2012		foods	
Kang and Hustvedt (2014)	Trust between consumers and corporations in the United states	Consumer perceptions of transparency and social responsibility	_____ does not pretend to be something it isn't _____'s product claims are believable -Over time, my experiences with _____ have led me to expect it to keep its promises, no more and no less _____ has a name you can trust _____ delivers what it promises	Online consumer panels (N = 303)	Confirmatory factor analysis	Consumers' trust is influenced positively by their perceptions of the corporate's transparency in production and labour conditions and social responsibility -Trust positively influences intentions	Together with transparency, direct communication to consumers increases trust in corporations
Knight and Warland (2005)	Risk perceptions about pesticides, *Salmonella* and fat in the United States	Trust in the government and food agents	-Government and business can be trusted to make the right decisions about the risks of new technologies -Trust in the food system was measured by asking people about their perceptions about safety of imported, restaurant and food in grocery stores or supermarkets and the job being done by farmers, processors and the government inspectors regarding the safety of food	Telephone survey in June and July 1999 (N = 1400)	Logistic regression	Trust in the food system negatively significantly influences risk perceptions about pesticides, *Salmonella* and fat	Trust is important in influencing risk even in situations where the risk is known and people have control of the risk (i.e., fat in this case)
Konuk (2019)	Willingness to purchase and to pay for fair trade (FT) food in Istanbul, Turkey	Trust in the fair trade label	-I trust FT label -I rely on this label -FT label is honest	Self-administered questionnaires in September and October, 2018. There are 478 valid responses	Confirmatory factor analysis	Trust in the fair trade was positively related to willingness to purchase and willingness to pay for fair trade food	Provision of credible information enhances consumers willingness to purchase or pay and sponsoring of social events is important in improving the trustworthiness of producers of fair trade food
Lang (2013)	GM food in the United States	Trust in university scientists, environmental organizations, farmers, food	-How much do you trust the following groups to make appropriate decisions about genetically modified food?" 1. No trust to 7 complete trust –When thinking about genetically modified food, how would you rate …. On each of the	Data from mail and telephone surveys (N=363) in June 2004	Factor analysis and linear regression	-University scientists and farmers were more trusted while grocers, grocery stores and food	Researchers might need to focus less on trust as a concept but analyse the distribution of trust elements

		manufacturers, government agencies, grocers and grocery stores.	following items 1. How honesty they are 2. How knowledgeable they are 3. How well they can predict potential effects 4. How much they share my values 5. How well they can tell which potential effects are important.			manufacturers were least trusted - Knowledge was significant in influencing trust in activists but not the food industry while shared values had an opposite result	
Lassoued and Hobbs (2015)	Confidence in credence attributes in Canada (packaged green salad)	Trust in brand and trust in food manufacturers	*System trust* -In general, I can rely on the food system to provide high quality packaged salad -In general, I think that the food system can be trusted to assure that packaged salad is of high quality *Brand trust* - I think that the salad brand I buy can be trusted for its high quality -I think that the salad brand I buy has reliable quality	Online survey in July 2012 (N = 310)	Structural equation modeling	Trust in a brand is positively related with consumers' confidence in the quality and safety of brands through trust in the food system	Private and public sectors and food agents may have a role in improving communication about the food system
Lombart and Louis (2014)	Corporate Social Responsibility in France	Trust in a retailer	-I think that to shop in the stores of this retailer brings me safety - I trust this retailer - I consider that to shop in the stores of this retailer is a guarantee - I think that this retailer is sincere towards its consumers - I believe that this retailer is honest towards its consumers - I think that this retailer is interested in its consumers - This retailer regularly renews itself to meet the needs of its customers - I think that this retailer tries to meet the expectations of its customers on an ongoing basis	Survey in a store laboratory (N = 352)	Structural equation modeling	-Trust (in the retailer) is influenced by the retailers' CSR policy while trust influences behavioural intentions	
Marques et al. 2015	Attitudes towards GM foods across time in Australia	Trust in organisations and the media	Respodents were asked about the degree of their trust in scientists, regulators and watchdogs	-Surveys were conducted each year during the period 2003 to 2012 -Computer-	ANOVA and structural egution models	-Respondents preferred GM foods more than GM animals -Trust in scientists (positive) and	The management and promotion of trust in information sources for new technologies is important for the

				assisted telephone interviews were used (N=8,821)		watchdogs (negative) had the greatest impact on attitudes -Trust in regulators also influenced attitudes towards GM	acceptance of the technologies
Matin et al. (2012)	Nanotechnology	Generalized trust	Similar to Muringai and Goddard (2016)	Online surveys (N = 777)	Multinomial logit model	Generalised trust had some influence on the acceptance of nanotechnology	
Mazzocchi et al. (2008)	Purchasing decisions (standard one and a hypothetical one where there is a Salmonella food scare) for chicken in France, Germany, Italy and the Netherlands	Trust in food safety information from the mass media, food chain, experts, alternative sources and other sources	Trust in 23 food safety sources of information was assessed	Face to face interviews and interviews in homes in 2004with a total of 2,725 respondents	Principal component and cluster analyses and ordered probit regression analysis	-Trust in information from experts and food agents generally decreases risk perception while the opposite is true for trust in alternative sources of information -However, there were cross country differences in terms of the effect of trust on risk perception	Communication strategies for risk should depend on the country and cultural instead of demographic differences are important
Muringai and Goddard (2016)	Changes in beef risk perceptions and attitudes in Canada	Generalized trust and agent specific trust (the government, farmers, food manufacturers and retailers)	Generally speaking, would you say that most people can be trusted? 1. people can be trusted, 2. can't be too careful in dealing with people, and 3. don't know -*Trust in food agents* was measured using questions similar to de Jonge et al. (2008a)	Data for the same 2,071 households from two Neilsen Homescan™ surveys conducted in 2008 and 2011 and purchase data	Seemingly unrelated regression analysis	Changes in trust in the government negatively influenced changes in risk perceptions only while changes trust in manufactures and farmers influenced changes in both risk perceptions (negatively) and risk attitudes	

						(positively)	
Muringai and Goddard (2018)	Bovine Spongiform Encephalopathy (BSE) and Chronic Wasting Disease (CWD) in Canada, the United States and Japan	Generalized trust and agent specific trust (the government, farmers, food manufacturers and retailers)	Similar to Muringai and Goddard (2016)	-Online surveys in Canada, Japan and the United States -Sample sizes range from 870 to 1,354	Ordered probit regression models	-Generalized trust was negatively related with BSE and CWD risk perceptions in Canada -Mixed results were found for the effect of trust in food agents on risk perceptions between the two diseases and across countries	Monitoring trust (both generalized trust in people and trust in food agents) might assist in predicting the impact of future animal disease events on meat consumption - Trust in agribusiness organizations can be built by open communication, transparency, honesty, and competence
Muringai et al. (2017)	Pig production attributes in Canada	Similar to Muringai and Goddard (2011)	Similar to Muringai and Goddard (2016)	Online public survey which included a choice experiment in 2011 (N = 1,603)	Conditional logit and random parameters logit models	Respondents with higher levels of trust preferred traditionally raised pork more than those respondents with low levels of trust -Government certification of the traditional pork attribute was preferred by both consumers with high and low trust	Open communication, transparency, honesty, development of brands and certification could increase trust

Myae (2015)	Food safety (traceability and animal testing) in Canada and the United States in the context of CWD	Generalized trust and trust in the government	Similar to Muringai and Goddard (2016)	Online surveys in canad (N = 1,516) and the United States (N = 1,016)	Mixed logit model	Generalizes trust and trust in the government influenced consumer preferences for traceability and animal testing	
Myae and Goddard (2012)	Traceability for sustainable production in Canada, Japan and the United States	Generalized trust	Similar to Muringai and Goddard (2016)	Online surveys (samples sizes were more than 1,000 people	Ordered probit regressions	Generalized trust influenced perceptions about traceability for environmentally sustainable production methods	
Newman and Briggeman (2016)	Building farmers' trust in sales representatives in Kansas, United States	Trust in sales represantatives	*Credibility* -Does their homework on me and my operation -Does not lie or exaggerate -Years working in the industry -Is passionate and loves their topic -Reputation of the company they work for -Well researched and knowledgeable of topic -When they don't know, they say so *Reliability* - Sends meeting materials in advance -Are always transparent -Makes sure meetings have clear goals, not just agendas -Reputation of the company they work for -Adapts to changing circumstances and situations -Makes specific commitments and delivers on them -Follows through on actions requested by me *Intimacy* -Ability to be candid and upfront about situations -Stays in contact via calls, visits, etc. -Not afraid to make conversation -Finds the fun and fascination in my operation -Understands my goals, mission, and values	Best worst survey was completed by farmers in August 2015 (N = 193)	Conditional logit model	Results show that farmers would want sales representatives to focus on own personal development (including professionally) instead of things beyond their control -age, years of employment and reputation of the employers of the sales representatives was of limited concern to farmers	-Sales representatives need to work on communication all the times -Representatives need to know the specific area, be dependable, and show the desire to help their customers

			-Years working with me -Shares a common interest *Self-Orientation* -Asks open-ended questions to understand me better -Listens without distractions -Reflective listening, summarizing what they've heard -Allows me to fill the empty spaces in conversations -Asks me to talk about what's behind an issue -If communication fails, they take most of the responsibility -Focuses on defining problem, not guessing the solution				
Peters et al. (2007)	Food biotechnology in the United States and Germany	Institutional trust	Political institutions try to do what is best Legal institutions try to do what is best Economic institutions try to do what is best Scientific institutions try to do what is best Political institutions are not competent enough Legal institutions are not competent enough Economic institutions are not competent enough Scientific institutions are not competent enough	Telephone interviews in the United States (N = 601) and Germany (N = 942)	Multivariate linear model and correlation analysis	Trust influenced attitudes about biotechnology in the United States (moderate effect) but not in Germany	Trust is potentially relevant regarding issues related to science, technology and the environment
Pivato et al. (2008)	Corporate social responsibility in Italian retail chains that have their own labels	Consumer trust in organic food	-I trust ___ -You can always count on ___ ___ are reliable	Survey with consumers of organic of organic food for eight retail chains in May to June 2005 (N = 183 in Milan and 217 in Florence)	Structural equation modeling	-Corporate Social Performance (CSP) influences consumer trust and trust influence subsequent actions by consumers -Trust mediated the relationship between CSP and financial performance	
Ricci et al. (2018)	Intentions for eco-friendly convenience food in Milan, Italy	Trust in firms, food processors, retailers and organizations	-Level of trust in firms operating in the vegetables supply chain (1=very low trust; 5=very high trust) -Level of trust in food processor brands producing IPM minimally–processed	Interviews at supermarkets (N =	Confirmatory factor analysis	Trust influences attitudes (positively) and concern about agricultural	Labeling may influence trust in the food system

		controlling compliance with environmental standards	vegetables (1=very low trust; 5=very high trust) -Level of trust in retailer private label brands producing IPM minimally–processed vegetables (1=very low trust; 5=very high trust) -Level of trust in organisations controlling compliance with environmental standards (1=very low trust; 5=very high trust)			practices (negatively)	
Roosen et al. (2015)	Food nanotechnology in Canada and Germany	Trust in agriculture, food-industry, science/ research, pharmaceutical industry, government agencies/public authorities and consumer organizations	How much trust do you have in the following institutions regarding their responsibility over the safety of food? (1 = no trust to 5 = very high trust)	Online surveys in Canada (N = 615) and in Germany in February and April 2009 (N = 750) -Experiment in Germany in January and February 2009 (N = 143)	Logistic and Tobit regressions	-Trust reduces risk perceptions in situations where there is uncertainty about the technology -Trust increases willingness to pay for new food	Skeptical consumers can act as watchdogs of the food system
Roy et al. (2017)	Food purchasing decisions in Canada (Vancouver) and New Zealand (Christchurch)			In-depth interviewing with restaurant chefs, farmers, farmers' market vendors and wholesale distributors (N=95) (September to November 2014 in Vancouver and February to April 2015 in Christchurch	Content analysis	-Trust increases commitment and loyalty between producers and wholesalers -Purchases of local food are enhanced by social interaction, face-to-face relations and personal knowledge of the supplier	Social networks play an important role in the local food system
Runge et al. (2018)	Novel food technologies and risk from ground beef and processed foods	Trust in for profit food institutions and government	*For-profit food institutions* How much trust do you have in (manufacturers/grocery/stores/restaurants/farmers/regional seed companies such as Renk and Croplan/international seed companies such as	Mail survey in 2015 (N = 931)	Hierarchical ordinary least squares	Trust in for-profit food institutions is negatively related risk perceptions about processed	Communicating about the care, competence, openness and honesty of

	in the United States	food-related institutions	Monsanto and DuPont) to keep food safe? *Government-related food institutions* How much trust do you have in schools/government regulatory agencies such as USDA and FDA) to keep food safe?			food, red meat and ground beef. -Trust in the media for information on science, health and nutrition is positively related to risk perceptions about red meat	stakeholders regarding public wellbeing might mitigate food scares -Communicating directly to the public by industry stakeholders prior to food scares is important
Sen and Bhattacharya (2001)	Consumer reactions to CSR			Experiments (Study 1 -277 MBA students), Study 2-345 students	ANOVA and three-stage least squares regression	-Negative CSR information influence consumers' evaluations of companies more than positive information (even in situations where it is due to omission than commission)	- Companies need to be aware of the negative effects of being perceived as not socially responsible
Sapp et al. (2009)	The food system in the United States safety, nutritional quality, treatment of workers, protection of the environment and livestock treatment)	Trust in the food system	Respondents rated institutional actors n trust, competence and fiducial responsibility	Two internet surveys in the fall of 2007 (N = 2,008) and summer of 2008 (N = 1,321)	Structural equation modeling	Variance in trust was mostly accounted by competence and fiducial responsibility and trust accounted for most of the variation for willingness to support institution's recommendations -Fiducial responsibility had a greater effect on trust as compared to competence	Communication strategies that focuses on corporate social responsibility and education about skills and expertise are important building and maintaining trust
Setbon et al. (2005)	Risk perceptions about mad cow	Trust in the government	-The French government waited too long before taking the necessary measures	Two national surveys January	Multiple regression	Trust was negatively related	Social trust was cognitive driven

	disease in France		-The French government took the right measures at the right time" -The European Commission took the right measures at the right time -All measures needed to stem MCD were taken	2001 and March 2002	analysis	with anticipatory risk assessments and personal worry about mad cow disease	instead of driven by feelings
Siegrist (2000)	Risk and benefit perceptions and acceptance of gene technology in Switzerland	Trust in scientists and researchers at universities, pharmaceutical companies, agricultural companies and food companies	How much trust do you have in the following institutions or persons that they are conscious of their responsibilities in doing genetic engineering or handling the modified products?	Telephone interviews (N = 1,001) in the fall of 1997	Structural equation modeling	Trust negatively influences risk perceptions and positively influences benefit perceptions and indirectly influences acceptance of gene technology through risk and benefit perceptions	Strong regulations for preventing unwanted side effects of gene technology are important for the acceptance of biotechnology and making values salient might increase trust. important
Siegrist and Cvetkovich (2000)	Perceptions of different hazards		In general, how much confidence do you have in the authorities regulating the following items?	Interviews with students (N = 91)	Correlations	Trust is positively correlated with benefit perceptions and negatively related with risk perceptions	
Siegrist et al. (2007)	Acceptance of nanotechnology foods and food packaging in Switzerland	Trust in the food industry, science/research, and pharmaceutical industry	How much trust do you have in the following institutions regarding their responsibility in utilizing nanotechnology in the food domain? 1. no trust … 5. very high trust	Computer survey (N = 153)	Path analysis	Trust influences the affect regarding nanotechnology foods and willingness to pay the products positively	Trust can be created through shared values and promotion of voluntary initiatives to avoid the negative side effects on nanotechnology foods.
Suvanto (2012)	Business relationships	Pork and cereal chains		Face to face interviews with business owners, top level managers and marketing or sales managers (N = 16)	Discourse analysis	Trust is complex and dynamic and it is related to control, context in the food industry and business size and reputation from customers	
Tonsor et al.	Beef risk	Trust in	Please indicate how trustworthy you consider	Online surveys	Bivariate	-Trust in doctors	Accurate and

(2009)	perceptions in Canada, Japan and the United States	information sources (family physician, dietician, government food agencies, university scientists⁄ educators, private researchers⁄ consultants, retail grocer or butcher, food industry sources consumer Groups)	each source.1. not trustworthy … 5. trustworthy. The sources of information were	(N = 1,002 in Canada, 1,001 in Japan and 1,009 in the United States	Tobit regression analyses	negatively influence beef risk perceptions in all three countries -Trust in the industry, grocer and government only influence beef risk perceptions (negatively) in Japan while trust in researchers and consumer groups influence beef risk perceptions (negatively)in Canada	reliable information about the safety of beef can be obtained by the beef industry if it works closely with health professionals
Walravens (2017)	Food safety and regulatory change since mad cow disease in Japan	Focuses on three institutional developments (Food Safety Commission, the Food Education program and the Consumer Affairs Agency		-official documents and qualitative interviews with experts on agriculture and food regulation, dairy farmers, interest groups and consumer organizations in 2015 and 2016	Textual analysis	In cases where there is low citizen participation and there is institutionalization of trust, regulatory changes can be used for economic or political goal easily	Clear and thorough explanations that are supported by evidence is important for rebuilding trust in food safety and the way food issues ate dealt with by the government
Yee et al. (2005)	Food safety	Trust in livestock farmers	Interviews (n = Twenty-nine statements for determinants of trust and four items of trust (seven-point scale from strongly agree to strongly disagree) e.g. livestock farmers are very knowledge in producing safe meat	Self-administered questionnaire (n = 1974)	Structural equation modeling	Trust positively influence f future purchase decisions -Trust is built by providing information, benevolence and integrity	Farmers need to provide accurate and reliable information to farmers -quality assurance schemes are important
Yue et al. (2017)	Online product presentation of organic food in	Consumers' trust in organic food	Five variables on a 5point scale from strongly disagree to completely agree	Lab experiment (N=120)	Confirmatory factor analysis	Trust can be improved by the degree of	-accurate and transparent information form

	China					media richness of presentation of the product online and the length of the online review mediates the relationship between the variables	food producers can enhance trust

Table A2: Summaries of case studies that focus on building trust

Authors	Context	Companies /agency studied/product	Interventions for building trust	Data source	Methods of Evaluation	Findings (if applicable_	Successful or not
Bonini et al. (2008)	Consumer concerns about climate change in different countries	Petroleum, food and beverage, retailing and high-tech industries	Small containers can be used in packaged foods, companied can reduce energy consumption and they can sell environmentally friendly products			-Some respondents state that they are more likely to choose products from companies that invest in alternative energy or take actions that benefit the environment - Although the food and beverage industry was rated highly in terms of trust, consumers state that they need to improve health and safety, the environment and sustainability and have business practices that are ethical. Clear labels with information that is honest are important -For retailers, provision of quality products to consumers that have low levels of income, selling environmentally friendly products, fair and equitable wages and selling local products will increase consumers'	

						likelihood to purchase products	
Bozic et al. (2018)	Repairing organizational trust during horse meat scandal in the United Kingdom	-Transgressing retailers (Tesco and Asda) and two blameless retailers (Waitrose and Morrisons)	-Transgressing retailers publicly acknowledged the incident; apologized and withdrew the products; engaged in testing the product; got rid of the meat suppliers who were implicated or put new requirements; changed to use more local suppliers; encouraged communication -Blameless organizations distanced themselves from transgressing retailers by emphasizing high product controls; the locally based nature of their supply chains; close familiarity and good relationship with producers; traditional knowledge of staff -Both the transgressing and blameless retailers wrote a joint letter stating that they cannot accept situations were consumers' trust is breached and will take measures to increase consumer confidence and they engaged in product testing and withdrawals	Different newspapers and media sources	Narrative analysis		
Davenport et al. (2007)	Natural resource management in the Midewin National Tallgrass Prairie	Forest Service	The area (Midewin) was created as a result of local efforts and this is the reason why the authors used it as a case study	In-depth interviews with 21 community members and personnel from the USD Forest Service	-Qualitative analysis	-The Forest Service was trusted by most community member -The dimensions of trust were institutional trust and interpersonal trust -The constraints to trust were communication that is not clear, limited engagement of the community, limited community power,	

						historical resentment, conflicting values, slow progress, lack of community awareness and staff turnover	
Lees and Nuthall (2015)	Supplier commitment added value agri-food supply chains in New Zealand	Agri-food supply chains-beef, lamb and venison	- The suppliers in the agri-food chain commit to differentiated supply chains for long periods -Increases in price certainty, premium prices and the quality of relationships led suppliers to be attracted to the differentiated agri-food supply chains	Semi structured interviews between May 2012 and October 2013 (multiple case study		High trust as a result of openness and transparency and confidence in character of personnel	
Ezezika et al. (2012)	Building trust with farmers in South Africa	Bt maize	Actors in the government, non-governmental organisations and private companies work together for the same objective of reducing maize losses due to the stem borer -There is no formal public-private arrangement	Semi-structured, face to face interviews (N =12) with people from public and private sectors	-Qualitative analysis	-Engagement of farmers at the beginning of the project e.g., using field demonstrations -Effective technology -open communication and full disclosure/transparency -enforcement of good agronomic practices	
Ezezika et al. (2013)	Governance of Public Private Partnership	Water Efficient Maize for Africa (WEMA) project	A social audit model was implemented to build trust and the outcomes were as follows: Mobilize the voices of stakeholders and the public, create transparency, improved management practices, increase accountability and align perspectives of the different stakeholders				The social audit model was successful in improving transparency, accountability by managers and management practices (building trust)
Facilitating Alternative Agro-food Networks	Local food systems in Europe (Austria, England, Hungary,		-In England, in order to restore trust in food sources, measures were undertaken to reconnect people with	In depth interviews, focus groups,			-Producers have made close and trust based relationships with

(FAAN, 2010)	France and Poland)		what they consume, reconnect the food chain with the countryside and reconnect different food agents (through farmers' markets and direct sales) -In Hungary, communications regarding the "Living Tisza" label that emphasizes that the products are local and environmentally sustainable methods of production, the quality of the product and responding to queries from consumers have led to the development of relationships between producers and consumer that are based on trust	workshops and other sources			consumers
Forney and Häberli (2016)	Local Food Networks in Switzerland	Three farmers' cooperatives involve ed in the localization of food in the Swiss dairy industry (Glarner Schabziger, Le Grande Pré and MIBA products	Milk quotas were removed such that strategies are being used for the benefit of farmers and the promotion of local products is one of the strategies	Semi-structured interviews (N = 45), in-field observations and document analysis	Qualitative analysis	-The three farmers' cooperatives are negotiating the meaning of local that enhances their positioning in the dairy industry	
Greenberg and Elliot (2009)	Listeria outbreak in cold cut meats in Canada	Maple Leaf Foods	-The company's CEO publicly apologized in a timely manner, accepted responsibility and promised to do better -The company closed the plant and television news teams visited the plant and they were shown areas where the outbreak happened				The strategies were successful in the short term in repairing and restoring the company's reputation
Jones et al. (1999)	E-businesses	Trust for e-businesses	The study focuses on building trust in e-businesses given the changes in types of systems needed for the business and changes in the environment among others	Literature review and a workshop for stakeholders	Conceptual model	Requirements for high levels of trust include confidentiality of sensitive information,	

						integrity and availability of critical information, identification of digital objects, traceability, quality, management of risks	
Labbrand (2008)	Consumers trust in China's milk	The case of Mengniu	-The government enforced new quality tests and the tainted products were removed from the market -The company also responded by encouraging people to protect national brand products and by reducing prices and these strategies had negative effects, for example, the price reductions indicated that the products were of low quality to come consumers		Qualitative analysis	-Mengniu can restore public trust through standards, PR and marketing campaigns -Guaranteeing transparency is important for gaining trust	
Lindgreen (2003)	Food industry	Danish-British bacon supply chain (multiple case study	-Marketing activities that are trust based were implemented by the Danish bacon sector (integrated production systems which is a baseline for quality systems and quality parameters -Danish bacon producers put meat assurance schemes (system-based trust)	In depth interviews	Qualitative analysis	-Trust is important in marketing and can be enhanced by promotion, education and building different market relationships, networks and interactions -Trust can be built by timely deliveries, reliability and knowledge of production requirements, valuable market information, capable employees, service that is appropriate and prices that are fair -There are different types of trust	

						(system trust, generalized trust, process-based trust and personality-based trust) and when one type is not available, others can be used	
McDermont (2012)	Forest certification in British Columbia	Forest Stewardship Council certification	Forest certification has been there for a long time but the is conflict and distrust among different stakeholders -Therefore trust between certifiers and people who set standards is analysed	In-depth and semi-structured interviews with different stakeholders including the forest industry and First Nations		-There were differences in trust in certifiers by the industry and environmentalists -For environmentalists, shared visions had a strong impact on trust in certifiers	
Pang (2017)	Restoring reputation across markets	Management of the bacterial contamination event in 2013 by Fonterra in New Zealand	-Delay in response, repairing image with China and the government in New Zealand -Strategies used included denial, mortification and taking corrective action	News and press releases August 3, 2013 to August 31, 2013	Textual analysis		Delay in response was not effective but corrective action was effective in all three phases -Recommendations are that bad news should be shared early and messages should be consistent, there is need to take into account different multicultural differences of the audiences, use different sources of media and ensuring that rhetoric and action are consistent
Richards et al. (2011)	Supermarkets and agro-industrial foods	Trust relations with consumers	Companies are using different strategies for example quality claims, private standards between businesses and symbolic representations, for example, authenticity			-Trust is being commoditized and is being more embedded in mass-produced food marketing -Trust can be	

						manufactured through enhancement of reputation by private standards between businesses, quality claims that are direct through badges on food that are privately certified and discursive claims ("symbolic representations of authenticity and reputation"	
Savadori et al. (2007)	Food safety events	Consumption intentions in the case of a dioxin food scare (chicken and salmon)	Chicken that was contaminated with dioxide was destroyed in Belgium			-Effective communication, drastic measures (recall or discontinuation of the product) are important solution in case of food safety events -Trust can also maintained and built through behaviours that focus on shared values	
Sodano et al. (2008)	Private and third-party certification food safety policy standards	Trust in the standards	There was a shift from public standards to private standards and certification by third parties			-Transparency and confidence increase trust -In terms of correcting contract incompleteness as a result of the credence type food safety characteristics, private standards and certification by	

						third parties are weaker tools -Risk analysis can be biased by excess consumers' trust in retailers and bodies that certify attributes resulting in risk assessments that are suboptimal and risk management policies that are not effective	
Steffen and Doppler (2019	Building consumer trust through practices that are sustainable in Germany	Alnatura which is an organic food retailer	- Product-focused promotions, friendly sales people and signs for sustainability that are visible -All products come from organic farming -The company sources their products from regionally -Employees are provided with free education on sustainability -Prices and payments are fair -Partnerships that lasts long	-Literature review and interviews with consumers (N= 10)	Qualitative analysis	-Trust in sustainable consumption is built by use of organic labels and claims - Practices by producers and retailers that are sustainable -Reputation, integrity and image of retailers -Peer information -Certificates and awards were regarded as unsuitable for building trust	-The marketing efforts conducted in the past resulted in strong trust and consumer satisfaction such that when one drug store removed their products, consumers' trust and satisfaction were not affected -Communication/ transparency is important in building trust
Vieira and Traill (2008)	Global value chains in Brazil	Brazilian beef processor who supplies to an EU importer and an EU retail chain in Brazil	-An external agency manages the flow of information and international advertising -Traceability standards had been recently introduced at the time of the study -The retailer had their own beef certification scheme	Interviews with the individual firms	Content analysis	Trust increases in the global value chain because of executive governance by the retailer (full compliance with private standards) -Lower levels of trust for importers due to differences in culture, distance,	

						unfavourable experiences	
Wilson et al. (2017)	The food systems in Australia, New Zealand and the United Kingdom	People working in the media, the food industry and good regulation	The objective of this study was to develop a model for re(building) trust in food agents during or after a food event.	-Semi-structured face-to-face or telephone interviews (N = 105) in 2013 - An electronic survey (N = 58) was used to evaluate whether the strategies for (re)building trust from the results of interviews were accurate	-Qualitative and descriptive analysis	Ten strategy statements for re(building were identified from the interviews for each actor (i.e., transparency, protocols and procedures, credibility, pro-action, putting consumer first, collaborating with stakeholders, consistency, educating consumers and stakeholders, building reputation and keeping promises	