

# **A Methodological Review of the Impacts of Risk and Trust on Consumer Behaviour Towards Food Safety**

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# A METHODOLOGICAL REVIEW OF THE IMPACTS OF RISK AND TRUST ON CONSUMER BEHAVIOUR TOWARDS FOOD SAFETY\*

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## **Abstract**

Consumers' attitudes to trust and risk are key issues in food safety research and attention needs to be focused on clearly defining a framework for analysing consumer behaviour in these terms. By creating a platform, or benchmark, it is hoped that more succinct policy programmes may be initiated to better communicate relevant issues to consumers. In order to achieve this, a detailed review of the recent literature surrounding risk, trust and, the relationship between the two must be conducted. This paper aims to collate the literature in the fields of consumer attitudes to trust and risk. It provides an insight into the economic and other modelling procedures available to measure consumers' attitudes to risk and trust in food safety and specifically notes the need for future research to concentrate on examining risk and trust as highly related variables rather than two distinct concepts.

## **1. Introduction**

The economic analysis of food safety issues, with respect to risk and trust, is a growing and varied body of literature. Bocker (2001) notes that there are two main areas of research within food safety literature. Firstly, studies which concentrate on the effect of a shock on demand, for example heptachlor milk contamination in Hawaii in 1982 (Liu et al, 1998); and the BSE crisis in Europe in 1996 (Burton and Young, 1996, 1997). The second strand of research focuses on policy and cost-benefit analysis of voluntary and obligatory safety regulations (Zaibet and Bredahl, 1997 and Henson and Heasman, 1998). Costs are measured either as aggregate medical costs as a result of a specific type of food poisoning or by defining peoples' willingness to pay for increased food safety either by contingent valuation (Burton et al, 2001), conjoint analysis and, experimental auctions (Melton et al, 1996).

With an increasing awareness of food safety issues by the general public the importance of evaluating the risks associated with food purchasing and consumption are paramount in order to provide effective policy communication in this area. It is becoming increasingly difficult for the general public to attempt to assess risks using traditional methods such as smell, taste or other physical attributes of food. The safety of food is now commonly recognised as a credence attribute (an attribute which cannot be observed by consumers either before or after buying the good), and it is this recognition coupled with the necessity of food and the advances of modern society that have lead to a scenario whereby there are no means by which consumers may reduce their own risks from food consumption to zero (Beck, 1992).

The concepts of risk and trust are combined as a result of the increasing inability of consumers' to make their own assessment of the risks related to food hazards and their

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dependence on those in social/political spheres to provide appropriate information. The complexity of this inter-relationship of risk and trust in the food industry further supports the need for the development of a benchmark methodological framework for policy makers.

This paper aims to examine the definition and measurement of risk and trust in relation to consumer behaviour towards food safety. Section 2 defines and measures risk. Section 3 discusses trust and its measurement. Section 4 illustrates the variety of approaches used in the literature. Section 5 focus on the interaction between risk and trust in relation to food safety and section 6 concludes this review.

## **2. Risk**

There are two main theoretical approaches to consumer risk decisions, the technical approach and the social process approach. The technical approach defines risk as “an objective, essentially value-free assessment of the probability of negative consequences” (Sapp, 2003, p 34), this application is particularly relevant when discussing the ‘safety’ of foods containing genetic modification. From Sapp’s definitions ‘technical risk’ can be further classified when relating the definition to food related risks. Specifically, the technical approach can be divided into two different hazard categories. Firstly, microbiological hazards and, secondly, technological hazards (production risks e.g. pesticides, genetically modified foods etc.) (Frewer et al., 1997). It is important to note that consumers distinguish between these two types of risks and hence evaluate the risks associated with these hazards in a different manner. This suggests that not only are different means of assessment required when measuring the publics’ risk perception but also different methods of policy are deployed to ensure that the correct type of information is available for different categories of food hazards.

Alternatively, the social process approach defines risk as a variable that is determined through public opinion, that is, “risk arises from public discourse about the technology and the political and economic conditions that influence expert assessments” (Sapp, 2003, p 35). There is much literature to support the social approach, in relation to media and food issues, which suggests that “risk perception is socially constructed, and that it is psychological elements which guide peoples’ responses to a particular hazard rather than the technical risk estimates” (Frewer, 1999, p 569). Also known as ‘social amplification of risk’ (Grunert, 2000), this notion has been investigated in relation to food scares. There have been many media and information related studies conducted which are closely associated with the concepts of trust in information sources, reporting bias and knowledge bias.

### *Measurement of technical and social risk*

The measurement of consumer risk perception and trust in food safety information is not an easy task. A key distinction involves the object of measurement. The focus of applied social science is the actual final consumer behaviour; attitudes and beliefs are seen as determinants of behaviour rather than the final aim of measurement (see East, 1997 and references therein).

There is a wide range of qualitative and quantitative research, across many disciplines, which focuses on the issue of technical risks and food safety. Qualitative analyses seem popular as the nature of risk often makes data difficult to collect. Contingency valuation and other non-market valuation techniques are also widely used (see Tables 4.1 and 4.2).

Social amplification of risk (Grunert, 2000) is an area that has received much attention in the last decade. This process aims to link the risk preferences of individual and collective consumers with other social forces, such as their specific sources of information (“the effects of the media”), and hence explain the impact of food scares, this suggests that as a food safety issue unfurls the potential hazard will be sensationalised and the risk will be amplified across society (Grunert, 2000; Frewer, in press; Henson, 2001). There are many

studies in this area which use a variety of sociological and economic techniques to explain the social intensification of risk.

A consumer's risk perception can be viewed as being dependent on information from various sources with differing impacts for negative and positive (often deemed 'incomplete') views (Liu et al, 1998). Sources can be official or derived from personal experience of the consumer or their friends or family. Negative news tends to reduce demand for a good and the response (consumer's reaction). A consumer's risk perception is likely to be 'asymmetric' and to change over time, as a result of both positive and negative news, which is also seen to be 'asymmetric' and to have temporal effect (Liu et al, 1998). It is interesting that psychological (Rowe et al, 2000) and economic (Smith et al, 1988) research concur that - "media exposure will increase fear of hazards relative to the degree of exposure" (Rowe et al, 2000, p 59). That is, regardless of the nature of information, the risks perceived or the view taken (positive or negative), it is the volume of coverage ('quantity coverage theory'), that will elicit a negative response from the general public.

### **3. Trust**

There are many definitions of trust that can be found across a large range of disciplines. For a comprehensive review of the trust literature see Kramer (1999). Trust, or more broadly, 'general trust', can be defined as "the extent to which one believes that others will not act to exploit one's vulnerabilities" (Morrow et al, 2002, p 6). From this, trust can be conceptualise as being a combination of rational thinking (cognitive process) and feelings, instinct and intuition (affective influences) (Lewis and Weigert, 1985, and Morrow et al, 2002). The formation of trust and the degree to which the trust is formed by a cognitive or an affective response will depend on past experience (Morrow et al, 2002).

The application of trust to risk and food safety issues has been widely investigated in media and information related studies (Slovic, 1992; Frewer et al, 1996; Liu et al, 1998). From an economic view point, it is important to look at the interaction of trust in 'institutions' or individuals (suppliers of food or government/regulators) on consumers purchasing behaviour (Bocker and Hanf, 2000; Eiser et al, 2002). Determining who, how and why a consumer trusts certain information sources or suppliers is an important component for food safety projects. A consumer's trust in the 'institution' or individual they purchase from, to some extent, must be unconditional as consumers are fully reliant on a provider's reputation and a regulator's competence.

#### *Measuring informational trust*

Beyond the intricacies of defining trust it is possibly more important to analyse how trust is perceived and conveyed in society. That is, who do we trust to provide us with the information we need to make an informed decision.

A more structured and operational definition of trust in communication is given by Renn and Levine (1991) and discussed in De Marchi et al. (2003). Five different components for trust are identified and they include the degree of perceived expertise of the source, lack of biases in information, fairness, consistency over time, good faith. A similar breakdown is proposed in Frewer et al. (1996), where the identification of trust dimensions is supported by factor analysis. In their studies Frewer et al. found to be relevant across cultures only two dimensions, defined as perceived expertise (i.e. competence) and trustworthiness (i.e. honesty). There are several sources of information on food safety available for consumers that we can categorise as follows: (a) labels; (b) advertising; (c) other point-of-purchase information; (d) word-of-mouth; (e) diet and health guidelines from the medical profession, government, independent authorities, consumer groups; (f) media news. Other forms of information (e.g. outcome of scientific research) are usually conveyed through one of the above channels. The role played by these sources is discussed in Caswell and Padberg (1992)

who also underline how the technical complexity of some information might be inaccessible to consumers.

Trust measurement can be decomposed into two components, (a) the reporting bias and (b) the knowledge bias, where the first refers to specific trust in the honesty of the source of information and the latter to the (perceived) degree of knowledge (expertise) of the source. Henson's study (2001) examines 'reporting bias' from an Eurobarometer study (INRA, 1998) surveying consumers across the EU about which sources can be relied on for information. Henson suggests that, regardless of the knowledge or expertise that these bodies have, consumers are loathe to place explicit trust in the information these organisations provide. Trust attributes for information sources for GM foods have also been measured by Hunt and Frewer (2001) using ANOVA to determine the mean trust, mean reporting bias and mean knowledge. Tabloid newspapers, government ministers and food industry (manufacturers and supermarkets) were least trusted with the main reason assumed to be the perceived "vested interest" that these individuals or bodies have in reporting information (Hunt and Frewer, 2001). Interestingly friends and family were perceived to have less of a reporting bias and hence a higher degree of trust than in previous research, although it was acknowledged that this source was the least knowledgeable (Hunt and Frewer, 2001).

Further analysis into consumers' attitudes to trust was undertaken by Frewer et al (1997) using 'internal preference mapping'. Trust is shown to be most prominent in consumer organisations and medical practitioners, less in governmental source and little in tabloid newspapers and friends, who are thought, from previous research, to "sensationalise" information (Frewer et al, 1996). "Government officials are perceived to be insensitive to the information needs and concerns of the public. To be trusted, information must be provided by sources that are not self-serving" (Frewer et al, 1996, p474). Frewer et al (1999) further note that trust in information is deemed more important in influencing consumer selection of GM foods, than the information strategy adopted. Finally, Frewer et al (1997) comment that "there is, however, a need to understand how important trust is in determining reactions to food risk information"(p 100).

#### *Measurement of institutional and personal trust*

Trust in sources (producers, suppliers, regulators) due to its complex nature, is not often directly measured in experimental studies. Research which uses economic techniques, like contingency valuation, tend to make assumptions that trust related attributes, 'safety levels' for example, are exogenous factors "applied as experimental input", instead of directly relating trust to the supplier (Bocker and Hanf, 2000). It is therefore important that future research concentrate further on 'internalising' trust in models of consumer behaviour.

#### **4. Models and methods**

Some of the methods and models used to analyse risk and trust issues in food safety are presented here. It is important to note that these following tables neither pretend to be a complete record of work in this field, nor are the classification techniques used presumed accurate.

Tables 4.1 and 4.2 show the types of qualitative and quantitative analysis used to investigate the risks involved in food safety issues. An increasing proportion of sociological and psychological studies attempt to use both qualitative and quantitative methods, preferring to begin with a more qualitative outlook (e.g. focus groups) and then using a questionnaire to collect data for a more quantitative analysis. Most of the qualitative research is psychology based.

Table 4.1 Qualitative research techniques employed in risk analysis

<b>Technique</b>	<b>Discipline</b>	<b>Author</b>
Focus groups	Sociology	Van Dillen et al, 2003; Frewer et al, 2003
In-depth interviews	Sociology	Frewer et al, 2003
Semi-structure and laddering interviews	Psychometric	Miles & Frewer, 2000
Optimistic bias model	Psychology	Frewer et al, 1997
Picture stimuli	Psychology	Von Alvensleben, 2002
Preference mapping	Psychology	Frewer et al, 1997
Elaboration likelihood model	Social psychology	Frewer, 1999

Table 4.2 Quantitative research techniques employed in risk analysis

<b>Technique</b>	<b>Discipline</b>	<b>Author</b>
Structural equation modelling	Economics	Henson & Northern, 2002
Demand analysis (applied to information and risk attitudes on demand for a product, usually following a specific food scare (shock)).	Economics	Liu et al, 1998; van Ravenswaay & Hoehn, 1991; Flake & Patterson, 1999; Burton & Young, 1996, 1997; Robenstein & Thurman, 1996; Smith et al, 1988; Zapeda et al, 2003.
Prospective reference theory	Psychology	Liu et al, 1998
Procrustes analysis technique	Psychology	Frewer et al, 1997
Content Analysis (Media coverage)	Sociology	Kalaitzandonalus & Marks, 1999; Hunt et al, 1999
Correspondance Analysis (Media coverage)	Sociology	Frewer et al, 1997
Contingent Valuation (or conjoint analysis)	Economics	Van Ravenswaay & Whol, 1995; Henson, 1996; Buzby et al, 1998; Burton et al, 2001.
Factor analytical model	Psychology	Frewer et al, 1993; Wandel & Fagerli, 2001.
Experimental auctions	Economics	Melton et al, 1996; Hayes et al, 1995; Buzby et al, 1998.
Subjective self-protection model	Economics	Eom, 1995
Social amplification of risk model	Social psychology	Kasperson et al, 1988
Cost Benefit Analysis	Economics	Henson & Heasman, 1998; Zaibet & Bredahl, 1997

Table 4.3, below, shows some of the methods used to assess trust in the area of food safety. The techniques employed here, are far more quantitative in nature than for the assessment of risk, however, similar methods of data collection (i.e. surveys) are deployed.

Table 4.3 Techniques employed for trust analysis

Technique	Discipline	Author
Structural equation modelling	Economics	Henson & Northern, 2002
Internal preference mapping	Psychology	Frewer et al, 1998
Elaboration likelihood model	Social psychology	Frewer, 1999
Associationist & Causal models	Psychology	Eiser et al, 2002
Individual information model	Economics (neural networks)	Bocker & Hanf, 2000

There appears to be a wider variety of models employed in the analysis of risk as opposed to trust analyses, although some, for example structural equation modelling and elaboration likelihood model are used to analyse both risk and trust issues. The multi-disciplinary nature of the research conducted in this field is also highlighted in these tables. Frewer et al, (2003) comment on the importance of a multi-disciplinary approach in risk analysis:

It is essential to integrate social and natural science research in developing best practice in risk analysis, rather than running the two research agendas in parallel as has been conducted in the past.  
Frewer et al, 2003, p 13.

It appears that a combination of different techniques, both qualitative and quantitative, from sociology, psychology and economics may be useful in researching the impacts of trust and risk in food safety.

## 5. Interactions between risk and trust

From this review it is evident that risk and trust should not be considered mutually exclusive in the field of food safety. Both concepts are inexplicably linked in relation to consumer behaviour and this connection is of paramount importance to policy makers, risk managers, regulators and the food industry in general. There are two specific approaches which show how risk and trust interact in the area of food safety.

Firstly, it is widely agreed that risk perception can be altered depending on a person's trust in the information, or the source of that information. For example, if a consumer were to read a food safety related article in a newspaper considered by that person to be trustworthy quoting from a credible, and hence trusted, source, the consumer's risk perception is likely to alter to reflect the information as a result of their trust (See McGuire, 1985 or Johnson & Slovic, 1995). Eiser et al (2003) note that controlling for the acceptance of technology decreases the positive correlation between trust and risk perception (Eiser et al, 2002). This suggests that any erosion of public trust, or an increase in perceived risks, in response to some specific hazard is likely to decline the general acceptance towards the related technology e.g. distrust in nuclear power following the 1986 Chernobyl incident.

Secondly, there is a growing body of literature which investigates the degree of trust held by an institution (a supplier, producer or regulator) and the way it can influence a consumer's risk behaviour beyond media information. There are two main components to this type of interaction between risk and trust, private sector (e.g. suppliers, producers) and public sector (government).

Bocker and Hanf (2000) investigate the effects of consumers' risk perceptions on food purchase decisions and the influence of these perceptions on consumers' trust in a supplier's reliability (p 472). Bocker and Hanf use an 'individual information' model "in which trust in a supplier of a potentially unsafe product is revised according to Bayes' rule"

(p 472). Trust is identified as a “necessary means to reduce uncertainty to an acceptable level and to simplify decisions” and it is believed that consumers use their perceived trust in suppliers over aggregate information to influence their food purchases (Bocker & Hanf, 2000, p 474). This assumption has been empirically confirmed by a consumer’s brand, retailer or product by origin loyalty suggesting reliability<sup>1</sup> (Henson & Northern, 1998). A major advantage of this type of judgement is that the consumer has less information to deal with which enables them to categorise by type of supplier (See Grunert, 1982; Ozanne et al, 1992), (Bocker & Hanf, p 474). Bocker and Hanf’s results suggest that only with high levels of consumer trust fuelled by adequate, positive and non-judgemental or defamatory information, prior to a food safety scare, will a supplier be able to maintain consumer confidence and insure against reduced demand (p 480).

Issues such as brand or store loyalty or confidence in a supermarket’s supply chain can have considerable impact on consumer behaviour following a food scare. Henson and Northern (2000) note that across several European countries (Ireland, UK, Sweden and Germany) that country of origin, name of producer and brand/ quality label, can allow consumers’ to feel as though they can better assess the risks associated with the safety of beef.

On a public sector level, the interaction between risk and trust is deeper and more particularly pronounced.

Trust may be particularly important within the public sector, as this sector has been identified by the public as a risk generator, as well as a risk regulator, with additional responsibility for communicating about those risks for which it has responsibility to regulate, and, to some extent maintain.  
(Eiser et al, 2002).

Beyond the dual role of governments, Smith and McCloskey (1998) have recently addressed the ability for governments to effectively communicate risks.

## **6. Conclusion**

Consumers’ attitudes to trust and risk in food safety issues play an increasingly significant role in research in this area. Attention of needs to be focused on defining a succinct framework for analysing consumer behaviour in these terms. It is hoped that, with further research, more effective policy programmes may be initiated to better communicate relevant issues to consumers.

This review helps to provide an insight into the modelling procedures available to analyse consumers’ attitudes to risk and trust. Although a specific platform, or benchmark method of analysis of risk and trust cannot be easily defined, by examining the current literature in this field, a couple of key issues were raised which are important for future research in this area. Firstly, it is important that food safety and consumer behaviour in relation to risk and trust be measured in a multi-disciplinary framework utilising the skills of psychologists, sociologists and economists, deploying a variety of qualitative and quantitative techniques. Secondly, and of possibly more importance, is the necessity to analyse risk and trust together as interactive variables rather than as two distinct concepts.

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<sup>1</sup> It is noted that only in “extreme cases of brand loyalty” can trust be expected to be absolute (Bocker & Hanf, 2000).



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