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## **Consumers and food waste – a review of research approaches and findings on point of purchase and in-household consumer behaviour**

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## **Introduction**

Around a third of the world's food is wasted at various steps of the supply chain (FAO, 2011). In Europe, the largest and increasing share is wasted at the consumer level (EPRS, 2014). The issue has gained considerable public attention in the past years, with a large number of initiatives developed by different stakeholders such as policy makers, retailers (e.g. France, Intermarché, 2014) and NGOs (e.g. Denmark, Stop spild af mad, 2014), and research projects that have and are exploring the issue (CONANX; FUSIONS). Furthermore, the European Parliament has called for 2014 to be the 'year against food waste' (EP, 2014). It is known that consumers avoid deformed food (Loebnitz & Grunert, 2014) and foods close to the best before date (Tsiros, 2005) in the choice situation, while consumer food safety concerns (Watson & Meah, 2013), storage facilities (Terpstra et al., 2005), family practices around meals and leftovers (Cappellini & Parsons, 2012) and planning capabilities (Stefan et al., 2013) influence the quantity of food waste created in the household.

Reports or overview articles define food waste and the global food waste problematic (Parfitt et al., 2010; FAO, 2011; Fusions, 2014). Less effort so far has been made to summarize what is known about factors influencing consumer behaviour. The purpose of this paper is to present results of a literature review on consumer behaviour research regarding food waste, and to highlight the research approaches used and findings that can be distilled from the state of the research. These results can contribute to the identification of research gaps in terms of research questions and methodologies applied.

## **Methodology**

A structured review identified 57 articles and reports (published between 2004-14, in English) reporting on consumer research with regard to food waste, covering consumer behaviour from food provisioning over to handling and disposal. The sources were categorised in terms of methodologies used and the issues addressed (e.g. food choice, handling, disposal, food service, date labelling, packaging). Apart from the literature review, 11 interviews with international experts were conducted in order to include knowledge on the issue not published

in writing, explore expert's assessment of the relative importance of factors of influence on consumer behaviour, and mirror the research gaps highlighted by experts with those indicated by the review. The interviews were conducted face-to-face, via phone or skype, transcribed verbatim and translated to English where needed.

As a result, a model of the influence factors on consumer choice and behaviour at the POS and in-store is developed, taking departure in consumer behaviour models (e.g. Motivation-Opportunity-Ability model, Ölander & Thøgersen, 1995; Consumer-Technology Interaction Model, Groot-Marcus et al. 2006; Total Food Quality Model, Grunert, 2005) but adapting it to the issue of food waste and the factors emerging to be of crucial relevance from the literature review and expert interviews. Furthermore, the results highlight which methodologies have been applied, as well as where research gaps are found as a potential target of future research efforts.

## **Results**

Most of the research had been conducted in the US or in Europe. Quantitative surveys, experiments or qualitative research approaches have been used to a similar extent. Few research studies used interventions or research observing developments over a longer period of time. Regarding the topics, especially qualitative studies tackled general household-level consumer perceptions and behaviour, while other studies looked more specifically at consumer behaviour in food service or with regard to disposal. Few, however, focused on topics such as food provisioning, storage, packaging, date-labelling or appearance. A greater share of the US studies explored food service consumer behaviour via interventions.

Generally, a crucial role seems to be played by what one could call the 'individual's psychographic predisposition', such as environmental concerns (Yue, Alfnes, & Jensen, 2009) or personal attitude (Ghani et al., 2013). Ethnographic studies show that consumers are rather willing to avoid food waste (Evans, 2011) or are placing importance on being ethical and thrifty with food and waste (Watson & Meah, 2013). Nevertheless, several studies stress the importance of a lack of awareness and awareness raising activities (Comber & Thieme, 2013; Whitehair, Shanklin, & Brannon, 2013).

Furthermore, economic factors are important during purchase decisions. With regard to appearance or shelf-life, there are several studies showing clearly that the consumer's willingness to pay decreases for suboptimal foods (Tsiros & Heilman, 2005; Yue et al., 2009);

for example, Yue et al. conclude that the market potential for visually suboptimal foods is rather low, even for organic (where WTP for visually suboptimal “normal” foods decreased even more than for organic apples specifically).

Generally, a repeated finding is that there are crucial trade-offs and goal conflicts that impact consumer food waste behaviour which might impact the relation between attitudes/intentions and behaviour. These are for example health/safety versus sustainability (Kriflik & Yeatman, 2005), food safety versus environmental concern (Watson & Meah, 2013), food waste versus packaging waste (Williams, Wikström, Otterbring, Löfgren, & Gustafsson, 2012; Koivupuro et al., 2012), convenience or being a good food provider for the family versus avoiding food waste (Graham-Rowe, Jessop, & Sparks, 2014; Evans, 2011; Capellini et al. 2012), and this also impacts the effects of policy changes (as the example of Finnish canteens switching to a Vegetarian Day subsequently increasing food waste shows Lombardini & Lankoski, 2013).

Repeatedly, it is stressed that various factors are related to individual or a household’s knowledge and ability to manage their food provision, storage, preparation and tackling of leftovers (WRAP, 2014; Farr-Wharton, Foth, & Choi, 2014; Stefan, van Herpen, Tudoran, & Lähteenmäki, 2013). This is amongst others consumers’ apparent lack of knowledge and ability to make the best and most effective use of packaging (WRAP, 2013), or for example misinterpreting the best before date (Williams et al., 2012), storing food incorrectly (Terpstra, Steenbekkers, de Maertelaere, & Nijhuis, 2005), or storing foods even though they most likely will not use them anymore (Wansink, Brasel, & Amjad, 2000).

A number of sources point out how factors of influence on food waste vary for consumer groups, thus suggesting that measures should be dependent on the targeted group in question (WRAP, 2014). Furthermore, there is also an important finding in that food waste-related factors vary for product category. For example, date-labels are differently interpreted and handled (van Boxstael, Devlieghere, Berkvens, Vermeulen, & Uyttendaele, 2014).

A number of authors interpret their findings with regard to the important role of the context / situational factors determining the perceived convenience of behaviour and habits of relevance. For example, food waste sorting is impacted by the institutional context and these in turn might shape consumers’ attitudes (Refsgaard & Magnussen, 2009), the convenience of use and visual cue function of technical equipment for sorting waste (Bernstad, 2014). Packaging not always matches individual or household needs (Williams et al., 2012). It is the social family context that often impairs food waste avoidance efforts (Evans, 2011; Capellini

et al. 2012). Indicating a similar direction are studies that – primarily in food service – proved the success of nudging strategies to reducing food waste (Kallbekken & Sælen, 2013; Thiagarajah & Getty, 2013; Wansink & van Ittersum, 2013).

## **Conclusions and implications**

The review documents that psychographic variables play a crucial role in consumer-related food waste behaviours. They motivate consumers' to tackle food waste (environmental concern, attitudes, values), they influence their trade-offs and preferences (health and safety concern, environmental concerns, convenience, financial resources/saving money etc.) and have implications for their buying and consumption behaviours (impulsiveness, curiosity and interest in new experiences, structuredness/organisation, enjoyment of being thrifty, cooking enjoyment, etc.). Apart from this, a number of sociodemographics, in particular household composition in terms of number of household members, and household member's age and presence of children appear to be influential.

It can be found or it is expected (on behalf of the experts) that most consumers are to varying degrees against food wastage and also aware of the existence of the problem, but they might underestimate their own food waste.

An especially crucial problem is the consumers' lack of sufficient motivation, ability and opportunity to reduce food waste, with problems specifically in the lack of knowledge (e.g. food safety knowledge to assess suboptimal foods and understand date labelling, capability to efficiently provision, store, prepare foods and handle leftovers) and a lack of planning and prioritising (e.g. the trade-offs in everyday life that cause consumers to waste food against their attitude and intention, because they prioritise time-saving or convenience, health goals or safety concerns, flexibility or enjoyment).

Furthermore, the interplay between consumers and their surroundings is of central importance for food waste at the consumer stage; That is, the macro-environmental context (especially: economic: - low food prices and large available income, legislative - regulations on date-labelling, technological - food processing, packaging and storage, cultural - consumerism), the social context (especially: social norms and habits influencing expectations on food's appearance and what can be eaten or not or is appropriate handling of food and wastage in the society at large and the household in specific), and the factual context of the food choice and handling environment (especially: the foods available and the way they are marketed in the

store or presented in food service – specifically the price of suboptimal foods -, the packaging information and functionality, and to a lesser extent the facilities in the household) are important in food waste.

The results show that for future research, the factors of especially crucial influence should be considered as variables. This should enable providing a more holistic picture of relations and interactions. Furthermore, future research could strive to explore certain areas of the overall picture more in detail, by focusing on a specific target group, situation, food category, etc., and therewith providing results with greater practical application. Moreover, methods used to limited extent, such as – admittedly more costly – interventions will allow moving from analysis to the provision of potential solutions.

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