NEW INSIGHTS INTO CONSUMER-ORIENTED FOOD PRODUCT DESIGN

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NEW INSIGHTS INTO CONSUMER-ORIENTED FOOD PRODUCT DESIGN

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PREFACE

This thesis is the result of my period as Ph.D. fellow at the Chair of Product Design and Quality Management of the Department of Agrotechnoloy and Food Sciences of the Wageningen University, under a fellowship contract of the Portuguese Foundation for Science and Technology (Program PRAXIS XXI). I view it as the "icing on the cake" of one of the most hectic, yet most productive and happiest periods of my life. I believe that we, and we alone, draw our own fate. Nevertheless, I have to admit that, funny enough, most of the events that are very dear to me always end up taking place in Wageningen. This is another one of them.

Because we only stand as tall as the shoulders that bear us, I would like to take the opportunity to thank all the people, as well as the organisations behind them, who made this little miracle of mine possible. There were so many of them that I hope not to forget anyone; please forgive me if I do.

Prof. Dr. W.M.F. Jongen and Prof. Dr. ir. F.M. Rombouts acted as my Ph.D. supervisors, Dr. Matthijs Dekker as co-supervisor. It has been great to be their student. Though I could write about the countless (and endless!) fruitful meetings and the expertise, good advice and ideas these people have provided me with, I rather stick to what really matters. Wim, throughout the last four years, you have been a continuous source of energy and challenges, as well as a true believer in the project and in me. Then and now, you remain a real "inspirator". At a personal level, I have received nothing but kindness and friendship from both you and Sirkka. For all of that, and much more, wil ik jullie beide van hart bedanken! Dear Prof. Rombouts (still can't bring myself to call you Frans!), you relentless faith in me from day one was always a great source of hope and comfort. Your quasi-permanent availability and your remarkably modest and service-oriented attitude towards academic education are an example that I can only hope never to loose sight from. Hartelijk bedankt! Matthijs, your support and trust in me were perhaps less visible, but, like still waters, they ran deep, strongly and continuously, until the very last writing moment, and beyond. You have always encouraged me to be more positive about life in general and about myself in particular. Moreover, you took upon yourself the task of reading everything I wrote (now that's something!), and thanks to you much nonsense never became public. Last but not least, you have introduced me to that very fine art of doing the best you can for others without doing the worst possible for yourself. For all of this and more, thank you very much! Finally, I have also greatly benefited from the suggestions and expertise of Dr. Rijkelt Beumer, Ed Zwarts and Corinne van den Bosch and I am very grateful to them for that.

Dear PDQers, you all know how much I loved being one of you. Marco, Siet, Marjolein, Carline, Erika, Andrea, Vesna, Cor, Addie, Ruud, Martin, Hanneke and Rhadika thank you for the many good

discussions about work (and everything else!), for you patience, companionship and support throughout all the ups and downs. You made biking up the mountain everyday more worthwhile. Ik wens jullie alle veel succes! To all the PDQ lecturers, past and present, I am grateful for the many meetings, presentations, suggestions, criticism and encouragement with which they have provided me. I am equally grateful to all the PDQ staff, past and present, for all their sympathy, willingness to help and constant support. Riet en Hugo, jullie hebben het voor mij zeker makkelijker en gezelliger gemaakt, bedankt! Tiny, though only directly involved in my project in its last stages, you have done your best to make sure that everything essential was made available to me. Meanwhile, I have become a fan of your open-door policy, of your ideals regarding academic education and the very hospitable, yet also very serious, way you deal with your students. Above all, I treasure how you and Cory have nurtured my sense of belonging to Wageningen and the Netherlands. For that, and much more, wil ik jullie beide bedanken! Finally, I would also like to thank the lecturers, Ph.D. students and staff of Food Physics, present and past, and the staff of the Biotechnion's library: bedankt voor de gezelligheid en de behulpzaamheid!

The content of this thesis has also greatly benefited from the expertise, input and helpfulness of others, more or less directly associated with my project. At a certain stage, I was lucky enough to be able to hire Diane Schoolmeester, and what started as mere assistance with the practical work ended up in a very exciting and useful scientific partnership. Lieve Diane, onze samenwerking was altijd leuk, bedankt! Ik wens je heel veel succes! I am also grateful to Ir. Marisa Navarro, Manon den Boer, Ir. Paula Nijland and Rianne Ruijschop for the good graduate theses they were able to produce, which contributed decisively to the quality of my own work. Thank you also to Prof. Dr. Ir. Hans van Trijp, Dr. Ivo van der Lans and Ir. Ellen van Kleef (Ellen, I am really glad you have accepted to be my paranimf!) (Chair of Marketing and Consumer Behaviour of the Wageningen University), Prof. Dr. Jan Kroeze (Department of "Psychonomie", University of Utrech, and guest lecturer at PDQ), to Prof. Dr. Wija van Staveren, Saskia Meyboom and Ir. Annet Hoek (Section Human Nutrition and Epidemiology), and to Dr. Karen Hulshof (TNO-Zeist) for their insights and co-operation. I have also learned a lot at courses of the VLAG graduate school (and others), which I was able to follow. Towards the end of my period as a Ph.D. fellow, I was able to attend a course on Research Methodology in Marketing, organised by the Netherlands Organisation for research in Business Economics and Management, and directed by Prof. Dr. B. Wierenga (Erasmus University of Rotterdam) and Prof. Dr. P.S.H. Leeflang (University of Groningen). I then had the privilege to be introduced to this fascinating topic by some remarkable teachers and a handful of talented marketing Ph.D. students. It was very hard work and great fun at the same time, and this thesis has greatly benefited from it all. Many thanks to those involved, good luck with finishing the theses and hope to see you again someday soon!

Obviously, consumer research can not do without consumers who are willing to devote some of their time to take part in interviews or fill in questionnaires. Over these last four years, we have collected data from over 800 participants. I thank them all sincerely for the their co-operation.

Thanks to the good work of some organisations and a lot of help from my friends in Wagenigen, I managed to stay sane and have a life of some kind in spite my Ph.D. It was good fun to meet other Ph.D. students at events organised by VLAG. I have also greatly enjoyed belonging to its Ph.D. council and being co-editor of its newsletter. I have spent many hours at the Educatie Centrum in Wageningen, where I learn practically all the Dutch that I know and met some really nice people. About the same number of hours was spent at my favourite fitness centre, where Yvonne, André, Danny, Tanya, and many others worked hard at making me feel welcomed, happy with myself and stress-free. Hartelijk bedankt iedereen! Nathalie and Erix, I love your no-nonsense humour and your company, and wish you both all the best. Siet and Niklaas, and Vesna, thank you for your sweetness and for making me feel so welcomed. Katerina and Mikis, and Nikos, thanks for the hospitality and friendship, and for reminding me of how great it is to be among Greeks. Ao Miguel, Susana, Célio, Carlota, João, e inúmeros outros estudantes portugueses "sediados" em Wageningen, obrigada pela companheirismo e boa sorte!

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Aos meus pais, porque o amor deles é muito maior do que qualquer agradecimento meu, dedico esta tese, que é o melhor que eu sei.

Chapter 1

General introduction

General Introduction[1]

This chapter presents the conceptual foundations of consumer-oriented food product design and describes its main implementation stages. The virtues and shortcomings of implementing consumer-orientation in food design are extensively discussed. Having in mind some of these shortcomings, the aims and scope of the research performed are introduced. Finally, the structure and contents of this thesis are summarily described.

1.1 The challenges of today's global food markets

Socio-economical and technological developments occurring in the last decades in Western society have triggered the need for a shift of the agricultural and food industry sectors' orientation from production to market. The fact that food markets have become buyer markets rather than seller markets has several sources of explanation (Grunert, Baadsgaard, Larsen & Madsen, 1996; Meulenberg & Viaene, 1998). From an macro-economic perspective, the increase of the disposable income and the decrease of the population growth resulted in the deceleration of food demand. Meanwhile, the scientific and technological developments of the last half-century gave rise to global-scale food production and distribution, making an ever-diverse and ever-increasing food supply almost permanently available everywhere. This *imbalance between supply and demand* decreased the importance of availability and price as determinants of food purchase and increased the relative importance of consumers' choice. (Meulenberg & Viaene, 1998; van Trijp & Steenkamp, 1998). Nowadays, most Western consumers can buy what they want to eat (instead of only what is readily available or affordable), and have therefore become the driving element of the food chain.

The *nature of food choice* itself has been transformed, mainly due to the significant changes in life-styles and values[2] observed during the last twenty-five. As expected, life-styles have evolved faster than values and brought about more immediate consequences. Smaller, higher-educated families, in which both parents work full-time, but also single-parent and single-person households, have triggered a quiet revolution which is gradually doing away with the established eating patterns. Though slower, the growing importance of values like "quality of life and well-being" or "protect our planet's environment" is also exerting influence on the way consumers perceive and evaluate foods and production systems, thereby increasingly determining choice (Engel, Blackwell & Miniard, 1995; Meulenberg & Viaene, 1998). Western

consumers are also demanding *more and better information* about (and a higher degree of control over) the food they eat and how it is produced (Earle, 1997). They are increasingly aware of the interdependence between food production, food consumption, their own good health and that of the environment. This awareness, together with an abundant and diversified supply, has made consumers highly critical of, and demanding about, food products' quality and safety (Steenkamp & van Trijp, 1996). Finally, *consumers are becoming more changeable and heterogeneous*. Consequently, their food choices are becoming harder to understand and predict (Grunert *et al.*, 1996; Linnemann, Meerdink, Meulenberg & Jongen, 1999). Consequently, to gain a better understanding of what consumers want, how these wants change and how these changes can be promptly addressed is becoming not only a factor of success for the agricultural and food businesses, but ultimately one of mere survival. Companies who are able to uncover, (or, better yet, anticipate) demand, deliver against it and communicate this effectively to consumers, increase highly their chances of survival and success in the marketplace (Kohli & Jaworski, 1990; Urban & Hauser, 1993). This is particularly true in today's context of global food markets, in which manufacturers and distributors seek to produce and sell foods to both familiar and unfamiliar customers in the midst of world-wide competition (Grunert, Harmsen, Larsen, Sørensen & Bisp, 1997a; van Trijp & Steenkamp, 1998).

Public policies of health protection, environmental friendliness or sustainability may also create the need to influence consumer's food choice (Engel *et al.*, 1995; Shepherd & Sparks, 1994). This influence can be exerted either by regulating processes and products (*i.e.*, affecting availability) or educating consumers about the relation between food consumption and health or the environment (*i.e.*, changing the relative importance of choice criteria). In both cases, the food chain is, directly or indirectly, affected and an effective communication between people and organisations becomes crucial. If consumers do not fully comprehend the need to change their food consumption and the benefits to be gained by it (or the risks to be avoided), they will not accept change, let alone behave according to what would be desirable (Meulenberg & Viaene, 1998; Best, 1991). In this context, a good example of the advantages of understanding consumers better, and communication more effectively with them, is the application of innovative technologies, such as the use of genetically modified organisms or the production of functional foods (Frewer, Scholderer, Downs & Bredahl, 2000; Bech-Larsen, Grunert & Poulsen, 2001). Using genetically modified plants to increase food chains' efficiency may be desirable in terms of overall sustainability, but unless European consumers can appreciate the added value or agree with the means of achieving it, it will not become acceptable. Another example is the thought of asking consumers if they view health-promoting foods as necessary,

or even desirable, which has naturally not crossed many minds. It seems almost absurd to think that people may not be interested in products that can prevent life-threatening diseases or increase their well being. But what do consumers actually think about the whole topic of health, diet and functional foods? Can an increase of the relationship between diet and health's awareness directly influence consumption behaviour? If that is so, how can we explain the relative failure of the attempts of health-professionals to persuade the western population to change its diet in order to prevent obesity and ageing diseases (De Graaf, van der Gaag, Kafatos, Lennernäs & Kearney, 1997)? If new technologies are to be successfully employed in food production or processing they must be, first and most, analysed in terms of perceived consumer value. Carelessly pushing them forward just because they might become highly profitable for chain actors can, in spite of all the enthusiasm, do more harm than good (Frewer *et al.*, 2000; Best, 1991; Fuller, 1994; Meulenberg & Viaene, 1998).

1.2 Market-orientation and consumer-oriented new product development

From what has been said so far, there is clearly a need for food companies to develop further their understanding of the markets in which they operate and skilfully apply this understanding in the creation of competitive advantage. Perhaps the most adequate way to achieve this is through the implementation of the market-orientation concept (Grunert *et al.*, 1996). Market-oriented companies are those which have committed themselves to the continuous generation and internal dissemination of market intelligence relevant to the current and future needs of their customers, as well as to the continuous improvement of their responsiveness to such needs (Kohli & Jaworski, 1990). Figure 1.1 depicts how the generation of market intelligence and responsiveness is related to the attainment of competitive advantage.

Although a positive relationship between market-orientation and business performance has been demonstrated for several industries (Avlonitis & Gounaris, 1997; Han, Kim & Srivastava, 1998; Slater & Narver, 2000), not much is known about the level of market-orientation of European food companies and how it influences their performance. One could expect the current European scenario of high market turbulence and competitiveness, slowing economy and low technological turbulence to be rather favourable to a market-oriented approach (Kohli & Jaworski, 1990). However, the few studies addressing this issue indicate that the generation of market intelligence by the food industry (a necessary but not sufficient condition for market-orientatio), namely about consumers, remains very scarce and mostly accidental. In practice, most food companies (with the probable exception of large multinationals) rely on retailers to obtain information about their end-users. This leads us to believe that truly market-oriented food

companies are still quite rare in Europe (Harmsen, 1994; Grunert, Harmsen, Meulenberg & Traill, 1997c; Meulenber & Viaene, 1998).

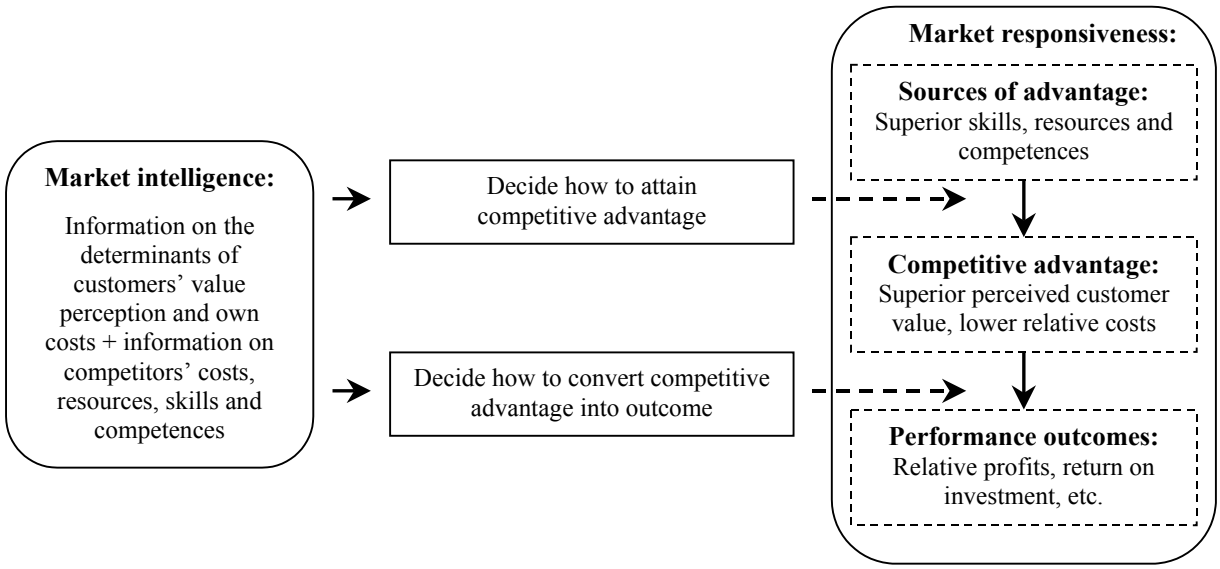

Figure 1.1 – Generation of market intelligence, market responsiveness and competitive advantage (adapted from Grunert et al., 1996).

Researchers in management and marketing have looked closely at the relationship between market-orientation and new product development (NPD), suggesting that these organisational processes can greatly benefit from each other (Grunert *et al.*, 1996; Kok, Hillebrand & Biemans, 2001). On one hand, it has been reasonably demonstrated that market-orientation is a critical factor for successful product development and innovation processes (Athuahene-Gima, 1995; Burchill & Fine, 1997; Cooper & Kleinschimdt, 1994; Kleinschimdt & Cooper, 1991; Lukas & Ferrel, 2000; Montoya-Weiss & Calantone, 1994; Naver & Slater, 1990, Wind & Mahajan, 1997)[3]. On the other hand, it is rather straightfoward to think that the continuous adaptation of a company's products and services to the market (*i.e.*, NPD) is a pertinent way of formulating the market-orientation concept (Grunet *et al.*, 1996). NPD can be seen as an organisational process in which information about the market and its actors is gathered, assimilated, processed and returned in the shape of a new product[4] or service. Therefore, a market-oriented approach to product development is about possessing a basic understanding of (1) the fact that both technical knowledge and market information are necessary to run effective development processes, and (2) the way market information can be gathered, disseminated and combined with technical information to develop successful products. Additionally, it is believed that the implementation of market-orientation in innovation and NPD processes can be a primary step in leading the remainder of the organisation to a more market-oriented conduct (Kok *et al.*, 2001).

The concept of *consumer-oriented new product development* can be seen as a special case of market-based innovation – since it focuses on the share of market intelligence pertaining to end-users or consumers –, developed for the manufacturers of consumer goods. It is an integrated concept concerning the use of consumers' current and future needs, and its determinants, in the development of improved or innovative products and services with added value (Urban & Hauser, 1993; Grunert *et al.*, 1996; van Trijp & Steenkamp, 1998). The main principles of consumer-oriented NPD are that (van Trijp & Steenkamp, 1998; Grunert *et al.,* 1997a; Lord, 2000; Urban & Hauser, 1993):

- Consumers' needs should be the starting point of the NPD process;
- The goals of NPD should be the fulfilment of consumer needs and the realisation of consumer value, rather then the development of products or enabling technologies *per se*;
- Sales and satisfactory returns on investments can only be achieved by anticipating, identifying and satisfying consumer needs; thus the NPD process's measure of success should be the degree of fit between the new or improved product and consumer needs.

The key stages in the formulation of the consumer-oriented NPD concept follow closely a market-oriented approach: *need identification*, *idea development* to fulfil the need, *product development* to substantiate the idea and the product's *market introduction*, communicating the fulfilment a need (Urban & Hauser, 1993) (Figure 1.2). Central here is the ability to "translate"

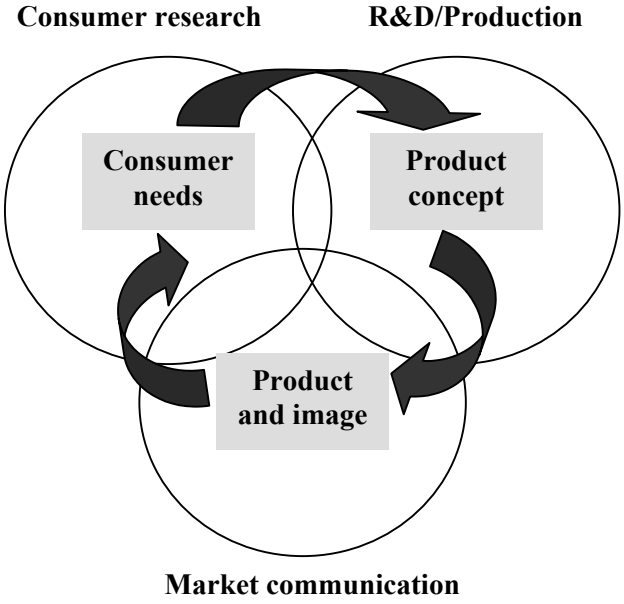

Figure 1.2 – The consumer-oriented new product development concept.

the subjective consumer needs (e.g. healthy, convenient) into objective product specifications, in order to, through the creation of the core product, substantiate the fulfilment of these needs. Concurrently, another type of "translation" is employed in developing a way to communicate to consumers the existence of a new product (the core product now augmented by marketing efforts), which satisfies, distinctively and in a superior way, their needs. It is believed that such a consumer-orientated approach can greatly increase the likelihood of success of product development processes (Bont, 1996; Dahan & Hauser, 2002a; Grunert *et al.*, 1996; Urban & Hauser, 1993; van Trijp & Steenkamp, 1998; Wind & Mahajan, 1997).

Given that the food industry currently possesses a low degree of market-orientation, the benefits of introducing consumer-oriented NPD could be significant (Grunert *et al.,* 1996). Having in mind the above-mentioned socio-economical constraints, it is relatively straightforward to conclude that the food chains' economic sustainability increasingly relies on industry's ability to continuously develop innovative and differentiated products with added consumer value. Therefore, any conceptual approach that can promote an increase of the efficiency and effectiveness of innovation processes is certainly useful and welcomed (van Trijp & Steenkamp, 1998; Meulenberg & Viaene, 1998). Moreover, since consumer-oriented NPD is a tangible way of putting market-orientation into practice, an increased business performance of the sector may be brought by its implementation. Finally, it should be the responsibility of all food chain actors to pursue the satisfaction of needs, both organisational or individual, in ways that preserve and enhance the well being of the society as a whole (Schiffman & Kanuk, 2000). By aiming at the structured and timely development of products and services matching consumer needs, consumer-oriented NPD promotes the effectiveness and efficiency of innovation processes and, consequently, the social and environmental sustainability of food chains and its actors.

1.3 Key stages in a consumer-oriented NPD process

The collection of appropriate information concerning consumers' needs and perceptions, from the beginning of development up to the product's market introduction (and beyond), is an essential requirement of a consumer-oriented NPD process. To understand the target consumers, and include their needs, views and problems at an early stage of the development process, is central in this concept (Bont, 1996; Buisson, 1995; Lord, 2000; Ortt & Schoormans, 1993; Robinson, 2000). Figure 1.3 depicts the main steps of such a (consumer) information-driven process. Since this thesis will focus exclusively on opportunity identification and design, the remaining stages will not be discussed further[5].

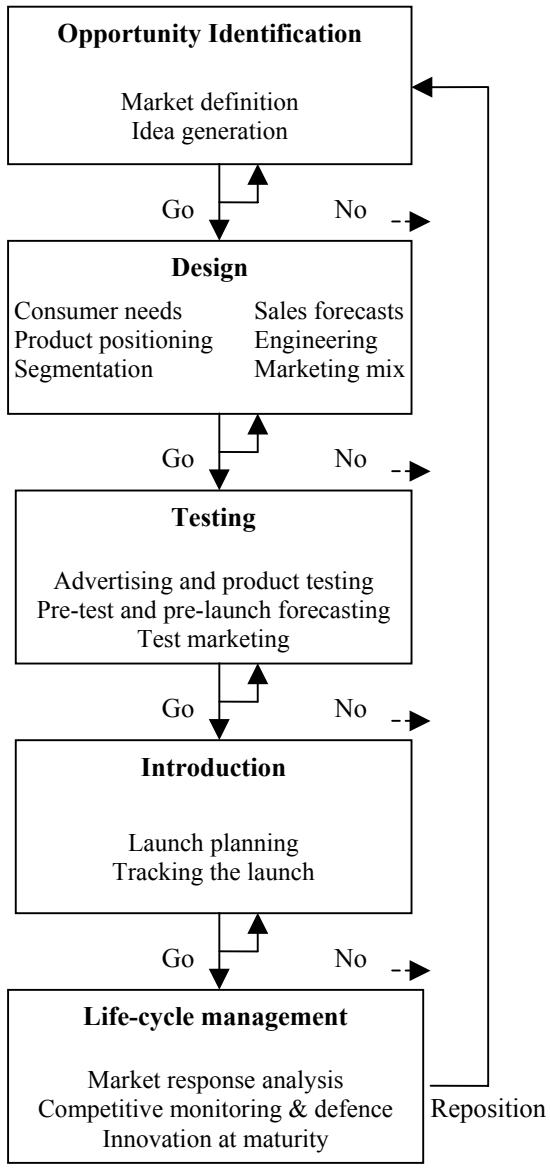

Figure 1.3 – The consumer-oriented NPD process (adapted from Urban & Hauser, 1993).

The opportunity identification stage aims to define the target markets in which management expects the NPD efforts to be profitable – *market definition* –, and generate product ideas that can successfully compete in these markets – *idea generation*. At this stage, a company's management should, based on a good understanding of its (and the competitors') core competencies and unique strengths, make a W3strategic assessment of which technological platforms can provide a solid basis for NPD. If, based on such an assessment, potentially attractive markets and ideas are found, the decision to initiate the design process can be made (Buisson, 1995; Dahan & Hauser, 2002a; Robinson, 2000; Urban & Hauser, 1993; van Trijp & Steenkamp, 1998; Wind & Mahajan, 1997).

The *design* stage aims to identify the key consumer benefits the new product is to provide and the positioning of these benefits *via-à-vis* the competition. It is also in this phase that the development of the augmented product and service policy, delivering the desired benefits, takes place (Urban & Hauser, 1993; van Trijp & Meulenberg, 1996).

Figure 1.4 depicts the main components and sub-processes involved in the design stage. The strategic information about the target consumers, collected during the *opportunity identification* stage, serves as primary input for the first design phase - *opportunity definition.* At this point, the potentially rewarding ideas selected earlier are submitted to the target consumers' evaluation. This evaluation process is central because it allows an assessment of the market potential of the selected ideas before any considerable funds are committed to the NPD project. Both qualitative and quantitative analysis of consumer aspects can be undertaken in this context.

Qualitative methods are usually employed first, to identify relevant aspects which may need further investigation, while quantitative methods are used at a later time, to establish the expected benefits, as well as their relative importance to consumers, in a clearer manner (Urban & Hauser, 1993; van Trijp & Steenkamp, 1998).

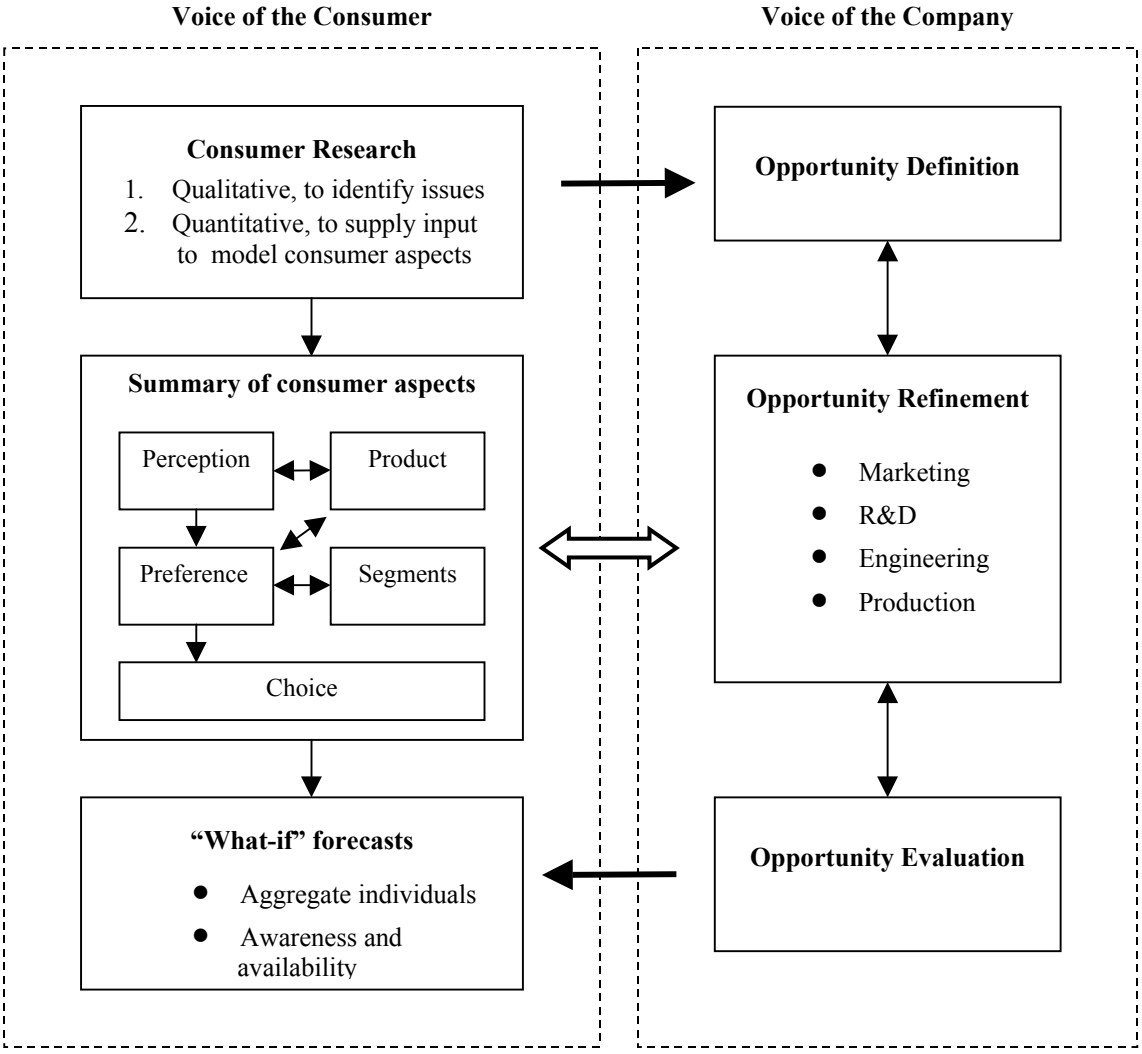

Figure 1.4 – Phases of consumer-oriented product design (adapted from Urban & Hauser, 1993).

A list of benefits and their relative importance is taken downwards into the *refinement* phase. It is at this stage that the new product or service starts to take shape. This achieved through the careful analysis and measurement of the relationships between consumer preferences, perceptions or choices, on one hand, and the core and augmented product's features, on the other. Underlying this analysis is a conceptual model of consumers' choice behaviour, which serves as theoretical structure upon which to organise and understand the relationships (Figure 1.5). This model is based on the well-established Brunswik's lens model (1952), which has been successfully employed in the study of several aspects of consumers' perceptions and choice

behaviour, including in food-related research. Put in a simplified manner, the behavioural model depicted in Figure 1.5 proposes that consumers establish their product perceptions through the integration of the perceptions of the product's augmented features. The product perceptions are then aggregated to originate preferences, which in turn lead to choices. The whole process mediated by additional internal and external influences (Axelson & Brinberg, 1989; Steenkamp & van Trijp, 1996; Tybout & Hauser, 1981; Urban & Hauser, 1993; van Trijp & Steenkamp, 1998).

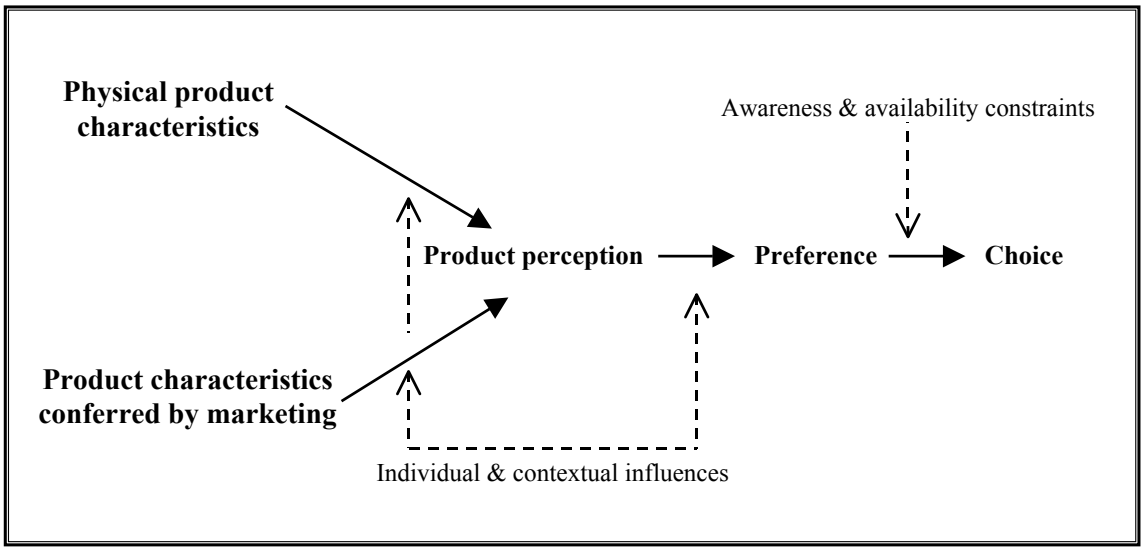

Figure 1.5 – Model of consumer choice implicit in consumer-oriented NPD (adapted from Tybout & Hauser, 1981, and Steenkamp & van Trijp, 1996).

Finally, if the refinement step has been successfully completed, *i.e.*, if it was possible to design a new product that fulfils the consumer needs in a superior and unique manner, an evaluation of the output takes place – *opportunity evaluation*. This consists in forecasting the sales of the new product, based on the aggregation of the probabilities of individual consumers' preferences and choices. If the estimated market performance complies with the expectations, further development and testing of the product can begin (Urban & Hauser, 1993).

1.4 Virtues and shortcomings of consumer-oriented food NPD

New product development has been often recommended as a suitable strategy to build competitive advantage and long-term financial success in today's global food markets. New products help maintain growth (thereby protecting the interests of investors, employees and other food chain actors), spread the market risk, enhance the company's stockmarket value and increase competitiveness (Buisson, 1995; Hoban, 1998; Lord, 2000; Meulenberg & Viaene,

1998; van Trijp & Steenkamp, 1998). Surprisingly, however, the European food and beverages industry displays lower Research & Development (R&D) investments than many other industries, and is known to be quite conservative in the type of innovations it introduces in the market. Radical innovations are rare (only 2.2% of total product introductions), while a large number of products (an estimated 77% of total product introductions), representing none or only minor incremental innovations relatively to existing products, is introduced to the market every year (Ernst & Young, 1999). This approach to innovation, which is less costly in terms of R&D and implies only a minute technological risk, allows the introduction of a relatively high amount of products. Nevertheless, most of the introduced products can not be really considered as "new", with such an approach frequently masking contributions to reductions in process costs (Galizzi & Venturini, 1996; Grunert *et al.*, 1996; Grunert *et al.*, 1997b). In spite of this rather risk-averse attitude (or perhaps partially because of it), many product introductions fail. Figures vary widely, but even the more conservative estimates (encompassing only truly new products and excluding those that fail before reaching the market) show that 40 to 50% of new product introductions are out of the retailers' shelves within one year (Ernst & Young, 1999). Apparently, this gives support to those advocating that only minor investments should be committed to discontinuous innovation in food NPD. It is frequently heard that the slow change of eating habits and preferences, and the consequent consumer aversion to innovations in food, constitute barriers to true innovation too high to overcome (Gallizi & Venturini, 1996; Grunert *et al.*, 1996, 1997b). However, as discussed in the first section of this chapter, consumers' eating habits do change, perhaps faster than ever. It is also not very wise to assume that all consumers share the same preferences or the same degree of risk-aversion concerning innovations. Given the global character of today's food markets, innovation may become more of a necessity than an option. Moreover, being conservative does not seem to be paying off much: me-too products introduced in Europe fail (on country average) 18% more often than line extensions and about 24% more often than truly new products (Ernst & Young, 1999).

There are many types of reasons why food companies decide to develop and market new products. Most frequently, these have to do with reactions to changes in the food chain and its environment (Best, 1991; Fuller, 1994). Upstream changes in the food chain, like supplier, package or ingredient modifications, leading to product and process reformulations, are a common reason why food companies go into NPD. But downstream changes, such as modifications in the distribution channels, market introduction of competing products or internationalisation, may also bring about product development. Finally, factors in the chain's environment, like the availability of new technologies (associated with cost reductions or quality

consistency) or restrictions imposed by governmental and supra-governmental legislation, can also motivate product improvement. In any of these situations, we are dealing with a *reactive approach* to NPD (Urban & Hauser, 1993), with food companies trying to market what was developed, namely by resorting to massive advertising, rather than developing what consumers want to buy (Buisson, 1995). Clearly, by assuming a more consumer-oriented attitude, companies will also be taking a more *proactive approach* to NPD (Urban & Hauser, 1993), since this attitude implies the NPD process to be driven by consumer needs. However, there is very little factual evidence, at least in academic literature, showing that proactive strategies are significantly more successful than their reactive counterparts in the context of the food industry. This will probably depend highly on the characteristics of the market within which the company operates and those of the company itself (Grunert & Valli, 2002). With this scenario, to adopt a proactive approach depends, therefore, not only on the management's strategic vision and a detailed analysis of the circumstances, but also on a leap of faith.

It is frequently heard among food scientists and technologists that there is very little reason to be concerned about being proactive and consumer-oriented in food R&D. Such issues are frequently seen as more of a marketing concern (thus "none-of-our-business") than anything else. Understandably, marketing research advising on how to become more market-oriented is often met with considerable scepticism, and is even seen as a kind of "territorial invasion". On the other hand, one must also understand that R&D practitioners have, so far, not been really required or encouraged to think about how to create and sell an augmented product as the market demands. Nevertheless, taking a less extreme view on both sides, there is no reason why reactive strategies should not be compatible with consumer-orientation, and even benefit from it. Being consumer-oriented in a technology-driven context simply means that a company is "allowed" to get its innovative ideas from anywhere it wishes, as long as it investigates at an early development stage whether there is sufficient consumer interest justifying the investment (Kok *et al.*, 2001). Two examples of how such an organisational attitude can greatly benefit the introduction of new technologies in the food area were given in the first section of this chapter.

Food scientists and technologists, particularly those working in R&D and Production, are important providers of a company's enabling technologies and core competencies. Their buy-in and expertise is essential to the optimisation of NPD processes, since they are the ones who ultimately create the core product and "get the job done" (Urban & Hauser, 1993; van Trijp & Schifferstein, 1995; van Trijp & Steenkamp, 1998). Therefore, we see no reason why they should not be able (and willing) to, together with marketing and other functions, learn and implement consumer-oriented concepts and tools, knowing that this will ultimately lead to a

higher consumer satisfaction and company growth. Reinforcing this view is the recent development of computer and web-based interface design tools which, instead of deploying the voice of the consumer downwards to the development team, enable its members to "climb upwards" and contact directly with consumers (Dahan & Hauser, 2002a,b).

Ultimately, the practice of consumer-oriented NPD implies that a reasonably successful integration of the knowledge and efforts of management, marketing, R&D and production has to be achieved. Such an integration is a notoriously difficult process in any organisation (Kok *et al.*, 2001). Nevertheless, a good co-operation and/or integration between R&D and Marketing has been identified has one of the major determinants of new product success (Dahan & Hauser, 2002a; Griffin & Hauser, 1992,1996; van Trijp & Steenkamp, 1998; Urban & Hauser, 1993). By encouraging cross-functional communication, multidisciplinary tasks and the development of a common language focusing on consumer needs, consumer-oriented NPD already contributes greatly to increase new products' chances of success.

Understanding consumer needs and reacting appropriately to them is believed by many to be one of the most important correlates of product development success[6] (Cooper & Kleinschmidt, 1994; Grunert *et al.*, 1996; Hoban, 1998; Saguy & Moskowitz, 1999; Urban & Hauser, 1993). Yet, there are also those who question the value of consumer focus in NPD. It has been stated that consumer-orientation, by following closely consumer needs, encourages incremental innovation in detriment of the development of truly new products (*i.e.*, discontinuous innovation). The main argument here is that consumers can not be expected to provide needs about products or technologies that are yet inconceivable to them (Athuahene-Gima, 1995; Ortt & Schoormans, 1993; van Trijp & Schifferstein, 1995; Wind and Mahajan, 1997). This is an old discussion in NPD- and marketing-related literature. Nevertheless, it seems to have to do more with a former methodological incapacity to deal with the problem (plus with some narrowness in defining what is relevant consumer information and what should be the degree of consumer involvement in NPD), than with a major conceptual weakness of consumer-oriented approaches. Since the eighties, several methodologies have been developed to overcome this issue, like consumer-idealised design (Ciccantelli & Magidson, 1993), problem and lead-users analysis (Fornell & Menko, 1981; Ortt & Schoormans, 1993; von Hippel, 1986), beta-testing (Kaulio, 1998) and information-acceleration methods, which "accelerate" consumers into future technological scenarios (Urban & Hauser, 1993). Recently, image-based, web-based and virtual reality approaches have opened even more exciting ways of getting better, real-time consumer information and involvement in NPD processes (Wind and Mahajan, 1997; Dahan & Hauser, 2002a,b; Zaltman, 1997).

Consumer-orientation does not explicitly consider the role of other chain actors in product development, not even in its most recent conceptualisations (Dahan & Hauser, 2002a). Looking at the markets in which food manufacturers operate today, this seems hardly realistic. Several studies point out that European food companies do, at least informally, involve retailers and suppliers in their product development processes. Additionally, it is anticipated that this vertical integration of the innovation efforts can greatly increase the chances of new products' success (Ernst & Young, 1999; Grunert *et al.*, 1996, 1997b; Harmsen, 1994; Hoban, 1998; Kristensen, Ostergaard & Juhl, 1998; Stewart-Knox & Mitchell, 2003). The integration of product development and innovation activities beyond the company's scope, upstream and downstream in the food chain, is thus an area where considerable improvements could be made to the consumer-oriented NPD concept.

Finally, a somewhat sequential (rather than concurrent, overlapping or iterative) nature of the consumer-oriented NPD approach has been pointed out as a conceptual shortcoming and a major obstacle to implementation in the food industry (Fuller, 1994; Buisson, 1995; Stewart-Knox & Mitchell, 2003; van Trijp & Steenkamp, 1998). Several attempts have been made to improve the realism and effectiveness of consumer-oriented NPD processes, like the "funnel" (Wheelright & Clark, 1992) and the "spiral" conceptual approaches (Cusumano & Selby, 1995). Both start with a broad range of ideas from several sources, which are later winnowed to a few high-potential concepts. Some of these are, in turn, finally developed and launched. The underlying assumption here is that it is less expensive (and more effective) to screen many alternative concepts at an early stage than to modify one product during testing and pre-launch. The latest, and perhaps most holistic, approach has been suggested by Dahan & Hauser (2002a) – the *end-to-end* NPD process (Figure 1.6). This concept combines the advantages of the stage-gate approach - in which developers must select, in a justified way, the most promising option at each stage (Rudolph, 1995) -, with those of the funnel approach. The goal is to develop new product platforms within a pre-specified market environment.[7] The *end-to-end* concept integrates the different development stages and also takes into account several environmental influences, like those related to the supply chain or associated with the human resources' expertise. Trade-offs between time-to-market, customer satisfaction and costs are also taken into account.

1.5 Aims and scope of the thesis

One of the major gaps in a consumer-oriented approach to food product design is the relative lack of concrete and clear guidelines on how to adequately conceptualise and implement its

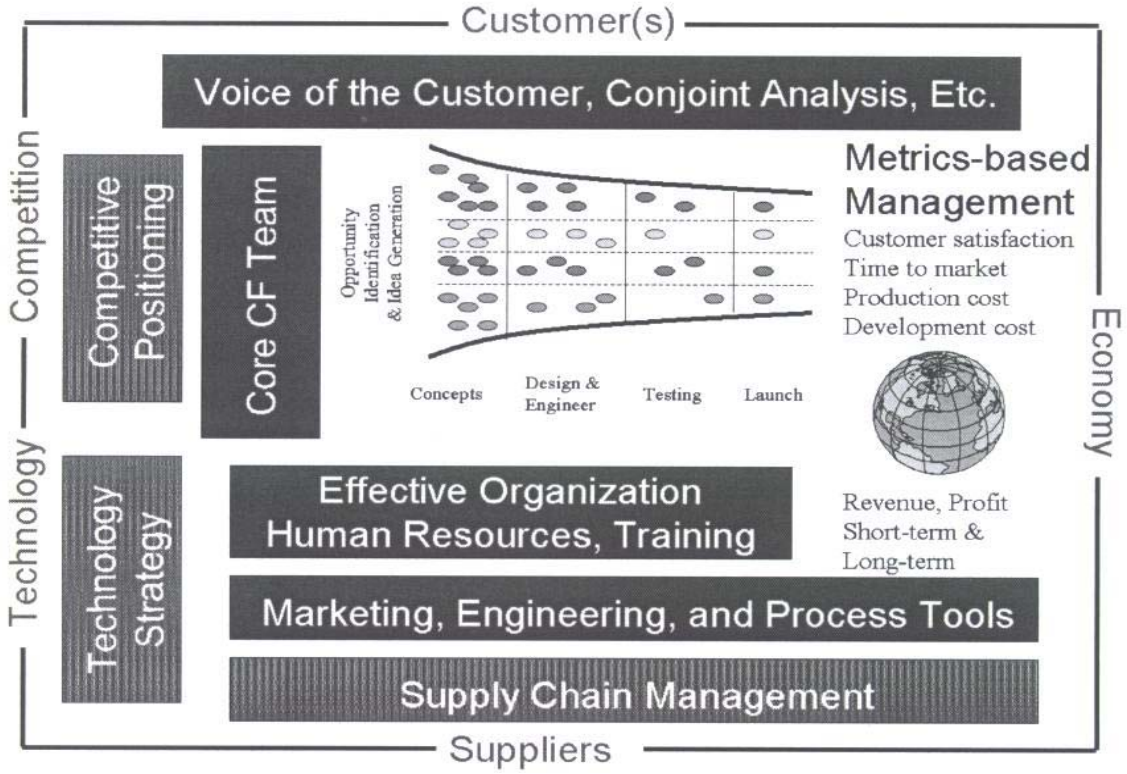

Figure 1.6 – The end-to-end NPD process (Dahan & Hauser, 2002a).

various phases. This deficiency is felt mostly at the early phases, which are simultaneously the less structured and the more determinant of the success of new products and technologies – *opportunity identification* and *opportunity definition*. Quite adequately, these phases also take the name of *fuzzy-front end* (Dahan & Hauser, 2002a). It is at this *fuzzy-front end* that suitable information about the market and consumers becomes essential, so that companies can effectively match their core competencies with demand (Cooper & Kleinschmidt, 1994; Grunert *et al*., 1996; Kok *et al.*, 2001; Mahajan & Wind, 1992; Robinson, 2000; Urban and Hauser, 1993).

Table 1.1 lists the methods and tools that have been associated with the different phases of a consumer-oriented design process. Though the list is extensive, the validity and applicability of many of these methods remains controversial, especially of those associated with the early phases. Moreover, the implementation of these methodologies in the food area has seldom been reported and evaluated[8]. Therefore, the aims of this thesis are:

- To test the implementation of several of the most promising tools and methods associated with the early phases of a consumer-oriented approach to food product design;

Consumer-oriented product design phases	What & How
Market definition	Define markets and target customers in which NPD efforts are expected to be profitable. • Substitution among products • Gap analysis
Idea generation	Generate product ideas which may successfully compete in the defined markets. • Exploratory group- and in-depth interviews with consumers • Information pump and web-based interviewing • Lead-user analysis • Delphi forecasting • Fast polyhedral adaptive conjoint estimation • Individual and group creative methods
Opportunity definition	Submit the product ideas to target consumers. List the expected benefits and their relative importance. • In-depth interviews, focus groups and image-based methos • Problem analysis • Information pump and web-based interviewing • Attitudinal and usage surveys • Consumers' stated (or statistically derived) benefit importance • Web-based conjoint analysis • Multi-attribute models.
Opportunity refinement	Determine (intensity of) the strategic benefits to be delivered *vis-à-vis* existing products. • Factor analysis and correspondence analysis • Perceptual and preference mapping • Conjoint analysis Segment target consumers based on these benefits. • Cluster analysis • Benefit segmentation Establish the combination of augmented product's features (and respective levels) that will deliver the desired consumer benefits. • Means-end chains and laddering • House of Quality • Quality Guidance Model • User design • Hybrid conjoint analysis • Experimental design and Taguchi methods
Opportunity evaluation	Determine the individual preference and choice probabilities for the new product. Aggregate these probabilities into sales forecasts. Estimate market performance, taking into account consumer awareness and new product availability. • Models of sales potential and formation • Information acceleration

Table 1.1 – Consumer-oriented product design phases and associated methods (Bont, 1996; Dahan & Hauser, 2002a,b; Fornell & Menko, 1981; Griffin & Hauser, 1993; Grunert et al., 1996; Lord, 2000; Mahajan & Wind, 1992; Myers, 1976; Ortt & Schoormans, 1993; Snelders & Stockmans, 1994; Steenkamp & van Trijp, 1998; Urban & Hauser, 1993; Zaltman, 1997).

- To improve the tested methods, or develop new ones, whenever deemed necessary;
- To use the results obtained to propose research guidelines that can lead to an improved implementation of consumer-orientation and associated methods in food product design.

Home Meal Replacements (HMR) (Costa, Dekker, Beumer, Rombouts & Jongen, 2001) were selected as the category within which to carry out the theoretical and empirical research necessary to the achievement of the above-listed aims. One of the reasons for this selection was that convenience in preparation is believed to be one of the main determinants of consumers' food choice (Steptoe, Pollard & Wardle, 1995; Rappoport, Peters, Downey, McCann, & Huff-Corzine, 1993). Additionally, due to demographic, socio-economic and life-style changes, meal replacement is considered to be one of today's most promising areas for NPD in Western countries (Lord, 1999). Finally, there is an increasing call for the use of a more holistic view of food consumption in product design, instead of the current focus on individual products. A thorough knowledge of a meal's context and preparation experience are increasingly deemed essential to understand how consumers perceive and evaluate foods (Fuller, 1994; Grunert, 1995; Meiselmann, 2000; Saguy & Moskowitz, 1999). By addressing the topic of meals and their replacement we hope to give our contribution to answer this call.

According to the analysis of the 1997-98 Dutch National Food Consumption Survey's (DNFCS) results, over 15% of the Dutch population uses HMR (Costa, Dekker, Beumer, Rombouts & Jongen, 2001; Ruijschop, 2002). About 47% of HMR users are between 26 and 45 years old and, somewhat surprisingly, 19% are older than 55 years; 80% have a low or medium education level. HMR users belong mostly to low or middle class, one-income, two person households with no children. The Dutch ready meals' (manufactured HMR) market has been steadily growing in the last decade, but is yet far from having reached its maturity (Khan, 2000). A recent survey conducted by the Dutch Nutrition Centre (Voedingscentrum, 2000) estimates that as much as 70% of the Dutch population still prepares hot meals from scratch everyday and would like to keep it that way. If having to replace their meals, Dutch people seem to resort more to take-out and eating out then to ready meals (Costa *et al.*, 2002). These characteristics of Dutch HMR consumption, clearly different from what could be expected based on the analysis of markets like the US or UK (Buisson, 1995) raise, in our opinion, enough interesting questions to warrant further investigation.

1.6 Structure and contents of the thesis[9]

Chapter 2 of this thesis presents an overview of Quality Function Deployment (QFD) and its application in the food industry. QFD is a consumer-oriented, technical knowledge system, which formalises the endorsed knowledge and skills involved in the processing of consumer (and other market and technological) information within a company's design processes (Kok *et al.*, 2001). The aim of this chapter is to elaborate further on the concepts dealt with in this thesis, as well as to provide an overview of the key issues in consumer-oriented food product design.

Opportunity identification in product design should include approaches that briefly, but with some depth, describe the potential markets' structure. This preliminary assessment should be an early and relatively simple appraisal of the potential markets, providing an overview of the benefits delivered by existing products. More importantly, it should identify gaps where benefits are demanded but not supplied, *i.e.*, development opportunities (Cooper & Kleinschmidt, 1986; Dahan & Hauser, 2002a; Urban & Hauser, 1993). **Chapter 3** presents the development and validation of a consumer-oriented classification for HMR based on convenience attributes. The classification is expected to provide valuable support to companies' product design processes by highlighting potential gaps between supply and demand.

The understanding of consumers' needs and demands is a cornerstone in the design stage of a new product's development or improvement process. Such an understanding is said to be best achieved by listening to the Voice of the Consumer (Griffin & Hauser, 1993). This listening activity usually begins with the employment of qualitative research methods. These enable the product design team to learn the consumers' views about a certain product category and understand basic desires and needs. The most popular qualitative research methods for the design stage are focus groups and in-depth interviews. These are thought to be particularly suitable for situations in which not much is known about the consumer segment or the product category in question (Dahan & Hauser, 2002a; Griffin & Hauser, 1993; Grunert *et al.*, 1996; Lord, 1999; Urban and Hauser, 1993; van Trijp & Steenkamp, 1998).

Chapter 4 evaluates the application of focus groups and in-depth interviews in uncovering the perceptions, beliefs and opinions of Dutch seniors about HMR. In view of the recent criticism concerning the usefulness and validity of these traditional qualitative methods (Dahan & Hauser, 2002a; Wind & Mahajan, 1997; Zaltman, 1997), this chapter also introduces the development, application and evaluation of a new method for need identification in food product design. This method combines the use of consumer collages and focus groups in the investigation of the feelings, emotions and experiences of young Dutch adults about meal preparation and meal replacement.

Two issues important for consumer-oriented food product design have been raised in literature: the exploration of the motivations underlying consumers' choice behaviour (Dahan & Hauser, 2002a; Grunert & Valli, 2002) and the problem of consumers' resistance to innovations in food (Ram & Sheth, 1989; van Trijp & Steenkamp, 1998). **Chapter 5** starts with a critical examination of the means-end theory's (Reynolds & Gutman, 2001) - a methodology used to uncover consumers' meanings and values associated with choice behaviour – applicability in a consumer-oriented product design framework. Next, a means-end analysis of the underlying motivations of fifty Dutch consumers' meal choice is described. This analysis seeks to investigate if these consumers perceive the existing meal alternatives to deliver the required benefits and, if not, why. The same chapter addresses the issue of the identification and measurement of barriers to food innovation adoption. This is achieved through the conceptualisation, development and validation of a psychrographic measure of the moral issues surrounding meal preparation.

Chapter 6 explores consumers' and experts' categorisations of HMR. The aim was to learn more about the criteria and attributes underlying individuals' meal perceptions and classifications, and whether these differ considerably between consumers and food experts. This is thought to lead to a better understanding of consumers' positioning of products and concepts *vis-à-vis* those of R&D practitioners. Finally, **Chapter 7** summarises the main conceptual and empirical findings of this thesis, discusses its limitations and proposes several avenues for future research in the area of consumer-oriented food product design.

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[1] This chapter builds upon a keynote lecture published as: Costa, A.I.A., Dekker, M. & W.M.F. Jongen (2001). Consumer-orientation in the development of functional foods: a research update. Paper no. 25. *Proceedings of the Vitafoods International Symposium 2001*, Geneva, Switzerland.

[2] Values are here understood as the mental representations of important goals that people try to achieve in life (Meulenberg & Viaene, 1998).

[3] The relation between market-orientation, time-to-market, innovation and product success remains controversial. Food academicians seem nevertheless inclined to believe that at least some degree of market-orientation is necessary to ensure product success (Grunert *et al.*, 1997c; Hoban, 1998; van Trijp & Steenkamp, 1998).

[4] *Product* is here understood as the *augmented* product, thus including both physical characteristics (*i.e.,* the *core* product) and those added by marketing efforts (Leeflang & Beukenkamp, 1987).

[5] Please refer to Dahan & Hauser (2002a), Urban & Hauser (1993) and Van Trijp & Steenkamp (1998) for a detailed description of these stages.

[6] Conversely, the lack of consumer understanding or responsiveness is thought to lead to failure (Buisson, 1995; Cooper & Kleinschmidt, 1986; Davis, 1993; Hoban, 1998; Song & Parry, 1996).

[7] Product platforms are sets of products sharing main common elements. Consequently, they enable cheaper and quicker development processes, as well as mass-customisation (Dahan & Hauser, 2002a).

[8] Some applications of consumer-oriented food product design are reviewed in **chapter 2**. Recently, others have been also presented by Grunert and Valli (2002), and by Jaeger and co-workers (2003).

[9] Although taking a holistic perspective of consumer-oriented product design, the structure of this thesis follows the sequential approach depicted in Figure 1.3 for the sake of simplicity.

Chapter 2

Quality Function Deployment:
An analytical framework within which to understand key issues of consumer-oriented food product design

Quality Function Deployment:
An analytical framework within which to understand key issues of consumer-oriented food product design[1]

This chapter presents a detailed literature review on the topic of the application of Quality Function Deployment (QFD) in the food industry. This review is extended with a thorough description of the methodologies involved in the practice of QFD within food companies, exemplified with the help of a case study on ketchup quality improvement. The benefits, drawbacks and challenges of QFD's application in food Research and Development (R&D) are presented and discussed.

2.1 Introduction

Today's food business arena can be best characterised as a mainly technology–driven environment whose survival is constantly challenged by a highly consumer-oriented market, demanding the continuous development of evermore innovative products that meet expectations [1,2]. The shortening of products' life-cycle and an increasing consumer demand for more food variety and quality [2,3,4] has led to a pressing need for tools that can help plan, structure and systematise food quality improvement and new product development [1,2].

Quality Function Deployment (QFD) is an innovative approach bringing quality - as demanded by the customer[2] - upstream into the product development process. QFD is said to have been first proposed in Japan by Yoji Akao in 1966 [5-9]. However, it did not emerge as a viable and formalised approach to quality control in planning until 1972 [6,9-10], when Akao [8] developed a quality control chart previously introduced at the Kobe shipyard of Mitsubishi Heavy Industries and instituted the QFD quality tables [8-13]. Together with Shigeru Mizuno, Akao spent years developing the approach [8] and in 1978 they both became co-editors of the first book on QFD [14], which lead to the rapid increase in QFD applications in Japan [7-8]. The Toyota organisation, as well as other Japanese companies, had meanwhile begun to apply QFD [5-6,11-13,15].

Quality Function Deployment's introduction in the US is usually traced back to the publication of "Quality Function Deployment and CWQC in Japan" in *Quality Progress* in 1983 [16], by Masao Kogure and Yoji Akao [7-9]. Throughout the 1980's, three people – Larry Sullivan [5],

Bob King [17] and Don Clausing [15] – and two organisations – the American Supplier Institute (ASI)[7] and the Growth Opportunity Alliance of Lawrence, Massachusetts/Quality Productivity Centre (GOAL/QPC)[8-9,12] – have learned, developed, promoted, trained and disseminated, through symposia and publications, the ways of QFD in the US [6,8-9]. QFD's first industrial applications in the US originated mainly in the automotive industry [18].[3]

The use of QFD became, meanwhile, quite popular. Early users of QFD included the Ford Motor Company, Procter & Gamble and 3M Corporation, but many other US companies have also adopted it [6-7,9-13,15,17]. In Europe, the first symposium on QFD took place in 1992 in the UK [7], but companies like Philips Corporation have been reported to have worked with QFD since 1986 [10,19]. Gustafsson [20] has also reported QFD applications in several Swedish industries. Since many companies are reluctant to openly present their experiences with QFD, it is difficult to know exactly how big is the implementation and popularity of QFD in Europe and the US [9]. Nevertheless, and according to some authors [9,16,18], QFD's current applications are only limited by one's imagination – it has even been proposed for the "quality improvement" of political candidates [21] - and have spread to nearly every industry.

QFD has been in use in the food industry since 1987 [18,22]. Meanwhile, many authors have advocated it as a planning tool to help in the management of food product/process development, subject to some adaptation to meet the specific requirements of the food industry [1-2,7,18,22-25]. However, there are not many published applications of QFD in the improvement of food product development processes, especially on an industrial level [22,25]. From the analysis of the literature published so far on the application of Quality Function Deployment to food product development, both at an industrial and a scientific research level, three main conclusions can be made:

- Within the limited amount of literature available, most of the relevant information has been published only in the form of scientific working papers, theses and reports, and is thus not so readily available to researchers in general;
- Researchers in food technology are probably still not much aware of the main ideas of QFD, its methodology and its potential for food product development and R&D guidance;
- Up to date, there are no structured accounts of the applications of QFD in food product/process development, either at an academic or at an industrial level.

The aims of this paper are to (a) describe QFD, its origin and practice in a way that is meaningful for food technologists, (b) review the published material, giving a structured account of QFD's applications in food product development, and (c) discuss QFD's implementation in food R&D. We will start by describing the origins of Quality Function Deployment and associated methodology, exemplifying its practice with the help of a case study on the improvement of tomato ketchup [2,26-27]. Next, an analysis of other published case studies and scientific papers about QFD applications in food product development will be given. Finally, the benefits, drawbacks and ways forward in the application of QFD to food R&D will be discussed.

2.2 Quality Function Deployment: the origin, the concept and its evolution

Throughout its almost thirty years of existence, QFD has been examined from several perspectives, has known many different definitions and undergone considerable evolution [6, 28-30]. Therefore, the understanding of QFD's multifaceted nature and of its practice requires some knowledge of this evolutionary process [10].

In the words of one of its creators, Yoji Akao, QFD was born "out of the need to find a way to get the production units to grasp the notions of quality assurance at the stage of planning, even before going into production of new goods" [8]. Later, in their first US publication about QFD and Company-Wide Quality Control (CWQC), Kogure and Akao [16] again stressed the idea that the creation of QFD cannot be disconnected from the Japanese notions of quality and quality control. These notions are based on three main pillars:

- *Quality is what satisfies the customer*, being thus customer-defined and not company defined;
- *Quality is preventive and proactive*, thus focusing on designing into products what the customer likes rather than fixing what he or she does not like in the final good;
- *Quality and quality control in a company are everybody's responsibility*, and rely totally on the co-operation of all functions [5,16,31].

Therefore, QFD was basically seen as a means of assigning to all parts of an organisation their share of responsibility in producing a quality item. In this way, QFD would ensure that quality, from the customer's viewpoint, and quality control were built into products and processes at the earliest stages of development [16]. This view of QFD as the "operational definition" of CWQC would be later shared by many of its practitioners [5-6,10,28,31].

At the time of QFD's introduction in the US (throughout the 1980's), the conceptual transition from the classical product/process control to quality assurance, and later to quality management, was already in motion [6]. The CWQC concept and its three pillars were therefore readily identified with the more 'Western' notions of company-wide quality management – the concept of Total Quality Management (TQM) [11-13,32-33]. TQM is a management philosophy developed around 1980, which is based upon the idea that entrepreneurial success can only be achieved through (a) continuous improvement of all company activities, (b) customer satisfaction (c) decision-making based on research and facts, and (d), employees' empowerment [11-13,32-33]. In practice, TQM consists of a group of qualitative and quantitative methods and tools to be applied in companies, which focus primarily on customer satisfaction and continuous quality improvement of all aspects of an organisation [22,11-13,32-33].

It is not our intention to dwell much on the theoretical aspects of TQM, which can be found in several sources [11-13,32-33]. What matters in this context is that, more than its philosophical grounds, QFD's novelty to the West was in providing a strategic means (at the product development level) of putting total quality management objectives into practice [6-7]. Thus some QFD promoters, like King [17], viewed it as a part of Total Quality Management, more specifically as a sub-system of the quality assurance component of TQM. Still today, several practitioners continue to view QFD as the key quality engineering tool to achieve TQM in an organisation, since it sets the basis for continuous, organisation-wide, quality improvement and the integration of customer satisfaction in all company activities [11-13,22,31,34-35].

Nevertheless, at the time of Quality Function Deployment's actual implementation in US companies, and given the quality approach in practice [5], most managers were probably not focusing much on its more philosophical aspects. In 1986, when Sullivan's [5] news of the astonishing reductions Toyota in Japan had achieved in development time and production start-up costs reached the American industry, it rushed to learn how it could implement QFD, with the same benefits, in its own product development processes [9]. There was not much consideration given to the fact that cost reductions and profitable product development were not actually a QFD objective to begin with [16]. Rather, they were the desired consequences of its planned, proactive, company-wide and customer-oriented approach to quality, which was in turn carefully nurtured by the Japanese entrepreneurial culture [5,10,16]. Already in the 80's, some QFD specialists [5,17] warned of the risk of implementing its practices in companies who had not previously undergone the necessary culture changes. In the 90's, some studies demonstrated that QFD implementation in the West did not consistently deliver the product development process's improvements reported by its Japanese users, mainly due to fundamental differences

in quality approach and company culture [6,10,28]. Today, most of its practitioners understand that QFD "is not a panacea for solving design problems or for developing *perfect* products" [10], but rather aims at structuring, planning and controlling the product development process [9-10]. Moreover, it is recognised that QFD should only be implemented in companies who have already mastered basic quality techniques, are system-oriented and are changing their culture towards Total Quality Management [10,36].

It is now more or less widely acknowledged that implementing QFD requires significant up-front company investments, and that its most tangible benefits – reduced product development time/costs and increased customer satisfaction - will only be achieved through an adequate, long-term use [9,28-29]. However, it is also recognised that important, qualitative, short-term benefits can be gained by practising QFD as a formal management process of product development activities. In this context, QFD can help to remove cross-functional barriers in a corporation, improve communication patterns and teamwork across departments, and change corporate culture [20,29-30] (Table 2.1). This recognition has led to yet another interpretation of QFD, which views it as a means of achieving increased inter-functional communication and integration in the product development process, thereby reducing the risks inherent to this activity [20,30,37].

TRADITIONAL	QFD
Sequential, iterative development	Simultaneous development across functions
Function involvement by phase	All functions participate from the start
Management approval after each phase	Team empowered to make decisions
Tasks assigned by function	Tasks shared across functions
Functionally led trade-off decisions	Consensus decisions about trade-offs
Meetings to present results	Working meetings to develop results jointly

Table 2.1 – QFD versus the traditional product development approach [29].

Considering what has been discussed so far, the definition of QFD provided by King [17] and Dean & Evans [11] is perhaps the one most accurately reflecting its nature. According to them, QFD is simultaneously an *organisational philosophy*, making the efforts to improve product/process development possible, and a set of cross-functional *planning and communicational tools*, documenting and disseminating these efforts through a series of charts. Moreover, it has become clear that the comprehensive and intricate nature of QFD results from the conceptual evolution process to which it has been submitted. Balancing these conclusions

with the main purpose of this paper – to review QFD application in the food industry -, we will now focus our analysis on the QFD aspects that are more related with the planning and practice of product development in the food industry.

2.3 Quality Function Deployment Implementation

In a R&D context, QFD can be seen as *a set of planning tools* that help introducing new or improved products/services faster to market by controlling their development process and focusing on customer satisfaction [7,11-12,18,23,38]. Once the decision of using QFD to manage product development activities within a company has been made, the next step should be to obtain the necessary executive commitment and organisational support to the project [9-10,17,29]. Then, decisions have to be made regarding the project's objectives (quality improvement, new product development, increase customer satisfaction, etc.), time-span and schedule. The next step is to define which concept or existing product (or product category) is going to be the object of the QFD project and which customers will be targeted [9-10,17,19]. Finally, a cross-functional team containing members from all functions involved in the product development and market introduction process - marketing, product and process design, engineering and production, quality management, sales and distribution – is assembled. The facilities, materials and time necessary to carry out the project are made available by management and the team can start [9-10,13,17,22] [4].

According to Kogure & Akao [16], there are two types of team activities involved in a QFD implementation project:

- The *Product's Quality Deployment*, referring to the activities needed to convert customer-required quality (as the customer defines it) into a product's specific attributes;
- The *Deployment of the Quality Function*, which concerns the activities needed to make sure that the customer-required quality, once put into the product, is actually achieved.

Basically, these activities link customer-required quality to the product development and market introduction functions through the generation of a cascade of matrix-shaped charts [6-7,11-12,16-17,28]. Regarding matrix generation, there are two generally recognised approaches [17,20,31]:

- A generic approach – *"the matrix of matrices"* – developed by Akao [39] and adopted by King [17] that consists of a scheme of thirty matrices or quality tables, where each matrix details a specific aspect of the development process [20,31];
- A focused approach – *"the four-phase approach"* – a modification of the QFD method proposed by Hauser & Clausing [15], which consists of four matrixes and involves only the phases of product planning, product design, process planning and process control planning [6,12,17,20,31].

The focused approach is seen as a simplification of the *matrix of matrices* that provides easier and more straightforward implementation steps [17]. We will now confine ourselves to the description of the *four-phase approach*, since this is the only one referred to in QFD-related literature regarding food industry applications. Additionally, this approach has been specifically recommended for the food industry by ASI[6-7].

2.3.1 *Product's Quality Deployment* – The House of Quality

In the QFD's *four-phase approach*, the first matrix to be built is the *Product Planning Matrix* [5,7,11-13,18,22,28], also called *House of Quality* (HOQ) [15] due to its house-like shape. Its purpose is to translate important customer requirements regarding product quality into key end-product control characteristics [5,6,17]. The HOQ comprises several different parts or 'rooms', which are sequentially filled in order to achieve an actionable translation from requirements into characteristics [11-13] (Figure 2.1).

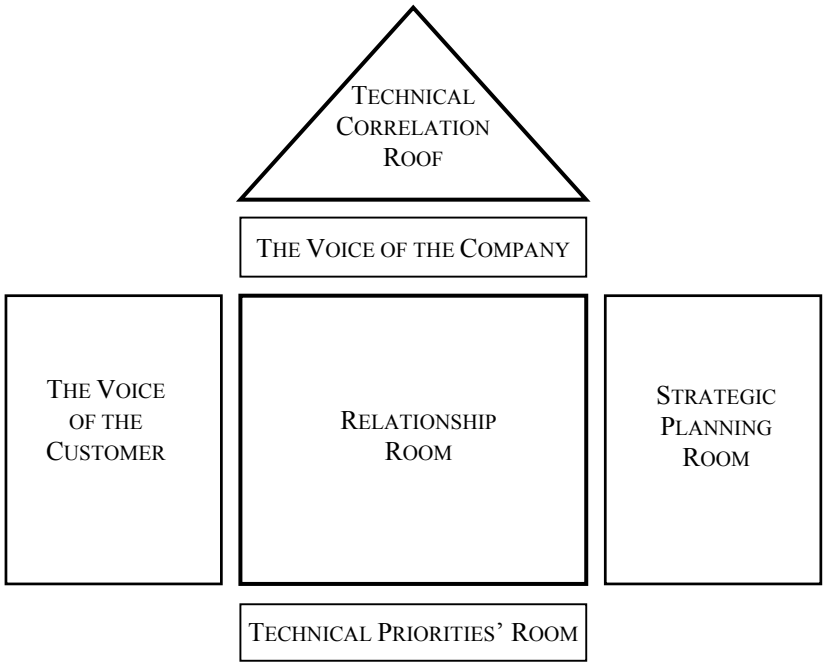

Figure 2.1 – The House of Quality.

The HOQ's first room concerns the *Voice of the Customer* [35] - a structured list of requirements concerning the product and its attributes as the customer(s)[5] describe(s) them (also called "customer needs", "wants" or "WHAT's"), together with a measure of the importance customers attach to each requirement [7,9-13,18-19,31,35]. Customer requirements are loose, vague qualitative statements in the customer's own words, like 'easy to use' or 'with a fresh taste'. They indicate which benefits the customer expects to be fulfilled by the product or service [7,10,18,31,35]. There are several possible sources of information about customers' requirements: market research data, sales data, customer complaints, retailers, focus groups, toll free lines, opinion surveys, in-depth interviews, etc. [9,12,17,22,27-28,31,35]. After their identification, the customers' requirements are compiled and organised by the QFD team in a hierarchical structure of primary, secondary and tertiary requirements [9-10,12,28,35], using the so-called "quality tools" [9,13,17-18,20,22,35]. The primary (strategic) requirements consist of a small number of broad needs that provide strategic direction to the development process, which are, in turn, specified into secondary (tactical) and tertiary (operational) requirements. These secondary and tertiary requirements indicate the design and engineering solutions that have to be developed by the QFD team in order to satisfy the strategic requirements [9,12,28,35]. Finally, based on quantitative market research, relative importance weights are attached to each customer requirement by the QFD team – the *Customer Importance Ratings*. Usually this is done at the tertiary level, although the primary and secondary needs' importance should also be known. This procedure establishes priorities for the product development process and the allocation of the necessary resources [7,9-10,22,28,31,35]. Figure 2.2 shows the *Voice of the Customer* in a case study concerning the application of QFD in the quality improvement of tomato ketchup [26].

The establishment of the *Voice of the Customer* is the most critical step in a QFD project [7,18,31,35]. On one hand, it requires obtaining and expressing what customers require from a product or service - and not what the company thinks they require -, and how important this is for them. On the other hand, since these prioritised customer requirements are guiding the whole development process, a misinterpretation at this stage may seriously compromise the process's outcome [9,28,31]. The sources of information and the tools available for the identification, structuring and prioritising of customer requirements, together with their strengths and weaknesses, have been extensively reviewed in the literature [9,12,17,22,35]. Nevertheless, the identification of customer requirements and their importance remains one of the most serious obstacles to a successful QFD application in product development, especially in the food industry.

THE BEST TO EAT	EASY TO SERVE	Flows easily from the bottle	4
		Pours without scattering	4
	HEALTHY	Still sweet but no sugar	3
		Contains less salt	3
	TASTY	There must be a tomato aroma	4
		Should have a salty taste	3
		Not too acidic	3
		Should be spicy	4
		Can feel the vinegar taste	3
		Can feel the tomato taste	5
		It is thick in the mouth	3
	NO DEFECTS	Manufacturing waste is reduced	3
		It never spoils	4
		No water at the surface	3
GOOD PACKAGING AND LABELLING	CLEAR INFORMATION	Proper storage indications	4
		Innovative usage suggestions	2
		Tomato content information	4
		"Green" practices information	3
	BEST PACKAGE	Can see the product inside	4
		Different sizes are available	3
		Can be squeezed	2
		Easy to handle and use	4
		Can be re-used or recycled	4
		No ketchup on the lid	4

Figure 2.2 – The Voice of the Customer in a case study concerning the quality improvement of tomato ketchup. The targeted market segment was the Dutch student population, aged between 20 and 26 years old. Results displayed are the outcome of the qualitative (focus group) and quantitative (survey with 75 respondents) research performed [26].

Once the QFD team has established the customer requirements, the next step is to understand where the company and its competitors stand in terms of satisfying them in the marketplace. This achieved with the filling of the *Strategic Planning Room* [7,15,17,19,28,31]. Based on qualitative and quantitative market information, the customers' perception of how the concept or product satisfies their requirements when compared to other products - C*ustomer Competitive Assessment* - is rated and graphically depicted [5,9-10,17-18,35]. Based on the company's current and planned levels of customer satisfaction an *Improvement Ratio* is calculated [9,17,28,31]. A *Customer Complaints* column can also be added [15,18]. Figure 2.3 depicts the

activities involved in filling the *Strategic Planning Room*[6]. This section provides a link between the QFD project and the company's strategic vision by uncovering market opportunities and identifying priorities for product development or improvement. Moreover, it helps to build competitive advantage by focusing on the requirements that customers would like to see better addressed by the market [5,7,12,15,28,31].

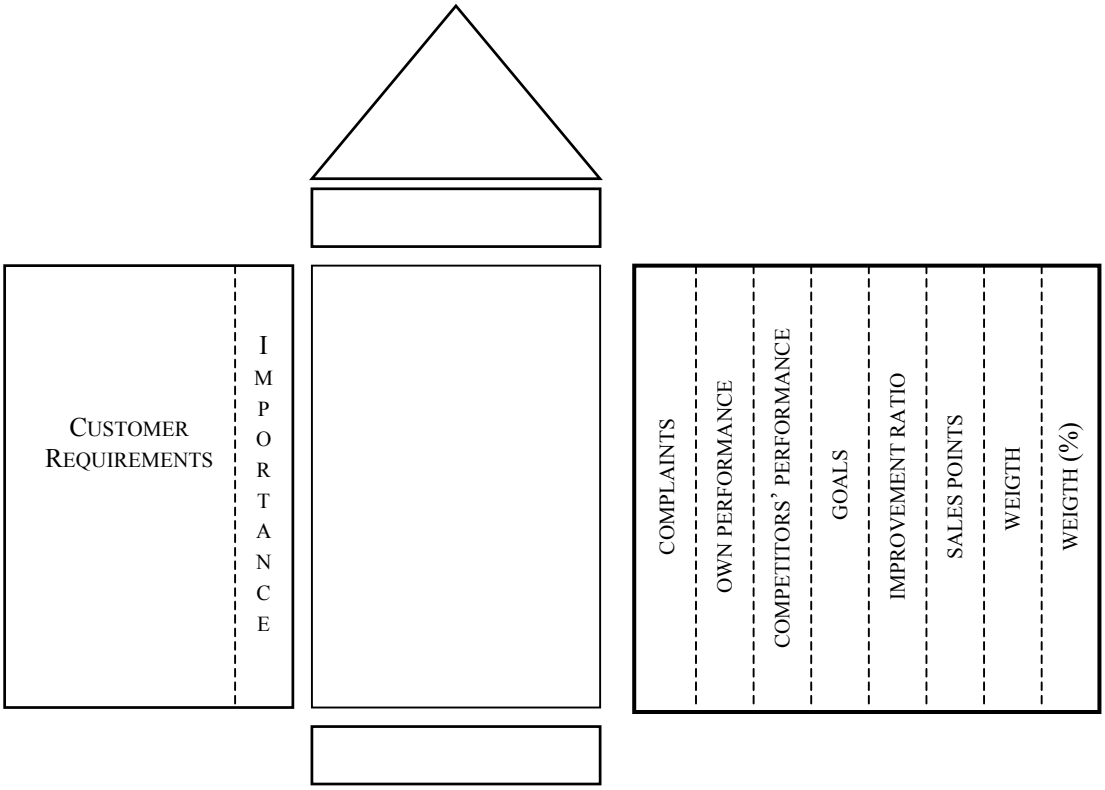

Figure 2.3 – The Strategic Planning Room and its components.

At this stage, the QFD team should have a clear picture of what the customer requires from the concept or product and how this can be related to the company's strategy. The team has now to decide how these requirements can be incorporated in the final product, so that the customer is satisfied [5,7,28]. This is achieved by building the *Voice of the Company Room* [22]. Here, the end-product's technical characteristics directly related to the customer's requirements are listed. These characteristics are known as the "design requirements", "quality functions" or "HOW's" [5,7,9-10,15,19,22,28]. These are measurable parameters that will be used to objectively evaluate product quality, since their values will be controlled and compared with target values. This procedure ensures that the customer requirements are being met [5,7,10,17-18,22,28]. Since these parameters are often correlated, the QFD team has to specify their degree of interdependence, if any. This is done in the *Technical Correlation Roof* [22]. This helps to

determine the effects of changing one product characteristic on the others, enabling the team to identify and react to synergistic (positive correlation) or trade-off (negative correlation) situations. Trade-off situations often point out R&D needs and should always be solved in the way that favours the customer most [7,9-13,18,20,22,35].

The QFD team must now fill the core of the HOQ – the *Relationship Room*-, where the relationships between each customer requirement (*Voice of the Customer*) and the product characteristics (*Voice of the Company)*, as well as their intensity, are depicted [5,7,9-13,15,17,19,28,31]. Based on in-house expertise, customer surveys or data from statistical studies and controlled experiments, the team seeks consensus on how much each product characteristic affects each customer requirement [1,7,11-13,15]. This task is widely recognised as a highly complex one and represents another critical stage in the HOQ building process [1,7,15,39]. On one hand, it shows whether or not the company is adequately addressing the customer requirements from a technical viewpoint. On the other hand, it is an important project checkpoint. Blank rows in the *Relationship Room* indicate customer requirements that are currently not being addressed by any of the product's technical characteristics. Therefore, a product characteristic may be missing or has to be modified in the end-product. An empty column indicates either a missing customer requirement or a waste of resources, since it indicates that there is a product characteristic not satisfying any of the listed customer requirements [5,7,11-13,15,18]. Figure 2.4 shows a simplified account of the *Voice of the Customer,* the *Voice of the Company*, the *Relationship Room* and the *Technical Correlation Roof* in a case study regarding the quality improvement of tomato ketchup [26].

The last task in building the HOQ is filling the *Technical Priorities Room*. It starts with a *Technical Competitive Assessment* of the end-product's characteristics (*Voice of the Company)* in the currently marketed products [9,19]. In this way, the QFD team can view the competitors' and their own technical performance level regarding product characteristics directly affecting customer requirements [5,7,9-12,15,17-18,22,28]. 'In-house' product testing usually provides the data necessary for this assessment, which should be expressed in measurable terms [5,7,9,11-12,28]. For each product characteristic, the comparison between the company's and the competitors' technical performance level is depicted in a graph. A row indicating the level of organisational difficulty related with realising each end-product characteristic can also be added [5,7,15,18,22]. The *Technical Competitive Assessment* is then compared with the *Customer Competitive Assessment* (*Strategic Planning Room*). This is done to determine inconsistencies between how the customers and the company are evaluating existing products [5,7,9-12,17-18,28,31]. For example, let us say that the *Customer Competitive Assessment* indicates a

competitor's product as best meeting a certain requirement from the customer's viewpoint. Meanwhile, the *Technical Competitive Assessment* and the *Relationship Room* indicate own product fulfils the requirement better. This contradiction indicates one of the following situations: (1) the *Technical Competitive Assessment* may have been inadequately performed; (2) there was a mistake in filling the *Relationship Room* and the end-product characteristic is not related with the customer requirement; (3) the customer's evaluation of the product has no real substance, making it suffer from an image problem [1,5,7,9,11-12,15,18]. In this last case, an advertising effort showing that the product's characteristic satisfies better the requirement than the competition should be envisaged [1,11-12].

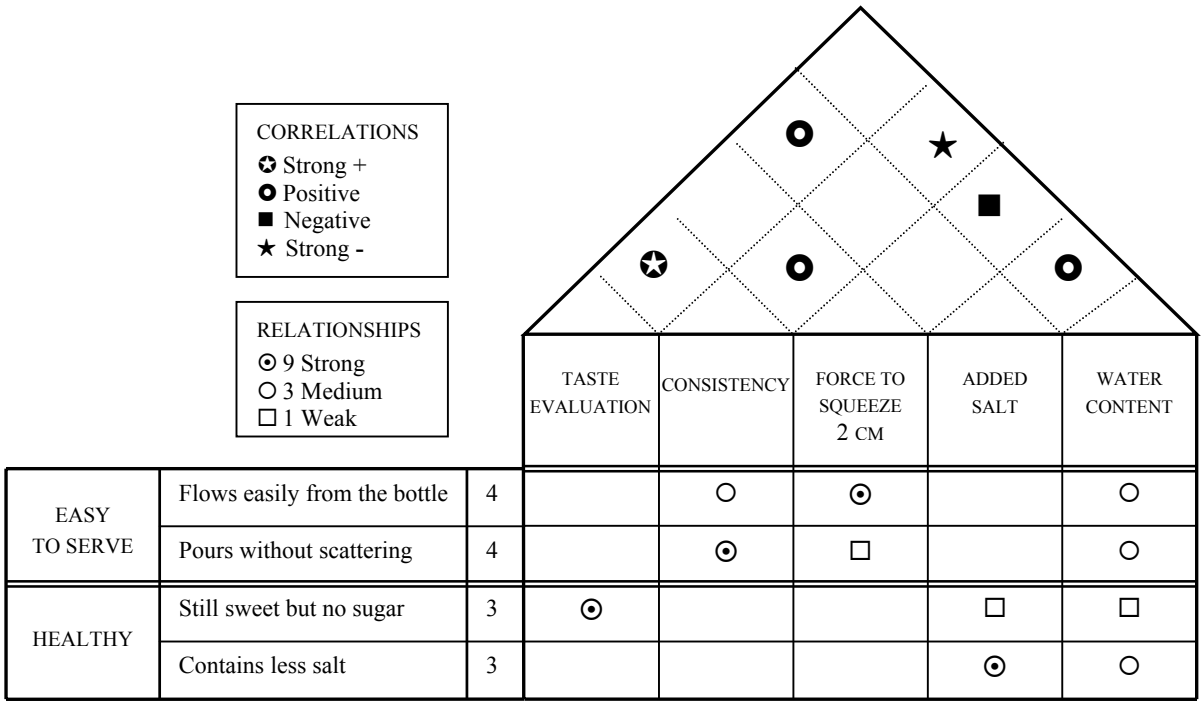

Figure 2.4 – The Voice of the Customer, the Voice of the Company, the Technical Correlation Roof and the Relationship Room in a case study regarding the quality improvement of tomato ketchup (simplified)[2,26-27].

The *Customer* and the *Technical Competitive Assessments*, the *Sales Points*, the *Relationship Room* and the *Customer Importance Ratings* all contribute to determine the *Target Values* or *HOW MUCHS* [5,7,9-13,17-19]. The *Target Values* represent, in measurable terms, the level of performance for each end-product characteristic the company has to provide in order to maximise customer satisfaction. These performance levels are critical control points to be measured at each stage of the product development and market introduction processes. The *Target Values* provide not only an objective means of assessing requirements' compliance, but also specific goals for future R&D [5,7,9-13,18,22]. A final *Technical Importance Rating* for

each end-product characteristic can also be calculated, based on the *Customer Importance Rating* for each requirement and the strength of the relationships between the characteristic and each customer requirement (*Relationship Room)* [7,9-10,17-18,12,28,31]. These ratings indicate the relative importance of each end-product characteristics in satisfying all the customer requirements. They are often expressed as a percentage, since their absolute values are meaningless [7,9-10,12,17-18,28,31]. Figure 2.5 depicts the activities involved in filling the *Technical Priorities Room*[7].

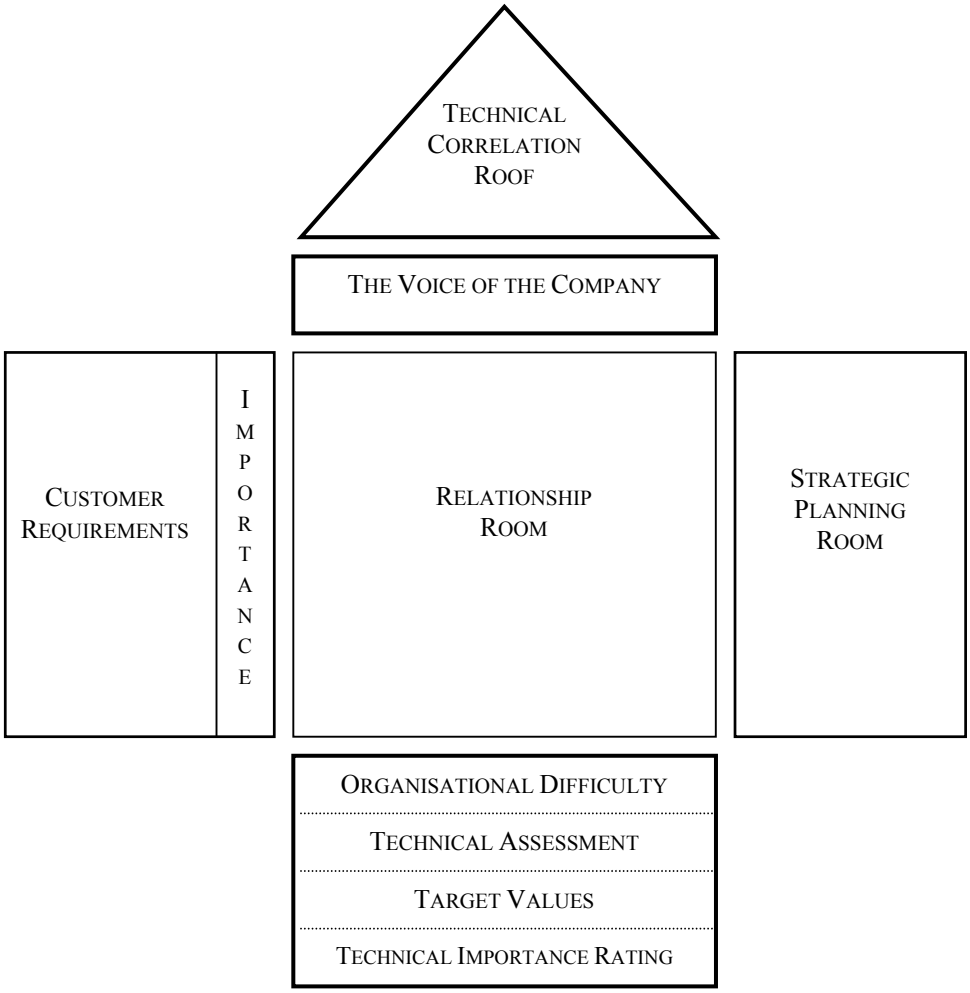

Figure 2.5 – The Technical Priorities Room and its components.

The HOQ has been the main focus of QFD-related literature because it contains the most critical information a company needs about its relationships with customers and competitive position in the marketplace [7,9,15,17-18,33]. However, and in order to truly drive the whole product development process, the *Voice of the Customer* must also be systematically cascaded to the remaining product and process design activities (and marketing stages), through the use of additional matrices [7,11-13,18,20,31].

2.3.2 *Deployment of the Quality Function*

Based on the information depicted in the HOQ, the QFD team now has to select the end-product characteristics to be deployed through the remainder of the R&D and market introduction activities [5,7,12-13,18,28]. End-product characteristics showing a *Technical Importance Rating* above a pre-determined threshold (indicating a strong relative importance in achieving the consumer requirements) are selected for further deployment. The same happens to end-product characteristics related with customer requirements that are strong *Sales Points* or have poor competitive performance. End-product characteristics having a high level of organisational or technical difficulty may also be selected [5,7,11-13,18,28].

The selected end-product characteristics are carried from the overall product level to the component level through the building of the *Deployment Matrix, Product Design Matrix* or *Parts Deployment Matrix* [5-7,11-13,15,20,28]. This matrix shows whether, and to what extent, the relationships between component and product characteristics are critical. Its structure is similar to that of the HOQ: the rows are the selected end-product characteristics, which have now become design requirements, while the columns list the components' characteristics directly affecting them. The relationships between both are again depicted at the matrix's core. Based on the strength of these relationships, critical component characteristics are selected and deployed further into the production planning and control system [5,7,11-13,20,28]. The critical component characteristics become the rows of a third relationship matrix – the *Process Plan and Control Chart* or *Process Planing Matrix*, in which the columns are related processing operations. If a critical component characteristic is strongly affected by a process operation, this characteristic becomes a control point in the quality control plan. Additionally, if a process operation parameter must be monitored to achieve the specified level of a component characteristic, this parameter becomes a checkpoint in the process control plan [5,7,11-13,20,28]. In the last matrix – *Operating Instruction Chart* or *Production Planning Matrix* – the control points and checkpoints originating from the preceding matrix are related to the operating instructions to be carried out during production [5,7,11-13,20,28]. Figure 2.6 depicts a guide for the *Deployment of the Quality Function* process in the food industry [2,7,18].

Through the *Deployment of the Quality Function* activities, the QFD team has established the operational means to control key product and component characteristics (control points), and monitor process parameters (checkpoints) during the product development and market introduction process. This information can now be integrated in the company's quality assurance system, bringing customer guidance and quality assurance upstream to product development [5,7,9,11-13,20,28,32,35].

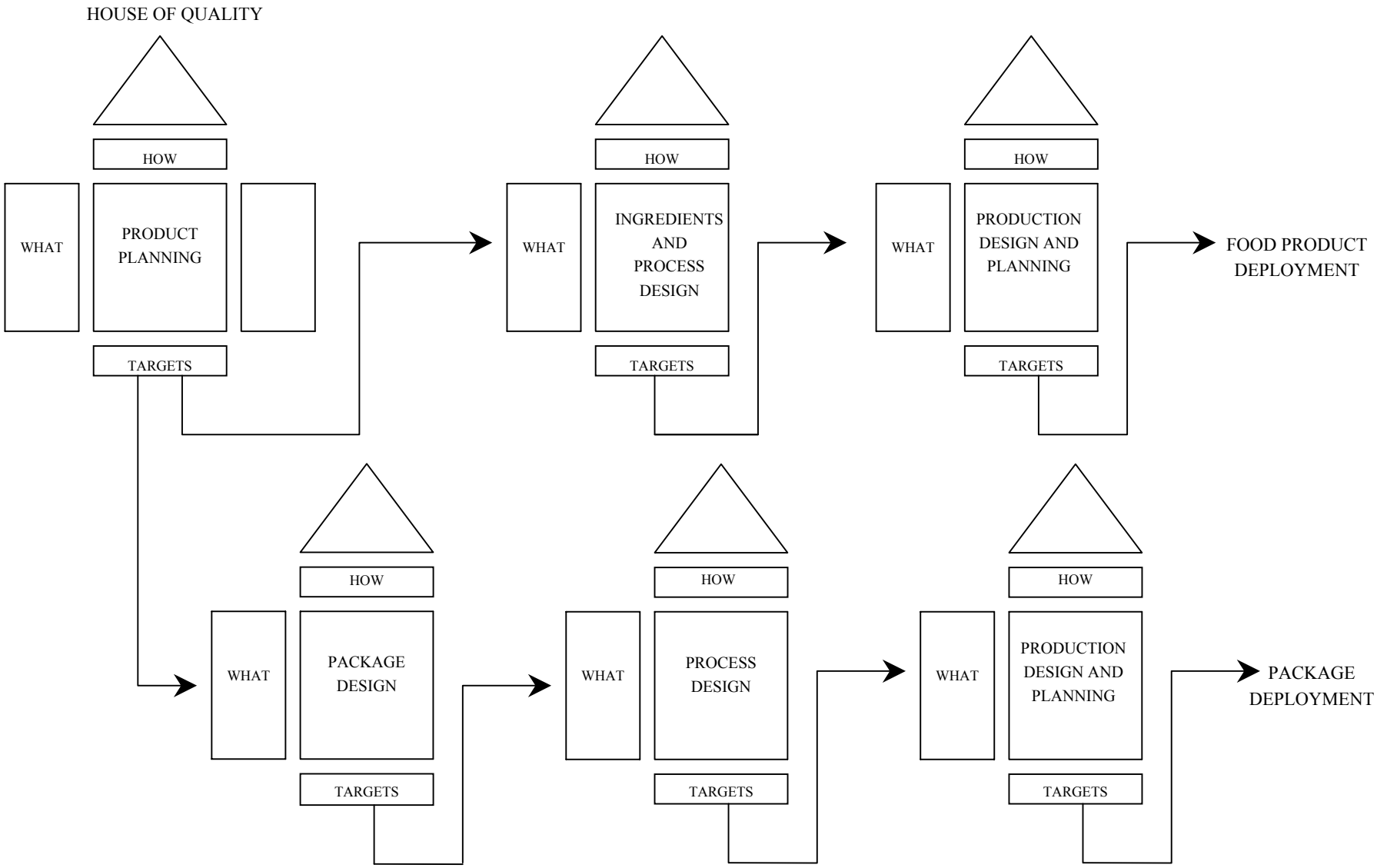

Figure 2.6 – Deployment of the Quality Function in the food industry [2,18].

2.4 Quality Function Deployment in the food industry

According to Charteris [22], Quality Function Deployment has been used in the food industry since 1987, the year in which the American Supplier Institute (ASI) conducted a three-day workshop on QFD implementation in this industry [7]. The implementation methodology presented at this workshop has been later described in detail by Hoffmeister [18] and Charteris [22]. Meanwhile, QFD applications in food product development have been increasingly promoted [23-24,36]. There are, however, very few documented QFD applications in food product and process development or improvement at the industrial level [22,25]. To our knowledge, there are only three papers [40-42] documenting the development and commercial introduction of new products and processes through the use of QFD - natural flavour enhancers, a table spread and a continuous frying system. Moreover, with the exception of Swackhamer [42], who described QFD's main ideas and gave a simplified example of the first implementation stages, these papers [40-41] have focused more on the description of organisational benefits and improved product properties than on the implementation process itself. Given the strategic importance of product development in the food industry, it is not surprising that this commercially vital information is not available [22].

It is at the scientific research level (resulting from the co-operation between the industry, research institutes and universities) that the exploration of Quality Function Deployment's implementation in the food sector has best been documented. Since 1992, the Danish R&D programme for the food sector (through the marketing research programme MAPP - Market-based Process and Product Innovation) has produced a significant number of working papers, proposing tailored QFD applications for food product and process development [25,43].

Holmen & Kristensen [25] described the partial structuring of a product development process in a Danish butter cookies' company according to the HOQ approach [15]. They also suggested some upstream and downstream extensions to the product development process in a HOQ framework that might prove very useful to the food industry. Downstream, a triangular matrix is added to the HOQ to depict incompatibilities between the requirements of consumers and those of distributors/retailers. Upstream, they have developed a method of identifying internal departments and suppliers with whom the development team has to establish close interactions in order to plan and control the product development process. In this method, the company's HOQ target values are deployed into a network of other Houses, one for each supplier or department involved in the product development process [25]. This brings more realism to the application of QFD in food product development since, in this industry, the end-product characteristics are highly affected by the characteristics of ingredients and packaging [2,18].

To achieve a better integration between sensory analysis and market analysis in food product development, Bech, Engelund *et al.* [43] proposed a new structure for the HOQ, in which the relationships between sensory specifications, technical specifications and consumer requirements are highly detailed (Figure 2.7). For this purpose, the *Relationship Room* is divided in two sub-sections, one specifying the technical relationships between the consumer requirements and product design characteristics, and the other the relationship between consumer requirements and the results of sensory analysis. The *Technical Correlation Roof* is also divided, into three subsections: (1) interactions between product design characteristics, (2) interactions between sensory attributes, and (3) interactions between design characteristics and sensory attributes. This new HOQ is expected to reflect better the specificity of food product development [43]. In addition, there is growing evidence that a better integration between marketing and sensory analysis in R&D may help increase a new product's chances of market success [30,43-44]. Nevertheless, there are still some difficulties in linking marketing and sensory analysis [43-44], namely: (1) the number of sensory dimensions involved in sensory analysis is to high to be evaluated by consumers; (2) consumers and products constitute different units of analysis.

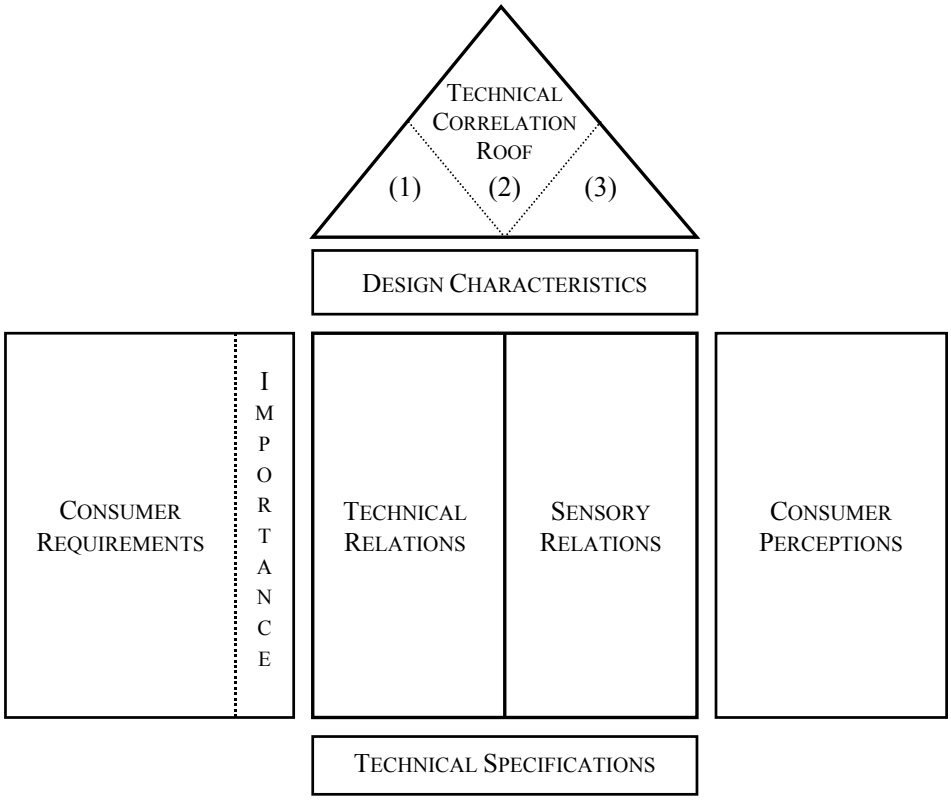

Figure 2.7 – Modified House of Quality for food product development: (1) interactions between product design characteristics; (2) interactions between sensory attributes; (3) interactions between design characteristics and sensory attributes [25,44].

The MAPP research programme has also given rise to some scientific publications [37,45] about QFD's application in food product development. Bech, Kristensen *et al*. [37] applied their modified HOQ structure [43] to the market-based quality improvement of smoked eel fillet. they built a HOQ in which relevant customer requirements are related with breeding and manufacturing characteristics, as well as to attributes generated by a sensory panel. Bech, Hansen *et al.* also used this modified HOQ structure [43] to optimise the translation of consumer needs into sensory attributes measurable by descriptive sensory analysis [45].

Data regarding a research project aiming at the development of pea varieties for freezing was, in this way, used to propose a model for sensory quality screening of new pea varieties. A case study concerning the use of QFD in the meat industry for improving the eating quality of beef has been published by Dalen [46]. The focus of this paper is to explore QFD's potential integration in food quality assurance systems, namely based on QFD's ability to depict customer requirements and their relationships with physical product attributes. The topic of QFD's introduction in food quality assurance systems, specifically within a Total Quality Management framework, was also investigated by Costa, Panagiotopoulou *et al* [47].

The application of QFD in food product development has also been researched and advocated at the Wageningen University in the Netherlands [1-2]. Since 1996, research in this topic has been reported in several MSc theses [26-27,48]. Costa [26] and de Vries [27] conducted a case study on the practical implementation of QFD in the quality improvement of ketchup. Several 'quality tools' [9,13,17-18,20,22,35] were explored to build a HOQ for tomato ketchup. The conclusions were that the *Relationship Room* lacked truly quantitative relationships between the consumer requirements and the food product characteristics, both intrinsic (physical) and extrinsic (brand name, price, origin). In view of the complex nature of consumers' relationships with foods and food matrix interactions (*Technical Correlation Roof*), multivariate statistical methods and statistical design of experiments [22,28,49] were recommended for the relationships' quantification. Korsten [48] developed a model by which food technological innovations can be quantitatively evaluated and compared in terms of how well they meet pre-defined consumer segment's requirements. The model was applied in a case study regarding orange juice manufacture. This model can be used for new concept selection (a pre-requisite of the building of the HOQ), in an approach similar to the *New Concept Selection Chart* in King's [17] *matrix of matrices* system. To our knowledge, the last published scientific research concerning QF's application in food product development refers to the chocolate industry [50]. In this paper, the authors use a modified structure of the HOQ, which focuses on sensorial aspects [43], to build a structured approach to product development. The approach was then implemented through the

construction of a HOQ for the sensorial quality improvement of a chocolate couverture. In a keynote lecture of the NMFST-2000 conference, a representative of Unilever Research Laboratory in the Netherlands has also reported results concerning the use of QFD in the development of table sauces [51].

2.5 Benefits, drawbacks and ways forward for Quality Function Deployment in food R&D

Tables 2.2a and 2.2b summarise the general benefits and drawbacks of QFD's implementation (as well as common mistakes made during this process).

	QFD BENEFITS	QFD DRAWBACKS	COMMON MISTAKES
NPD process	Reduction of design changes during development, production and market introduction [5,7,9-13,15,17,19-20,23,28,31,24]	Not created for product development but rather for upstream quality control [5,8,10,16,10,28,31]	High level of planned product change [15,17,29]
	Time and cost reductions in design, development and market introduction [5-7,9-13,15,17,20,22,28,31,35,43]	Better suited for quality improvement and cost reduction than for developing true new products[6,7,10,28]	Too much focus on the chart and less on product or process [7]
	Early identification of quality problems, product attributes relevant for the customer and trade-off decisions [7,11-13,14,20,22,28,31]	Due to all the relationships created, changes in initial project are hard to introduce and matrixes become huge[5,7,16,31]	Not knowing what you are doing in this project anyway[18,31]
	Customer-driven product development, *via* built-in translation methods[5-7,12-13,18,22-23,28,30,52]	It does not actually translate anything: 'Do it yourself' method [7]	'Mega' charts [7,10,16-17,19,22,28,31]
	Establishes clear priorities[5-7,10,15-20,22,31,35]	Highly complex relationships have to be established [1,7,17,52]	Only use HOQ [12,17,20]
	Helps integrate, structure & systematise activities[7,13,17,20,22,28,52]	Measurable benefits only on the long-term[7,9,29-30]	Team is not cross-functional [12,17,29]
		Too much focus on quality and less in cost, organisation and technology issues; series of matrices makes it a sequential process [6]	Fail project deadlines [7,10,17,19]
Market	Better understanding of customer requirements and increased market share [11-12,17-18,20,30-31]. Increased customer satisfaction [7,13,16,27,33]	Number of customer needs has to be kept low or HOQ becomes huge [7,16-17,28,52]	Assume that high satisfaction has to bring high market share[35]
	Decreased quality problems, dissatisfaction or complaints[11-12,17,20,31]	Hard to identify customer needs for non-existing products[10,17,53]	
	Evaluate better the competition from technical and customer viewpoint [10-13,17-18,28,31,43]	Difficult to evaluate competition on non-existing products or concepts[7,10,53]	

Table 2.2a – QFD implementation: benefits, drawbacks and common mistakes.

	QFD BENEFITS	QFD DRAWBACKS	COMMON MISTAKES
Organisation	Improves inter-department communication, breaks down barriers and provides a common language[6-7,9-13,15,17,20,28-31,35]	Decreased communication between team and management although communication among team members improves [29-30]	Low management support, people not willing to think differently [7,15,17,29]
	Better documentation of product development activities, building up knowledge and tracebility[7,13,15,17-18,20,28, 29,52]	Initial implementation stages demand big investments in time, money and effort[5,7,9,15,17,29-30]	Do it for nothing because you don't actually want to change [17]
	Gives reputation concerning quality and reliability[17,20,31]	Difficult to document and to administrate[5,17]	'Mandatory' QFD [10,17]
Innovation and Consumer Orientation	Creates a better environment for technological innovation by increasing consumer awareness and identifying technical needs[5,7,20]	Consumer involvement limited to initial phases[34]; relies heavily on *stated* needs/importance, and team interpretations [15,20,29,35,52]	Assume that market research can uncover all current and future consumer needs[20]
	Integrates marketing and engineering, allowing for new concept simulation [1,11-12,20]	Can not start without pre-defined concept and market segment [9,10,17,52]	Not really listen to consumers[7,31]
Human Resources	Encourages cross functional team work, open-mindness and empathy [5,11-13,15,17,29-30]	Requires highly motivated teams and management commitment [15,29]	Poor team work, low motivation[7,15,17,29]
	Structures decision-making and institutionalises consensus decisions[20,28-30]		Team members not familiar [15,17,29]
Information	Traces a continuous information flow from the customer to production, ensuring design intent is maintained [5-6,10,13,15-16,20, 23,28-29,30-31]	The information it provides is difficult to disseminate[5]	Mixing information while filling the charts [17]
Quality Management	The planning and control of quality is taken upstream to product design [5,7-8,16-17,31]	It works better within a TQM culture[10,36]	Low level of integration [10,34,36]
	Institutionalises quality consistency, customer satisfaction, continuous improvement and the use of 'quality tools'[5,10-11,17-18,20,22,29,31,49]	It works better in companies with a high degree of functional integration [10,34,36]	Low knowledge of quality philosophies and tools [10,34,36]
Market Research	Encourages the use and practice of good market research by all functions [10,17,20]	Relies highly on elaborated market and consumer research [10,15,17,29,31,52]	Ask customers what they can't answer[17]
Methodology	Self-checking, visual tool, using matrix charts and numerical values [5,7,12,18,22,29,31,35]	QFD implementation process after HOQ has yet not been clearly described [28]	No use of actual customer data [7,31]
		No scientific basis for the scales and importance ratings used, no support for target value definition [28,52]	

Table 2.2b – QFD implementation: benefits, drawbacks and common mistakes (cont.).

In order to address some of QFD's drawbacks, practitioners have developed several QFD modifications. To minimise the somewhat sequential nature of QFD's matrix building process, the combined used of QFD and Concurrent Engineering has been explored [6-7,28,33,52]. Concurrent Engineering is a systematic approach to the integrated, concurrent design of products and processes, in which developers have to consider all elements of a product's life cycle, starting from the design stage [28]. Some modifications also proposed are the 'Extended House of Quality' and 'Concurrent Function Deployment' [6], as well as the 'Integrated Concept Development', which also addresses the aspects of concept development, testing and selection [52]. Other approaches suggest the use of Conjoint Analysis [20,22,31,43] or Statistical Design of Experiments [16,20,22,31,44,49], in order to minimise guessing when establishing the relationships between customer requirements and product characteristics and interactions between product characteristics.

In addition to the benefits and drawbacks listed in tables 2.2.a and 2.2b, Griffin [29] and Bech, Hansen *et al.* [25] have hypothesised some QFD limitations that have direct implications for food product development:

- Process-related quality improvements are more difficult to achieve than product-related improvements;
- QFD may benefit service developers more than product developers;
- Improvements are more difficult to achieve with more complex products;
- Improvements are more difficult to achieve in projects that seek radical product redesign or are developing a truly new product;
- QFD is better suited for industries in which the physical product can be described as 'several components assembled into one whole'.

QFD was not specifically developed for the food industry or manufacturers of fast-moving consumer goods. Thus, it does not address a series of aspects that are vital for carrying out product development in these areas. Foods are highly complex products, with which people have equally highly complex relationships. Ingredients in foods display intricate interactions that affect the way processes should be designed and optimised. Moreover, raw materials show a natural predisposition for variation that does not suit well the somewhat inflexible character of the QFD charts [2]. Consumer requirements concerning foods can be highly variable and heterogeneous [2]. It is also likely that they can only be satisfied if both the food product attributes and its interactions are taken into account during development. Therefore, we do not

share the opinion that food products can be described as a set of attributes, which together fulfil consumers' needs [43]; interactions between attributes can also play a decisive role in achieving consumer satisfaction. Finally, and taken into consideration the published information [7,18,22,40-42], it is likely that QFD, in its standard format, is more suitable for the ingredients' and food packaging industries than for food manufacturers. Hopefully, this situation will gradually improve with the development of more tailored QFD solutions for the food industry such as the ones reviewed in this chapter [25,37,43,45,48,50].

Four fundamental research issues are crucial for future developments in QFD's application in food development.

I. Mechanisms by which consumers choose foods, choice factors and interactions [1,4,54-55].

Food choice is influenced by many interdependent factors. A great deal of research has focused on listing these factors [4,54,56], but we are still lacking knowledge about how much each factor influences food choice and how the different factors interact [4,54]. Moreover, it is thought that food choice behaviour could be mostly not based on a rational decision-making process, but rather characterised by a low consumer involvement and limited information search [4,44]. There are indications that factors like habit, seasonality, search for variety and the food supply available at the time of purchase can play a major role in consumers' food choice [1,4,44,54-57]. These indications should be further investigated.

II. Methods by which consumer requirements and its attributed importance (stated or inferred) can be collected and structured [1,7,9-10,31,35,52].

It is widely recognised that the most powerful consumer requirements – features whose presence in the product consumers view as necessary but not sufficient for their satisfaction ('dissatisfiers' or basic needs) or enthusing features that are not expected (delighters)-, are hard to verbalise [7,9-10,14,17,20,35]. These demand the use of elaborate market research techniques in QFD [10,15,17,29,31,52]. These techniques should be further improved, to better reflect the specificity of consumers' food choice processes [4,54,58]. However, it is unrealistic to think that market research can uncover all of consumers' current and future needs or judgements, especially when the development of truly new products is concerned [20]. In addition, the determination of the relative importance of consumer requirements, crucial to establish development priorities in QFD, is still a rather unexplored topic [1]. Finally, the structuring of consumer requirements into the *Voice of the Customer* should increasingly rely on consumer involvement [20,35].

III. Methods by which quantitative relationships between consumer requirements and intrinsic and extrinsic food attributes can be established [1,26,55-59].

Research on this topic has focused on the establishment of models quantifying the relationships between the consumers' perception of food quality (at the sensorial level) and the foods' intrinsic properties - the so-called *psychophysical* relationships [4,59-61]. The recognition that food quality, as consumers perceive it, is not only related to physico-chemical or sensorial aspects, but also to extrinsic food properties (brand name, origin, advertising, etc.) and consumers' expectations, has led to the extension of these models [1,44,59,62-64]. Nevertheless, we are still missing truly integrative models for consumer-oriented product development, which encompass both the physical properties of food and its effects, as well as elements of the marketing mix [59].

IV. Methods by which consumers can become more involved in food development processes, so that an increased consumer acceptance of innovative technologies can be achieved [20,34,47,53,65-66].

Although QFD is considered to be mainly consumer-driven (*via* the determination of the *Voice of the Customer* and its downstream deployment), it does not specifically support feedback from consumers at later stages of product development, like prototyping or market introduction [34]. This is clearly one of the major drawbacks of the QFD methodology, which poses serious obstacles to the development of truly new products (Tables 2.2a and 2.2b). Perhaps approaches focusing on consumer segments more likely to accept the use of innovative technologies in food manufacture, like the Lead Users method [53], can increase the chances of success of discontinuous technological innovations. On the other hand, Consumer Idealised Design [67], which aims to involve consumers in the actual design of manufactured goods or services, may be worth while investigating further in a food development context.

2.6 Concluding remarks

In essence, QFD encompasses exactly the same activities that development teams performed in product design and development processes. Its contribution is mainly to replace informal, intuitive decision-making by a structured methodology that compiles all relevant information and company expertise and puts it to use in product development and market introduction activities. It is up to its supporters in the food area to develop the methods by which QFD's contribution to the success of food product development processes can be increased.

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[1] This chapter is an extension of the publication: Costa, A.I.A., Dekker, M. & Jongen, W.M.F. (2001). Quality Function Deployment in the food industry: a review. *Trends in Food Science and Technology* 11, 306-314.

[2] A customer in a QFD project can be another manufacturer and/or a wholesaler, a retailer, a regulatory body, a consumer segment, etc. [7,18,28].

[3] For a more detailed review of QFD's history please refer to Cohen [9] and ASI [7].

[4] More detailed descriptions of QFD's start-up phase and team assembly requisites can be found in several handbooks [9,14] and other types of publications [10,13,29-31].

[5] In QFD projects, in which consumer requirements are the main issue, the needs of other customers or external regulations may also have to be taken into account. In order not to confuse one type of requirements with another, the later can be listed in a separate room – *the Important Control Items* [18].

[6] For a detailed description of these activities please refer to Cohen [9], King [17] and Buchanan [31].

[7] For a detailed description of these activities please refer to Sullivan [5], ASI [7], Cohen [9] and Hoffmeister [18].

Chapter 3

Market opportunity identification:
A consumer-oriented food classification system for Home Meal Replacements

Market opportunity identification: A consumer-oriented food classification system for Home Meal Replacements[1]

This chapter introduces a new definition and classification system for Home Meal Replacements (HMR), based on convenience attributes as viewed by consumers. An overview of food classifications, focusing on methodological aspects, is also presented. The classifying criteria chosen (shelf-life and required preparation), and their organisation into a 4 x 4 matrix structure, demonstrated to provide a sound and effective way of classifying HMR. Additionally, a qualitative and quantitative analysis of HMR consumption in the Netherlands, using data from the 1997-98 Dutch National Food Consumption Survey (DNFCS), was performed by applying the developed classification. The results of this analysis show that Dutch HMR consumption was low and concentrated in a handful of products; they also highlighted potential gaps between supply and demand. The classification system is expected to provide valuable support for consumer-oriented product and process development by, for instance, facilitating a quick and simple, convenience-based analysis of household food consumption data.

3.1 Introduction

Of the many trends assigned to today's Western food consumer by marketers and manufacturers, *lack of time* is certainly the one we can least argue against. For most of the active population there is not much time to eat and even less for shopping and cooking. According to Hollingsworth (1997), 60% of US consumers do not know at 4 p.m. of a week day what they will cook for dinner, but expect to loose only about 30 minutes with its preparation, eating and cleaning up. Moreover, 40% of Americans consider cooking at home a bother and meal preparation a highly time-consuming activity (Sloan, 1997). This trend has also been extensively reported for EU countries, along with increasingly shorter shopping cycles (Dade, 1992; Datamonitor, 1998; McHugh, Greenan, Kerrigan & Wightman, 1991; Ritson & Hutchins, 1995). Nevertheless, and in spite of this generalised "need for speed", consumers do not always seem ready to compromise the pleasure of eating a tasty meal for the sake of earning extra time. According to Sloan (1997), there are indeed situations in which American consumers willingly spend time preparing and eating meals, for instance on weekends or if they have guests. Eating

remains, therefore, a key aspect of leisure or socialising, as well as a valued personal experience (Datamonitor, 1998; Gofton, 1995; Marshall, 1995).

It is not surprising that there is a growing interest of all food chain partakers in supplying quality dishes or full meals that can quickly and conveniently replace home made meals. The so-called *meal solutions* bring more choice for the hurried consumer who still likes to eat a good meal, and become thus a good business opportunity for food manufacturing, -service and retail alike (Bond, 1992; Larson, 1998). In 1998, Datamonitor (1998) reported ready meals' (the manufactured share of meal solutions) sales of almost 13.5 billion US dollars, for a total of eight Western European countries. In the meantime, sales in North America were over 12.5 billion US dollars. Until 2003, the ready meals' sales in Western Europe are expected to grow on average 3% in value and 2.5% in volume. Yet, in countries like Italy and Spain, a growth in sales value of as much as 7.5% and 14.5%, respectively, is expected. Attention must be paid, however, to the fact that only half of a North American family's food budget is currently spent on retail shopping, the other half being spent on foodservice. The search for meal solutions in foodservice or *via* Internet ordering is rapidly spreading and should be taken very seriously by food manufacturers (Datamonitor, 1998).

There is an increasing diversity of production and distribution solutions offered to consumers with the aim of partially or fully replacing homemade meals (Figure 3.1). Consequently, meal solutions' terminology is also increasingly complex, with food chain partakers resorting to their own (mostly obscure and vague) definitions and designations. However, the introduction of technical jargon does not improve this situation. It is difficult to clearly differentiate meal solutions from each other (or from other foods) based on a specific level of technological or kitchen processing, since they can be as diverse as a chilled sandwich, a take-out meal, a frozen pizza, a canned stew or a restaurant dinner. The apparently simple issue of defining what exactly a meal is appears already to be extremely intricate (Meiselmann, 2000). More or less scientific tags for meal solutions, such as *ready-to-eat*, *sous-vide*, *oven-ready*, *cook-chill*, *refrigerated foods with extended durability*, *minimally processed* and *frozen TV-dinners* are not new to manufacturers or even to consumers (Brody, 1998; Ghazala, 1999; Mossel & Struijk, 1991; Notermans, Dufrenne & Lund, 1990; Paulus, 1977; Verlegh & Candel, 1999). They are intended to reflect the various preservation properties and degrees of readiness for consumption intrinsic to such foods, but this intention is not always perceptible to the consumer. Senior (55+) Dutch citizens, for instance, have reported during focus groups to have difficulties understanding exactly what *ready-to-eat* means. Likewise, they have difficulties in relating

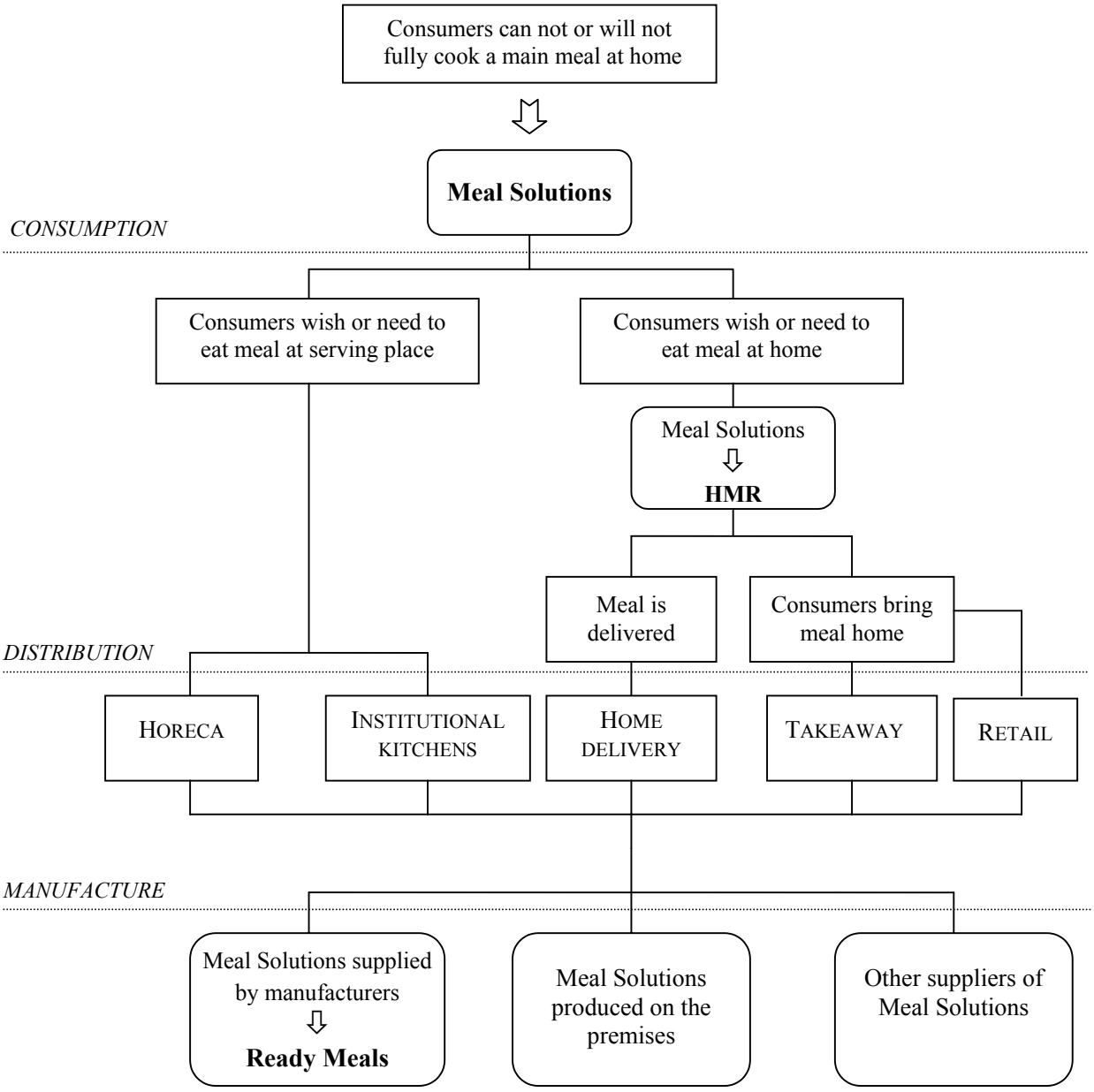

*Figure 3.1 – The Meal Solutions category and its terminology (HORECA: **HO**tels, **RE**staurants and **CA**tering).*

advertised claims with the actual convenience levels provided by food products (Costa, Schoolmeester, Dekker & Jongen, 2002).

It is not only the consumer or manufacturer who has difficulties in understanding exactly what lies under current *Meal Solutions*' terminology. A direct result of this disarray is the difficulty to of harmonise safety criteria for *Meal Solutions* (European Commission, 1998), or holding them accountable for food-borne illness occurrences (Fraser, Sawyer, Andrews, Youatt & Kirkwood, 1995). Public health systems in many countries do not have a specific food class or even a classification system under which food-borne illness incidents related to ready-meals'

consumption can be recorded, simply because it is very difficult to define what a ready-meal is. Perhaps this may be the reason why chilled ready meals have consistently maintained excellent safety records, despite a considerable body of evidence demonstrating a high potential for hazardous mishandling (Fraser *et al.*, 1995; Hauben, 1999). Public health policy-makers and food scientists are thus in need of unambiguous definitions and classifications for meal solutions. Additionally, product development and marketing teams involved in the food business can also greatly benefit from a clear product classification system (Larson, 1998; O'Carrol, 1998a,b). Consequently, the aim of this study is to extend our present knowledge of HMR by developing a consumer-oriented system for its classification. This chapter starts by proposing a use-based, comprehensive and clear definition of Home Meal Replacements (HMR), as a sub-category of Meal Solutions. Next, an overview of current food classifications is presented, focusing on methodological aspects. Finally, a new classification system for HMR is presented, followed by its validation and discussion of possible applications in food science and marketing.

3.2 What are home meal replacements?

Home Meal Replacements are meal solutions that have been produced away from home for in-house consumption (Figure 3.1). According to our opinion, they can be defined as:

- *Main courses or pre-assembled main course components of a meal - a protein (animal or plant), a carbohydrate (starch) and a vegetable source -, in single or multiple portion containers, designed to fully and speedily replace, at home, the main course of a home-made main meal.*

Main course components packed in non-assembled, separate containers, as well as all kinds of desserts, breakfast cereals, yoghurts, candy bars, etc. are excluded from this definition. Some snacks (foods usually eaten in-between main meals), starters, soups or salads can be considered as HMR, as long as they respect the readiness and compositional requisites set by the definition and can be regarded as a meal's main dish by consumers. The proposed definition intends to clarify previous HMR characterisations (Datamonitor, 1998; Ghazala, 1999; Larson, 1998; Morris, 1998; O'Carrol, 1998b; Solganik, 1997), by focusing on use-based requisites like readiness, pre-assembly and main ingredients for sub-category delineation. Additionally, it makes no distinction between technological sectors or distribution channels, thus reflecting the current market integration movements (both horizontal and vertical) within the food chain (Ghazala, 1999).

3.3 How can we classify HMR?

3.3.1 Classification systems

"The world consists of an infinite number of potentially different stimuli. Thus a basic task of all organisms…is a segmentation of the environment into classifications by means of which non-identical stimuli can be treated as equivalent" (Rosch, 1978).

Classifications group items under pre-defined criteria by emphasising similarities or differences between them and providing a commonly accepted range of item designations (Axelson & Brinberg, 1989; Peri, 1990). Methodologically speaking, they should be based on precise definitions and clear criteria. Moreover, they should provide a hierarchical ranking of the items under classification and exempt from ambiguities. Finally, classifications should be comprehensive and yet concise (Lennernas & Andersson, 1999; Peri, 1990). As any other simplified representation of reality, classification systems should be validated and tested for reproducibility and usability.

3.3.2 Food classification systems

Food consumers instinctively categorise foods since this process provides them with an orderly system by which to view and structure the available supply (Axelson & Brinberg, 1989; Rosch, 1978). By identifying and placing foods in classes, they make associations between a product and a group with which it shares a set of characteristics, benefits or risks. In turn, this influences consumers' food-related behaviour, not only with respect to post-acquisition conducts (storing, handling, preparing and serving foods) and consumption, but also to food perception and choice (Axelson & Brinberg, 1989; Johnson, 1974; Schutz, Rucker & Russel, 1975). On the other hand, classification systems are also relevant in organising and communicating information within different areas of food science, like nutrition, marketing, unit operations and microbiology.
Regarding their methodological approach, existing food classification systems can be divided into four main groups:

- Classifications elicited from a list of items;
- Classifications elicited from behavioural observations or consumer data;
- Classifications deduced using pre-defined convenience criteria;
- Classifications that share two or more of the previous approaches.

3.3.2-1 Technological food classifications

Most commonly, food classification systems are based on extensive lists of food items grouped according to processing technologies - fermented, frozen, canned, etc.-, and/or major raw material's origin - dairy, seafood, cereals, etc. These so-called *technological classifications* usually form the skeleton of assortment catalogues, nutritional surveys, sales ad consumption data, international safety guidelines and other technical or scientific publications (Datamonitor, 1998; European Commission, 1998; Fraser *et al.*, 1995; Stannard, 1997; Voedingscentrum, 1999). Among technological food classifications, the most widely known are perhaps those related to nutrition and diet. Their aim is to contribute to the improvement of the diet and health of the populations by communicating nutritional guidelines in a simple manner. The food pyramids or food wheels, for example, illustrate the structuring of foods into groups based on their function in the meal system and their major contribution to the diet's nutritional value. (Axelson & Brinberg, 1989; Johnson, 1974; Peri, 1990; Schutz, 1975). Food-based classifications are also used to characterise and assess dietary patterns and eating episodes (Lennernas *et al.*, 1999; Popkin, Haines & Siega Riz, 1999). The area of food processing has also found use for technological classifications, namely in the provision of standards for processes and products (Barbiroli & Mazzaracchio, 1994), or in the improvement of operations' efficiency and effectiveness (Erzincanli & Sharp, 1997; Peri, 1990). Regarding food preservation and microbiology, food classifications are mainly used in microbiological quality control (Gravani, 1986; Mannheim, Liu & Gilbert, 1994), hazard analysis (Lee & Hilderbrand, 1992), public health and risk analysis tasks (Fraser *et al.*, 1995), standardisation (Stannard, 1997) and safety guidelines (European Commission, 1998).

By conferring structure to production, sales, purchase and consumption data, classification systems lay at the core of food market research (Datamonitor, 1998; Euromonitor, 1996; Mintel, 1996; Voedingscentrum, 1999). Still within the marketing area, category definition and sub-category product segmentation are essential for key processes in retail category management activities, such as assortment management or new product introduction. Furthermore, classifications can help uncover food companies' lack of technological and/or marketing consistency by highlighting product categories that are not being (well) addressed by their production or marketing activities. They can therefore be used as indirect performance measures of R&D teams' technological and marketing competence, while providing helpful guidance to product innovation (Geraedts & Berg, 1999; Peri, 1990).

Conventional (technology-based) food classification systems present conceptual frailties. Since they are simply elicited from more or less comprehensive item lists, they often lack coherence and clear definition. Classes are either too general, in order to avoid overlapping or ambiguity when classifying new, or too detailed, in order to fit in the extensive amount of new product and process developments in the food area. Overall, technological food classifications are unable to maintain the necessary balance between detail and comprehension (Johnson, 1974; Peri, 1990). Additionally, their ability to classify, precisely and completely, the range of products they intend to is rarely tested. Thus, they generally lack scientific prove of their validity. Last but not least, technological food classifications have been designed to meet the classifiers' particular needs, rather than to reproduce the way consumers themselves would make the groupings (Schutz *et al.*, 1975). In addition, testing whether or not established food classifications reflect consumer's own groupings is very scarce. An exception is provided by the study of Axelson *et al.* (1986), who tested whether food groups displayed by nutrition guides reflected consumers' own food classifications. The results obtained show that (a) consumers may use other than product-related criteria to group foods and (b) consumers' classifications are probably more complex than the ones structuring nutrition guides. Therefore, all existing evidence seems to indicate that technological food classifications do not adequately reflect the consumer's perceptions of food and its uses (Axelson & Brinberg, 1989; Johnson, 1974; Schutz *et al.*, 1975). This makes them of limited value for consumer-oriented product development and marketing. Given the current product diversity and the rate of product introduction, consumers experience difficulties in using the conventional groups to identify and classify foods. These difficulties are increased by the general decline of cooking and household skills (Datamonitor, 1998; Johnson, 1974; Larson, 1998). This situation may be rendering nutrition and safety communication by health-officials rather inefficient, since consumers depend on correct product identification and characterisation to make decisions about their dietary choice and food handling. (Axelson *et al.*, 1986; Axelson & Brinberg, 1989; Brody, 1998; Creed & Reeve, 1999; Johnson, 1974).

3.3.2-2 Food classifications and consumer studies

Classification systems can also be used to study food consumption from a behavioural perspective. Examples of such studies are the anthropological or sociological classifications and the food-use classifications. Jelliffe (1967) developed a *world-wide* food classification by comparing eating patterns in developing and industrialised countries, while Schaik (1964) and Leininger (1969) used observational studies to group food's sociological uses. Food-use knowledge has also been employed by market researchers to segment product supply, leading to

recipe-*based* classifications (Mintel, 1996) (Table 3.1). However, since these studies are based only on the researchers' own perception of consumer behaviour and were not further validated, the resulting classifications may not have much correspondence to the actual consumer behaviour (Axelson & Brinberg, 1989; Schutz *et al.* 1975).

CLASSIFICATION SYSTEM	CLASSES	
World-wide	Cultural super-foods (staple commodity and major calorie source)	
	Prestige foods (for important occasions and community leaders)	
	Body-image foods (fitting cultural ideas regarding body functions	
	Sympathetic magic foods (associated with beliefs in food properties)	
	Physiologic food groups (reserved or forbidden to women or elderly)	
Food use	<u>Social uses</u>	<u>Physiological uses</u>
	Means of family contact	Provide energy
	Recreation and enjoyment	Satisfy hunger
	Initiate/maintain interpersonal relations	
	Help cope with psychological stress	
	<u>Educational uses</u>	<u>Status functions</u>
	Express religious ideas	Influence a group's political status
	Reward or punish	Bring prestige
	Treat or prevent behaviour deviations	
Recipe-based	Traditional British meals (chicken roast, sausage and chips)	
	International and gourmet meals (curries, stroganoff, Italian pasta)	
	Fish-based meals (fish-in-sauce recipes, fish pies)	
	Niche meals (vegetarian, 'fixed calories', 'authentic ethnic')	

Table 3.1 - World-wide, food use and recipe-based classification systems (Jelliffe, 1967; Leininger, 1969; Mintel, 1996; Schaik, 1964)

Other use-based food classifications have been derived directly from consumer data. Fewster, Bostian & Powers (1973) used consumer data to generate twelve major categories of connotative meanings associated with food and food habits, mostly based on preference ratings. From these categories, twenty-five scales for measuring food meanings were developed and validated. Axelson *et al.* (1986) asked 51 college students to group 23 foods, representing the nutrition guides' *Four Food Groups*, according to their own criteria. The students grouped the foods in a manner related to, but more complex than, the *Four Food Groups*. The criteria used

to make the groupings were convenience in preparation, health-related properties and the food source (animal or plant). Yet, the study did not proceed to establish a classification system (with defined classes within each criterion) that could display the results obtained in a structured manner. In a study conducted by Schutz *et al.* (1975), consumers judged the appropriateness of allocating certain food items to pre-defined use categories. However, these use categories were not tested for validity and reproducibility prior to the study.

Consumers tend to classify foods based on their own preferences and evaluations, rather than on more objective criteria (Axelson *et al.*, 1986; Schutz *et al.*, 1975; Worsley, 1980). Therefore, classifications related with food consumption behaviour, even when originated in direct consumer data and fully validated, tend to be extensive and systematically lack any kind of hierarchical structure or defined criteria (Schutz *et al.*, 1975). While they can provide useful information regarding consumer behaviour, which can be employed in marketing activities, these type of categorisations are often difficult to translate into specific, quantitative product features. This renders them of limited value for product development.

3.3.2-3 Convenience-based food classifications

Convenience attributes of food supplies are highly valued by the foodservice industry, since they contribute to a more efficient employment of the resources in the food preparation process. Advantages brought by the use of convenient food supplies are: time, labour and bulk reductions in acquisition and logistic activities; downsizing of kitchen inputs such as time, skills, energy, labour and equipment; pre-assembly; ease of storage and regeneration (bringing stored foods to a state of readiness for consumption), and storage extension. Nevertheless, foodservice entrepreneurs lacked a user-based, coherent and precise system to identify and group food supplies with regard to their different levels of built-in convenience (Harrison, 1979; Paulus, 1977; Pepper, 1980; Sheard, 1999). Consequently, several food classification systems based on pre-defined convenience attributes have been developed by and for the foodservice industry. Harrison (1979) has developed a convenience scale to rate caterers' food supplies on the basis of their pre-assembly and readiness for service levels (Table 3.2). Paulus (1977) suggested a classification system based on the processing stage prior to arrival in an institutional kitchen, in which provisions could be categorised as *Ready to cook*, *Ready to heat*, *Ready to kitchen process* or *Ready to eat*. Having in mind the fast food sector, Pepper (1980) classified supplies in terms of the preparation level required before servicing: *No Preparation*, *Mixing*, *Heating*, *Mixing/Cooking* and *Cooking*. This study also pointed out the close relationship existing

between food preparation methods and preservation and storage methods (Figure 3.2). None of these studies were, however, validated.

CONVENIENCE SCALE	DESCRIPTION
Zero convenience	The completely fresh produce; the unprocessed product where the requirement for peeling, paring, maturing, cleaning, basic preparation, and other basic stages have to be done.
Basic convenience	Where basic stages as described have been completed but where slicing, shredding, mincing, soaking, dicing, chopping, rolling, shaping, etc. have to be carried out.
Pre-assembly convenience	Where items mentioned above have been carried out but the aspect of assembly is missing: constituents are available in an easy to handle format but need to be combined.
Pre-cooking convenience	Where the items or principal constituents are assembled prior to cooking.
Pre-service convenience	Where items have minimal processing prior to service and where only defrosting or/and end-cooking or similar activities are required before service.
Full service convenience	Where items are ready to serve; when nothing more than opening a can or a box is required.

Table 3.2 – Convenience scale for food supplies (Harrison, 1979).

Convenience attributes are also relevant for the household food preparation process. They are a decisive factor in food choice and a major trend in consumer demand (Datamonitor, 1998; Gofton, 1995; Rappoport, Peters, Huff-Corzine & Downey, 1992). In line with the approach used in the food service industry, some studies used household-based convenience attributes to develop definitions and classification systems. According to Traub & Odland (1979) "the term convenience foods refers to fully or partially prepared foods in which a significant amount of preparation time, culinary skills or energy inputs have been transferred from the home kitchen to the food processor and distribution". Based on a similar convenience concept, Havlicek, Axelson, Capps, Pearson & Richardson (1983) created a four-category system for all foods used in the household. Categories considered were *Non-Convenience* (fresh and home processed foods or ingredients with no home-prepared counterpart), *Basic Convenience* (single ingredient processed items), *Complex Convenience* (foods with high levels of timesaving and culinary

skills built in and multi-ingredient prepared mixtures) and *Manufactured Convenience* (foods with no home-prepared counterpart).

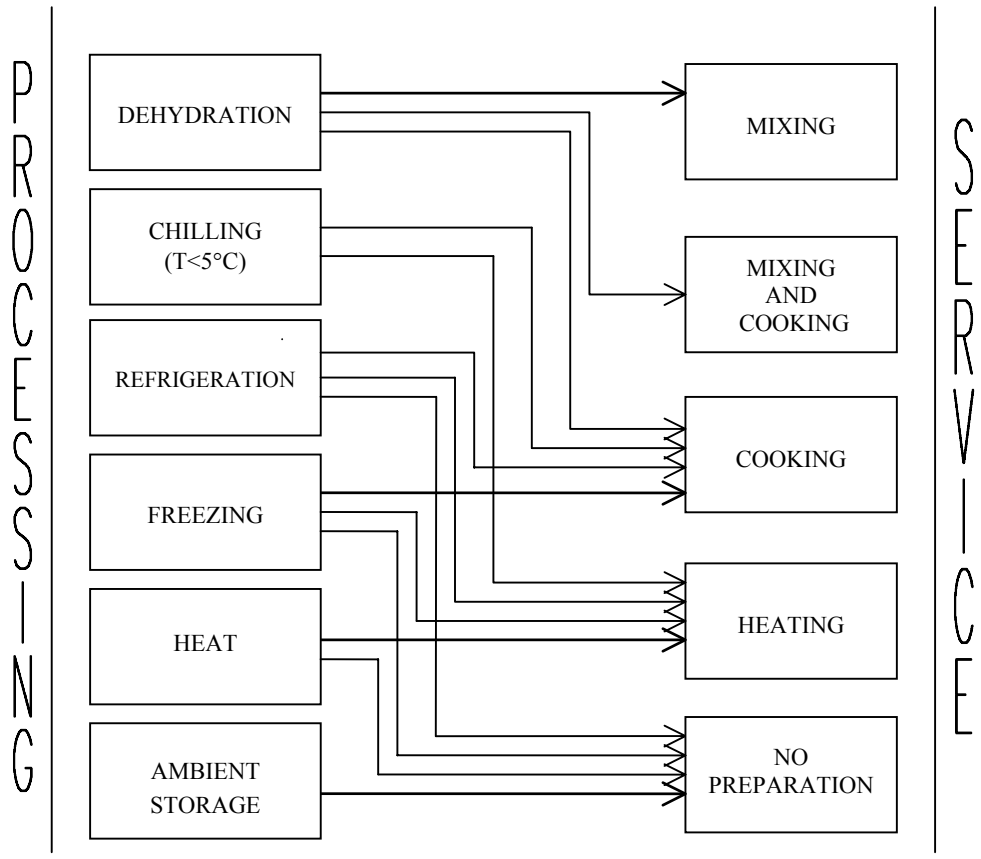

Figure 3.2 – Relationship between food preservation and storage methods, and the preparation levels required before servicing (Pepper,1980).

Perhaps fairly more comprehensible and meaningful than to view the consumer's kitchen as a *household-based preparation unit*, or his or her food shopping as *process inputs*, is to relate convenience levels with the amount of preparation foods require before they can be eaten (Pepper, 1980). Therefore, Pearson, Capps, Gassman & Axelson (1985) grouped the 4082 food products recorded in the 1977-78 USDA Nation-wide Food Consumption Survey database in a 14-category system, according to the household preparation activities they required. Due to its excessive length, the system was then condensed into three major food preparation categories – *No Preparation, Some Preparation and Considerable Preparation*. Another classification criterion – the extent of processing prior to arrival at the home kitchen - was brought into the system, to compensate for the subsequent loss of resolution. In it, two classes - *Non-convenience* and *Convenience* (basic, complex or manufactured) - were created, in an abbreviation of the

Havlicek *et al.*'s (1983) classification. The final system was therefore a three by *two preparation required by built-in convenience* matrix (Table 3.3). Both the 14-category system and the final matrix were validated using the set of foods from which the system had been extracted (the survey's database). Food technologists, home economists and nutrition students tested the 14-category system's usability with a sub-set of 82 food products. The survey's quantitative results (food product consumption per household) were grouped according to these 14 categories, enabling the authors to assess both the quality and quantity of household food consumption per level of preparation required (Pearson *et al.*, 1985). The advantages of this approach for food classification are the consumer relevance of the chosen criteria and the development of a systematic validation procedure for classification systems. Its main weakness is that the authors did not resort to pre-defined criteria or classes to build their system, but rather elicited it directly from a set of food products. Moreover, the combined use of two convenience criteria, which are to some extent complementary, brought redundancy to the classification matrix. For some foods, the fact that they had been partially processed reduced the level of preparation they required before consumption. Consequently, one of the two classification criteria selected would have been sufficient to place them in a defined convenience level. Finally, both the 14-category system and the classification matrix were tested resorting to the same set of products from which they had been extracted. Therefore, their validity and reproducibility were definitely not established.

	NON CONVENIENCE	**CONVENIENCE**
NO PREPARATION Eat as is Ready to use		
SOME PREPARATION Cut, slice and shell Thaw Hydrate Ready to heat Thaw then heat Hydrate then heat Ready to cook Thaw then cook Hydrate then cook		
CONSIDERABLE PREPARATION Cut, peel or shape then cook Add other ingredients, then cook Eviscerate, prepare for cooking, then cook		

Table 3.3 – 'Preparation required by built-in convenience' matrix (Pearson et al., 1985).

3.4 Development, validation and application of a consumer-oriented classification system for HMR

3.4.1 Development of the classification system

In view of the HMR definition presented, the characteristics of HMR products and the food classification studies reviewed, several conceptual and methodological requisites were taken into account in the definition of a HMR classification system. From a conceptual viewpoint, the classification system should be based on criteria that are relevant for both HMR consumers and HMR producers/providers when defining and grouping existing products. It should provide clear designations and a meaningful group structure for HMR product assortments. Ideally, the classification should reflect how consumers perceive the different HMR products, yet provide a direct link between the classes and specific technological sectors. This would demonstrate the usefulness of food classification systems as strategic tools for food product and process innovation, as well as related marketing activities (Peri, 1990).

From the many product attributes used by consumers as choice criteria for Home Meal Replacements, like *product range*, *quality consistency*, *main ingredients* or *similarity to home-made*, convenience attributes are usually at the top of the list (Dade, 1992; Datamonitor, 1998; Rappoport *et al.*, 1992; Ritson *et al.*, 1995; Sheard, 1999). Furthermore, a study performed by Axelson *et al.* (1986) indicated that consumers use convenience in preparation as a criterion to group foods. Convenience attributes are also relevant as user-based criteria for food classification, while having direct counterparts in technological processes. Therefore, it should be possible to use convenience attributes to build a sound, consumer-oriented HMR classification, in which classes are directly linked to technological processes. From a methodological viewpoint, the classification system should be founded on pre-defined and precise classification criteria and not elicited from a product list or behavioural data. These criteria should be in sufficient number to, comprehensively but concisely, classify all HMR products currently available for consumption without any ambiguities. If more than one criterion is to be used, a reasonable degree of independence between criteria must be retained in order to avoid redundancy. Finally, the HMR classification system should be validated and tested for reproducibility and usability.

Based on the requisites listed above and on the reviewed literature, two convenience attributes were chosen as classifying criteria for Home Meal Replacements - the level of preparation required before consumption (**Cn**) and shelf-life (**Sn**). Within the level of preparation criterion, and based on the range of preparation activities displayed by commercialised HMR products, four classes (**C1** to **C4**) were defined (Table 3.4). This definition explicitly encompasses the

HMR regeneration process – the time/temperature couple required for bringing a HMR to a state of readiness for consumption-, which is "translated" into the consumer preparation instructions displayed in the products' package. Additionally, it implicitly includes storage and preservation methods, since relationships between these methods and the levels of required preparation described by the classes can be established (Figure 3.2). From **C1** to **C4**, classes have an increasing level of time, appliances and energy inputs required before consumption. Culinary skills are kept to a minimum throughout the classes, except for C4, where higher cooking expertise or the addition of other ingredients may be required. Other aspects of convenience, such as reduced time and effort in purchasing and logistic activities, the meaning of convenience for different groups of consumers/customers or the situational context in which the meals are to be taken, were not considered. The pre-assembly aspect was already contemplated in the HMR definition presented.

CONVENIENCE CLASS	DESCRIPTION	EXAMPLES OF COMMERCIALISED PRODUCTS
Ready to eat (C1)	HMR consumed as purchased, requiring no prior preparation	Chilled sandwiches and salads, chilled pies, canned salads, take-away main courses and snacks
Ready to heat (C2)	HMR requiring only mild heating[a] before consumption (includes products processed up to a stage rendering them fit for immediate consumption after thawing or warm water addition)	Chilled pizzas and other main courses, frozen pizzas, frozen main courses and snacks or soups, dehydrated soups and spaghetti dishes, canned soups and main courses.
Ready to end-cook (C3)	HMR requiring sufficient heating[b] to finalise cooking before consumption.	Chilled and frozen lasagne, some frozen menus, dehydrated pasta dishes.
Ready to cook (C4)	HMR that have been minimally prepared for cooking (trimmed, shelled, peeled, cut, washed, etc.) but still require full cooking of some or all of its components.	Frozen seafood paella, raw chilled meat/fish cuts with side dishes, raw frozen fish cut with breadcrumbs and vegetable sauce.

[a] ≤15 minutes in a pan, or ≤ 20 minutes in a conventional oven/ *au bain marie*, or ≤ 10 minutes in a microwave oven
[b] > 15 minutes in a pan, or > 20 minutes in a conventional oven/ *au bain marie*, or >10 minutes in a microwave oven

Table 3.4 – Four convenience classes for an HMR classification system.

The shelf-life criterion encompasses the convenience aspect of storage extension. For this purpose *shelf-life* was defined as the period within which an HMR can be kept by the consumer

at home, under the recommended storage conditions, without it being rendered unfit for consumption. Taking into account the shelf-life range displayed by commercialised HMR products, four shelf-life classes were chosen:

- **S1** < 1.5 weeks
- 1.5 weeks ≤ **S2** < 1.5 months
- 1.5 months ≤ **S3** < 1.5 years
- **S4** ≥1.5 years.

The two pre-defined criteria - the level of preparation required before consumption (**Cn**) and shelf-life (**Sn**) - were assumed to be reasonably independent since no directly link could be established between them. They could consequently be arranged in a four by four *shelf-life by preparation required* matrix structure, extending the number of possible classes from eight (the 4+4 granted by a separate criteria use) to sixteen. This improved considerably the level of detail of the classification without having to increase the number of classificatory criteria or define sub-classes. The matrix system developed is expected to classify all products defined as HMR without ambiguities, providing a clear and meaningful structure for this product category.

3.4.2 Validation of the classification system

A procedure similar to the one presented by Pearson *et al.* (1985) and Park & Capps (1997) was followed, in order to assess the validity of the proposed classification. In the first step of this procedure, we have resorted to the Dutch National Food Consumption Survey 1997-98's (DNFCS) database to obtain an HMR product list. The DNFCS database records the types of food consumed by a representative sample of the Dutch population during the surveyed period, and contains about 3100 items. More specifically, it records all the foods reported to have been eaten, either at home or outside, at least once by one of the respondents during the survey (2-day food consumption diary method) (Voedingscentrum, 1999). It does not contain, however, any information regarding the quantities of each recorded food product that have been consumed during the survey. From the DNFCS database, and with the help of a Dutch dietician, all food products complying with the given HMR definition (174 items) were selected and its description recorded. Foods were only selected as HMR if they could be regarded as main courses of a meal that had been produced outside of the household. The decision of whether a food product could be considered a main course of a household meal was based on (1) whether the food product complied with the compositional requisites of the HMR definition, (2) our knowledge about

HMR products currently commercialised in the Netherlands, and (3) our knowledge of the characteristics of Dutch food consumption and meal structure. The DNFCS database provided the necessary information regarding the provenience of the food product and the place of consumption. Next, information about the shelf-life and the required preparation for the manufactured share of the 174 items was collected directly from the packaging of products displayed in supermarkets. In this way, the information level was the same as that available to consumers. HMR products that could only be bought at a foodservice outlet and are intended for immediate consumption were given the shelf-life of one day. It was assumed that they do not require any further preparation before consumption. Finally, each item was classified according to the pre-defined criteria (Appendix 3.1), and assigned to its respective C x S class combination within the matrix system.

3.4.3 Convenience-based qualitative and quantitative analyses of Dutch HMR consumption

The validation procedure followed implied the allocation of HMR products selected from the DNFCS database to the classification system. Hence, we were able to, based on the procedure developed by Pearson *et al.* (1985), directly apply the developed classification as framework in a convenience-based qualitative analysis of Dutch HMR consumption. In order to facilitate this analysis, the number of HMR products allocated to each class combination during the validation was calculated in a percentage form.

In a later step of the analytical procedure, the actual DNFCS consumption diaries of 2.564 Dutch households were screened for in-house HMR consumption[2]. Only 150 out of the 174 food products initially selected from the DNFCS's database as HMR could be traced back in the household diaries. This discrepancy was due to inaccuracies existing in the database and the exclusion of some products from the HMR category, after concluding that the surveyed households had not seen them as complete main courses. All the households in which one or more of these 150 HMR products was consumed during the 2 days of the survey were selected, and its HMR consumption (type of product and number of consumption occurrences) recorded. The household identification code and the demographic characteristics of the household member (s) who actually consumed the product were also recorded. The number of HMR consumption occurrences that could be allocated to the S_n x $C_{n\ (n=1,\ldots,4)}$ class combinations within the developed matrix system was tallied, as well as the number of consumption occurrences per HMR product. The 150 HMR products consumed were then arranged in a descending order by

the number of consumption occurrences per product. Six HMR product types, which together accounted for more than 70% of the total consumption occurrences, were sorted by its position within the matrix-shaped classification system.

3.5 Results and discussion

3.5.1 Validation of the classification system

The convenience criteria chosen and its organisation in a matrix structure demonstrated to provide a sound and effective classification system for Home Meal Replacements. The proposed system enabled the classification of all HMR products selected from the DNFCS database without any ambiguities, demonstrating its validity for the given product list. However, the results presented in Table 3.5 show that there were no products allocated to two class combinations (S4xC1, S1xC3) and to preparation level **C4,** which means that their specific validity could not be tested with the given product list. Thus, we can prove neither their validity nor their non-validity. Nevertheless, we have decided to assume these class combinations and **C4** as valid until rebutting evidence is presented.

	C1 Ready to eat	**C2** Ready to heat	**C3** Ready to end-cook	**C4** Ready to cook
S1 Shelf-life < 1.5 weeks	**32** (18 %)	**2** (1 %)	**0**	**0**
S2 1.5 weeks ≤ shelf-life <1.5 months	**11** (6 %)	**11** (6 %)	**3** (2 %)	**0**
S3 1.5 months ≤ shelf-life < 1.5 years	**2** (1 %)	**55** (32 %)	**14** (8 %)	**0**
S4 Shelf-life ≥ 1.5 years	**0**	**41** (24 %)	**3** (2 %)	**0**

Table 3.5 – Classification system displaying the allocation of the 174 HMR products selected from the DNFCS's database, and the percentage of products per Cn x $S_{n\ (n=1,\ldots 4)}$ class combination.

Our decision was based on three different aspects. First, there are HMR products currently commercialised in the Netherlands and elsewhere (Table 3.4) that are not present in the DNFCS database (due to the survey's nature and time span), but which could be allocated to the referred

class combinations or to **C4** level. For instance, canned tuna salad is a S4xC1 HMR product currently commercialised in Portugal and in the Netherlands. Thus, we have reason to believe that the validity of these class combinations and the **C4** level will be demonstrated when the system is tested with other product lists. Second, all convenience-based food classifications developed so far include some measure of either the food's level of readiness for consumption or, complementary, the preparation level it requires before consumption. In all of them, likewise, this measure ranges from a *ready-to-eat/no preparation required* convenience level to a *ready-to-cook/considerable preparation required* one. Therefore, and from the supplier's perspective, the defined *preparation required* criterion and its **C1** to **C4** class structure make perfect sense. On the other hand, evidence also exists that some consumer groups, for instance the elderly, enjoy playing at least a small part in preparing their meals, since this gives them the feelings of self-reliance and having more control over what they eat (Costa *et al.*, 2002; Larson, 1998, Solganik, 1997). All the evidence put together shows that level **C4** implies a degree of convenience in meals that is both relevant from the suppliers' and the consumers' perspective, and thus should be maintained in the classification. The third aspect concerns our trust that the proposed system reflects, at least partially, the way consumers classify HMR and perceive convenience in such products, that in turn influencing their product choice. In that context, classes to which no HMR products currently consumed can be allocated to should not be immediately dismissed, since this may indicate gaps on how product assortments are meeting consumer demand. This information can be used to guide new product and process development. Nevertheless, repeatability tests must first confirm that there might be indeed a true gap between demand and supply, rather than an artefact caused by the nature of the product list used or the system's definition. Furthermore, the trust on the consumer-orientation of the classification system must also be verified.

Overall, in order to trust the proposed HMR classification as a market analysis instrument, its usability, reproducibility and consumer-orientation still have to be established. Consumers, food scientists and marketers (at the academic and industry level) should assess the classification's usability and clarity. Supported on Pepper's (1980) findings, the existent relationships between the convenience-related classes of the proposed system and the different technological sectors involved in HMR production should be further examined. The usability test could show whether or not the development of a more detailed system is necessary in order to obtain clearer relations between classes and enabling technologies. Such development may involve the definition of sub-classes within the established classes. For instance, in class **C2** (Table 3.4), a sub-category

for products that are ready for consumption after thawing or re-hydration could be created. Regarding reproducibility, we should look in the Netherlands and abroad for databases similar to the one we have used in the validation procedure. This would allow us to obtain product lists that are equally representative in terms of the actual HMR consumption and test the reproducibility of the classification.

3.5.2 Convenience-based qualitative analysis of Dutch HMR consumption

The qualitative analysis of Dutch HMR consumption yielded some interesting results (Table 3.5). First, the fact that only 174 out of the 3100 survey items could be selected as HMR indicates that the use of a narrow range of HMR is characteristic of Dutch food consumption. It is not likely that this result was unduly influenced by the nature of the HMR definition used or the validation procedure. The proposed definition is rather broad and the check for product compliance with it was quite thorough. Secondly, the analysis revealed the concentration of HMR consumption at two convenience levels: top convenience products with minimum shelf-life (S1xC1), mainly sandwiches and prepared meals supplied by foodservice, and long durability convenient meals (S3xC2/S4xC2), mostly frozen or canned ethnic meals.

There are three possible explanations for the results obtained. The first hypothesis is that they are an artefact caused by the proposed HMR classification. This hypothesis can only be dismissed once the classification's validity with other product lists (repeatability testing) has been verified. The second hypothesis is that the concentration of Dutch HMR consumption is an artefact caused by the data sample used – the DNFCS database. This is highly unlikely since the survey was carefully designed to provide a representative picture of Dutch nation-wide food consumption in the years of 1997-98 (Voedingscentrum, 1999). Nevertheless, we can not completely dismiss this hypothesis since no similar surveys were performed at the time with other representative samples of the Dutch population, so that the results could be compared. The last, and most likely, hypothesis is that indeed Dutch HMR consumption in 1997-98 was practically limited to products belonging to the two referred convenience levels (and probably still is today), although products displaying different convenience levels were available. This hypothesis is partially corroborated by ready meals' sales for the Netherlands in 1997-98, in which canned and frozen ready meals together represented over 70% of the total sales volume (Datamonitor, 1998). This situation can be either due to the nature of Dutch consumer preferences or the characteristics of the HMR assortment available. How much each of these causes actually contributes to such concentration in HMR consumption and ready meals' sales is a topic worthy of further investigation. Nevertheless, it should be mentioned that forecasts for

the next three years indicate that while frozen meals will still represent half of total ready meals' sales, chilled meals will gradually surpass their canned counterparts as the second most sold ready meals in the Netherlands (Datamonitor, 1998).

3.5.3 Convenience-based quantitative analysis of Dutch HMR consumption

The second stage of the analytical procedure yielded a total of 388 HMR consuming households, who were responsible for 426 HMR consumption occurrences during the DNFCS. This represents approximately 15% of the households participating in the survey and about 1.1 HMR consumption occurrences per consuming household, respectively. This finding is corroborated by the results of DNFCS itself, which show that the group of *main dishes* (a category of foods roughly comparable to the HMR category) was not even among the 10 most used nutritional food groups in the Netherlands (Voedingscentrum, 1999).

Table 3.6 shows the number and percentage of HMR consumption occurrences that can be allocated to each of the S_n x $C_{n,\,(n=1,\ldots,4)}$ class combination within the classification matrix. The percentages displayed add to more than 100% since there were households that during the survey consumed HMR products belonging to different class combinations. This overlapping was, however, not relevant, and it was limited to the class combinations S_3 x C_2 and S_4 x C_2. This may indicate that Dutch households consistently choose to consume HMR products with the same level of shelf-life and convenience in preparation. Nevertheless, no definite conclusions can be drawn regarding this matter, since the DNFCS was limited both in time-span and number of participating households. The results depict in Table 3.6 confirm to a large extent those displayed in Table 3.5. Thus, the conclusions of the qualitative analysis of Dutch household HMR consumption previously drawn hold true. Differences between the values presented in Tables 3.5 and 3.6 were only relevant (above 2%) for the class combinations S_1 x C_1, S_1 x C_2 and S_3 x C_2. These differences indicate that the importance of the consumption of top convenience products with minimum shelf-life was reinforced by the quantitative analysis, namely in what concerns the consumption of chilled ready meals and HMR supplied by the foodservice.

Table 3.7 shows the six most frequently consumed types of HMR during the survey, the percentage of consumption occurrences per product type and the type's respective classification within the matrix system. These results show that 74% of the HMR consumed during the DNFCS comprised only four main types of products – take-away meals, frozen pizzas, canned soups and chilled ready meals. These groups all belong to classes that require none to minimal

preparation before consumption (C_1 and C_2), but display a wide range of shelf-life when classified according to the shelf-life criteria (S_1 to S_4).

	C1 Ready to eat	**C2** Ready to heat	**C3** Ready to end-cook	**C4** Ready to cook
S1 Shelf-life < 1.5 weeks	**140** (36 %)	**19** (5 %)	**0**	**0**
S2 1.5 weeks ≤ shelf-life <1.5 months	**15** (4 %)	**21** (5 %)	**6** (2 %)	**0**
S3 1.5 months ≤ shelf-life < 1.5 years	**0** (0 %)	**95** (25 %)	**30** (8 %)	**0**
S4 Shelf-life ≥ 1.5 years	**0**	**91** (24 %)	**9** (2 %)	**0**

Table 3.6 – Classification system displaying the number and percentage of HMR consumption occurrences during the DNFCS, which were allocated to each C_n x $S_{n\ (n=1,...4)}$ class combination (n=426).

TOP 6 HMR PRODUCTS	PERCENTAGE OF CONSUMING HOUSEHOLDS	CLASSIFICATION
Chinese take-away meals	24 %	S_1 x C_1
Frozen pizzas	17 %	S_3 x C_2
Canned soups	17 %	S_4 x C_2
Take-away pizzas	6 %	S_1 x C_1
Chilled ethnic and Dutch ready meals	5 %	S_1 x C_2
Chilled ethnic and Dutch ready meals (vacuum-packed)	5 %	S_2 x C_2

Table 3.7 – The six types of HMR most frequently consumed by the DNFCS' households, the percentage of consumption occurrences per type of product and their respective classification within the matrix system (n = 426).

Summarising, it can be said that the HMR consumed in 1997-98 by Dutch households consisted only of a handful of products (mostly ethnic meals), which display a consistently high level of convenience regarding the preparation they require before consumption. The range of shelf-life observed is somewhat wider, but products tend to have either a minimum shelf-life - 35 % of the consumed products belonged to class S_1 -, or long durability (34% of the consumed products belonged to classes S_3 and S_4).

3.6 Conclusions and future research areas

This chapter presented a clear definition and a new, valid classification system for Home Meal Replacements. Moreover, it seems that the classification proposed might be useful to establish relationships between product attributes and their consequent benefits, as perceived by consumers. If this proves to be the case, it would be interesting to use the classification to study how consumers perceive different convenience levels and how this perception influences their food choice. Other related areas, which could also be investigated using the classification, are (i) the influence of situation on convenience perception and HMR consumption (Verlegh *et al.*, 1999), (ii) HMR acceptability (Ghazala, 1999) and (iii) consumer trade-off mechanisms between health, taste and convenience (Rappoport *et al.*, 1992). Existing relationships between HMR consumption patterns, consumers' socio-demographic characteristics and convenience levels of HMR products could also be investigated using this classification, as suggested by the work of Pearson *et al.* (1985). This investigation could uncover areas where the introduction of new products and/or marketing strategies could bring great benefit. It may also be worth while to study the hypothesis of developing a similar classification for non-assembled main course components, which were not abridged by our HMR definition. Recent market reports indicate that the consumer demand for this specific type of convenience products is growing rapidly (Datamonitor, 1998; Ghazala, 1999, Solganik, 1997).

This chapter has proposed that classifications can play an important role in linking consumer perceptions, product attributes and enabling technologies, helping to streamline food product development. The analysis of the Dutch food consumption in 1997-98, through the use of a proposed classification for HMR, highlighted a mismatch between the diversity of convenience levels inherent to current offer and the narrowness of those inherent to the products actually consumed. We think that this analysis sufficiently demonstrates that such a classification system can provide valuable guidance for more consumer-oriented food product development and marketing activities.

3.7 References

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[1] This chapter merges two publications: Costa, A.I.A., Dekker, M., Beumer, R.R., Rombouts, F.M. & Jongen, W.M.F. (2001). A consumer-oriented classification system for Home Meal Replacements. *Food Quality and Preference* 12, 229-242 **and** Costa, A.I.A., Dekker, M., Beumer, R.R., Rombouts, F.M. & Jongen, W.M.F. (2002). A quantitative analysis of convenience-related food consumption in the Netherlands. In C.A.A. Butijn, J.P. Groot-Marcus, M. Linden, L.P.A. v.d. Steenbekkers & P.M.J. Terpstra (Eds.) *Changes at the other side of the chain – everyday consumption in a multidisciplinary perspective* (pp. 81-89). The Netherlands: Shaker Publishing.

[2] Each household participating in DNFCS was given two diaries to record the household members' food consumption during the two days of the survey: an individual diary for individual, out of the house, food consumption, and a diary for the in-house consumption of all household members (Voedingscentrum, 1999).

Appendix 3.1: HMR s' description and classification: designation, main components, preservation method, shelf-life and preparation instructions (examples).

DESIGNATION	MAIN COMPONENTS	PRESERVATION METHOD	SHELF LIFE	PREPARATION	CLASSIFICATION	
Bami Goreng	Beef/pasta/soy bean sprouts	Cooked	1 day	None	S1	C1
Big Mac	Beef/bread/onion/gherkin	Cooked	1 day	None	S1	C1
Chicken curry salad	Chicken/potatoes/celery	Refrigerated	23 days	None	S2	C1
Potatoes with bacon	Bacon/potatoes/onion	Refrigerated	1 month	Heat in a pan with oil or butter for 10-12 minutes	S2	C2
Pizza Tre Fromaggi	Cheese/pizza base/tomato	Frozen	6 months	Heat for 12-14 minutes in a conventional oven	S3	C2
Spaghetti carbonara	Cheese/bacon/pasta/broccoli	Dehydrated	12 months	Add to boiling water and cook for 10-15 minutes	S3	C2
Pea soup	Sausage/potatoes/peas	Frozen	6 months	Cooking in a pan for 15 minutes with added water	S3	C2
Egg roll	Chicken/dough/sprouts/leak	Frozen	8 months	Fry in oil for 25 minutes	S3	C3
Brie Sandwich	Cheese/bread/lettuce	Refrigerated	1 day	None	S1	C1
Dutch potato dish	Ham/potatoes/mushrooms	Frozen	6 months	Heat in a pan with oil for 10-15 minutes	S3	C2
Pea soup	Sausage/potatoes/peas/onion	Sterilised, in a can	2 years	Heat in a pan for 5 minutes	S4	C2
French meat dish	Beef/potatoes/peas Carrots /mushrooms	Frozen	6 months	Heat with a pan for 8 minutes with a small quantity of water or in a microwave oven for 10 minutes	S3	C2
Macaroni Ham/Cheese	Ham/cheese Pasta/tomato/peppers	Sterilised, in a flask	2 years	Heat for 2 minutes in a pan or microwave oven, or for 10-15 minutes "au bain marie"	S4	C2
Lasagne Bolognese Verdi	Ham/cheese Pasta/spinach/tomato	Refrigerated	14 days	Heat for 12 minutes in a microwave oven, for 25 minutes in a conventional oven or 'au bain marie'	S2	C3
Hunter's meal	Beef/potatoes/red cabbage	Frozen	11 months	Heat for 12 minutes in a microwave oven of for 40 minutes in a conventional oven	S3	C3
Vegetarian lasagne	Broccoli/carrots/pasta tomatoes/onion	Frozen	1.5 years	Heat for 14 minutes in a microwave oven or for 40 minutes in a conventional oven	S4	C3
Babi Ketjap	Pork/rice/onion/tomato	Refrigerated	15 days	Heat for 4 minutes in a microwave oven or for 20 minutes in a conventional oven or 'au bain marie'	S2	C2
Pasta salad	Salmon/pasta/apple carrots/broccoli	Refrigerated	23 days	None	S2	C1
Pizza Verdura	Cheese/pizza base/tomato Maize/broccoli	Frozen	10 months	Heat for 12-15 minutes in a conventional oven	S3	C2

Chapter 4

Market opportunity definition:
Bringing the consumer input to early design stages

4.1 Focus groups and in-depth interviews:
Perceptions of Dutch seniors regarding Home Meal Replacements

4.2 The collage technique:
Feelings, emotions and experiences of young Dutch adults regarding meal preparation

Focus groups and in-depth interviews: Perceptions of Dutch seniors regarding Home Meal Replacements[1]

Four focus groups (n=32) and 11 individual, in-depth, semi-structured interviews were conducted with self-standing senior (55+) residents of the Dutch Gelderland region. This research aimed at ascertaining the seniors' beliefs and opinions regarding Home Meal Replacements (HMR), as well as their perceptions of some of these products. Subjects were all in charge of meal acquisition and/or preparation at their households, and included both HMR users and non-users. Results indicate that, besides meal composition, the hedonic aspects of preparing and eating a meal are important. Reasons for using HMR are mainly related with convenience and timesaving aspects or incapacity to cook, while reasons for not using HMR are related with a higher degree of trust and self-esteem achieved by preparing one's meals. Taken together, our findings show that psychological factors, especially the low moral status of convenience foods, play an important role in the seniors' meal choice, which raises interesting questions for future research. By focusing more on overall priorities and concerns about meals than on quantitative evaluations of single products, focus groups and in-depth interviews gave a significant contribution to a better understanding of the Voice of the Consumer regarding HMR.

4.1.1 Introduction

Home Meal Replacements (HMR) have been recently defined as *manufactured main courses (or pre-assembled main course components) of a meal – a protein (animal or plant), a carbohydrate (starch) and a vegetable source -, designed to fully and speedily replace the main course of a homemade meal* (Costa, Dekker, Beumer, Rombouts & Jongen, 2001). This definition encompasses not only the so-called r*eady meals* (manufactured HMR), but also *meals-on-wheels*, home-delivery and take-away services. According to an analysis of the 1997-98 Dutch National Food Consumption Survey's (DNFCS) results, over 15% of the Dutch population uses HMR (Costa, Dekker, Beumer, Rombouts & Jongen, 2002; Ruijschop, 2002). Over 19% of these HMR users are older than 55 years, which is somewhat surprising since HMR consumption in the Netherlands has always been associated with young, dual-income couples (Zuurbier & Migchels, 1998). Nevertheless, a European study on seniors' nutrition (Hautvast, de Groot & van Staveren, 1992), reporting a wide consumption of ready meals among Europeans between 70 and 75 years of age, provides some support to the DNFCS's findings.

Senior citizens (55+) currently represent 23% of the Dutch population, a share expected to rise to about 30% in 2015, mostly due to an increase in life expectancy (CBS, 2000a,b). Most Dutch seniors are, at least, in reasonable health and have an income from which they can live comfortably, though there is a considerable minority – some single seniors and widows, the very old and seniors from ethnic minorities- who are in a less favourable situation. In 1992, only 25% of the Dutch population between 55 and 65 years old (mostly men) remained in the workforce (Hielkema & Kuyer, 1995). Along the nineties, though, the Netherlands' early retirement trend was slowly reverted, with the government encouraging seniors to remain working after retirement, to help fight the shortage of labour and the need for immigrant workforce. The Dutch government is also highly interested in increasing the amount of self-standing seniors and their quality of life, as this eases the pressure on welfare and health care systems (BBC, 2000; Klerk & Timmermans, 1999).

All things considered, it looks like most of the Dutch seniors will probably be able to enjoy the rest of their (long) lives with a reasonable degree of both physical and economical self-sufficiency (Hielkema & Kuyer, 1995). This evidence, together with the expectation of a growing *grey* buying power with an interest for high-quality products and services, has made of Dutch seniors a very attractive market segment for many companies (Todd, 1995). In view of this, marketers have segmented Dutch seniors (from a life-style perspective) into three distinct groups (Sonneveldt, 1996):

- The *Golden Enjoyers* (21%)– Socially and physically active people, with high spending power and not much will to cook everyday;
- The *Silvered Singles* (21%) – Reasonably healthy, well-off widows, very active in associations, eating out frequently;
- The *Bronzed Home-birds* (58%) – More conservative seniors, with poorer health and little wish to be socially active, keen on cooking and eating Dutch traditional recipes.

In what respects food-related behaviour in particular, it seems that Dutch seniors are mostly interested in the aspects of eating which will enable them to have a long and independent life. They are, therefore, interested in healthy eating, which they associate with the consumption of fresh foods (especially vegetables), and pay attention to their salt, sugar and fat intake. They also pay considerable attention to price. Dutch seniors enjoy shopping for food, preferring speciality shops to supermarkets, as buying daily in supermarkets is found to be too tiresome (Hielkema & Kuyer, 1995). Studies performed so far have investigated Dutch seniors'

nutritional needs, the determinants of their appetite and the quality of meals served to them by resting homes and meals-on-wheels services (Hautvast *et al.,* 1992; LCO, 1995; Mathey, 2000). Yet, not much is known about their beliefs, attitudes and wishes regarding food and eating, particularly meals and meal preparation. It is generally thought that Dutch seniors do not have a high regard for meal replacements, since they consider their own cooking to be healthier (Hielkema & Kuyer, 1995). Nevertheless, based on the available consumption data, it seems that at least some of these seniors do regularly replace their home-cooked meals, mostly by take-out meals from Eastern cuisine restaurants or frozen ready meals from supermarkets (Costa *et al*., 2002; Ruijschop, 2002).

As governments and society encourage seniors to become more self-standing and intervening in daily life, less time and energy remain for food-related household activities. Dutch seniors are beginning to question themselves about what they will eat when they do not wish, or are no longer able, to purchase and fully prepare their meals. As they become more active in society, it is reasonable to expect an increasing demand for healthier meals that require little or no preparation (Hielkema & Kuyer, 1995). To our knowledge, however, there are no published studies reporting on what sort of features these seniors expect to find in cooked meals, particularly in meals that have been prepared for them, and their relative importance. It becomes thus imperative for meal providers (both institutional and private) to seek a better understanding of what seniors expect from products that can potentially replace home cooking. Based on these considerations, the aims of this study are:

- To get a better impression of Dutch seniors' views on HMR through the performance of qualitative research, which can then serve as basis for future surveys;
- To come up with suggestions for manufacturers on how to make HMR more attractive to seniors and create new meal replacements for this segment.

This sub-chapter starts by describing the methodological aspects that presided to the qualitative research performed. Next, the research findings are presented and extensively discussed. Finally, some conclusions regarding the potential of HMR for senior market segments in the Netherlands are drawn, and avenues for future research on this topic are suggested.

4.1.2 Qualitative study

4.1.2-1 Methodology

Food-related, qualitative consumer research can be roughly divided in two areas – observation and inquiry. Inquiry methods encompass both group and individual interview settings, as well as different levels of structured questioning (Marshall, 1997). Focus groups are thoroughly planned, moderated group interviews designed to obtain the perceptions of several individuals (usually between 6 and 9) regarding a specific area of interest in an informal, non-threatening environment. The careful and systematic analysis of the group discussions should generated considerable insight into how a certain topic is perceived by individuals (Casey and Krueger, 1994). Although focus groups are said to be particularly suitable for exploratory research regarding product, service or concept development, individual, in-depth interviews can be used for the same purpose without compromising the quality of the results obtained (Griffin & Hauser, 1993). Individual interviews are especially suitable when social acceptability and peer-pressure may unduly influence individual responses (Marshall, 1997).

Several researchers have compared quantitative and qualitative consumer research methods, and among the last, the efficiency and effectiveness of focus groups *vis-à-vis* individual interviews (Aldag & Tinsley, 1994; Casey & Krueger, 1994; Dawson, Manderson & Tallo, 1993; Fern, 1982; Griffin & Hauser, 1993; Marshall, 1997; Ressureccion, 1998; Stewart & Shamdasani, 1990). It is generally acknowledge that qualitative research methods present three main advantages when compared with quantitative ones:

- They allow researchers to gather wide-ranging information quickly and at low cost;
- They enable the collection of large and rich amounts of data in respondents' own words;
- They allow researchers to interact directly with respondents, which facilitates follow-up questioning, probing for more information and the observation of non-verbal cues.

Nevertheless, the analysis and interpretation of qualitative findings, which are usually not quantifiable, is a rather time-consuming, difficult and subjective process. Moreover, due to the usually small number of subjects inquired, who may or may not represent the population under scrutiny, results can hardly be extrapolated. Finally, there is also the danger of researchers unduly believing more the qualitative results than the hard statistical data, since these results are generated 'live' and heard directly from the consumers' mouth.

Setting aside the discussion of whether or not focus groups yield richer data than individual interviews (since the contradictory nature of the findings reported in literature does not allow us to take any definite conclusions on this matter), the potential rewards of conducting focus groups are said to be:

- A potentially higher chance of getting new ideas or uncovering underlying opinions, since the subjects can react and build up on each other's responses;
- A potentially higher chance of getting more and better information since the subjects, by providing and discussing their opinions together with others in a relaxed and open environment, are probably more motivated to adequately fulfil their task than in an individual interview.

However, focus groups may also present limitations, especially if they are not carefully planned and conducted:

- Subjects may tend to agree with each other, give socially accepted answers, be unduly influenced by a dominant participant, or not talk at all if they are shy;
- The presence of a moderator and the way he or she conducts the discussion can lead to biased results.

Both focus groups and individual, in-depth interviews have been successfully used in the collection of food-related believes, attitudes and views (Brug, van Assema & Weijts, 1995; Crockett, Heller, Merkel & Peterson, 1990; Furst, Connors, Bisogni, Sobal & Winter, 1996; Holm & Kildevang, 1996; Thompson, 1996).

After carefully weighing the advantages and disadvantages of focus groups and individual interviews, and taking into consideration the study's aims and the characteristics of Dutch seniors, we decided that the most suitable approach was to conduct both group and individual interviews. We expected the planning and performance of focus groups at a central location to be more feasible given our time and budget constraints. Nevertheless, by conducting also some individual interviews, we would give seniors less able or willing to join a group discussion the opportunity to take part in the study, thereby increasing the number of potential subjects. Moreover, we would be able to pursue lines of questioning more socially sensitive than those discussed with the groups, and cross-check the results obtained with both methods for any undue bias.

Based on the above-mentioned considerations, semi-structured guides for both the group discussions and the individual interviews were developed according to the standard guidelines (Casey & Krueger, 1994; Dawson *et al*., 1993; Holm & Kildevang, 1996; Stewart & Shamdasani, 1990). The focus group guide divided the discussions into two parts of 40 minutes each, with a 15 minutes break for refreshments in between. With the aim of putting the subjects at ease with each other, the first part started with a general question, to be asked in turn, and proceeded to discuss the subjects' attitudes, beliefs and opinions about home made meals and ready meals. In the second part, subjects were to be shown 5 branded ready meals available at local supermarkets (a frozen, a chilled, a canned, a vacuum-packed and a dried version of the same pasta dish), and asked to give their opinion about them. Subjects were to be free to touch and examine the samples and open the packages, but should not be given the opportunity to taste the product. This was done in order to extend the discussion to other aspects besides the products' sensory attributes. The structure of the individual interviews' guide was similar to that of the first half of the group discussions, but encompassed additional questions of a more behavioural nature. Individual interviews were planned to last no more than 90 minutes.A pre-test of the two guides was carried out among university students, to see whether the questions were understood as intended. These questions were also shown to experts in nutrition and consumer research experienced with interviewing seniors, improved according to their comments and re-tested. This re-test was already performed by the interviewers selected to conduct the group discussions and the individual interviews. The final set of questions used throughout the focus groups and individual interviews is depicted in Table 4.1.1.

According to the guidelines presented by Stewart and Shamdasani (1990), the interviewers and moderators were recruited among food technology graduates with a background in consumer research, who appeared to be genuinely interested in the research and curious to hear the seniors' opinions. Preference was given to graduates who seemed to possess a reasonable degree of social skills during the recruitment interviews. The two selected interviewers had a month to familiarise themselves with the research area, the target population, the skills of focus group moderation and interviewing and the interview guides. Interviewers trained themselves by asking for advice from people who had experience with focus groups or interviewing seniors, and by watching videotapes of focus groups previously performed. During the training, it was stressed that interviewers should interfere as little as possible with the subjects' flow of speech and remain neutral in their speech and non-verbal conduct, in order to maintain the discussion natural and informal (Casey & Krueger, 1994). The interviewers were also introduced to the

basic aspects of qualitative data analysis (Marshall, 1997; Spiggle, 1994), since they were expected to participate in the analysis and interpretations of the findings to be obtained.

FIRST PART OF THE FOCUS GROUPS AND INTERVIEWS:
1. How does your daily hot meal look like? What kind of meals do you prefer?
2. Which characteristics do you find important in a hot meal?
3. What kind of ready meals do you know?
4. What is your opinion about ready meals? What is your experience with them?
5. Do you use ready meals regularly? Why/Why not?
6. Would you use ready meals regularly if you were not able or not willing to cook anymore?
7. If you would start using ready meals regularly, what would be the opinion of your family or acquaintances? Would that opinion matter to you?
8. How much do you usually spend on your daily meals? What is your opinion about the price of ready meals? How much would you be willing to pay for them?
SECOND PART OF THE FOCUS GROUPS:
9. Which aspects of the displayed products raise your attention?
10. Having in mind your answer to question 2, what is your opinion about these products?
11. Which of these products would you choose for your hot meal today? Why?

Table 4.1.1 – Main questions asked to the subjects during the focus groups and interviews. Questions in italic were asked during the interviews only.

4.1.2-2 Subjects

The target population for this study was defined as *self-standing Dutch citizens (men and women) aged 55 years or older, in charge of meal acquisition and/or preparation at their households*. This definition excluded individuals living in resting homes, but included seniors who occasionally (but not regularly) ate at day care centres or made use of the meals-on-wheels service. For the convenience of both subjects and interviewers, it was decided to only select individuals who had their residence in the Gelderland region, preferably near the town of Wageningen. Moreover, and to ensure a reasonable degree of representativity, it was decided that the recruitment procedure should aim at obtaining subjects with different educational levels, marital status and housing situations. Finally, both users and non-users of ready meals were to be recruited, as we were interested in obtaining as much different views of HMR among seniors as possible.

Subjects were recruited directly at supermarkets, the Wageningen seniors' association and the canteen of a sports facility. The individuals approached were briefly informed about the general research aim – to know their opinion about meals and meal preparation -, and asked to provide some answers for a short questionnaire, which included socio-demographic variables and aspects related to meal preparation and HMR use. The subjects' selection was based on some of these factors, such as age, knowledge about HMR and responsibility in meal acquisition or preparation. Care was taken not to select individuals for the group discussions who were acquainted with each other. The eligible individuals were invited to choose between participating in a (video-recorded) group discussion about meals and meal preparation at the Wageningen University or making an appointment to receive the interviewer at their home for an individual (audio-recorded) interview. Individual interviewees were asked to select a time of the day when they felt they had the availability and quietness necessary at their homes to give their full attention to the interview. Potential focus group participants received a written invitation displaying the date and time of their session and a telephone number to contact in case of questions or cancellation. They were also informed that transportation to the university could be arranged for them, if necessary. One day prior to their interview or group session, the subjects were contacted by telephone to confirm their participation. Forty-three individuals ended-up participating in the study - 32 in the group discussions and 11 in the individual interviews. Table 4.1.2 depicts the main characteristics of these two samples of subjects.

4.1.2-3 The focus groups

A total of four focus groups took place, two in the first semester of 1999 and two in the second semester of 2000. All these group discussions took place at a lecture room of the Wageningen University, between 10 and 12 o'clock in the morning. The University is a non-commercial location close to the subjects' home, and its lecture rooms provided the necessary space, comfort and quietness. Since the discussions were video-recorded, 3 persons associated with the research team were present in each focus group: the moderator[2], an assistant[3] and a cameraman. The assistant organised the arrival and departure of the subjects, observed the discussions and took notes of the main ideas mentioned.

The subjects were received upon arrival by the assistant and guided to the lecture room, where they were served coffee or tea. There, the moderator, the assistant and the subjects were seated at tables placed in a circle. To facilitate the discussion name cards were placed on the table in front of the subjects. The cameraman was located in the background behind the subjects and was

	FOCUS GROUPS (n=32)	INTERVIEWS (n=11)
GENDER		
Female	84%	64%
Male	16%	36%
AGE		
Range	54-84 years	59-81 years
Mean ± SD	70.53 ± 8.25	69.4 ± 7.97
MARITAL STATUS		
Married/living together	53%	36%
Single	6%	0%
Widow/widower	31%	36%
Divorced	9%	28%
HOUSING STATUS		
Independent	78%	91%
Service flat	22%	9%
EDUCATION LEVEL		
Low	19%	36%
Middle	50%	46%
High	31%	18%
EMPLOYMENT STATUS		
Paid Job	6%	18%
Unemployed	16%	0%
Retired	78%	82%
USE OF READY MEALS		
Yes, often	62%	73%
Yes, but not very often	13%	9%
Never	25%	18%

Table 4.1.2 – Socio-demographic and product usage characteristics of the subjects.

instructed to film from a fixed point without disturbing the discussions. The focus groups started with the moderator welcoming the subjects and briefly introducing herself, the assistant and the cameramen, and reminding the subjects that the session was being video-recorded. Next, the general research topic and the aim of the session were explained. The subjects were informed of some ground rules for the discussion (Stewart and Shamdasani, 1990) and asked if they had any further questions or remarks. If not, and according to the interview guide, the moderator initiated the discussion by asking the subjects, in turn, what they found important in a hot meal. Approximately 30 minutes later the break for refreshments took place. The second half started with the presentation of the 5 selected ready meals to the subjects. After the last question in the guide being addressed, the moderator summarised the main ideas coming out of the discussion, asked for any final comments or questions, thanked the subjects for coming and closed the session. The assistant then accompanied the subjects out and presented the gifts (a ready meal or

a gift coupon). At that time, most of the subjects took the opportunity to tell that they had greatly enjoyed the session.

4.1.2-4 The individual interviews

Eleven individual interviews took place throughout the second semester of 1999. Upon arrival to the subjects' home, the interviewers introduced themselves, re-stated the general aims of the study and reminded subjects that their conversation was to be tape-recorded. Interviewers also took notes throughout the conversation. The interviews started by asking the subjects to describe their daily hot meals and proceeded from there to address the other questions in the guide. After the last questions regarding the cost of meals and ready meals were answered, the interviewer summarised the main ideas contained in the answers provided, asked for any final comments or questions, thanked the subject for his or her participation and closed the interview. At that time, the subjects were also rewarded with gift coupons.

4.1.2-5 Analysis of the results

After each focus group, the moderator wrote down her first impressions from the session, afterwards comparing her notes with those of the assistant. Next, the respective video recording was viewed and discussed, and based on it, a complete transcript of the session was made. The audio-recordings of the individual interviews were also transcribed and supplemented with the notes taken by the interviewers. All this written documentation was translated into English by the research team (the interviewers and the focus group assistant), with two independent researchers checking the accuracy of the translation. The English transcripts were then carefully read and content-analysed by the research team according to the guidelines present in literature. (Casey & Krueger, 1994; Furst *et al.*, 1996; Holm & Kildevang, 1996; Marshall, 1997; Spiggle, 1994). A summary of the main ideas put forward by the subjects during each focus group and each interview was made. Sections of the transcripts that were incomplete or did not make much sense were eliminated at this stage, together with sections of doubtful veracity. Based on this summary, a system of categories covering everything relevant said during the discussions or the individual interviews was developed independently by each member of the research team. These categorisations were afterwards discussed among team members until a consensus was reached over two final sets of category labels: one for the four focus groups and another for the individual interviews. Following a 'copy-and-paste' procedure, the parts of the transcripts relevant to each category were then grouped together under the respective label, after being coded with the identification of the participant and the discussion or interview concerned. Based

on the labels and excerpts directly related to the questions considered in the interview guides, global summaries of the focus groups and individual interviews – consisting of key findings and related subjects' quotations – were finally made.

4.1.3 Results and discussion

Tables 4.1.3, 4.1.4 4.1.5a and 4.1.5b summarise the key findings obtained with the four focus groups and display some related quotations. The results of the individual interviews conducted, given the shorter extension of the data obtained, will be presented throughout this section' text.

4.1.3-1 Daily hot meals and seniors' preferences

According to our individual interviewees, their daily hot meals are mostly eaten in the evening, although a few subjects reported to have their hot meals at noon. The standard Dutch recipes – a piece of stewed or fried meat, boiled potatoes and boiled vegetables, are typically used in the large majority of hot meals. These are simultaneously the most preferred dishes, although some subjects mentioned they once in a while liked to try new recipes. The most preferred, "unusual" meals consisted of eastern cuisine-type dishes based on recipes from cooking magazines or supermarket brochures. These were said to introduce different ingredients and flavours in the diet, breaking the monotony of the typical Dutch cuisine and, consequently, helping to avoid boredom and lack of appetite.

Concerning meal composition, and due to health concerns, only small quantities of meat were reportedly eaten, with red meat being often replaced by grilled or fried poultry. Most respondents said they used plenty of fresh vegetables in their meals, which were often accompanied by fresh green salad. Variation was said to be introduced in the diet by changing the staple (rice or pasta instead of potatoes) or the proteins source (fish, eggs or vegetarian instead of meat) a couple of times per week. On Sundays, some subjects reported to replace their usual meals by take-out pizza, Chinese food or soup and sandwiches. In turn, fresh salads were said to be generally preferred over hot meals in the summer. Soups and salads were, however, mostly seen as starters, not main dishes, with dairy products constituting the most frequent and appreciated type of dessert. Some subjects mentioned that meals prepared for guests or invited family members were usually different from the household regular meals in their complexity.

4.1.3-2 Important characteristics of a hot meal

According to the focus group participants, the main characteristics of a hot meal were variation, appearance, taste, healthiness and freshness (Table 4.1.3). Regarding variation, subjects stressed

Variation	"Meals must be varied" "It is important not to repeat meals in the same week"
Taste, **Appearance**	"I think that above all meals must be tasty" "Taste and smell are very important" "It is important how the meal looks like, that it looks appetising" "I find the colour of a meal important, it should not be too homogeneous" "The meal should be well cooked" "Potatoes should not be overcooked. Vegetables should be crunchy, to let the taste come forward"
Healthiness, Freshness	"It is not only about eating tasty food, I want to eat healthy food everyday" "You must get your vitamines" "It is important to pay attention to the amount of fat in the meal" "I preferably eat freshly prepared meals" "The freshness and quality of a meal are important things to me"
Preparation	"It has to be prepared quickly, I don't like standing in the kitchen for hours" "The meal's quality is more important than how long it takes to prepare it"
Composition	"What I mostly like to eat is the Dutch pot, as mother cooked at home" "I am from the generation of potatoes, vegetables, meat and gravy." "Meals should be simple, but good and varied"
Serving and eating	"I always eat at a set table" "It is important to serve the food warm" "It is important that you take the time to have your diner" "It is the atmosphere around it that makes a nice meal"
It is one's duty to cook	"I don't like to be in the kitchen for long. But I make sure that meals are cooked everyday one way or another" "I was never an enthusiastic cooker. I cook because one has to"
One should make one's own meal	"I hear about women who don't want to cook and I think: girls, you have the whole day for it!" "I find ready meals totally unnecessary. I can shop for myself. The most important thing is to be active." "Ready meals are for lazy people"
Appreciation, achievement	"I enjoy when my children come to eat at my place. I love when they say: Mom, it was delicious" "I make a big effort to please my guests with my meals" "A good meal is the meal I cook, with fresh vegetables and tasty meat"
Socialising	"Making time for diner, the entire atmosphere. Everybody sitting together at the table, the best part of the day" "Dinner is a social event. It is not only the quality of the food, it is also the quality of the conversation" "We try to prepare something in advance, so that we spend less time in the kitchen when the guests arrive"

Table 4.1.3 – Important characteristics of a homemade hot meal mentioned by the subjects during the focus groups, together with some related quotes.

that the hot meal should be varied on itself, that is, that meals should not contain only potatoes, or only meat, but rather a combination of a starchy component, a protein source and different vegetables. Additionally, variation across meals was highly appreciated, as it was thought to ensure a healthy diet. Subjects stated that, although they believe to remain fairly good eaters, they did not have as much appetite as they did before. Consequently, the perceived appearance and taste of the meal influenced highly their appetite. In their opinion, meals should look and taste good in order to increase appetite. Meal components should be well cooked but not overcooked. Potatoes that remained intact and crunchy vegetables were appreciated features, as they were associated with a more pleasurable taste and mouthfeel. Subjects stated that it is important for them to eat healthy meals, meaning meals that are freshly prepared everyday from non-processed ingredients, low on salt and fat, and containing a high amount of raw or cooked vegetables. The importance of variation in the diet was also stressed by the subjects interviewed individually, as they perceive it to have a considerable influence on the taste and healthiness of meals. Healthy eating was associated by these interviewees with eating moderately, avoiding large quantities of meat, cooking fat and salt, and consuming only fresh foods (especially fresh fruits and vegetables). Processed foods were seen as containing high amounts of additives, salt and fat, which could potentially damage their health. Similarly to focus groups participants, individual interviewees also considered the appearance of the meal, namely the colour, as an important indicator of tastiness and freshness. This was said to exert considerable influence on their eating enjoyment.

Other aspects of the hot meal, such as composition and how the meal should be served and eaten, were also mentioned spontaneously during the focus groups (Table 4.1.3). According to subjects, daily meals should be simple and preferably follow the tradition of the Dutch cuisine: boiled potatoes, fried meat with gravy and boiled vegetables. Soup, dessert and salads are appreciated but not essential. However, some meals may be different. For instance, subjects stated that on Sundays they rather eat soups and sandwiches or order meals from the Chinese restaurant than prepare a hot meal, since they are usually not willing to cook. Both the participants in the group discussions and the individual interviews were of the opinion that meals should generally not take too long to prepare. Nevertheless, they were mostly not willing to sacrifice quality for quickness in preparation, especially when having guests or family members for dinner. Meals should always be prepared with care, served warm and eaten at a set table. The eating environment should be cosy and people should take time to enjoy their meals, especially when eating together with others. Mealtime was regarded as one of the highlights of the day, a time to socialise with family or friends.

Some of the underlying values attached to meals and meal preparation were put forward by the participants in the focus groups (Table 4.1.3). Meal preparation was generally seen as a (woman's) duty. Independently of whether a person has time for cooking or actually enjoys it, meals should be cooked from scratch everyday. Furthermore, people who are not willing to cook everyday, or search for alternatives to their own cooking, are seen as lazy, with subjects attaching a high value to being active and doing things for oneself. To prepare meals was also seen as a means of being appreciated by your family and as giving a sense of achievement. Some of the individual interviewees shared these views, stating that they were against the concept of replacing their own cooking since they thought that it was everybody's duty to cook. As one woman stated "to warm up something in the oven does not feel right, it feels too easy, too…modern". Even occasional users of ready meals reported that not cooking led them to feel a bit guilty, "like I have done something that I really shouldn't".

4.1.3-3 Knowledge and opinion about ready meals

Subjects' general knowledge regarding the current ready meals' offer available in Dutch supermarkets was very good. Even non-users knew a wide variety of products and could correctly describe a considerable number of them.

The large majority of the participants in the focus groups declared that they viewed ready meals as being more appropriate for other groups of consumers (Table 4.1.4). Ready meals were seen as products suitable for people who cannot cook anymore – "for the really old or sick" -, people who do not know how to cook – young people and male adults in general – and working people – "they don't have time to cook, we do". Generally speaking, ready meals were seen as products for people who can not or will not make the effort to cook, or that do not enjoy eating anymore. A few subjects also stated that the fact that they did not have a microwave or did not know how to use such an appliance prevented them from using ready meals. Nevertheless, subjects could name situations where the use of ready meals might be handy, like on "special" days (when one is "allowed" not to be in the mood for cooking, like on weekends or very busy days) – when eating alone, when having unexpected guests, during holidays, etc. Other situations in which these meals can be convenient are, according to the subjects, when one forgot to shop for food or just came back from holidays, or when a particular recipe is too complicated to prepare. Some subjects also said that ready meals are handy when, due to other engagements, one simply does not have enough time to cook and eat one's dinner. The use of ready meals by people who are too ill or too old to cook, or by widowers, was also seen as something not reproachful. Moreover

Ready Meals are not for me	"They are for people who cannot cook anymore"
	"They are for men who cannot cook themselves"
	"Young people do not cook anymore, they don't enjoy the pleasure of preparing their own food"
	"People who work would use ready meals before we do"
	"If you want to use ready meals than you have to have a microwave. I don't have one"
	"We are just not used to them"
Ready Meals are mass-produced and standardised	"They contain a lot of added stuff, E-numbers"
	"Ready meals are mass-produced, I don't believe that any quality product can come out of that. They must put the cheapest vegetables and potatoes in it"
	"If you buy the ingredients yourself, you choose the amounts, the quality and the price. With ready meals you don't have that control anymore"
	"The quantities are standard: for one person it is too much, for another too little, for another too little vegetables or too many potatoes…"
	"There are too little vegetables"
Ready Meals are not wholesome	"If you eat ready meals everyday you will quickly get a deficiency in some vitamins. We miss a salad as side-dish"
	"Ready meals are fatty and salty"
	"Meals that lay for a week in the supermarket before they are sold cannot be fresh anymore"
	"In spite of the package I have the feeling that bacteria can grow in it really quickly"
Ready Meals are expensive	"I think you can cook yourself for less money"
	"Look at how much electicity you have to spend to get the oven warm in the first place!"
	"A ready-to-eat meal on its own doesn't look that yummy. If you want to eat a tasty meal, you have to organise yourself and add something extra. You might as well cook in the first place"
Ready meals do not look or taste that good	"I think that they often don't look that tasty, with all that cooked stuff in it"
	"I have tried it once, I thought it was not tasty"
	"It's too salty"
	"The potatoes fell apart when warmed, I had to eat them with a spoon"
Package is excessive and not handy	"Everything looks nicely packed, but if you look at your dutsbin at the end it is full with plastic"
	"Even with this one person's package you get a pile of waste"
	"The package gets too hot in the microwave. I always burn my fingers on it"
	"You only get this little piece loose to pull the lid off. You have to get a pair of scissors and cut the package open. I think that is terrible"
Labelling	"The ingredients are there but not how much of each ingredient"
	"The information regarding whether the package can or cannot go into the oven or microwave is not clearly written on the packages"
	"Sometimes the letters are too small"
Ready meals are not that convenient	"Frozen foods do not warm up well in the microwave. The outside is cooked but the centre is still frozen"
	"You can also be ready in 15 minutes when cooking yourself. It takes only 10 minutes to prepare noodles"
	"Take-away meals are already cooked. I just have to take them home and eat them, and that is it"

Table 4.1.4 – Opinions about ready meals mentioned during the focus groups, together with some related quotes.

some individual interviewees declared that they greatly enjoyed cooking, which in their view constituted a major obstacle to the replacement of homemade meals.

Both focus group and individual interviewees perceived ready meals, in general, to be standardised, mass-produced and unwholesome foods (Table 4.1.4). They stated to believe that ready meals contain mostly bad quality ingredients, excessive amounts of food additives and are prone to quick spoilage. They also stated that people who frequently eat ready meals do not get a well-balanced, healthy diet. Furthermore, ready meals were viewed as being expensive and energy-intensive. Subjects believed they could cook a cheaper and tastier meal in the time that takes to prepare a ready meal. Ready meals were also seen as being rather incomplete from a nutritional viewpoint. Subjects declared that when they use ready meals, they feel the need to prepare something additional, like a salad or a fried egg. Some individual interviewees stressed the lack of control they felt over several aspects of the manufacture of a ready meal: quality of ingredients, seasoning, portion size and price. Moreover, the preparation process itself was seen as an indication of the major shortcoming of ready meals. As one male interviewee stated "warmed up food is not fresh food, it is not as tasty, does not have as many vitamins, it is not as healthy as a meal cooked from scratch. Perhaps ready meals are not that bad, but they can't beat what you cook yourself."

The experiences related to ready meal use, described by focus group and individual interviewees, were mostly not very positive (Table 4.1.4). Ready meals portions were found to be generally too big, but often containing relatively few vegetables. They were also considered to look mostly unappetising. Some subjects found them to be often overcooked and salty, while others found them just not tasty enough. Packages were seen as difficult to handle and open, especially the ones going into the microwave, and as creating an excessive amount of waste. The information on the label was found to be mostly not quantitative enough and written in too small letters to be readable. Finally, subjects found ready meals not that much easier or quicker to prepare than their own meals. Some of them also stated that they rather order from take-away services, since these meals are already fully prepared. Nevertheless, subjects could also name positive aspects of ready meals. They thought that ready meals usually tasted much better than they looked, were really quickly and convenient to prepare and convenient to stock.

4.1.3-4 HMR as an alternative to self-cooking

When confronted with the idea that in the near future they might not be able to cook anymore, most of the subjects in our study reacted in an unconcerned manner. Some of them simply declared never to have considered such possibility. Others declared that they would ask

neighbours or a relative to prepare their meals. Others yet stated that people who can not cook anymore should not be living independently anyway. Nevertheless, participants in the focus groups extensively discussed alternative solutions to the problem, such as the regular use of ready meals or meals-on-wheels services. Some were more in favour of using ready meals, since they thought these would allow them a higher degree of independence than the meals-on-wheels service. One participant said: “With ready meals you still decide when you eat and what you eat. It is reassuring to know that they exist”. Subjects also found it inconvenient that one has to be at home at specific hours to receive the meals from the meals-on-wheels service. Regarding the positive aspects of meals-on-wheels, subjects named the fact that they are brought home (eliminating the need to shop everyday) and that they offer plenty of choice, including tailored meals for people following a diet. Subjects clearly preferred meals-on-wheels services providing frozen or chilled meals to the ones providing hot meals. They thought that it was likely that the meals were already lukewarm when people received them. Moreover, they found the fact that they would have fixed times to eat, depending on the schedules of the meals’ distribution, highly inconvenient. On the other hand, services delivering chilled or ready meals were seen as giving them more freedom to decide the timing of meals and other daily activities, since distributions were not so frequent and meals could be stored for a longer period. The only downside to this service was the fact that subjects would then have to own a microwave and be able to handle it.

4.1.3-5 Opinions of relevant others about the use of ready meals

The statements of the individual interviewees diverged considerably on this topic. Some regular users of ready meals said their children did not mind, and even encouraged them to use them, for the sake of self-sufficiency. Others said that, although the children disapproved of this behaviour, they went on using them anyway. Most non-users, however, found the (potentially unfavourable) opinion of their children, husband or acquaintances to be an additional obstacle to the consumption of ready meals. As one woman put it “I think that the people within my close environment would find it very strange. They would think I was drifting away from my beliefs, giving in to the easy life”.

4.1.3-6 The price of meals and ready meals

The large majority of individual interviewees were unanimous in considering that ready meals should not cost more than homemade ones. Only one ready meal user said that she understood the service being provided to her by the convenience attributes of these products. Therefore, she thought that is was natural that they were more expensive than her own meals. However, the

general opinion was that these meals were too expensive, with a few, most spendthrift, saying they were willing to pay up to 5.5 Euro for a ready meal. Meanwhile, the most thrift declared themselves not ready to pay more that 1.5 Euro.

4.1.3-7 Reactions to specific ready meals and suggestions for product improvement

Tables 4.1.5a and 4.1.5b display the results obtained from the discussion during the second half of the focus groups (related aspects were also mentioned spontaneously by individual interviewees). When shown the different products, subjects began mostly by mentioning features that had to do with packaging or labelling. Comments related to packaging generally stressed their wish for easy-to-open packages that keep meal components separated and allow buyers to see the product inside. Attractive packaging was also stated as being highly appreciated. Regarding labelling, subjects generally expressed their need for more precise and clearer information. They also expressed their trust in products sold by well-known brands.

The following discussion focused on the preparation required by the different products, portion size and composition. Taking into account what was said, there seems to be a demand for a more diversified supply and more tailor-made meals. Different portion sizes, suiting the needs of different households, more varied recipes and the possibility to assemble one's own meal from separate meal components were improvements suggested by a great number of subjects. This demand for tailor-made meals reappeared when subjects were discussing the healthiness of the products displayed. Subjects declared they would like to see special meals for people following a diet, in particular meals low on fat. Above all, they thought ready meals should be really "ready", that is, they should demand only minimum time and effort to prepare.

Subjects were allowed to open the packages and look at their contents, if they required doing so. When that happened, the discussion focused on the appearance of the meal. Meals were found to be generally not colourful or attractive enough. Subjects disliked highly the appearance of meals in which the components were already mixed together, and they had difficulties imagine how the dried ready meals would finally look like. A discussion of the freshness and the storage properties of the meals followed. Some subjects found no meal to be fresh, since they were all already prepared. Others thought the chilled meal to be fresher, because it had been packed fresh and had a short shelf-life. Others yet found the frozen meal fresher, because the ingredients were "fresh frozen". The dried or canned meals were generally found to be not fresh, but were on the other hand highly appreciated because of their storage properties. Different subjects appeared to have different concepts of freshness, and no consensus on this topic could be reached.

Composition	***Additives***
	"I would preferably choose a meal which is free from preservatives and colour or taste enhancers"
	Protein source
	"I look at how much meat is in it, and what type of meat"
	"There should be ready meals made with fish too"
	"A meal does not necessarily have to contain meat"
	Starch source and vegetables
	"The overwhelming component of the meal is pasta or rice. There are too little vegetables"
	"Good quality potatoes that do not fall apart when heated"
	"I would add a salad, you need some more vegetables in a meal"
	"Product only has carbohydrates, a little bit of vegetables. I would rather have a fried egg with bread"
	"They should offer more choice. They should allow you to choose the ingredients' combinations you want"
	Not complete
	"I would choose the frozen meals because they contain already all the necessary ingredients"
	"I would choose the frozen or the dried, with the idea of adding something to it"
Healthiness, Nutrition	"The label already informs you that they added vitamins, because they could not keep its original value. I think that is very honest of them"
	"I wonder what is the amount of vitamins in these products, if they are so harshly processed"
	"They should not be too fatty"
	"They should create special meals for sick people, low on fat and/or salt"
Appearance	"This meal does not look that good, I exclude it immediately because of that"
	"It is a bit weird, you cannot imagine that the dried meal is going to become food"
	" I find the noodles too white. I don't have any high expectations about it"
	"I don't see myself eating this, it is all mixed up, a real mess"
	"We want them to look nice"
Freshness	"The dried product does not attract me. Dried vegetables are not the same as fresh, even after adding water"
	"I should choose the frozen one, its vegetables are freshly frozen. I expect that to taste better"
	"You can read on the label: fresh, quick, easy. But that is really not fresh anymore, it is already cooked"
	"The chilled meal appears to be the most fresh, it was prepared and immediately set under cool storage. As long as you pay attention to the due-by date it should be ok to eat it. I would choose this one"
Storage	"The dried meals fit better in my closet"
	"Frozen meals are handy because you can use half of it and keep the rest in the freezer"
	"We want meals that we can keep for long in the freezer, or better yet, in the closet"

Table 4.1.5a – Reactions to the selected ready meals mentioned during the focus groups, together with some related quotes.

Packaging	***See-through package***
	"I rather have a package that allows me to see the contents, then I know what I'm buying"
	"You should be able to see what is in it. Maybe they can put a little window on it"
	Components kept apart
	"They should keep the components apart so that you can decide for yourself how much of each you want to eat. That works better for the taste buds"
	"I should be able to distinguish what I'm eating, otherwise I don't buy it"
	Attractive
	"I find the package of the dried meal very pretty. It gets your attention"
	"The package should make the product look tasty"
	Easy to handle
	"You heat it in warm water, and then what? How do you open it? There is only that little metal gadget"
	Environmental-friendly
	"The packages should be recyclable or returnable. They should work less with plastic and more with carton"
Labelling	***Composition Information***
	"They should have labels with bigger letter types and a light background, otherwise it is almost unreadable"
	"Sometimes there is no information about the composition. You should at least know what it contains"
	"I would not choose for a product that does not mention the quantities of the ingredients"
	"I have problems understanding the labelling. What is maltodextrine?!"
	"They should always use the same units of measure"
	Shelf-life
	"I always look first at the due-by-date"
	Brand name
	"I first look at the name of the producer, to see whether it is a known brand "
	"I would not usually buy such a product, but if it is from that brand…"
	Preparation instructions
	"I always read carefully the preparation instructions before I start cooking"
	"It should be clearly stated in the label how you should prepare the meal"
Preparation	"All these products can be very quickly prepared, only 5 minutes in the microwave"
	"This one must stay 13 minutes in the microwave, or 45 min in the oven. If you are in a hurry… You use a lot of electricity and time just to get the oven warm! It should not take that long to prepare"
	"Ready meals for people who cannot cook should be as simple as possible. You should only have to warm them up, eat it and throw the plastic package away afterwards. No washing!"
Portion size	"It is too much. I don't dare to put the rest back in the freezer because I am afraid it will spoil"
	"There should be different portion sizes for the different people and for one-person households"

Table 4.1.5b – Reactions to the selected ready meals mentioned during the focus groups, together with some related quotes (cont.).

4.1.4 Conclusions and future research

Taking into account the quality and quantity of the information obtained regarding the opinions and perceptions of Dutch seniors about Home Meal Replacements, it seems that both qualitative research techniques used resulted in valuable information. The idea of starting the discussions and interviews by asking about homemade meals, their characteristics and relative importance did much for the quality of the results obtained, since homemade meals appeared to be a strong reference point for the subjects' HMR evaluation. Perhaps due to their modest number, the individual interviews did not add much to the overall findings of the group discussions in what respects common topics. They were, nevertheless, quite useful in obtaining answers for more sensitive questions, like the ones concerning the price of meals.

Statements regarding similar topics were formulated in a blunter manner during the individual interviews than during the group discussions. During the group discussions, the subjects were less frontal and assertive on their views on regular users of ready meals, perhaps not to hurt the susceptibilities of the users present. Ready meal users participating in the individual interviews also seemed more willing to acknowledge some discomfort and guilt associated with the consumption of these products than their focus group counterparts. Though for some, it was the absence of such feelings they thought worthy to announce.

The results obtained by similar studies performed in the Netherlands and in other European countries support our findings (Fjellström, Sidenvall & Nydahl, 2001; Oude Ophuis, Dekker & Candel, 1994; Schlettwein-Gsell, Barclay, Osler & Trichopoulou, 1991). The study of Oude Ophuis *et al.* (1994) involved a sample of 26 people from Wageningen, both users and non-users of frozen ready meals. The positive aspects of ready meals reported were also exclusively convenience-related, like the ease of storage (reducing the need to shop so often, while making meals readily available), ease of preparation and rendering washing up unnecessary. Similarly to what was found in our study, the negative aspects uncovered had largely to do with the highly processed and un-natural character attributed to ready meals. Subjects felt this to compromise considerably its nutritional value and, therefore, their own health. In Sweden, self-standing senior women were also shown to display negative attitudes towards ready-to-heat or ready-to-eat foods (Fjellström *et al.*, 2001). These Swedish seniors, especially the oldest, stated they wanted to remain cooking for themselves for as long as possible, since this allowed them to use only fresh ingredients. These were seen both as tastier and cheaper than their convenient counterparts. Nevertheless, it is worth noticing that attitudes towards convenience foods and meals seem to be culturally dependent, with this type of products being much more bought and

consumed among seniors living in French, Swiss and Danish small towns than in Dutch or Norwegian ones (Schlettwein-Gsell, 1991).

Our findings show that the Dutch seniors participating in this study attach a high moral and emotional value to the preparation of their own meals, which reflects negatively on their judgement of ready meals and other HMR. Nevertheless, this negative judgement seems to be at least partially compatible with ready meal usage, given that 68% of our subjects reported themselves as users of these products during the selection procedure. This seems to represent a curious case of *reversed* cognitive dissonance, probably introduced by the social desirability bias that is inherent to inquiry methods, to a lesser or greater extent (Eagly & Chaiken, 1993; Marshall,1997). In any case, ready meals only seemed to be more appreciated when subjects were confronted with the possibility of not being able to cook anymore, since they thought that these products allow them to remain somewhat independent from others.

Independently of psychological or social considerations, the seniors in our study believed that there is much room for the improvement of ready meals' quality. Handier packages, clearer labels, easier and shorter preparation processes, better taste and appearance, "light" meals and tailor-made meals are the sort of practical improvements that would be probably greatly appreciated by seniors. Whether that would do much to make the whole concept of replacing home-made meals more attractive to them, turning these products into sales hits within the segment, is something that companies need to carefully contemplate. Perhaps an improvement of the image of ready meals, aiming at changing the low moral status associated with not cooking one's meal (or removing the consequent feeling of guilt for using ready meals), could be more effective. In any case, as subjects stated, at a certain stage HMR become unavoidable for everybody, and companies selling HMR products seen as "less worse" or "almost as good as my own cooking" will probably have a better chance of success.

From a more fundamental viewpoint, it would be worthwhile to repeat these sessions with other groups of Dutch seniors and with groups representing other Dutch (or non-Dutch) market segments, to see if similar results could be obtained. It would also be interesting to learn more about the cognitive structure (attributes-benefits-values hierarchy) underlying senior citizens' meal choice, in order to be able to understand better the motivations behind the low moral status of convenience foods (Reynolds & Gutman, 1985). Finally, the results of the focus group study presented here can also be used to design a quantitative study, assessing the actual influence of the low moral status of convenience foods on consumption behaviour in general (Gofton, 1995).

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[1] This sub-chapter is an extension of the publication: Costa, A.I.A., Schoolmeester, D., Dekker, M. & Jongen, W.M.F. (2002). Perceptions of Dutch seniors regarding Home Meal Replacements: a focus group study. In C.A.A. Butijn, J.P. Groot-Marcus, M.v.d. Linden, L.P.A. Steenbekkers & P.M.J. Terpstra (Eds.) *Changes at the other side of the chain: everyday consumption in a multidisciplinary perspective* (91-101). The Netherlands: Shaker Publishing.

[2] One of the moderators, D. Schoolmeester, is co-author of the publication that originated this sub-chapter.

[3] The author of this thesis.

The collage technique:
Feelings, emotions and experiences of young Dutch adults regarding meal preparation[1]

This chapter presents the development, application and evaluation of a method for need identification in food product design, which combines the use of collage techniques and focus groups. Recent findings in neurobiology and psychology have considerable relevance for methodological improvement in consumer research. Based on these findings, a collage and focus group study aiming to identify feelings, emotions and experiences of consumers towards Home Meal Replacements, as well as relevant product attributes, is developed and performed. Its effectiveness is compared with that of (strictly) verbo-centric research previously carried out. Trends in image-based consumer research for product design are discussed.

4.2.1 Introduction

It has been proposed that the success of food product development processes can be greatly improved if companies focus on creating products that deliver unique and superior benefits to consumers (Grunert, Baadsgaard, Larsen & Madsen, 1996). Such a delivery of benefits, however, can only take place if companies are able to optimally exploit their technological capabilities in order to meet relevant consumer needs. Therefore, the identification of consumer needs, by already taking place at the design stage, becomes one of the earliest and most crucial steps in a consumer-led product development process (Dahan & Hauser, 2002; van Trijp & Steenkamp, 1998).

In-depth knowledge regarding consumer needs is essential to product development processes since these needs:

- Reflect how current offer is (or is not) satisfying consumers;
- Set the standards to which new products have to comply;
- Often contribute to generate new, unique and superior ways of satisfying consumers.

It is therefore not surprising that a significant part of consumer research is dedicated to the development of methods aiming at the identification of consumer needs and its use in the generation of new concepts (Dahan & Hauser, 2002). Nevertheless, most of the current research

in need identification is verbo-centric and views consumers as rational-decision makers, which may not be totally appropriate in the light of recent developments in psychology and neurobiology. These developments point out to a more significant role of emotion and imagery in the context of consumer behaviour. There is thus a need for methods that acknowledge both reason and emotion in decision-making processes, and enable consumers to represent their emotions, feelings and experiences towards products in a non-verbal form (Schiffman & Kanuk, 2000; Zaltman, 1997). We anticipate that the development and application of such methods can help achieve the degree of creativity and consumer insight essential to successful consumer-led food product development.

This sub-chapter presents the development, application and evaluation of the combined use of the collage technique (Havlena & Holak, 1996; Marshall, 1997; Schiffman & Kanuk, 2000; Schlackman, 1989; Solomon, Bamossy & Askegaard, 1999) and focus groups discussions (Marshall, 1997; Casey & Krueger, 1994; Schiffman & Kanuk, 2000; Solomon *et al.* 1999;) as an appropriate methodology for need identification in food product design. The chapter starts by briefly presenting the theoretical assumptions that presided to the methodological development. Next, an experimental study is presented, describing the method proposed and the results obtained. Through the comparison of these results with those of (strictly) verbo-centric research previously conducted (Costa, Schoolmeester, Dekker & Jongen, 2002, 2003), some conclusions regarding the effectiveness of the method are drawn. Furthermore, its potential application in the design of *Home Meal Replacements* (HMR), in particular ready meals, is discussed. Finally, trends in the area of image-based consumer research for product design are discussed.

4.2.2 Needs, consumer decision-making and product development

4.2.2-1 Classical approaches

It is widely accepted that behaviours like the purchase or consumption of products are the outputs of consumer decision-making processes, which, in turn, are triggered by the recognition of needs. Once the consumer is aware of a certain need, he or she will engage in a thought process that eventually leads to a particular form of purchase or consumption, believed to best satisfy that need (Schiffman & Kanuk, 2000). This view of consumer decision-making processes implies the following (Phillips, Olson & Baumgartner, 1995; Schiffman & Kanuk, 2000; van Trijp & Steenkamp, 1998; Zaltman 1997)[2]:

- Consumers are aware of their needs;

- Consumers are logical-problem solvers, *i.e.*, their reaction to need recognition is to engage in careful thought processes leading to the purchase or consumption decisions that best satisfy the need;
- The thought processes are based on words and their meanings;
- Consumers are rational-decision makers, *i.e.,* they are capable of objectively (1) evaluate available products based on their attributes, (2) judge on the ability of these attributes to deliver relevant benefits and (3) select products providing the combination of relevant benefits that maximises need satisfaction at the lowest cost;
- Consumers are aware of the criteria guiding their decision-making regarding product selection.

The above-stated premises have laid the ground for the operational definition of consumer needs in product design and the development of research methods for need identification. According to Griffin and Hauser (1993), needs are descriptions, in consumers' own words, of the benefits to be fulfilled by a product or service. These descriptions can be elicited from consumers through the performance of either individual interviews or moderated group discussions (focus groups), in which consumers are asked to provide their opinions about and experiences with certain products or services. This methodological approach implies thus that consumers are always able (and willing) to verbalise the benefits they expect from products in response to verbal stimuli decided upon by others. These authors do recognise that some needs are harder to articulate (*i.e.*, dwell at a deeper level of consciousness) than others. Nevertheless, they state that only 20 to 30 (individual or group) interviews should be able to provide as much as 90% of the needs related to a certain product category, as long as the interviewees belong to the same consumer segment (Griffin & Hauser, 1993; Urban & Hauser, 1992). The issue of how consumers establish which relevant benefits are to be expected from a product is not specifically addressed.

4.2.2-2 Recent developments

Increasingly fewer people today will contest that emotion, alongside with reason, plays a decisive role in consumer decision-making (Schiffman & Kanuk, 2000). Recent findings in the field of neurobiology have also provided ample evidence supporting the idea that emotion and reason commingle, rather then conflict, in decision-making processes (Damásio, 1994). However, as discussed in the previous sub-section, research methods concerning need identification are intrinsically biased towards reason. On one hand, they collect and present information regarding consumer needs and their consumption decisions as if the latest are

always the result of a conscious and rational process triggered by the recognition of the first. On the other hand, by asking consumers to react verbally to selected verbal stimuli, they encourage the display of the rational aspects of decision making in detriment of its emotional ones. This is due to the fact that people usually find their rational qualities easier to articulate than their emotional ones, especially in a group setting (Zaltman, 1997; Phillips *et al.*, 1995).

Another relevant development in the field of decision-making processes' research is the increased recognition that thought is image-based, rather than word-based (Zaltman, 1997; Zaltman & Coulter, 1995). Thoughts arise from images, which are topographically organised neural representations that occur in the early sensory cortices. If neurones are sufficiently activated, images can be experienced as conscious thought. Images are thus internal, sensory-based, representations used in information processing. These images are often visual, since two-thirds of all stimuli reaches our brain through the visual system (Damásio, 1994; Kosslyn, 1994). This knowledge, together with the widely accepted notion that about 80% of human communication is non-verbal, renders our current verbo-centric need identification methods rather inadequate, to say the least. Focus groups and individual interviews, but also many other consumer research tools, rely mostly on literal language to collect, synthesise and report consumer responses. If non-verbal cues are collected at all, they are only infrequently analysed and reported. However, if we accept that thought processes are, at least partially, image-based, it seems unreasonable to expect that consumers can adequately convey their feelings and expectations about a product by words alone. (Schiffman & Kanuk, 2000; Zaltman, 1997).

Researchers dealing with need identification in product design processes have, nevertheless, attempted to integrate the above-mentioned developments. Dahan & Hauser (2002) have recently revised the definition and scope of consumer needs. It is now acknowledged that consumers may be often unaware of a great deal of their needs, and that needs may not only be the result of word-based, logical inference. In order to improve our understanding of how consumers establish the relevant benefits to be expected from a product category, and how the satisfactory delivery of these benefits is inferred from product attributes, the use of the Means-End Chain theory (MEC) has been suggested (Audenaert & Steenkamp, 1997; Grunert, 2001; Reynolds & Gutman, 1988). According to this theory, expected benefits are the link between the product's attributes and the relevant (personal, cultural and social) values held by consumers. It is thus this chain of attributes, benefits and values that guides consumers' choice towards products delivering the desired outcomes (Dahan & Hauser, 2002; van Trijp & Steenkamp, 1998). The MEC's concept is rooted in a rational approach to consumption-relevant cognitive structures, but also accommodates well emotional and other less conscious consumption aspects.

MEC's applications remain, nevertheless, semantic and verbo-centric. The resulting chains depict only non-specific knowledge about products, their attributes and expected consequences, and are restrained to the knowledge that can be verbalised by consumers. The data is collected through individual interviews, and both the chain building and its presentation are strictly word-based (Grunert & Grunert, 1995).

A new stream of consumer research has addressed the issue of enabling consumers to represent their image-based thoughts and their feelings about products in a non-verbal form. Some sophisticated forms of self-expression, like the Zaltman Metaphor Elicitation Technique (ZMET) (Zaltman & Coulter, 1995; Zaltman, 1997), or web-based focus groups (Dahan & Hauser, 2002) have been considered. But two more straightforward approaches are the making of collages and psycho-drawing (Havlena & Holak, 1996; Marshall, 1997; Schiffman & Kanuk, 2000; Schlackman, 1989; Solomon, *et al.*, 1999). In collage studies, consumers are given magazines, scissors, paste and paper, and asked to cut out pictures from magazines that represent their feelings, emotions and experiences regarding the product category under study. They then organise these clippings into a "meaningful" collage that is later interpreted with the help of the researcher (Schiffman & Kanuk, 2000).

One study has used the collages made by groups of graduate students to explore the nature and meaning of nostalgia (Havlena & Holak, 1996). The collages obtained included images based on both personal and cultural memories, and were considered to provide useful guidance for advertising and merchandising activities. A more recent study makes use of drawings made by consumers to elicit their views on health and diet in a moderated group discussion (Sijtsema, Linnemann, Backus, Jongen, Gaasbeek & Dagevos, 2002). The individual perceptions of health and health promoting product attributes were discussed in sessions of six persons, with a balance between individual and group tasks on one hand, and expressive and associative components on the other. The use of drawings seems to lead to an interesting and participants-friendly methodology, providing insight into both the affective and the cognitive aspects related to health promoting product attributes.

There is enough reason to believe that food-related consumption behaviours are, to a great extent, based on oversimplified and irrational decision-making processes. On one hand, food purchase, preparation and consumption mostly involve decisions that are frequent, mundane and deeply rooted in habit. These decisions can be thus characterised by a low level of consumer involvement, a limited search for information and a high level of automated and procedural processes (Grunert, 1995; Grunert & Grunert, 1995; Steenkamp, 1997). On the other hand, food consumption has a high social and cultural value, and is increasingly seen as instrumental in the

achievement and maintenance of a long and healthy life (Roininen, Lähteenmäki & Tuorila, 2000). If we add to this argument the increasing societal focus on food safety and sustainable food production (Miles & Frewer, 2001), it is not hard to imagine that both rational and emotional aspects of food consumption will continue to play a very important role in consumers' decision-making. Having in mind the above-mentioned theoretical findings and its applications, we anticipate a need for the further development of methods that acknowledge both reason and emotion in food choice, and enable consumers to express their feelings and emotions towards products in a non-verbal form.

4.2.3 A combined collage and focus group study concerning meal preparation and HMR

4.2.3-1 Aim

The specific aim of this experimental study was to investigate the feelings, emotions and experiences (FEE) associated with meal preparation and HMR by young (< 30 years old) Dutch consumers, through the combined use of the collage technique and focus group discussions. This study's underlying assumptions were:

- That the meal context and the meal preparation experience themselves are crucial to the understanding of how consumers perceive and evaluate food products, particularly HMR[3] (Meiselmann, 2000; Grunert, 1995);
- That consumer collages allow us to gain more insight into the affective aspects of meals and their preparation, while focus groups, using the collages as stimulus materials, provide the complementing, more concrete cognitive aspects.

Given the findings obtained in other, strictly verbo-centric, studies (Costa *et al.*, 2002,2003; Oude Ophuis, Dekker & Candel, 1994), we were particularly interested to (1) see how consumers compared HMR with home-made meals and (2) evaluate the appropriateness of this empirical approach for need identification in food product design.

4.2.3-2 Experimental procedure

Twenty-nine self-standing Dutch citizens (24 women and 5 men), living in Wageningen (the Netherlands), and aged between nineteen and twenty nine years old, were, based on a brief screening questionnaire, selected to participate in this study. Selected participants were all single, educated people (high school or university diploma), who were in charge of their own

meal acquisition and/or preparation on a daily basis. Participants were either students at university (24) or held a full-time paid job (5), and included both users and non-users of HMR.

Five two-hour sessions, each with an average of 6 participants, were held in the second half of 2001, in the same settings previously used for a focus group study (Costa *et al.*, 2002). To ensure that the completion of both tasks (making the collages and the group discussions) could be easily supervised by the moderator, and would yield the desired results, the number of sessions and participants per session was pre-determined (Havlena & Holak, 1996). Each session was divided in two parts of 45 minutes, with a 15 minutes break in between for refreshments. The sessions were all conducted in Dutch by an experienced moderator, assisted by another member of the research team[4]. The second half of each session was video-recorded by a professional cameraman. All participants were previously informed that part of the sessions would be videotaped, to which they gave their consent, and were rewarded with a gift for their participation in the study.

In the first half of each session, the first five minutes were devoted to introducing the participants to each other, the research team, the general aim of the study and the format of the session. Next, the participants were divided into two groups (A and B) and separately asked to select from supplied magazines images depicting their FEE regarding cooking one's own meal (A) and using a ready meal (B). The two groups were also asked to cut and assemble these images in meaningful collages in the following manner: the centre should contain images depicting the most important and/or consensual FEE, while the borders should be left to place less important and/or individual FEE determined (Havlena & Holak, 1996). Although this might constrain the lay-out of the collages, we still wanted to obtain a measure of the different FFE' importance (to facilitate interpretation and discussion), and to make sure that both consensual and individual FEE were given a space in the collages.

The choice for a group setting, instead of an individual one, for the making of the collages was based on careful weighing of the advantages and disadvantages of the two options. We were aware of the possible suppression of the expression of emotions due to the potentially inhibitory presence of other group members. There was also the possibility of introducing additional rational aspects to the collages, due to the need of explaining and negotiating the final selection of images and the layout with other group members. Nevertheless, even in an individual setting, the participants still would be required to select images, decide on the final composition of the collage and finally explain it in-depth to the researcher. Therefore, and given the inconspicuous nature of the issue under investigation, we assumed that the benefit of collectively making, presenting and discussing the collages *vis-à-vis* individual interviews - like increased creativity,

diversity of viewpoints and interest for the task (Havlena & Holak, 1996) -, outweighed the potential undue influence of rational processes. Another possibility would have been to ask participants to individually make their collages in advance (Zaltman, 1997; Zaltman & Coulter, 1995) and introduce them at the start of the group discussions. We excluded this option in order to prevent that (1) participants would not show up due to not having made their collages in time or not wanting to present their individual work to an audience; (2) even a bigger influence of rational processes would take place, due to the time gap between being informed of the task and having to present the outcome. Another collage study, which also took place in a group setting, did not report any unduly influences of this situation (Havlena & Holak., 1996). Moreover, we were aware that standard projective techniques presuppose the presentation of the projections to a small audience (Schlackman, 1989).

The research team supplied each group with scissors, paste, pencils, one A2-sized sheet of light cardboard of a soft and warm colour, and a set of contemporary issues (approximately the same throughout the five sessions) of nine Dutch magazines:

- *Magriet* and *Viva* (womens' magazines);
- *Revu* and *Men's Health* (mens' magazines);
- *Cosmopolitan* (fashion);
- *Elsevier* (opinion);
- *VT-Wonen* (decoration);
- *Ville d'Art* and *Living* (life-style).

These magazines were selected to provide a reasonably broad range of images, which could be browsed within the time given to complete the task (Havlena & Holak, 1996). Cooking magazines were purposely excluded from the stimuli set to minimise the likelihood of participants making collages depicting only concrete examples of meals and their preparation, instead of depicting the more abstract feelings and emotions associated with them. Since almost all of the magazines supplied contained a cookery section, images of food and meal preparation were still amply available. Word cuttings were allowed to be included in the collages, but this practice was not encouraged. Finally, the groups were informed they had about 35 minutes to complete their task and organise a five-minute presentation about their collage, which would take place at the beginning of the second half. During the completion of their tasks the two groups were kept physically separate and unaware of each other's collages or collage topic.

The instructions on how the participants should proceed to make their collages seemed to be clearly understood by everybody, and the few questions actually posed were requests to rationalise the task. Some groups asked if they could give a title to the collage, add written words or word clippings, split the poster in two halves to better represent the duality of the topic as they perceived it, or draw schemas elaborating on their purchase or related decision-making processes. Participants were told that although it was up to them to decide on the composition of their collages, they should keep in mind that they had been asked to focus on their FEE. We stressed our desire for individual expression in the making of the collages, rather than aesthetic quality or functionality. They were also reassured of the non-competitive character of the task. The participants' high level of education seemed to be partially responsible for these requests, but we have also noticed that these were more frequent in the groups who had to make a collage about ready meals.

The second half of each session began with each group presenting their collage. The presentations and the collages were then taken as starting point for a focus group discussion involving all the participants in the session, the moderator and her assistant. The following probing questions were used:

- *What do you think about the feelings, emotions and experiences depicted in the collage from your own/the other group?*
- *Are there important images regarding these meals that you can not find back in any of the collages?*
- *Can you identify yourself with (some of) the images depicted in the collages, or do you have another vision on these issues?*
- *Do you think this image is the most appropriate to depict this issue? Why/why not?*
- *Can you elaborate on why this issue is worthy of taken a (central) place in your collage? Why not other issues, such as…?*

The focus group discussion took place for about 35 minutes. It was concluded with the moderator summarising the main ideas coming out of the debate, asking for any final comments or questions and thanking the subjects for their participation.

Each of ten collages made during the sessions was digitally photographed and saved in a computer file. After each session, both the moderator and the assistant viewed the collages made and wrote down their first impressions about the session, focusing on the way the groups had completed their tasks, the presentations and the subsequent discussion. Next, a complete

transcript of the second half of each session was made. These transcripts were afterwards independently content-analysed by both the moderator and her assistant. Based on the notes, the study of the collages and the results of the content-analysis, two global summaries of the five sessions - one about the presentations, which assisted in the collages' interpretation, and another regarding the group discussions – were produced in English. These summaries reported the key findings, as well as examples of related quotes extracted from the presentations and discussions. During the content-analysis, the relative importance of the different findings was established by a categorisation procedure (Costa *et al.*, 2002; Marshall, 1997; Spiggle, 1994). In this procedure, we searched for regularities and patterns by looking at recurrent (central *vs.* peripherical) issues and themes emerging from the collages, their presentations and/or the group discussions across the sessions. Based on this initial search, category lists were independently established by the two analysts, who later on discussed and agreed upon a single list. This list was then used throughout the remainder of the analysis.

4.2.3-3 Results and discussion

The making of the collages

Although the first half of the sessions was not videotaped, in order to disturb as little as possible the making of the collages (and due to practical constraints), the moderator and the assistant did observe the strategies used by the groups to approach their task. One of the strategies was to start by discussing and listing important FEE (whether consensual or not), followed by dividing the magazines among the group members and browsing through them in search of the adequate images. Finally, based on the instructions they had been given, the members collectively selected the images and decided upon the layout of the collages. Three groups making collages regarding their own meal followed this strategy. Another, less formal approach was taken for the making of two other collages (one about own meals and the other about ready meals). Each group member started by browsing through the magazines in search of adequate images regarding self-relevant issues and, later on, the group decided upon the images to be included and the layout. The last, and most formal approach, was taken by four of the groups dealing with ready meals and by one group dealing with own meals. In this approach, the groups first decided on the issues to be included and the structure determining the layout of the collage, and then browsed through the magazines in search of the appropriate images. Once again, it seemed that participants dealing with the topic of ready meals felt the need to be more rational about the making of their collages than the ones dealing with home-made meals. However, the personal

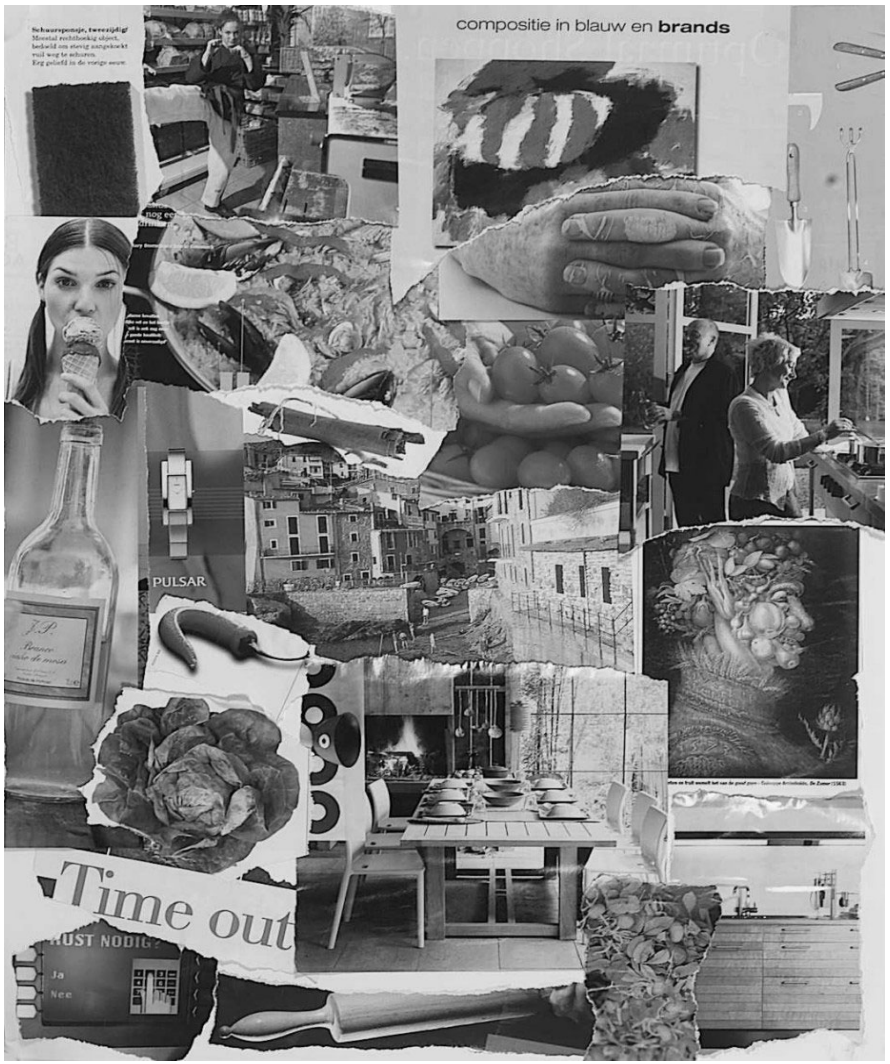
traits of the participants of the different groups could also have influenced the nature of the approaches considerably.

Although the approaches chosen by the groups to make the collages differed, a significant share of the selected images remained the same across the sessions. This indicates that the number and type of magazines supplied to participants in this kind of study may be less relevant than previously thought by some *(*Havlena & Holak*,* 1996*)*. Most of the participants appeared to have rather clear mental images of the FEE they associated with the topic even before they browsed through the magazines. The magazines seemed to be used more as a source of images fitting their own mental image than a source of mental images *per se*. This finding fits well with the theory of consumption visions presented by Phillips *et al.* (1995), and the underlying assumptions presiding previous applications of collage studies in the investigation of consumers' relationships with products (Zaltman, 1997).

The presentation of the collages

Figures 4.2.1 through 4.2.4 show some examples of the collages made, as well as their interpretations, as provided by the participants during the presentations. In these examples, we have stayed close to the participants' own words, in line with the definition of consumer needs provided by literature (Dahan & Hauser, 2002; Griffin & Hauser, 1993). According to the participants, cooking can be either an inspiring, restful and pleasurable event (ideal and rare) (Figure 4.2.1) or an efficiency-driven, stressful experience (realistic and frequent) (Figure 4.2.2). This depends on the time available to shop, cook, eat and clean up afterwards, on whether or not one is eating alone, and on the level of effort and time put into the performance of other daily activities. A central issue in all collages about home-made meals was that these should be simultaneously tasty, healthy (*i.e.*, containing plenty of fresh ingredients, namely vegetables), simple and quick to prepare. Provided there is enough time to cook and eat, meals were also seen as a good moment to socialise, relax and use one's creativity. One group mentioned that cooking gave them a certain rustic, hand-made feeling they missed in other daily activities (Figure 4.2.1). It was generally believed by the participants that one should strive to cook healthy and varied meals everyday, but they also admitted frequently trading off such beliefs for meals that were easy and quick to prepare.

The results found are comparable to those obtained from a means-end study of the attribute-benefit-value structure behind consumer motivations for cooking and/or using ready meals (Costa *et al.*, 2003). In this study, the elements of an unrelated sample of sixteen self-standing Dutch individuals (ten women and six men, aged between twenty and forty-two years old,



Cooking as an inspiring, relaxing and pleasurable activity

- *Cooking is a delight to the senses, with all those colours, smells, textures... It makes you look forward to the meal* (cinnamon & pepper, girl eating ice cream).
- *The making of a good meal demands the use of fresh and natural ingredients* (Italian village, lettuce, red pepper).
- *Cooking keeps you busy, body and mind:*
  - *It is a creative activity. You have to decide about the ingredients, the recipe… It gives you the opportunity to try new things* (choosing tomatoes, portrait, painting & dirty hands);
  - *You need to handle all those pots and pans, not to mention the cleaning-up afterwards* (karate girl, senior couple, gardening tools, scouring pad).
- *Cooking helps you relax. It forces you to take a break from all your other activities* ("Time out", Italian village).
- *Mealtime is the perfect setting for socialising, and that makes all the effort you put into cooking worthwhile* (dining table, bottle of wine).

Figure 4.2.1 - Example of a collage about "cooking one's own meal".

Cooking as an efficiency-driven, stressful experience

- *You have a limited amount of time to cook your dinner* (central picture).
- *Preparing a meal requires organisation, swiftness, co-ordination and focus* (table, car, people running around, receptionist pointing the way, surgeon).
- *One is busy with one's own thoughts when cooking. People should not trouble you when you are preparing your dinner* (man fishing).
- *You feel simultaneously happy, proud and relieved when you have succeeded to prepare a good meal* (man standing on his head, doll cheering up, sailing boat, cherries, "Overleef de maaltijd = survive the meal").

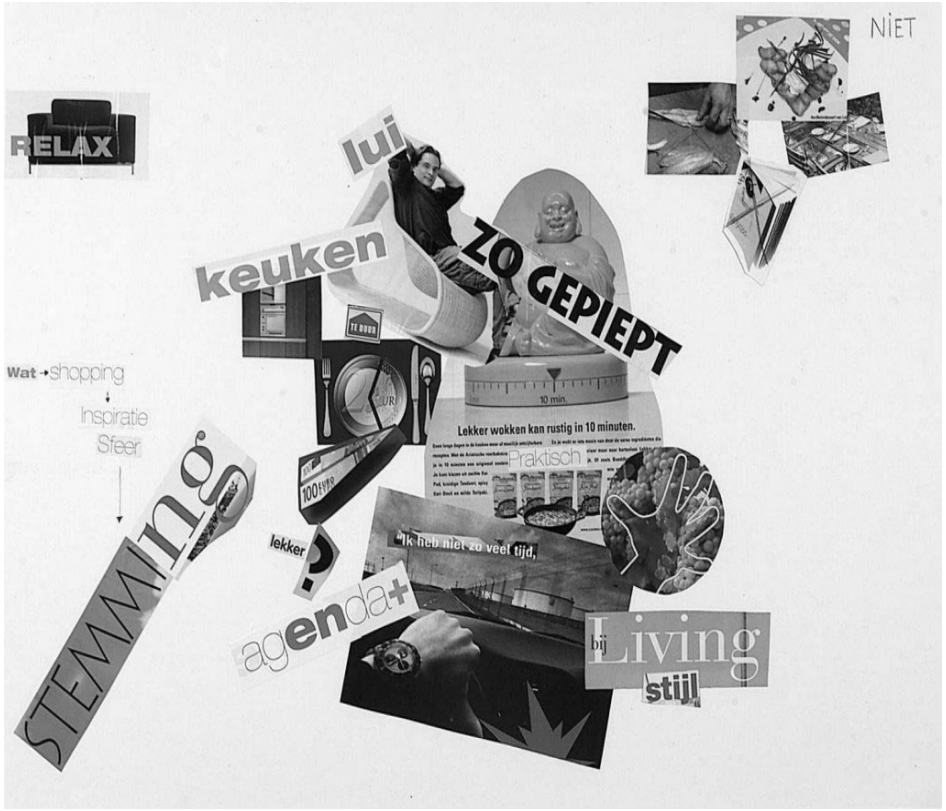
Figure 4.2.2 - Example of a collage about "cooking one's own meal".

highly educated and living in Wageningen, the Netherlands) have also declared to find cooking a rewarding, pleasurable and relaxing activity. Additionally, though, they stated their desire for meals that are quick to prepare and eat, so they could have more free time to pursue other activities with more valued outcomes. The preparation of more sophisticated meals, and the consequent increase in time and effort devoted to cooking, was said to be left for special occasions, like weekends, festivities, or when having guests for dinner. The successful preparation of complex and/or new recipes, particular when cooking for guests, was seen as a means to attain desired end-states, like a sense of achievement and self-esteem.

In another study (Costa *et al.*, 2002), a sample of thirty-two self-standing Dutch seniors (twenty-seven women and five men, aged between fifty-four and eighty-tree years old, with an intermediate to high education level and living in Wageningen, the Netherlands) expressed similar opinions about preparing their own meals, in spite of the considerable age difference. These older respondents, however, emphasised more issues related with the sensorial and compositional quality of their meals, and appeared to find the recreational aspects of cooking less important than the respondents in the other two studies.

In spite of the appreciation for convenience in meal preparation, ready meals were not always seen by participants as the ideal solution to replace (or speed-up) home-made meals (Figures 4.2.3 and 4.2.4). The positive feelings brought about by the preparation of a ready meal, in terms of being able to relax and devote less time, energy and thought to the whole meal event, were counteracted by a sense of guilt and regret for not having cooked. These negative feelings were said to be associated not only with health concerns - like not being able to feed yourself a proper home-made meal or spoiling yourself with snacks and fast-food -, but also with being afraid to be (or appear to be) too lazy, laid-back or careless. Moreover, participants felt that ready meals were more appropriate for when they were eating alone, and thus should not be served to guests. Finally, they were of the opinion that ready meals' current assortment was too narrow and not always up to their expectations in terms of sensory quality.

The results found are similar to those obtained by a means-end study regarding the use of ready meals (Costa *et al.*, 2003). Young non-users of ready meals stated that they found them too fatty and salty. Additionally, they were of the opinion that they contained only minute amounts of vegetables. This, in turn, lead them to believe that these meals, when consumed regularly, might jeopardise one's health due to their inadequate nutrient composition. Users of ready meals, however, saw them as fully replacing home-made meals, at least in terms of energy intake and satiety sensation. Above all, they valued the extra time made available by not having to shop and cook so often, which they linked directly to the convenience-related properties of



Ready Meals are convenient but not always appropriate (I)

- *The question is, am I in the mood to cook tonight? I had a lousy day so I'm going to give myself a treat. Sit back, relax and watch the meal get ready all by itself, with no help from me* (scheme on the left hand-side).
- *Eating is just one of the thousands things you do every day, so why not make it simple and quick?* (Steering wheel, "agenda").
- *You do need an oven or a microwave, but not much else* (oven). *You just take your plate, go seat on the couch, watch TV and relax* (couch).
- *Ready meals are easy and quick to prepare. They do not demand much from the cook. But you should not expect a fancy meal out of them.* (Buddha, hand with grapes, top right-hand corner).
- *Good ready meals are expensive, and still not as good as my own* (coins & bills, "lekker ? = tasty ?").
- *Ready meals are for people who like cutting corners, or are too lazy* ("lui") *or too busy to prepare and eat a proper meal* (man on the chair).
- *You are not going to use ready meals when you have somebody coming over for dinner* (table at top right-hand corner + "niet = not").

Figure 4.2.3 - Example of a collage about "using a ready meal".

Ready Meals are convenient but not always appropriate (II)

- *You cannot possibly have a nice, cosy dinner when using ready meals* ("geen romantiek").
- *You feel guilty about using ready meals because you think: is this the best I can do for myself?* ("iets verkeerds gegeten? = Eaten something you shouldn't?", "health", "verwensnacks = snacking to spoil yourself").
- *Eating is just one of the thousands things you do every day, so why not make it simple and quick?* (watch, "snell, chaotisch, stress").
- *Ready meals are something to eat on your own. You just take your plate, go seat on the couch, watch TV and relax* ("solo", TV, couch, fries).
- *Ready meals are easy and quick to prepare, and need no washing up afterwards* ("pure eenvoud = simple", "klaar = ready", scouring pad, dishwasher).
- *Good ready meals are expensive, and still not as good as my own* ("duur = expensive). *Others are just not fit to be eaten* ("niet te vreten" = how can a person eat that?!").
- *Ready meals are for people who are too lazy or too busy to prepare and eat a proper meal* ("gemaksmens = the convenience people", "geen levensgenieters = those who do not enjoy life").

Figure 4.2.4 - Example of a collage about "using a ready meal".

ready meals. In general, the participants of this study also mentioned experiencing (or anticipating) guilt when using ready meals. They associated this feeling with the (decreased) amount of time and effort put into cooking, which they linked directly with the non-fulfilment of their obligations.

In a comparable study, senior respondents displayed analogous concerns about the sensorial and nutritional quality of ready meals, being even more critical about this type of products than the younger respondents from the other two studies. The seniors found the use of ready meals almost always inappropriate, since the time- and effort-saving properties of these products were considered to be irrelevant in view of their daily life circumstances (Costa *et al.*, 2002).

It was interesting to realise that specific patterns of collage making were common across sessions. Collages concerning own meals generally used more of the available paper area, contained bigger and more colourful images, and displayed much less clippings of words than those concerning ready meals. Collages about ready meals were usually less appealing, duller and dimmer. Images about own meals often depicted foods, dinner tables and kitchens. The relatively few images of people present in collages about own meals depicted persons that mostly seem to be experiencing positive feelings or emotions, like feeling creative or proud of yourself. Images concerning ready meals were often of people who either appeared to experience less positive feelings (like tiredness, frustration, anger or stress) or displayed an enjoyment for not having to cook that was negatively viewed by the collages' makers. Collages regarding ready meals were also much richer in schemes, fixed structures, titles, explanations, opinions and judgements, than in feelings or emotions. All five collages dwelled on the topic of "the good few *versus* the bad many" aspects of using ready meals.

It seems that participants had difficulties finding images depicting their negative feelings about ready meals, thereby resorting to words, or felt the need to be much more rational about them then about home-made meals. There are several possible explanations for this:

- "Cooking one's own meal" is a more abstract, much broader concept than preparing a ready meal, and thus easier to be envisioned and explored through a collage task;
- Participants' personality traits, like creativity and rationality, their views on the task and issues involved, the groups' composition, the setting or the selection of images provided have determined these results[5];
- Preparing and serving one's own meal is a daily habit with a high social and cultural value, while the use of ready meals is seen as more exceptional (and in some cases even reprochable) event, therefore requiring more explanation and justification.

Given the results of comparable studies (Costa *et al.*, 2002,2003a) and reports uncovering feelings of guilt and regret associated with the consumption of HMR in several countries (Gofton, 1995; Thompson, 1996; Voedingscentrum, 2002), we anticipate that the last explanation provided is, at least partially, responsible for the findings reported here.

The focus group discussions

The focus group discussions seemed to have diverted the participants' attention away from the posters, since these were hardly ever mentioned again. This was actually a desired development, since the making of the collages aimed at providing a starting point for the discussions and not at overwhelming them. A few exceptions occurred at the last part of some sessions, when the discussion focused on the negative connotations of ready meals and its users. At this stage, some participants resorted to the images depicted in the collages, in an effort to provide a better idea of what they were referring to.

Four main topics related with meal preparation were discussed across the sessions. These were:

- Reasons to cook one's own meals;
- Positive and negative aspects of ready meals, and the advantages of cooking over ready meal usage;
- Other HMR and convenience foods;
- Negative connotations of ready meals and their users.

As it can be seen from items listed above, most of what was talked about during the groups' discussions was in line with the topics depicted in the collages. Nevertheless, the discussions brought out some interesting topics that had not been mentioned before, like the use of convenience foods. Therefore, we are lead to conclude that (1) the collages worked rather well as stimulus material for the discussions, and (2) the collage technique and the focus group complemented each other rather well in supplying a broad range of information.

Reasons to cook one's own meals

Participants stated that they cooked everyday mainly out of habit or because they felt they were expected to. Some of the specific statements regarding this issue were:

"*It has always been like that, my mother cooked and the family sat together at dinnertime.*"

"It is one of your daily tasks, whether you like it or not. And you better do it, otherwise people start thinking you don't care about them, or about yourself, and they are going to nag you about it."

Cooking was also seen as a sign of caring for relevant others:

"I really enjoy preparing a special meal when my friends come over for dinner. And actually I don't mind how much time and money I have to put into it. It is another way of showing them how much they mean to me."

Once again, cooking was seen as a source of fulfilment, enjoyment and relaxation:

"Cooking is a very creative activity. You have the opportunity to try out new recipes… it is very exciting, not as boring and as predictable as the other household tasks. You are free to improvise."
"You are momentarily absorbed with your own thoughts, reviewing how the day went."
"When I am too anxious or nervous, I go into the kitchen and start cooking, trying to get rid of some of the stress built-up inside."

Some positive consequences of cooking, in terms of social relations and issues like self-esteem and achievement, were also mentioned:

"When you are cooking you know that in a moment everybody is going to come and seat at the table, enjoying having dinner together."
"If you manage to cook a particularly nice meal, you feel really proud of yourself. You see it as being your own special creation of the day."
"It is very nice to hear your friends praise your meals, like: 'what a nice meal!', or 'Wow, I never had that before!'"
"You want to impress the others with your cooking skills, especially when among gourmets. Everything has to be just perfect."

Positive and negative aspects of ready meals, and the advantages of cooking over using ready meals

Relevant positive and negative aspects associated with ready meals' usage, mentioned during the sessions, together with some related statements, are depicted in Tables 4.2.1 and 4.2.2, respectively. Participants pointed out that both the positive and negatives aspects mentioned

determined their consumption behaviour towards ready meals, depending on the situation and the self-relevance of the different aspects.

You have the opportunity to try new and/or different meals.
You reduce the time you spend shopping for the different meal ingredients.
If you cook your meal from scratch, you end up with leftovers of the ingredients used, since package sizes are usually not adequate for a one-person household. This doesn't happen if you use ready meals.
You don't have to figure out what you are going to cook for dinner that evening.
If you have to buy a lot of different ingredients to prepare a dish, it is easier and cheaper to buy this dish already prepared.
Ready meals are easy and quick to prepare.
You can use the time your dinner is getting ready to do other things.
You can invest the time you would otherwise spend cooking in more rewarding activities.
It is the Friday night feeling: chaos and tiredness, I'm not in the mood to cook. I am already fed up with all the things I had to do today. I'll just buy a ready meal and skip cooking.
Ready meals can be stored for later use. That's handy since sometimes you just don't have time to shop.
You simply don't have the time or the facilities to cook your own meal.
Some ready meals you eat because you actually like them, not because you need to replace your own meal.
It is a way of indulging myself.
If I am eating alone tonight, why bother cooking?

Table 4.2.1 – Positive aspects of ready meal usage, as mentioned by the participants.

Similar results were obtained in a means-end study involving twenty-six people from Wageningen, both users and non-users of frozen ready meals (Oude Ophuis *et al.*, 1994). The positive aspects mentioned in this study were exclusively convenience-related, like the ease of storage (reducing the need to shop so often while making meals readily available), ease of preparation and rendering washing up unnecessary. All these aspects were associated with saving time and mental energy, which were in turn devoted to more rewarding activities, like the preservation of social relations and entertainment. The negative aspects had once again to do with the highly processed and un-natural character attributed to ready meals by the participants, which they felt to compromise considerably its nutritional value and, therefore, their own health. As already pointed out by other studies (Costa *et al.*, 2002; Oude Ophuis *et al.*, 1994), home-made meals are a strong reference point in the evaluation of ready meals. The participants of our study generally felt sure that by cooking everyday they would get more varied, healthier, fresher and tastier meals than by using ready meals. They also felt that cooking was a way to show their relatives and friends how much they care for their well being, as well as for their own. In

their opinion, the frequent use of ready meals would not only jeopardise the relatives and friends' current regard for their cooking skills, but also be a source of reproach from and concern to others.

Ready meals don't seem natural. They contain all sorts of additives, things that you usually don't have in your own meals. They are covered with plastic and the ingredients are all mixed up in a pulp. It does not look at all like what I get on my plate when I cook. You can just imagine this stuff coming out of a machine. You can immediately see it was mass-produced, not cooked in somebody's kitchen. You miss the personal touch, the care put in it just for you.
Even the way you prepare these meals is weird: you make some holes in the packages, the whole thing revolves in the microwave for some minutes and there you have it.
I have the idea I have just eaten something really unhealthy. Everything that comes out of a factory I do not consider healthy anymore, due to all those additives. The same with everything that comes out of a microwave. Processing eliminates most of the vitamins in foods. Only fresh vegetables are really healthy and those you never get in ready meals. It is all processed and packed in plastic. I don't see that as being freshly prepared food anymore.
They are not really varied from a nutritional point of view. So if you eaten them, you often end up having an unbalanced diet. And since there are never sufficient amounts of vegetables in them, it is even worse.
You have no way of knowing how the meal was prepared. You are always a bit suspicious of food you don't cook yourself. You have no way of knowing if they really use the ingredients that they claim to use. Of course they tell you that everything is prepared in a safe and responsible way, that the whole process is completely under control, that it is whole freshly prepared and healthy but… You can not help thinking that they are only aiming at making a profit. That they simply use left-overs and poor quality ingredients and try to pass it as a meal. Cheap and efficient.
You are not really impressing anyone by using ready meals. If people are coming over for dinner, you are not going to put two of these bags in the microwave and say: Here you are! It looks like you did not even bother to cook for them.
You can not really expect compliments when you serve a ready meal, like: Oh! You really know how to handle a microwave beautifully!
It is not your own meal anymore. You do not decide on how much salt or pepper, or what kind of herbs, go into it. Somebody else decides everything for you. You choose for the kind of meal you would like to have and that's it. It is all standardised. With ready meals you can not add something yourself, they leave no room for your own creativity. Thus you do not expect much of them.
The proportions are all wrong. There is always too much of one thing and too little of another. And it is usually pasta with a kind of lousy sauce. The vegetables are always scarce: you really need a magnifier to find them!
Some of these meals simply taste bad, while the reasonable ones are often too expensive for my budget.
Ready meals are not handy when you are having guests for dinner because you have to warm up all those individual packages one by one.
Some meals really look good on the package's photo, but once you open them you realise they don't look at all how you expected them to. Some don't even look fit for human consumption!

Table 4.2.2 – Negative aspects of ready meal usage, as mentioned by the participants.

Other HMR and convenience foods

The negative aspects of ready meals mentioned during the sessions led participants to come up with what they felt to be more suitable alternatives to replace home-made meals. Some of these alternatives were: cooking double in advance, eating in a canteen, eating some sandwiches, home-delivery and take-out meals. We found the motivations for having a take-out meal instead of a ready meal quite curious, since they hardly seemed to be based on an objective evaluation of both products:

> *"I think that take-out meals just taste better, they taste more like the real thing* (ethnic restaurant meals)*. They certainly look tastier than these vacuum-packed meals you see in the supermarkets."*
> *"You have the impression that they are freshly prepared meals and therefore healthier. Although they are probably mass-produced as well…"*
> *"You have the idea that someone has been standing in the kitchen for hours, preparing that meal especially for you. However, come to think of it, they probably also just warm up a package for you…But you don't want to know about that, of course* (laughing)."
> *"It is also a way to spoil yourself and your guests a little, something for a special occasion. It is like sitting in a restaurant, but then at home."*

This positive evaluation of take-out meals is not in line with the results obtained by a means-end study concerning their use (Costa *et al.*, 2003). The participants in this other study viewed take-out meals as being too expensive and unhealthy, as well as not particularly tasty. They found its use to be appropriate only during the week, when they stated to have little time and energy left to cook dinner. One possible explanation for different results obtained (besides the different samples used), could be that participants in the current study compared take-out meals directly with restaurant meals, while in the previous study the home-made meal was used as a reference point.

Another recurrent topic was the use of semi-prepared ingredients, also known as convenience foods, in order to speed up meal preparation. These products seemed to be well regarded by the participants:

> *"The use of minimally processed or canned vegetables saves a lot of time when preparing a meal."*

> *"There are a lot of sauces you don't know how to make yourself, or are rather difficult to make. This kind of products makes the cooking easier and quicker, since somebody already did half of the work for you."*

Participants also mentioned why they consider these products to be a better alternative than ready meals to speed up meal preparation:

> *"An advantage of these products is that they give you the feeling you did something yourself. You still have to stand in the kitchen and prepare your dinner."*
> *"You feel good about yourself because, in spite of the little time spent on it, you still managed to cook a nice meal."*
> *"You feel that a meal prepared with these products is more your own meal, since you still had to add something to it – extra ingredients, seasoning, cooking skills, time… You have to do more than just walk to the microwave, and that gives you the feeling you actually cooked yourself."*

To our knowledge, there are no reports in literature about the perceptions of consumers regarding semi-prepared meal ingredients. No comparisons with findings from other studies can thus be made.

Negative connotations of ready meals and their users

Participants were of the opinion that there is a lot of unwarranted prejudice against ready meals, and that this reflects negatively on how these products are perceived:

> *"In general, ready meals have a poor image. People see them as unnatural and unhealthy products, although most of the times that is probably not the case. There is just a lot of prejudice against them."*
> *"You don't associate them with tasty food. Quite the opposite, you think of them as being dull, uninteresting and unsophisticated products, although the assortment is quite broad nowadays."*

Participants were also willing to provide some of the reasons they thought to be behind this prejudice. One of these reasons is associated with the high social and moral status of cooking one's own meals:

> *"I think that a lot of the prejudice against ready meals comes from the fact that you haven't cooked yourself, as you should. So to use them leaves you with a sense of guilt. You feel*

guilty because you haven't put any time or effort into the preparation of the meal you're eating, except for the fact that you bought it."

Health concerns were also mentioned in relation to this prejudice:

"If you use ready meals often you don't feel happy with yourself. You think you are neglecting your wellbeing, because you know they are not the healthiest stuff that you can eat. When I use a ready meal, I try to limit the damage by adding some fresh salad, or I make sure I eat a piece of fruit afterwards. This makes me feel more reassured."

Participants thought that the fact that ready meals are considered to be relatively novel in terms of preparation process and recipes could explain some of the consumers' preconceptions:

"We are reluctant to accept ready meals because they are new to us. It is not something we would eat at our parents' house, except for the frozen pizzas perhaps. But those we like to eat, and we don't even see them as ready meals anymore. Maybe the fact that ready meals don't taste or look like something you would cook yourself contributes to that."

"Take pizzas, for example. They are also ready meals in a way, but they seem much more natural to us. I mean, you can clearly see the ingredients they contain. Besides, when you make pizza yourself, you also place the ingredients on top of the dough, put everything in the oven and that's it. So the process of warming up a frozen pizza feels right."

The role played by eating habits and traditions was also mentioned in relation to this issue:

"At my parents' there was a fresh meal on the table every night. So, the idea of running to the supermarket to buy this package, put it in the microwave, and call it dinner does not really appeal to me."

It was also curious to see that, according to the participants, the poor image of ready meals reflected badly on its users:

"Ready meals are seen as something more appropriate for lonely and unhappy bachelors than for families. And that's an image you don't want to be associated with."

"Ready meals are for people who won't go to the trouble of cooking everyday. They are a form of laziness, because everybody knows you should cook your own meals."

"Lack of time should not be given as an excuse to use ready meals, because it only takes 10 minutes to cook a decent meal anyway."

> *"It's okay to use ready meals once in a while, like when you've had a particularly busy or tiresome day, or when there is still a lot to do after dinner. But you should not make a habit of it."*

New issues related to the negative image of ready meals and their users surfaced during the last stages of the sessions. These were the novel character of ready meals, the influence of eating habits and traditions and the moral judgements passed on ready meal users. These issues, although already present in the collages, had not been explicitly mentioned during the presentations. These findings can be related to the well-established notions that habits and tradition influence food choice considerably (Steenkamp, 1997; Tuorilla & Pangborn, 1988), and that consumers in general are averse to innovation (van Trijp & Steenkamp, 1998). The passing of judgement on ready meal users, and the enumeration of situations when the use of ready meals is less censurable, were issues also discussed by Dutch seniors during a focus group study (Costa *et al.*, 2002). Such issues can be probably related to feelings of guilt and regret associated with HMR consumption (Gofton, 1995; Thompson, 1996; Voedingscentrum, 2002).
The emergence of new issues during the discussions demonstrates, in our opinion, that focus groups are a rather effective complement to the collage technique. The group discussions allow participants to dwell deeper into issues that may have not been explicitly considered yet (*i.e.,* during the collage making and the presentations), thereby generating more information about the topic under investigation.

4.2.4 Conclusions and future trends

Projective techniques have their roots in psychiatric therapy and motivational research, and are mainly used to retrieve information that is not readily made accessible with verbo-centric methods. The use of a particular kind of projective technique – the making of collages – in the exploration of the emotional aspects of consumption has been recently suggested (Marshall, 1997; Zaltman, 1997, Zaltman & Coulter, 1995). While this technique has been applied in the design of advertisement (Havlena & Holak, 1996), its use in consumer research for food product design has been, so far, practically unheard of.
This sub-chapter presents the development of a method for need identification in food product design, which integrates the use of the collage technique in regular focus groups' studies. This method has been applied in a study aiming at the identification of feelings, emotions and experiences associated with meal preparation and Home Meal Replacements, namely ready meals. The outcome of this study served as basis for the evaluation of the effectiveness of the

method developed. Our study has yielded a considerable number of concrete consumer needs, as well as direct and indirect suggestions for product improvement (see Tables 4.2.1 and 4.2.2). The participants of this study have stated that they expect ready meals to display the same characteristics they value in their own meals. These are the use of fresh ingredients, namely plenty of fresh vegetables, the absence of artificial additives, a natural (*i.e.*, handmade) and tailored preparation process, a reasonable degree of control over the sensorial quality of the outcome and easiness and quickness of preparation. The implementation of such suggestions, however, will probably pose considerable technological challenges.

The current study offered the opportunity to look into the more emotional aspects involved in meal preparation. More specifically, it seems that the high regard for home-cooked meals displayed by the participants negatively influences their perception of ready meals. Through the use of collages, we were able to uncover these more abstract and unconscious aspects. Moreover, we could present them in a way that is more tangible than the results of strictly verbo-centric research. It is our opinion that the images depicting the FEE investigated by this study can be useful for both product and advertising designers. It would be interesting to investigate if the positive attitude towards cooking and the (consequently) negative attitude towards ready meal consumption hinted by our study can be confirmed and generalised. More important yet, it would be interesting to determine the extent to which these attitudes actually influence consumption behaviour. The knowledge generated by this additional study might prove very useful for streamlining product development and design advertisement for HMR.

This study has shown that collages and focus groups complement each other rather effectively. Collages add to traditional interview techniques by tapping into different knowledge structures and promoting more fruitful discussions. The making of the collages probably also encourages subjects to be more easily forthcoming with their FEE in a group setting. Focus groups, in turn, provide further interpretation of the collages and a more complete understanding of the issues they portray. Nevertheless, we anticipate that much of the added value of this methodology, demonstrated by our study, is related to the level of abstraction of the aim (need identification at the design stage) and the object (ready meals' category) under investigation. We would like therefore to advise potential users to reconsider its application if their aim is, for instance, to question consumers about certain technical improvements of specific food products or packages.

One final question remains: How to proceed from the non-verbal expressions of consumer needs to the actual development of products and their features? Among others, three new developments in non-verbal consumer research seem highly promising in this context – the ZMET, web-based qualitative research and computer-aided/web-based design. The ZMET

(Zaltman, 1997, Zaltman & Coulter, 1995) combines the use of established research methods (like semi-structured interviews, storytelling and MEC) with a wide range of self-expression techniques (like collages, drawings, evocations of sounds, smells, etc.) and computer-aided design. ZMET aims to uncover the mental models, major themes and constructs that guide consumers' thought processes and behaviour, and has already demonstrated its usefulness in the investigation of how consumers view products.

The Internet can provide an excellent means to identify customer needs, through the observation of purchase behaviour on a web site or the creation of instant, virtual focus groups, in which participants can provide their opinions about product concepts or prototypes (Dahan & Hauser, 2002). New web-based methods for concept design and engineering are, among others, web-based conjoint analysis (MacArdle, 2000) and the *drag-and-drop* design (Dahan & Hauser, 2002), in which consumers can associated preferred features to fully configured products on-line, by dragging and dropping them onto design palettes. In addition to these developments, we believe it would be very interesting to combine the possibilities offered by web-based design with self-expression techniques. Image-based, consumer research tools for on-line product design could (1) help reduce development costs, (2) bridge the gap between design and actual product development, and (3) provide the high degree of consumer involvement said to be essential for new product success (van Trijp & Steenkamp, 1998). Although many of these methods still require extensive research into their feasibility, efficacy and validity, they already open a whole new realm of exciting possibilities for more efficient and successful food product development.

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[1] This sub-chapter has been published as: Costa, A.I.A., Dekker, M. & Jongen, W.M.F. (2003). Exploring the use of consumer collages in product design. *Trends in Food Science and Technology* 14, 17-31.

[2] The existence of alternative behavioural models, which do not build upon strictly cognitive approaches, is also acknowledged in literature (Schiffman & Kanuk, 2000). Nevertheless, to our knowledge, and besides the few exceptions mentioned later in this sub-section, this recognition has had little impact on conceptual approaches to consumer-led NPD.

[3] For a description of the range of products encompassed by the concept of *Home Meal Replacements*, please refer to Costa, Dekker, Beumer, Rombouts & Jongen (2001).

[4] The second and first authors of the paper that originated this sub-chapter, respectively.

[5] However, as argued earlier, we do not find the two last possibilities very likely.

Chapter 5

Market opportunity definition:
Beyond the Voice of the Consumer

5.1 An overview of the means-end theory and its potential application to food product design

5.2 A means-end study of the motivations behind meal choice

5.3 Understanding the resistance of consumers to convenience-related innovations in foods: Measurement of moral issues related to meal preparation

An overview of the means-end theory and its potential application in consumer-oriented food product design[1]

This sub-chapter presents an overview of the means-end theory (MEC) and associated tools, and discusses the virtues and shortcomings of its potential application in consumer-oriented food product design. This overview is based on literature in the food area and introduces the process of conducting a MEC study by drawing on previous research on consumers' motivations regarding meal choice. Finally, the usefulness of MEC studies in the context of consumer-oriented food product design is evaluated and future research trends in this area discussed.

5.1.1 Introduction

Consumer-oriented food product design is a market-based innovation concept, which focuses on the use of consumers' current and future needs, as well as its determinants, in the design of innovative and/or improved food products with added value (Grunert, Baadsgaard, Larsen & Madsen, 1996; van Trijp & Steenkamp, 1998). The key stages in the formulation of this concept are: *need identification*, *idea development* to fulfil the need, *product development* to substantiate the idea and the product's *market introduction*, communicating the fulfilment of the need (Urban & Hauser, 1993) (Figure 1.2). Central here is the ability to "translate" the subjective consumer needs (e.g. healthy, convenient) into objective product specifications, in order to, through the creation of the core product, substantiate the fulfilment of these needs. Concurrently, another type of "translation" is employed in the development of a positioning and a communication strategy for the new product, which can clearly communicate the benefits delivered and, thus, the satisfaction of consumer needs in a distinctive and superior way.

It has been suggested in academic literature that the means-end chain theory (MEC) (Gutman, 1982; Olson & Reynolds, 2001) could be a relevant way of putting consumer-oriented food product design into practice (Audenaert & Steenkamp, 1997; Grunert & Valli, 2001; ter Hofstede, Steenkamp & Wedel, 1999). MEC is said to provide a better understanding of potential food consumption motives by depicting how concrete product attributes are linked to self-relevant consequences of consumption and personal life values (or goals), in a hierarchical model of consumers' cognitive structures. In essence, this approach is thought to be able to identify the choice criteria used by consumers to evaluate and select among alternative products or services, and explain the higher-order reasons leading to the salience of these particular

criteria (Grunert & Valli, 2001; Olson & Reynolds, 2001). MEC's main assumption is that people do not buy products for the products' sake, but for the benefits that their consumption can provide. That is, the utility of a product is not so much in its features, but in the functional and psychological consequences it delivers, which are in turn important for the realisation of consumers' goals and values. A similar assumption underlies the concept of consumer-oriented food product design. According to it, new foods and their production technologies should not in themselves be seen as the goal or end of the design process, but rather as a means of fulfilling needs, thereby facilitating the achievement of consumers' values and goals (van Trijp & Steenkamp, 1998).

It has been proposed that MEC can improve the actionability of consumer-oriented food product design by providing three types of useful information about consumers, in an integrated manner (Audenaert & Steenkamp, 1997; Grunert & Valli, 2001; Gutman, 1982; ter Hofstede *et al.*, 1999; van Trijp & Steenkamp, 1998):

- The key benefits consumers expect from foods (*i.e.*, the consumer needs), which can be used to establish the positioning of new products in the marketplace;
- The concrete and abstract product features consumers use to infer the delivery of key benefits (or the absence of negative outcomes or risks) associated with consumption, which can provide guidance to R&D efforts;
- The values and goals establishing the relevance of the different benefits for consumers, which can be used to design and target advertising campaigns communicating about the new product.

By increasing the dissemination and use of relevant consumer information across organisational functions, MEC is said to help improve the level of co-ordination between R&D and Marketing. Consequently, the likelihood of success of new product development (NPD) processes is also improved (Griffin & Hauser, 1996; Søndergaard, 2002; ter Hofstede *et al.*, 1999).

The aim of this sub-chapter is to present an overview of the MEC theory and associated tools, and discuss the virtues and shortcomings of its potential application in consumer-oriented food product design. This sub-chapter starts with a description of MEC's main assumptions and the tools that lead to its implementation. We restrict ourselves to issues that are relevant to food products and their design, using examples drawn from food-related literature whenever possible. The process of conducting a MEC study, from data collection to analysis and outcome, is exemplified through the description of a study uncovering consumers' motivations regarding

meal choice (Costa, Schoolmeester, Dekker & Jongen, 2003a). Finally, the usefulness of MEC studies in the framework of a consumer-oriented food product design is evaluated and future research trends in this area discussed.

5.1.2 The means-end theory and associated tools

5.1.2-1 Issues involved in the design of a MEC study and the performance of laddering interviews

Conceptually, MEC views consumers as rational decision-makers, who choose to perform the behaviours that seem most likely to lead to desired outcomes. Two general assumptions are relevant in this problem-oriented framework. The first is that consumers buy and use products depending on their evaluation of the self-relevant consequences of these behaviours. They establish the self-relevance of the consequences based on individually held values, while inferring their valuation from the products' attributes. These attributes, consequences and values (ACV) and, above all, the links consumers establish between them, constitute the essence of MEC. The second assumption has to do with the level of intent and rationality of consumption-related behavioural decisions. Consumers are assumed to make voluntary and conscious choices between alternative objects that are guided by the search of positive consequences and/or the avoidance of negative outcomes (Olson & Reynolds, 2001). Food- and meal-related decision-making is, however, known to be highly influenced by habit and symbolic and emotional aspects, as well as characterised by a relatively low level of involvement[2] (Costa, Schoolmeester, Dekker & Jongen, 2003b; Grunert *et al*., 1996; Steenkamp, 1997). Nevertheless, MEC theory is thought to accommodate well emotional and other less conscious consumption aspects (Grunert & Grunert, 1995), and to produce satisfactory results even with low involvement (food) products (Nielsen, Bech-Larsen & Grunert, 1998).

MEC's original development and application took place in the areas of marketing and advertising research (Gutman, 1982), and were recently revised by Olson & Reynolds (2001). Meanwhile, two alternative approaches to this theory have been suggested: the classic, motivational perspective, advocated by Olson & Reynolds (2001), and the more ambitious, cognitive-structure view taken by Grunert and co-authors (1995). The classic view is concerned with obtaining qualitative insights into consumers' consumption motives in specific situations. The usefulness of this approach can be evaluated by the extent to which its users feel they have achieved a better understanding of consumers' decision-making processes. Means-end chains can, nevertheless, be seen as models of the consumption-relevant cognitive structures, that is, of the way consumers store and organise consumption-related knowledge in their memory. With

such an approach, it should be possible to predict the actual consumption behaviour by specifying, in a given situation, which parts of the cognitive structure are activated to guide decisions. The criterion for the evaluation of the application of this kind of approach would then be the predictive ability of the uncovered cognitive structures (Grunert *et al.*, 1995). Given the actual low level of knowledge about MEC's predictive ability, food-related studies (mostly of an exploratory character) have primarily opted for the motivational approach. Nevertheless, it is advisable that both empirical procedures and the analysis of results are carried out in a way that promotes the evaluation of a MEC study's predictive ability. Ways to assess this predictive validity are discussed later in this sub-chapter.

In practice, MEC consists of a set of methods for interviewing consumers about the motivations behind their choices and interpreting these interviews in terms of the linkages between its outcomes (Olson & Reynolds, 2001). The interview method supported by the motivational approach is the so-called *laddering technique* (Grunert & Grunert, 1995; Reynolds & Gutman, 2001; Reynolds & Gutman, 1988). Laddering interviews are face-to-face, individual, in-depth, semi-structured interviews aiming at the elicitation of the attribute-consequence-value associations consumers hold regarding the object(s) under study. They consist of two stages: first, an elicitation technique prompts subjects to generate relevant attributes associated with the object(s), and second, through a series of probing questions, subjects expose why these attributes are relevant in terms of related consequences and values.

The collection of the relevant attributes associated with the object of study is achieved through the elicitation of distinctions made by each subject. These distinctions concern perceived meaningful differences between the object of study and alternative objects in the same context. The elicitation procedure is rather important for the outcome of a laddering study, since it determines the relevance of the ladders to be extracted from subjects. Three main types of elicitation techniques have been proposed (Bech-Larsen & Nielsen, 1999; Grunert & Grunert, 1995; Kelly, 1955; Reynolds & Gutman, 2001; Reynolds & Gutman, 1988; Steenkamp & van Trijp, 1997):

- Techniques based on sorting procedures – triadic sorting, free sorting or hierarchical dichotomization–, which lead subjects to sort objects according to perceived similarities or differences;
- Direct elicitation techniques – free elicitation or picking from an attribute list -, which ask subjects to directly come up with self-relevant attributes, or to select them from an attribute list generated in a previous qualitative study;

- Techniques based on some sort of ranking or scaling task, in which subjects are asked to rate or rank objects in terms of preference and/or likelihood of usage in a given situation and to justify their ranking or rating.

Two studies have addressed the validity of several elicitation techniques within different research contexts (Bech-Larsen & Nielsen, 1999; Steenkamp & van Trijp, 1997). From these studies one can conclude that, if the aim is to obtain insights about how subjects choose between fairly similar and concrete objects, then one should opt for sorting techniques. These seem to produce the highest number of attributes, though mostly concrete, and have the highest discriminative power. However, they are thought to generate the fewest abstract attributes and have the lowest predictive ability. Sorting methods emphasise tangible differences between objects and, as such, may lead to the generation of irrelevant attributes. This may, in turn, produce irrelevant ladders (Bech-Larsen & Nielsen, 1999). Additionally, they are time consuming and tiresome, which may leave less time and energy for the actual laddering part of the interviews. On the other hand, if the aim is to obtain insights on how subjects compare fairly abstract and dissimilar objects, then direct elicitation techniques seem to be the most appropriate. They are the least time consuming and produce a high number of abstract attributes. They have, nevertheless, rather low discriminatory and predictive abilities, since they almost totally neglect attributes resulting from the comparison of concrete product features.

Ultimately, if the aim is to obtain the motivations behind consumers' choices in real life, an approach is needed that focuses on the elicitation of abstract attributes (which are instrumental for need satisfaction), without neglecting the concrete ones (which are critical for the differentiation among products in a consideration set). Such an approach might be the use of ranking or scaling tasks. Since they strike a good balance between abstract and concrete attributes, they are thought to yield a high number of relevant attributes and have, thus, both good discriminative and predictive ability. Care should be taken, nonetheless, to design a research instrument that does not force subjects to spend a lot of time or energy in ranking or scaling the stimuli, and that very clearly specifies objects and contexts. The use of techniques yielding rank orders of objects according to preference or likelihood of choice has been encouraged (Green, 1992; Grunert & Grunert, 1995; Reynolds & Gutman 2001) and implemented with success in several food-related studies (Bredahl & Grunert, 1997; Jaeger & MacFie, 2000).

Concerning the stimuli to be used in the elicitation task (which are later to be laddered upon), it is advisable to choose, besides the product (s) of interest, other product alternatives that could be

considered during the consumers' behavioural decision processes. Such an approach should be implemented in order to ensure the realism of the interview and the predictive ability of the study. This matter is also related with the importance of assigning context to laddering tasks. The relevance consumers assign to the different choice criteria is thought to be situational-dependent. Therefore, to provide a clearly defined context and an appropriate set of alternatives for elicitation and laddering is crucial to the predictive ability of a MEC study. In fact, one of the strengths of MEC, when compared to other models of consumer decision-making, is that the situational-dependency of attribute importance is explicitly acknowledge, being reflected in the associations between ACV uncovered (Asselbergs, 1993; Grunert & Grunert, 1995; Olson & Reynolds, 2001).

An example of how this type of considerations can be taken into account during a MEC study involving food products is depicted in Figure 5.1.1. This multi-step, consumer decision-making process was used to establish an elicitation and laddering procedure for a MEC study of the motivations behind meal choice (Costa *et al.*, 2003a). In this procedure, subjects were asked to rank-order four general meal alternatives (homemade meals[3], manufactured ready meals, take out meals and eating out at a restaurant), according to the likelihood of choice for dinner on an ordinary weekday and an ordinary weekend in the week of the interview. These meal alternatives were written down in cards, along with some common examples, and presented to the subjects. The last three meal alternatives were selected because they were believed to be the most credible options to homemade dinners in the eyes of Dutch consumers (Candel, 2001; Costa, Schoolmeester, Dekker & Jongen, 2003b & 2002a; Oude Ophuis, Dekker & Candel, 1994). An additional reason was the presence of at least one meal representing each of the main vertical pathways depicted in Figure 5.1.1, *i.e.*, homemade, HORECA and HMR.

To ensure that the elicitation of concrete attributes, resulting from comparisons between less abstract and more similar objects, would not be neglected, subjects who chose ready meals as the first or second most likely choice in either of the days went through a second elicitation procedure. In this second procedure, they were asked to rank order five manufactured ready meals (frozen pizza, canned soup, chilled Oriental-style pasta, dried Italian-style pasta and chilled hotpot), according to the likelihood of choice on the day considered during the first elicitation task. The designation of each ready meal was also written down in cards, along with

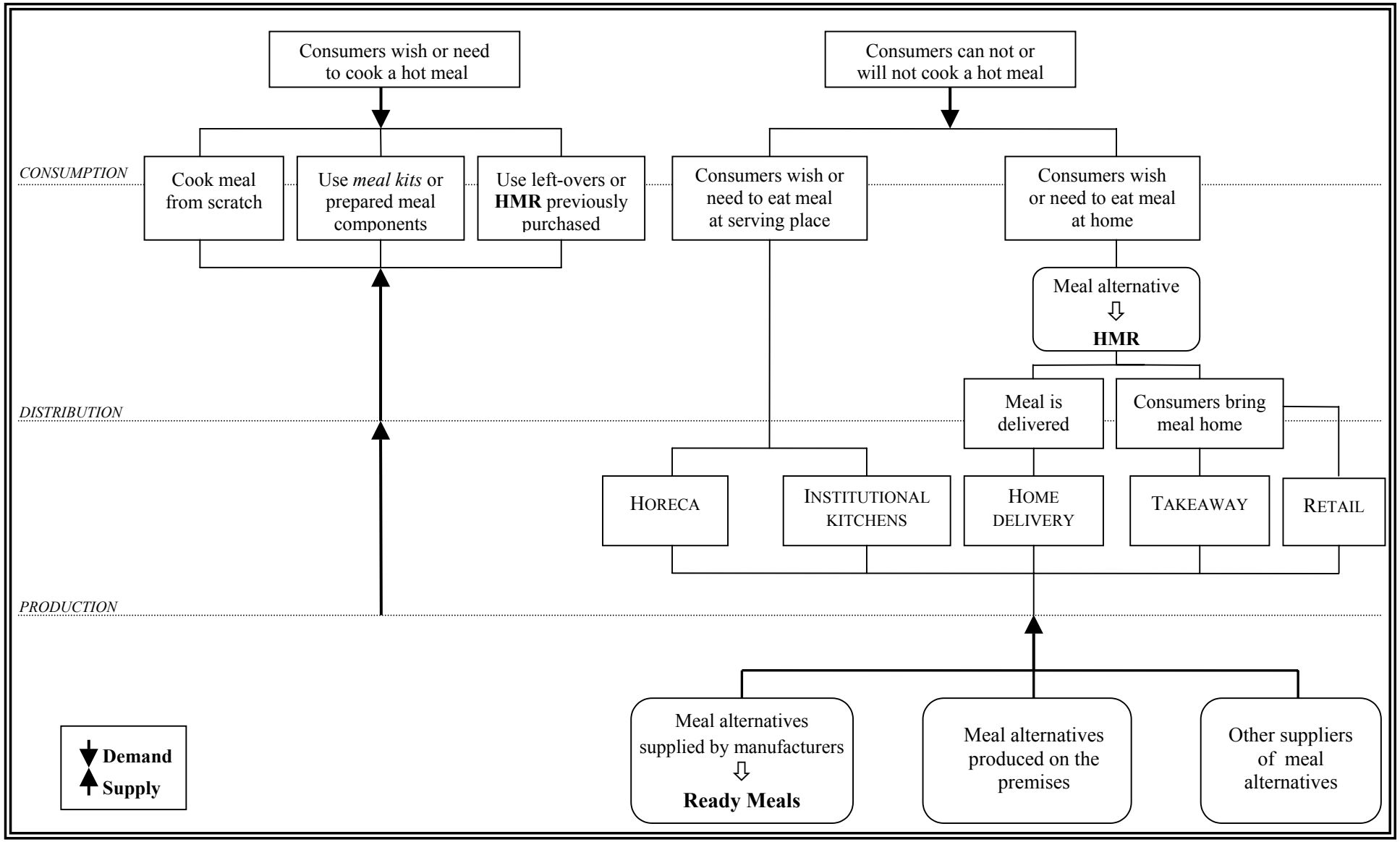

*Figure 5.1.1 – Multi-step, decision-making process of consumers' meal choice (HORECA: **HO**tels, **RE**staurants and **CA**tering) (Costa et al., 2001a, 2003a).*

some examples, and showed to the subjects. These products are widely present in supermarkets in the Netherlands and are within the six most commonly eaten types of ready meals in this country (Costa, Dekker, Beumer, Rombouts & Jongen, 2002b).

Regarding the laddering interview itself, two types of methods can be employed: the *hard laddering* and the *soft laddering* (Grunert & Grunert, 1995). *Hard laddering* refers to all interview and data collection techniques in which respondents are compelled to generate or verify associations between elements within individual ladders, in sequences that reflect increasing levels of abstraction. In *soft laddering*, a natural and unrestricted flow of speech is encouraged during interviews, with associations between ACV being reconstructing subsequently during the analysis. Within the context of face-to-face interviews, there seems to be little agreement about which type of laddering technique is more suitable. *Hard laddering* is suspected to force respondents to generate associations that might not be there in the first place, to provide one-sided visions of the motivations under scrutiny and result in boring and rather mechanistic interview environments. On the other hand, it is also said to provide less biased, more comprehensive and more detailed representations of the results than *soft laddering* (Asselbergs, 1993; Jonas & Beckmann, 1998). It has also been suggested that *soft laddering* implies a sounder steering of the interviews, thereby increasing the probability of uncovering relevant and valid MEC (Grunert & Grunert, 1995). Given that no definite proof of the two methods' convergent validity has yet been provided (Grunert & Grunert, 1995; ter Hofstede, Audenaert, Steenkamp & Wedel, 1998), *soft laddering* is usually employed, especially in the case of studies with few subjects and/or more exploratory research. This is also the approach recommended by the motivational view, especially when dealing with broader and more abstract topics (Asselbergs, 1993; Miles & Frewer, 2001; Reynolds & Gutman, 2001).

When dealing with the large samples (> 50 subjects) usually involved in segmentation studies, and due to the rather high level of time and expertise necessary to conduct and analyse laddering interviews in this case, substitute, pencil-and-paper methods have been employed (Bagozzi & Dabholkar, 1994). These methods usually involved the application of *hard laddering*. In particular, the use of the *Associative Pattern Technique* (APT) (ter Hofstede *et al.*, 1998) is often recommended for market segmentation and/or cross-cultural comparisons, in which the quantification of the results of interviews with large-scale representative samples is required (Gutman & Alden, 1985). This technique has already been successfully employed in food-related research (Feunekes & den Hoed, 2001; ter Hofstede *et al*., 1999).

The process of conducting a laddering interview in the context of a mean-end study regarding foods has been described in detail in several publications (Costa *et al*., 2003a; Miles & Frewer,

2001; Bredahl & Grunert, 1997). Basically, the attributes gathered through the elicitation task are used as starting point for a series of "Why is this important to you?" type of questions, which are intended to lead consumers "up the ladder" of related consequences and values. Sometimes the elicitation task yields consumption motives that are already consequences. In this case, to attempt to link the consequence to product attributes, *reverse laddering* can be applied by putting forward the question "What is it about this product that leads to this outcome?" In situations in which more than one product alternative is considered during the elicitation task, the formulation of negative attributes or outcomes is frequent. In these cases, *negative laddering* (or *negative* plus *reverse laddering*) can be employed by putting forward the question "Why do you want to avoid products displaying such features?" This is thought to effectively turn the dialogue from negative attributes or consequences to positive consequences and/or values, with which subjects are more able to express their views. In any case, probing for motives both for and against certain decisions should always be included in a MEC study, since only the comparison between the two allows a complete understanding of consumers' decision-making processes. Throughout the interview, it is also advisable to use other probes, like third-person probes or re-direction techniques, to facilitate the flow of conversation (Miles & Frewer, 2001; Reynolds & Gutman, 2001; Bredahl & Grunert, 1997).

5.1.2-2 Issues involved in data analysis, presentation of the results and predictive validity

The first stage of data analysis in a classic means-end study is a qualitative one. Its goal is to reconstruct the main lines of reasoning provided during the interviews (which supposedly underlie each subject's views about the topic under investigation), in a schematic network of nodes and links - the subject ladders. In order to be able to generate such a schema for each subject, a thorough content analysis of the transcribed interviews takes place. In this content analysis, meaningful sentences or words in the raw dialogue, corresponding to nodal elements, are isolated, while the stream of the dialogue itself is used to establish the relative position of the nodes and the inter-nodal links. According to the contextual information supplied by the dialogue, the nodal elements in each interview are then classified into a hierarchy of ACV, assigned a label that summarises its content (preferably using the subjects' own words), and linked to each other. At this point, the aggregation of the ladders across subjects can take place, whether the aim is to produce an estimate of a sample's cognitive structure regarding a certain object, or merely to be able to summarily report the major results obtained from a group of subjects. This aggregation is primarily achieved through an iterative coding process, in which the content labels within each nodal category are classified into broader codes until a set of

summary codes, reflecting everything that was mentioned by the subjects about the object(s) under study, is established. The set of ACV summary codes should strike a good balance between accuracy, parsimony and broadness of meaning, which is not always easy to achieve. As a general rule, no more than 50 to 60 ACV summary codes should be generated for each object, so that the second step of the aggregation procedure (the aggregation of the nodal links based on the new codes) can be facilitated (Gengler & Reynolds, 2001; Grunert & Grunert, 1995; Reynolds & Gutman, 2001).

Content analysis is the core of the analytical procedure in a means-end study, since it is then that the qualitative data provided during the interviews is transformed into nominal codes that can be quantified. Unfortunately, there are not many concrete rules on how such an important step should be conducted. For instance, there is no generally accepted definition of attributes or consequences, nor a clear distinction between different types of ACV. Some researchers even argue that capturing the right hierarchical order of the elements mentioned by subjects may be more relevant than forcing the data to fit into ACV categories (Asselbergs, 1993). Consequently, content analysis remains a rather complex and subjective procedure, and its results may always become the object of controversy (Gengler & Reynolds, 2001; Grunert & Grunert, 1995).

In the study of consumers motivations behind meal choice, we resorted to the LadderMap software to carry out the content analysis of the interviews performed (Gengler & Reynolds, 2001)[4]. The initial observation of the data, as well as recommendations from literature, indicated that the higher the partitioning within ACV categories, the higher the difficulty to properly distinguish between them, and the higher the risk of overlapping (Asselbergs, 1993; Reynolds & Gutman, 2001). Thus, before the content analysis took place, and for the sake of simplicity and clarity, the two analysts involved agreed to a number of four different, sequential ACV categories – concrete attributes, abstract attributes, consequences and values. This agreement left out distinctions between functional and psychosocial consequences, and between instrumental and terminal values (Olson & Reynolds, 1983). The following definitions for the categories were established (Bech-Larsen, 1996; Bech-Larsen, Nielsen, Grunert & Sørensen, 1996; Howard & Woodside, 1984):

- *concrete attributes* – tangible, visual characteristics of meal alternatives or ready meals, including package and labels, such as "does not contain meat", "expensive" or "fully cooked";
- *abstract attributes* – intangible, subjective characteristics of meal alternatives or ready meals, which cannot be assessed without consumption, or have to be inferred

from other internal or external information sources (possible examples are "tasty", "unhealthy" or "easy to prepare");

- *consequences* – expected functional and psychological implications of purchase, consumption and disposal of meal alternatives and ready meals, such as "easy to digest", "no need to cook" or "keep fit".
- *values* – specific modes of conduct or end-stages of existence that are permanently believed to be personally or socially preferable, *i.e.*, the individuals' existential goals or subjective norms (examples are "good health", "optimal performance" or "comply with expectations").

Sets of summary labels were independently developed by each analyst for each meal alternative in each situation (weekday and weekend), and for each ready meal under study, since several labels were expected to be unique to specific meals. The two analysts finally confronted their sets, which diverged only on 8% of the labels. These divergences were discussed and solved by re-analysis of the documentation and mutual agreement (Asselbergs, 1993; Bech-Larsen, 1996; Grunert & Grunert, 1995). These sets of summary labels were then used to, based on the interview transcripts, reconstruct the individual subject ladders. These subject ladders underwent an additional coding process, having in mind the aggregation of the results. This process consisted mainly in the reduction of the number of labels by combining opposing elements under one code that designated the underlying construct. For example, "not tasty" and "tasty" were combined under "taste", and "more effort put into cooking" and "less time spent on cooking" were combined under "time and effort put into cooking". The software used automatically readjusts the individual subject ladders according to new codes.

The second stage of analysis in a MEC study is a quantitative one, in which the codes resulting from the content analysis are used to aggregate across the individual subject ladders and produce a graphical representation of the results. This representation summarises the subjects' means-end structures regarding the object under investigation. The number of times two codes were linked to one another, either directly or indirectly, by subjects during the laddering task is counted[5], so that all direct and indirect connections between each pair of codes, corresponding to one object, can be represented in a square matrix format. This so-called *implication matrix* is then used to derive a map – the *hierarchical value map* (HVM) -, in which the most important ACV (content), and the links most frequently established between them (structure), are represented in a diagrammatic form. The direct links in this map indicate a direct cause-effect association between two codes, whereas the indirect ones reflect only a general association

between them. HVM based only on direct links can also be constructed, but only if hard-laddering is used, otherwise it may prove impossible to reconstruct similar ladders enough times to be represented in the map (Bagozzi and Dabholkar, 1994; Olson & Reynolds, 2001; Reynolds & Gutman, 2001; Reynolds & Gutman, 1988).

The decision regarding what elements and links should be represented in a HVM is usually the result of a trade-off between retaining enough information from the interviews and producing a simple, clear and sufficiently self-explanatory map. This trade-off, which depends on the number of subjects interviewed, the degree of homogeneity of the information they provided and the efficacy of the content analysis performed, is usually materialised by the definition of a *cut-off point*. This cut-off point indicates the minimum number of times a direct or indirect link between two codes has to be established by subjects in order to appear in the HVM (Gengler, Klenosky & Mulvey, 1995; Reynolds & Gutman, 2001). There are several criteria for the selection of an appropriate cut-off point. Reynolds & Gutman (2001) recommend trying multiple cut-off points and evaluating the respective solutions in terms of the level of information and interpretability provided. They suggest that a cut-off point of between 3 to 5 is usually appropriate for a sample of 50 to 60 respondents. Another option is to find an optimum between the cut-off point (proportional to the HVM's parsimony) and the proportion of direct plus indirect links in the implication matrix that actually appear on the map (proportional to the amount of information retained), for each cut-off point selected (Baggozi & Dabholkar, 1994; Reynolds & Gutman, 2001). Nevertheless, a more theoretical or statistical criterion guiding the choice of an appropriate cut-off point is yet to be established (Grunert & Grunert, 1995).

Apart from the cut-off point selected, the *principle of non-redundancy* imposed upon the aggregation process also influences the final appearance of HVM and the information they provide. The principle of non-redundancy implies that direct links established by subjects between two non-consecutive codes are shown only if the subjects did not provide other ladders in which these codes are connected by an intermediary code. Due to this principle, some direct links may be lost during aggregation. Thus, unless subjects are able to provide fairly homogeneous ladders, chains may be passing through intermediary codes that are not relevant to all subjects (Gengler *et al.*, 1995; Grunert & Grunert, 1995). The homogeneity of the information provided during laddering also determines the way HVM can be interpreted. If the means-end structure obtained for a certain object of study can be regarded as homogeneous, then this structure can be taken as a valid estimate of the cognitive structure of the subjects concerning that same object. If not, it can be only considered as a mere summary of the study's main results. Ideally, homogeneity should be investigated before the generation of the HVM,

through cluster analysis. This type of analysis can use the data depicted in the implication matrix to check whether clusters containing distinct sets of linked codes are formed (an indication of non-homogeneity). Multidimensional scaling, using as measure of distance the sum of the direct and indirect associations between ACV categories, can also be employed to test the validity of the associations expressed by an HVM (Bech-Larsen *et al.*, 1996). A perhaps more established procedure is to determine a conceptual *consistency index*, a diagnostic of the degree of homogeneity expressed in a certain HVM (Grunert & Grunert, 1995). For any chain depict in an HVM, this index indicates the difference between the highest frequency of any direct link in the chain and the frequency of indirect links between the start and the end code in the chain. The higher the consistency index of a chain, the higher the likelihood that this chain has resulted from the aggregation of different ladders across subjects. Therefore, it becomes less appropriate to judge this chain (and the whole HVM along with it) as an excerpt of the "true" cognitive structure of subjects regarding the object investigated.

Figure 5.1.2 depicts an example of an HVM generated for the ready meal category (originated by non-users users of ready meals) through the above-described procedure (Costa *et al.*, 2003a). The relative frequency of the association of two elements by subjects is represented in the HVM by lines of proportionally varying width. However, there is no relation between the area of the shapes representing the different elements and the number of subjects who mentioned each of them. The figure caption provides information about the cut-off point selected and the average consistency index obtained, as well as the percentage of direct relationships, present in the implication matrix, which is actually depicted in the HVM. This percentage can be taken as an index of the ability of the HVM to express the aggregated data contained in the implication matrix (Reynolds & Gutman, 2001).

The evaluation of an HVM's ability to accurately express consumers' knowledge structures remains a fairly subjective and unreported topic. Little is known about how software type, cut-off point selection, content analysis procedure, stimuli's abstraction level and sample heterogeneity (in terms of socio-demographic, cognitive, affective and behavioural aspects) affect an HVM's content validity (Grunert & Grunert, 1995). Consequently, there is no generally accepted consistency index value that separates a valid from an inappropriate HVM. Reynolds & Perkins (1986) have developed a method for assessing the predictive validity of HVM through *Cognitive Differentiation Analysis*. This is an individual level analysis, which uses ordinal regression to relate vectors of ratings of products on different ACV with a matrix representing pairwise preference or perception judgements about these products. This approach,

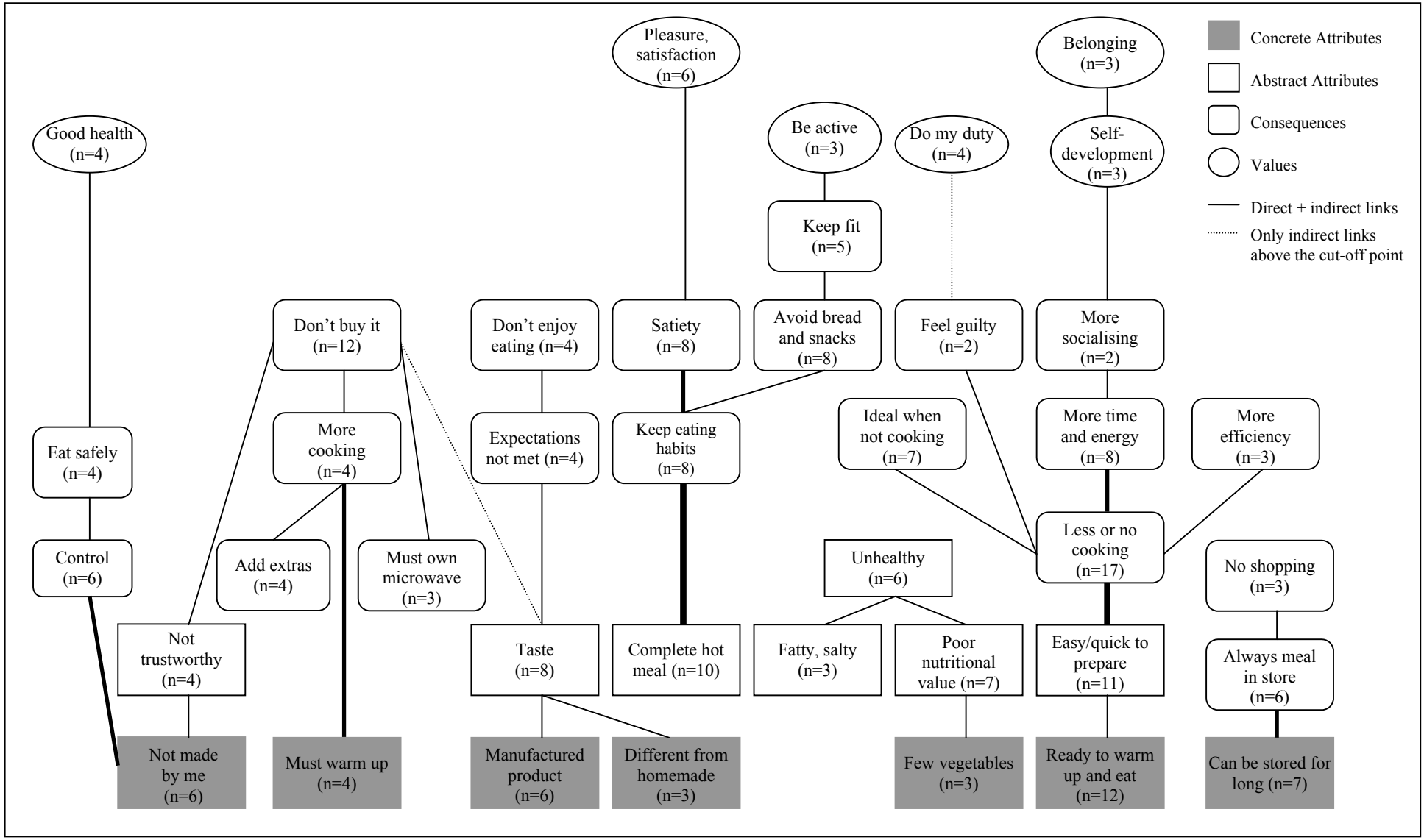

Figure 5.1.2 – Hierarchical value map of ready meals for non-users of these products (frequency of use ≤ once/month, n=20, cut-off point = 2). This HVM represents 59% of all direct links between two codes mentioned during the laddering interviews. Average consistency index = 2.6 (Costa et al., 2003a).

implies, however, that extra information - the product ratings - has to be collected during the laddering interview (Gutman, 1991). Also to overcome issues of content and predictive validity, other formalised ways of analysing laddering data have been purposed. Valette-Florence & Rapacchi (1991) have employed correspondence analysis to, based on the frequency of ACV mentioned (and excluding the sequences), show how different subject groups stress the several ACV. In an alternative approach, Grunert (1997) has employed an extension of conjoint analysis (Green & Rao, 1971) to look at the relations between beef purchase motives, expected benefits and physical characteristics. This extension can be used as a validation procedure for MEC.

Most MEC studies tend to focus on the generation and analysis of HVM for the products under scrutiny. Nevertheless, valuable information can be gained by performing a preliminary exam of the quantitative characteristics of the ladders obtained and their relation with sample features. Table 5.1.1 depicts some of the quantitative characteristics of the ladders obtained during our meal choice study[6,7].

There are several reasons why a classic MEC study can produce more and longer ladders for some objects than for others. Apart from the potential bias introduced by the interviewer and the content analysis, and on whether a usage scenario was pre-defined, subjects' different levels of product knowledge, involvement and experience are also known to play a role in this matter. It has been proposed that the generation of a higher number of ladders for a certain object is an indication of a more complex cognitive structure and a higher degree of involvement regarding that object (Bech-Larsen *et al.*, 1996; Bredahl, 1999; Grunert & Grunert, 1995; Sørensen, Grunert & Nielsen,1996). In our study, given that each object was laddered by a different number of subjects, we can only compare the different sets of ladders in terms of their average number and length. In this case, our results suggest that subjects possessed more complex cognitive structures about homemade meals than about any other meal alternative investigated, in both situations studied. This could be associated with a higher degree of involvement with homemade meals (which we think is not unreasonable to assume given their functional, symbolic and social value), but also with the overwhelming preference subjects showed for this type of meals. Following a similar reasoning, we can also presume that, according to Table 5.1.1, subjects have more complex cognitive structures and higher levels of involvement regarding frozen pizza, chilled hot pot and canned soup than about the remaining ready meals. A plausible explanation for these findings could be that pizza and soup were generally the subjects' most or least likely choices, while the hot pot duplicates a recipe that they are probably very familiar with. We did not measure the involvement and experience of the respondents with

	No. of resp.	Conc. attb.	Conc. att. per resp.	Abs. att.	Abst. att. per resp.	Cons.	Cons. per resp.	Val.	Val. per resp.	No. of ladders	No. of ladders per resp.	Ladder length per resp.	Min. ladder length	Max. ladder length
Homemade meal	48	12	2.4 ± 1.2	17	4.1 ± 1.7	51	12.6 ± 3.7	19	5.9 ± 2.2	515	11.0 ± 3.9	4.1 ± 0.7	2.7	5.8
Homemade meal (weekend)	10	2	1.0 ± 0.0	6	1.7 ± 1.0	18	4.1 ± 1.9	8	2.5 ± 1.4	28	2.8 ± 1.9	4.8 ± 1.5	2.8	8.0
Ready Meal	50	25	3.0 ± 1.4	21	3.4 ± 2.2	62	8.0 ± 3.8	15	3.3 ± 1.7	326	6.5 ± 3.11	3.5 ± 0.8	2.0	5.1
Ready Meal (weekend)	10	4	1.0 ± 0.0	4	2.0 ± 2.0	20	4.7 ± 5.2	8	4.5 ± 2.1	16	2.7 ± 3.1	4.0 ± 1.5	2.0	6.0
Take-out	21	11	1.6 ± 1.0	12	1.6 ± 0.9	20	2.2 ± 1.7	4	1.5 ± 0.9	37	1.9 ± 1.0	2.8 ± 0.9	2.0	4.5
Take-out weekend	8	6	2.0 ± 1.1	7	1.4 ± 0.6	12	2.4 ± 1.5	4	1.2 ± 0.4	15	1.9 ± 1.4	3.2 ± 1.0	2.0	5.0
Eating out	23	7	1.4 ± 0.5	11	1.9 ± 1.3	20	2.9 ± 2.3	8	1.6 ± 0.8	48	2.4 ± 1.6	3.1 ± 0.8	2.0	4.3
Frozen pizza	31	14	2.1 ± 1.3	14	1.9 ± 0.8	49	6.5 ± 4.3	13	2.9 ± 1.9	133	4.4 ± 2.9	3.8 ± 0.9	2.0	5.5
Chilled pasta	15	13	2.0 ± 1.6	12	1.7 ± 1.4	18	1.9 ± 1.7	3	1.5 ± 0.7	25	2.1 ± 1.3	3.1 ± 0.8	2.0	4.0
Dried pasta	13	3	1.5 ± 0.6	6	1.6 ± 0.7	15	2.2 ± 1.6	5	2.0 ± 1.0	18	1.6 ± 1.0	3.1 ± 1.5	2.0	6.0
Chilled hot pot	21	15	1.9 ± 1.1	10	1.7 ± 0.9	20	2.5 ± 1.3	6	1.6 ± 0.6	41	2.0 ± 1.3	3.4 ± 0.9	2.0	6.0
Canned soup	16	6	1.5 ± 0.7	13	1.8 ± 0.9	21	3.0 ± 2.0	2	1.0 ± 0.0	34	2.4 ± 1.8	2.6 ± 0.7	2.0	4.0

Table 5.1.1 – Number of subjects, total number of concrete attributes, abstract attributes, consequences and values; number of concrete attributes, abstract attributes, consequences and values per subject, number of ladders, number of ladders per subject, ladder length per subject and minimal and maximal ladder length for different meal alternatives and ready meals.

the different meal alternatives and ready meals, since this would necessarily imply longer and more tiresome interviews. We did, however, investigate the existence of significant associations between some of the variables depicted in Table 5.1.1 and the information about the subjects' level of knowledge and usage of ready meals obtained during recruiting. This was done through the analysis of two-tailed Spearman's correlation coefficients. The subjects' level of knowledge about ready meals was positively associated with the frequency of ready meal usage (.505, $p<.001$) and negatively associated with age (-.363, $p<.010$). Moreover, it was positively associated with the number of ladders, consequences and values related to the use of ready meals on a weekday (.310 ($p<.028$), .331 ($p< .019$) and .506 ($p<.002$), respectively). Product knowledge was, however, not significantly associated with the number of concrete and abstract attributes generated for ready meals, or with the ladder length per subject (although these associations were positive, as expected). Knowledge about ready meals was also significantly and positively associated with the number of concrete attributes (.586, $p<.001$), consequences (.390, $p<.033$) and values (.545, $P<.007$) of frozen pizzas. These results seem to indicate that younger, more frequent users of ready meals, also have a higher knowledge about them, and that subjects with more knowledge about this category were able to generate more ladders, consequences and values than subjects with less knowledge.

It was interesting to see that ladder length was not significantly associated with product knowledge (although there was a positive association between the two), as it would be expected. The nature of soft-laddering and the subsequent content analysis might justify these results. It is also interesting to see that although product knowledge was significantly associated with the number of consequences and values generated for ready meals, the same did not happen with the number of concrete and abstract attributes. One possible explanation is that product knowledge (which was in our study highly correlated with the frequency of consumption) does not influence the subjects' ability to enumerate product attributes, but does positively influence their ability to enumerated consumption consequences and associated values. Although the subjects' frequency of ready meal consumption was negatively associated with the number of abstract and concrete attributes, and positively associated with the number of consequences and values, none of these associations were significant ($p<.05$), thus no further support can be given to our hypothesis. Nevertheless, it has been suggested that consumers with more experience with a product may tend to underrate the relevance of its attributes in the explanation of their choice behaviour, giving instead more focus to the consequences of consumption and associated values (Sørensen *et al.*, 1996; Perkins & Reynolds, 1988). Since MEC are assumed to portray consumers' knowledge structures about a product, the significant positive relations obtained

between knowledge about ready meals, as well as the number of ladders and ACV generated for this category and frozen pizzas, provide preliminary evidence of the validity of our study's results (Peter & Olson, 1999).

5.1.3 Virtues and shortcomings of MEC and associated tools

At first look, MEC and associated tools seem to successfully bridge the gap between the qualitative and quantitative methods most frequently employed in the early stages (*idea generation* and *opportunity definition*) of consumer-oriented product design. Like other qualitative methods, they provide a holistic view of consumption motives and allow access to the ways in which consumers perceive products and themselves, as well as to the words they use to express those perceptions. However, and unlike focus groups, in-depth interviews or projective techniques, MEC studies also elicit responses from subjects that can be used to build estimates of consumers' cognitive knowledge structures with predictive value. MEC studies' outcomes are thought to provide (Audenaert & Steenkamp, 1997; Bech-Larsen & Nielsen, 1999; Grunert and Valli, 2001; Nielsen *et al.*, 1997; Ter Hofstede *et al.*, 1999).

- A better understanding of consumers' cognitive positioning of existing products;
- A more adequate development of positioning strategies for new products;
- An improved understanding of what are the relevant consumer needs and which product attributes deliver those needs;
- More focus for product improvement programs, by showing which current or potential product attributes are valued by consumers and which are not;
- More focus for marketing communication strategies, by highlighting the relevant links between product knowledge and self-knowledge established by consumers.

Nevertheless, MEC and laddering suffer from some shortcomings, which, in our opinion, limit the extension of its application beyond exploratory studies and the very early stages of product design. Firstly, and above all, laddering interviews and their traditional method of analysis are very labour and time-intensive. *Hard laddering* techniques, namely the APT, can greatly reduce this limitation, but the question remains as to whether they can yield data with the same quality. Secondly (and momentarily setting aside how methodological shortcomings can affect the predictive validity of MEC data), knowing consumers' cognitive structures regarding a certain product or category does not yet allow us to make predictions about consumers preferences, or ultimately, their choices. The means-end approach does not take into account the influence of

other relevant constructs, such as attitudes or beliefs, on consumption behaviour (Ajzen & Fishbein, 1980). Furthermore, it does not provide us with the relative importance to consumers of the different ACV, or with an estimate of their influence on behaviour (Asselbergs, 1993; Feunekes & den Hoed, 2001; Reynolds & Gutman, 1985). We must also not forget that perceived product attributes (whether abstract or concrete) are not yet objective, measurable product features, which can be object of characterisation. That is, consumers' perceptions of product features have yet to be adequately translated into the product's technical specifications. Thus, the question to be asked at this point is: will a product designed based on the knowledge of target consumers' cognitive structures indeed have significantly more chances of success that one which has been designed otherwise?

It is clear that the focus of MEC is, as marketing researchers advocate, at the level of the outcomes of consumption, *i.e.*, at the level of the key benefits driving consumers' motivations (Gutman, 1991). Accordingly, means-end data in food-related research are typically rich in consequences and abstract attributes, while poor in values and concrete attributes. Several reasons can lie at the source of this unbalance. Since food selection and purchase are mostly highly routinised and habitual behaviours, consumers can experience difficulties in making the links between their motivations and potential underlying values explicit. Moreover, because their expert knowledge on foods is limited, consumers are naturally weak in inferring outcomes from concrete product features. Consumers may have, likewise, serious misconceptions about the links between product attributes and consumption consequences. But, most important of all, is perhaps the fact that consumers can not infer consumption consequences from products that do not yet exist. Consumers' cognitive structures regarding existing products can provide only but a glimpse of how they would perceive a truly innovative product[8]. Therefore, means-end data may have limited use in the guidance of (proactive) R&D efforts.

5.1.4 Conclusions and future trends for the application of MEC in consumer-oriented food product design

This sub-chapter has provided an overview of the main conceptual and methodological issues involved in the implementation of MEC and associated tools in the context of food-related research. We have also discussed some of the particular advantages and disadvantages of the application of MEC and laddering studies in consumer-oriented food product design processes. It is our conclusion that methodological issues related with MEC studies' construct and predictive validity, together with some shortcomings related to specific aspects of food design, pose some serious obstacles to its full implementation in a consumer-oriented product design

process. Nevertheless, we believe still that MEC is a highly valid and valuable conceptual approach, since it provides a better understanding of consumers' product knowledge structures. Therefore, in Box 5.1.1, we have suggested some areas in which more research may help minimise some of MEC's methodological and implementation shortcomings. We anticipate that progresses in these areas can extend and improve the implementation of MEC and associated tools within consumer-oriented food product design, with the consequent desired gains in its efficiency and effectiveness.

BOX 5.1.1 - RESEARCH AREAS THAT CAN IMPROVE MEANS-END THEORY AND ITS IMPLEMENTATION

- The development of computer-aided interview and data analysis methods with improved validity.
- The development of statistical methods which can adequately test the validity of MEC as estimates of consumers' cognitive structures and as predictors of choice behaviour (or alternatively, of methods that ensure the generation of valid MEC).
- Creation of a detailed framework which, by integrating consumers' product knowledge structures in the Voice of the Consumer (Griffin & Hauser, 1993), can confer a consumer-based hierarchical structure of needs, thereby improving the face validity of Quality Function Deployment projects (Costa, Dekker & Jongen, 2001b).
- Counteraction of MEC's excessively semantic and verbocentric nature, by attempting its integration with more metaphor- and image-based elicitation techinques (Christensen & Olson, 2002; Costa *et al*., 2003b).
- Develop computer and web-based interface tools which enable R&D representatives to directly interact with consumers during laddering interviews. This could lead to a better understanding of the links established between product attributes and consumption outcomes (Dahan & Hauser, 2002).
- Develop information-acceleration and virtual-reality tools that allow consumers to develop knowledge structures about truly innovative concepts and prototypes, thereby facilitating the use of MEC in processes of discontinuous innovation (Dahan & Hauser, 2002).

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[1] This sub-chapter has been submitted for publication as: Costa, A.I.A., Dekker, M. & Jongen, W.M.F. (2003). An overview of the means-end theory and its potential application in consumer-oriented food product design.

[2] Though one could argue that meal choice is probably characterised by a higher level of involvement than the choice of individual foods. This is be due to the high personal relevance conferred by the socio-cultural, functional and financial valuations of meals (Meiselmann, 2000; van Trijp & Meulenberg, 1996).

[3] Whether cooked from scratch or with the help of prepared meal components.

[4] The advantages and disadvantages of this, and other types, of software employed in the analysis of laddering data have been discussed in detail by Gengler & Reynolds (2001) and Grunert & Grunert (1995).

[5] Each direct or indirect link established between two codes is only counted once per subject, independently of the number of times each subject has mentioned it.

[6] More details concerning these characteristics have been presented elsewhere (Costa *et al.*, 2003a)

[7] The number of subjects in Table 5.1.1 refers to the actual number of subjects who laddered upon a particular object, which may not always coincide with the results of the elicitation task. This discrepancy can be caused by time constraints felt during the course of some interviews, which did not allow the exploration of all the rank-orders and reasons mentioned during elicitation. Additionally, the use of soft-laddering does not usually permit a 100% recovery of the ladders during content analysis.

[8] The introduction of truly new products usually implies that consumers have to construct new product knowledge structures, rather than simply adjusting existing ones (Moreau, Markman & Lehmann, 2001).

A means-end study of the motivations behind meal choice[1]

Few studies have approached the issue of the motivations behind meal choice, i.e., the choice between cooking or using meal replacements. This is, however, a factor of undeniable importance for consumers' food choice, purchase, preparation and consumption. In this study, we have resorted to the Means-End Chain theory and laddering interviews to conduct an analysis of the motivations behind meal choice of fifty Dutch consumers. This analysis yielded hierarchical value maps for homemade and ready meals, take-out, eating out (general meal alternatives), frozen pizza and chilled hot pot (specific ready meals). Results show that the replacement of homemade by ready meals is, to a great extent, dependent on how consumers trade-off convenience and sensory- and health-related aspects. Situation, a highly positive evaluation of self-cooked meals and some degree of moral criticism towards saving time and effort in food preparation may nevertheless have a considerable influence on meal choice.

5.2.1 Introduction

Convenience, together with price, sensory appeal and health-related aspects, is believed to be an important determinant of food choice (McIntosh, 1996; Rappoport, Peters, Downey, McCann, & Huff-Corzine, 1993, Steptoe, Pollard & Wardle, 1995). Like healthiness or sensory quality, convenience is a broad, multidimensional construct, in which not only the foods' characteristics but also those of consumers and circumstances play a role. The need for convenience shapes a myriad of food-related behaviours, such as shopping, storage, meal composition, meal preparation (how and by whom), eating patterns and cleaning and waste disposal (Swoboda & Morschett, 2001; Yale & Venkatesh, 1986). It is reasonable to say that, in our day and age, convenience determines to a great extent when, where, what, how and even with whom we eat. The industry and service sectors have readily reacted to this trend by stepping up product development and considerably expanding their offer of convenience products and services (Khan, 2002; Larson, 1998). There seems to be a reasonable degree of certainty about how the convenience-driven demand for foods is shaped and how best to respond to this demand. Given the reports about the fast tempo of Western life-style and the increasing time pressure brought about by job- and leisure-related activities onto meal preparation, the extraordinary reduction of cooking times (Bowers, 2000; Sloan, 1997; Voedingscentrum, 2000) and the multiplication of the offer, one could ask: is someone still cooking out there? And why?

Yet, several studies reveal that European consumers still view homemade hot meals as the proper dinner (Mäkelä, 2000). A recent survey conducted by the Dutch Nutrition Centre (Voedingscentrum, 2000), shows that as much as 70% of the Dutch population prepares their hot meals from scratch everyday. Despite Americans' reputed preference for eating out or using Home Meal Replacements (HMR), the ideals about the importance of well-prepared family meals prevail (Bowers, 2000; Larson, 1998). Fifty-five percent of American dinners have one or more homemade dishes, and larger meals are cooked so that leftovers can be used in subsequent meals. Another sign that understanding the demand for convenience in meal preparation may not be as straightforward as one might think, is the fact that not all alternatives to cooking are equally popular. For instance, manufactured meal components or food service generally do better than manufactured ready meals in Europe, while food service and *on-the-premises* prepared meals have taken the lead in the US (Datamonitor, 1998; Larson, 1998). It seems that when consumers decide not to cook from scratch, not all convenience-delivering alternatives are equally considered.

Studies approaching convenience in meal preparation have been almost entirely devoted to the investigation of its socio-demographic and economical determinants, like employment level, household composition, education level and income. They have often obtained contradictory results (Bonke, 1996; Darian & Tucci, 1992; Swoboda & Morschett, 2001). A view of convenience based strictly on rationality – consumers choose the meal preparation alternative (including cooking) that offers the greatest concrete time and effort savings – has also framed the few studies devoted to psychological determinants, like convenience-orientation, role overload or perceived time-pressure (Candel, 2001; Reilly, 1982). None of these studies have, however, been able to convincingly demonstrate the existence of the relationships between employment level (hours of work/week), role-overload or convenience-orientation and the use of meal replacements that would be expected under the rationality principle.

To our knowledge, only a few, mostly qualitative, studies have investigated the higher-level motivations behind the use of homemade and other types of meals (Costa, Schoolmeester, Dekker & Jongen, 2003; Costa, Schoolmeester, Dekker & Jongen, 2002a; Gutman, Reynolds & Fiedler, 1984; Milburn, 1995; Oude Ophuis, Dekker & Candel, 1994). Moreover, not much is known about the specific attributes consumers use as criteria to select between meal replacing alternatives. The aim of this study was, therefore, twofold:

- To investigate the general motivations behind the choice of different meal alternatives, such as homemade meals, manufactured ready meals, take-out meals and eating out at a restaurant;
- To uncover the attributes consumers find relevant when discriminating between specific meals, and how they might relate to the above-mentioned motivations.

We anticipated that the general motives behind the choice of meal alternatives would probably be more abstract and self-related than the criteria used to evaluate and select between specific meals, which we expected to be more concrete and object-related. Therefore, we have opted for the use of the means-end chain (MEC) theory and laddering interviews (Gutman, 1982; Reynolds & Gutman, 1988,2001) to achieve our purposes.

MEC theory is said to provide a better understanding of potential consumption motives by depicting how concrete product attributes are linked to self-relevant consequences of consumption and personal life values (or goals), in a model of consumers' cognitive structures. In essence, this approach is thought to be able to identify the relevant choice criteria used by consumers to evaluate and select among alternative products or services, and explain the higher-order reasons leading to the salience of these particular criteria. We believe, therefore, that the knowledge generated by the application of the MEC theory can improve our insight into the determinants and processes of convenience-related food choice. Furthermore, this type of knowledge can be very useful for R&D practitioners in the successful development of new meal replacements (Grunert & Valli, 2001; Olson & Reynolds, 2001).

5.2.2 Experimental procedure

5.2.2-1 Methodology

In practice, MEC theory consists of a set of methods for interviewing consumers about the motivations of their choices and interpreting those interviews in terms of linkages between its outcomes. The interview method supported by the motivational means-end approach, employed in this study, is the so-called *laddering technique* (Reynolds & Gutman, 1988,2001; Grunert & Grunert, 1995). Laddering interviews are face-to-face, individual, in-depth, semi-structured interviews, aiming at eliciting the attribute-consequence-value (ACV) associations consumers hold about the object(s) under study. They consist of two stages: first, an elicitation technique prompts subjects to generate relevant attributes associated with the object(s), and second, subjects expose why these attributes are relevant in terms of related consequences and values, through a series of probing questions. In studies involving large samples (over 50 subjects), the

two stages of laddering may be conducted independently, resorting to *pencil-and-paper* methods instead of face-to-face interviews, in the so-called *hard-laddering* approach (Grunert & Grunert, 1995). In view of the motivational approach followed and the aims of this study, which according to literature can be successfully achieved using homogeneous samples of 20 to 50 subjects (Reynolds & Gutman, 2001), we have opted for the above-described, classic laddering procedure, also known as *soft laddering*.

The use of elicitation techniques yielding rank orders of objects according to preference or likelihood of choice has been recommended for laddering interviews, especially when seeking to uncover the motivations behind consumers' choices in real life (Grunert & Grunert, 1995; Reynolds & Gutmans, 2001). These techniques, which focus on the elicitation of abstract attributes (instrumental for the satisfaction of consumer needs) without neglecting the concrete ones (critical for the differentiation among products in a consideration set), have been implemented with success in several studies (Bredahl & Grunert, 1997; Jaeger & MacFie, 2000). In view of this, for the first step of our laddering study, we have opted for the use of a rank-order method based on the likelihood of usage of different meals in particular situations.

5.2.2-2 Subjects

Due to practical constraints, we were restricted to recruit Dutch subjects living in the province of Gelderland. We were primarily interested to interview people whose beliefs were thought to be relevant for understanding the motivations behind meal choice. This implied that subjects should be frequent preparers/purchasers of their households' meals and have a minimum familiarity with, or knowledge about, different meal alternatives besides cooking. Non-usage of other meal alternatives should not, however, be an excluding criterion, since we were also interested in the reasons why people do not resort more frequently to other types of meals. This seems to be the most common situation in the Netherlands (Voedingscentrum, 2000). Probing for motives both for and against certain decisions should always be included in a MEC study, since only the comparison between the two allows a complete understanding of consumers' choice behaviour (Reynolds & Gutman, 2001). Given the exploratory nature of our study, a wide age spectrum (≥ 20 years old) was chosen, in order not to exclude the motivations of any group of consumers.

Subjects were recruited through advertisements in the Wageningen University's newspaper, local supermarkets, students' residences or direct contact. During a first telephonic contact, in which further details of the study were provided, potential subjects were asked a series of

questions regarding socio-demographic variables, frequency of cooking and food purchasing, frequency of usage of HMR and their level of knowledge about these products. If they met the criteria necessary to participate in the study, and were willing to do so, an appointment for an approximately two-hour interview was made. A sample of 50 participants was assembled through this procedure, the profile of which is described in Table 5.2.1.

Gender	
Female	80%
Male	20%
Age	
Range	20-87 years old
Mean ± SD	52.2 ± 19.73
Marital Status	
Married or living together	52%
Single	32%
Widow/widower	14%
Divorced	4%
Housing Status	
Independent	92%
Service flat	8%
Education level	
Low	4%
Middle	44%
High	52%
Job Status	
Paid Job	30%
Unemployed	18%
Retired	36%
Student	16%
Children at home	
Yes	18%
No	82%
Meal preparation	
Self	76%
Partner	6%
Others	18%
Use of ready meals	
Never	12%
Low (≤1/month)	28%
Middle (2-3/month)	46%
High (1-3/week)	14%
Knowledge about ready meals	
Low	14%
Middle	32%
High	54%

Table 5.2.1 – Description of socio-demographic, product usage and product knowledge characteristics of the subjects (n=50). Product knowledge was assessed by asking subjects to provide their definition of the ready meals' category (accurateness of definition) and enumerate top-of-mind examples of these products (number of products mentioned).

5.2.2-3 Stimuli and elicitation task

The meal context and the meal preparation experience are essential to understand how consumers perceive and evaluate food products, particularly regarding convenience-related aspects. Moreover, findings from previous studies indicate that homemade meals are a strong reference point in the evaluation of other meal alternatives, both in terms of relevant attributes and valuation of usage consequences (Costa *et al.*, 2003 & 2002a; Grunert, 1995; Meiselmann, 2000). Having this in mind, it is proposed that the choice of different meal alternatives is the outcome of a multi-step decision-making process, like the one depicted in Figure 5.1.1. Accordingly, we decided to incorporate in our study some of the steps in this process, as well as some of the meal alternatives considered by consumers at each of these steps, and under different circumstances. This matter is also related to the importance of ensuring the realism of the interviews by assigning context to laddering tasks. The relevance consumers assign to different choice criteria is thought to be situational dependent. Therefore, to provide an appropriate set of alternatives for elicitation and laddering, and a clearly defined context, is crucial for the validity of a MEC study (Grunert & Grunert, 1995; Olson & Reynolds, 2001).

Based on the above-mentioned considerations, an elicitation and laddering procedure was established for the interviews performed during the study. In this procedure, subjects were asked to rank-order four general meal alternatives (homemade meals[2], manufactured ready meals, take out meals and eating out at a restaurant), according to the likelihood of choice for dinner on an ordinary weekday and an ordinary weekend in the week of the interview. These alternatives were written down in cards, along with some common examples, and presented to the subjects. The last three meal alternatives were selected since they were believed to be the most credible options to homemade dinners in the eyes of Dutch consumers (Candel, 2001; Costa *et al.*, 2003 & 2002a; Oude Ophuis *et al.*, 1994). An additional reason was the presence of at least one meal representing each of the main vertical pathways depicted in Figure 5.1.1, *i.e.*, homemade, HORECA and HMR.

To ensure that the elicitation of concrete attributes, resulting from comparisons between less abstract and more similar objects, would not be neglected, consumers who choose ready meals as the first or second most likely choice in either of the days went through a second elicitation procedure. In this second procedure they were asked to rank order five manufactured ready meals (frozen pizza, canned soup, chilled Oriental-style pasta, dried Italian-style pasta and chilled hotpot), according to the likelihood of choice on the day considered during the first elicitation task. The designation of each ready meal was also written down in cards, along with some examples, and showed to the subjects. These products are widely present in supermarkets

in the Netherlands and are within the six most commonly eaten types of ready meals in this country (Costa, Dekker, Beumer, Rombouts and Jongen, 2002b).

Following each of the two rank-ordering tasks (dinner alternatives and ready meals), subjects were asked to supply the reasons for their ranking, which were, in turn, used as starting point for the laddering task. In order not to unnecessarily fatigue the subjects, not all positions in the rankings were explicitly laddered. The interviews focused on the alternatives ranked in the first and second position during the first elicitation task (since we expected homemade meals to almost always rank first), and on the first, second and fifth position during the second task. Since we were also interested to compare the results of this study to those of previous studies concerning ready meals, reasons for choosing or not choosing this category as a likely dinner alternative were always elicited and laddered upon, independently of the ranking provided by the subjects.

Finally, an interview guide was designed to help the interviewer steer the dialogue and keep track of all the elements mentioned. This guide was composed of the interview structure, a checklist of questions and room to write down all elements mentioned, as well as to graphically record the general lines of reasoning generated by the subjects.

5.2.2-4 Laddering interviews

A trained interviewer, familiar with the research project[3], pre-tested and optimised the developed interview procedure through the performance of two pilot interviews. During the second semester of 2001, the same interviewer conducted the fifty "real" interviews, which lasted between 45 and 120 minutes each. In order to create an environment that was simultaneously private, familiar and comfortable, thus more favourable to the establishment of good rapport between interviewer and interviewees, the subjects' homes were chosen as the interview venue. All interviews were conducted in Dutch and tape-recorded with the subjects' permission.

The interviews started with a brief description of the sequence of tasks and questions that would follow. Subjects were told that there were no wrong or write answers, since the purpose of the interview was solely to gain a better understanding of how they viewed the topic of meal preparation. During the above-described elicitation procedure, the interviewer wrote down the rank-orders provided by the subjects for each of the two situations and the ready meals considered, as well as the reasons behind them. These reasons were recorded according to the order they had been provided, since it was assumed that the first five, top-of-mind reasons mentioned would be the most important and should thus be given priority during laddering

(Bech-Larsen & Nielsen, 1999). A five-minute warm-up conversation, regarding the rank ordering and the cooking and eating habits of the subjects, preceded the actual laddering.

Laddering started with the interviewer addressing the reasons why a certain dinner alternative was the most likely choice on a weekday. If the reason was a positive attribute of the dinner alternative, then the question "why is this attribute important to you" was asked. If the reason provided was judged by the interviewer to be more a usage consequence than an object characteristic (either concrete or abstract), then *reverse* laddering was applied, and the question "what is it about this meal that makes it that way" was put forward. If subjects were able to generate attributes in this manner, those were listed in the interview guide and linked to the usage consequence. After this, the typical "why is this important to you" line of questioning was picked up at the consequence level. If not, laddering started immediately at the consequence level, which is not at all uncommon among classic means end-studies. The conversation about the attribute or consequence went on until the respondent had nothing more to say about the topic. When this happened, the interviewer moved on to the next reason mentioned and a similar dialogue took place. This went on until all the reasons recorded for the most likely choice on a weekday and on the weekend were explored, or until the interviewer felt that no more relevant information would be gained from exploring the remaining reasons. Next, the first mentioned reason for choosing a certain meal alternative as the second most likely dinner on a weekday was addressed. In this case, some negative attributes or undesirable consequences related to the meal alternative, leading it to be placed in the second position and not in the first, were also mentioned. In these cases, *negative* laddering (or *reverse* plus *negative* laddering) was used and the question "why do you want to avoid meals displaying such characteristic" was asked. This effectively turned the dialogue from negative attributes or consequences to positive consequences and/or values, with which subjects are thought to be more able to express their feelings (Bredahl & Grunert, 1997; Miles & Frewer, 2001; Reynolds & Gutman, 2001).

If ready meals had been mentioned as the first or second most likely choice on either of the days, laddering based on the results of the second elicitation task took place, following a procedure similar to that described in the last paragraph. If not, the interviewer asked for the reasons why this was the case, laddered upon them and concluded the interview immediately after. In this way, each respondent went trough a minimum of 3 and a maximum of 5 laddering tasks. Throughout the interviews, several probes, like third-person probes or redirection techniques, were used to facilitate the flow of conversation (Reynolds & Gutman, 2001). At the end of each interview, the subject's main lines of reasoning were summarised back to him/her

and the interviewer asked if there was anything else him/her would like to add. Finally, the interview was concluded, the subject thanked for his/her time and rewarded with a gift voucher.

5.2.2-5 Data Analysis

After all the interviews were concluded, the correspondent audio-tapes were transcribed and individual files, containing the information provided during recruitment, the interview guide and the transcript, were assembled for each subject. This documentation formed the basis of the consequent data analysis.

The initial stage of data analysis in a means-end study is a qualitative one. Its objective is to reconstruct the main lines of reasoning provided during the interviews by building a schematic network of nodes and links – the subject ladders. In order to be able to generate such a schema for each subject, a thorough content analysis of the transcribed interviews must be performed (Grunert & Grunert, 1995; Reynolds & Gutman, 2001). In our study, the content analysis of the fifty interviews performed was carried out independently by the interviewer and the author of this thesis, with the assistance of the individual subjects' files and the LadderMap software (Gengler & Reynolds, 2001). Our initial observation of the data, as well as recommendations from literature (Reynolds & Gutman, 2001), indicated that the higher the partitioning within ACV categories, the more difficult to properly distinguish between them, and the higher the risk of overlapping. Thus, previously to the analysis, for the sake of simplicity and clarity, the analysts agreed to a number of four different, sequential ACV categories – concrete attributes, abstract attributes, consequences and values. This agreement left out the distinctions between functional and psychosocial consequence, and between instrumental and terminal values (Olson & Reynolds, 2001).

Sets of summary labels were independently developed by each analyst for each meal alternative in each situation (weekday and weekend), and for each ready meal under study, since several labels were expected to be unique to specific meals. The two analysts finally confronted their sets, which diverged only on 8% of the labels. These divergences were discussed and solved by re-analysis of the documentation and mutual agreement (Grunert & Grunert., 1995). These sets of summary labels were then used to, based on the interview transcripts, reconstruct the individual subject ladders. Subjects' sentences or words, thought to best represent the set of ideas comprised by each label, were identified and retained, to help the further interpretation of the results. Sentences, words and labels were finally translated to English.

The subject ladders and labels concerning meal alternatives and ready meals, which had been laddered by less than 20 subjects, were recorded and analysed as such. The labels corresponding

to the remaining subject ladders underwent an additional coding process, having in mind the aggregation of the results. This process consisted mainly in the reduction of the number of labels by combining opposing elements under one code that designated the underlying construct. For example, "not tasty" and "tasty" were combined under "taste", and "more effort put into cooking" and "less time spent on cooking" were combined under "time and effort put into cooking". The software used automatically readjusted the individual subject ladders according to new codes.

The second stage of analysis in a means-end study is a quantitative one. At this stage, the codes resulting from the content analysis are used to aggregate across the individual subject ladders, producing a graphic representation that summarises the subjects' means-end structures regarding the object under investigation. The number of times two codes were linked to one another, either directly or indirectly, by subjects during the laddering task is counted[4]. In this way, all direct (cause-effect) and indirect (general) associations between each pair of codes corresponding to one object, can be represented in a square matrix format. This so-called *implication matrix* is then used to derive a map – the *hierarchical value map* (HVM) -, in which the most important ACV (content), and the links most frequently established between them (structure), are represented in a diagrammatic form (Olson & Reynolds, 2001; Reynolds & Gutman, 1888, 2001). The decision regarding which elements and links should be represented in the map is usually the result of a trade-off between retaining enough information from the interviews and producing a simple, clear and sufficiently self-explanatory HVM. This trade-off is materialised by the definition of a *cut-off point*, which indicates the minimum number of times a direct or indirect link between two codes has to be established by the subjects in order to appear in the HVM. Besides the cut-off point chosen, the *principle of non-redundancy* imposed upon the aggregation process also influences the final appearance of HVM and the information they provide. The principle of non-redundancy implies that direct links established between two non-consecutive codes are shown only if subjects did not provide other ladders in which these codes are connected by an intermediary code. Due to this principle, some direct links may be lost during aggregation. Consequently, chains may be passing through intermediary codes that are not relevant to all subjects, unless subjects are able to provide fairly homogeneous ladders (Grunert & Grunert, 1995; Reynolds & Gutman, 2001).

Implication matrices, and the respective HVM, were generated for all meal alternatives and ready meals considered in this study, provided they had been laddered upon by more than 20 subjects. According to the number of subjects that laddered each object, a cut-off point was chosen which guaranteed a good balance between the amount of information retained (the

proportion of direct plus indirect links from the total matrix cells), and the clarity and simplicity of the HVM generated. Average consistency indices were calculated for each HVM generated (*i.e.*, consistency index of each main chain/number of main chains). This was done to evaluate the extent to which heterogeneity in the subjects' answers may have led to unduly elimination or creation of information, due to the non-redundancy principle. These indices can be taken a measure of the HVM's ability to display the "true" knowledge structure of subjects towards the meal alternatives and ready meals (Grunert & Grunert, 1995).

5.2.3 Results and discussion

5.2.3-1 Elicitation tasks and content analysis

Homemade meals were, by large, the most likely subjects' choice on weekdays and weekends (92% and 78% of subjects, respectively). Eating out was almost always the least or the second least likely choice, being relatively more favoured on weekends. Since the few respondents who chose eating out as the second most likely choice on a weekday also chose it as first or second most likely choice on the weekends, interview results pertaining eating out on weekdays were not submitted to further analysis. Ready meals were mostly the second most likely choice on weekdays and weekends, with take-out meals being most frequently the third. On weekends, however, take-out meals were almost as frequently considered as the second most likely choice as ready meals. A total of 21 subjects ranked ready meals either as the first or second most likely choice both on weekdays and weekends, while 10 other subjects ranked them as most likely on weekdays and 2 as most likely on weekends. Therefore, any results concerning specific ready meals presented onwards describe for a great deal the subjects' views about their consumption during the week. In the second elicitation task, over 60% of the subjects elected frozen pizza as their most likely choice of ready meal. Chilled Oriental-style pasta and chilled hot pot were mostly ranked in the third or fourth positions, while the dried, Italian-style paste occupied mostly the second and third positions. Canned soup was either the second or the fifth most likely choice.

The content analysis of the interviews generated 43, 49, 112 and 19 different labels for concrete attributes, abstract attributes, consequences and values related to meal alternatives, respectively, counting both weekends and weekdays. Thirty different labels for concrete attributes and 32 labels for abstract attributes were, in turn, developed for the five ready meals, plus 113 labels for consequences and 14 labels for values. More attribute labels were developed for meal alternatives than for the ready meals, which was expected given that ready meals can be seen as being more similar to each other than meal alternatives. The relatively high number of

consequences generated in both cases can be attributed to the choice-based nature of the elicitation task and the use of soft-laddering, which sometimes allowed for forked answers at the attribute level and laddering to begin at the consequence level. Additional reasons for such a high number of consequences could be also the level of abstraction of the meal alternatives and the number of different ready meals considered. Yet, a considerable number of labels, especially at the consequence and value level, were similar across meal alternatives, across ready meals and between the ready meals' category and the five products considered. This is not surprising since the variety of food consumption consequences and associated values is usually less than that of food attributes, especially if comparisons are made between fairly dissimilar foods or food categories (Miles & Frewer, 2001; Reynolds & Gutman, 2001). In our opinion, the high number and relative proportion of the ACV labels obtained by this study vouch for the quality of the interviews' and content analysis' procedures followed. The fact that more labels were generated for abstract than for concrete attributes lead us to expect a sufficiently high relevance of the ladders obtained. Meanwhile, the relatively high number of consequence and value labels indicates that subjects were frequently able to produce higher level motivations for their choices, which is one of the main aims of means-end studies (Bech-Larsen & Nielsen, 1999).

A total of 1236 ladders were reconstructed from the interview transcripts, representing an average of 24.7 ± 10.7 ladders per subject. An average subject generated 11 ladders about homemade meals on weekdays, 6 or 7 ladders regarding ready meals, 4 to 5 ladders about frozen pizza, and 2 to 4 ladders concerning any other two types of ready meals. The average number of ladders per subject per object of laddering reported by classic mean-end studies is usually between 2 and 5 (Gutman *et al.*, 1984; Grunert & Grunert, 1995). In our study, subjects tended to ladder more about homemade meals than other meal alternatives, and more about alternatives considered to be more likely, which may be an indicator of different levels of involvement with the different meal alternatives and rank orders (Bredahl & Grunert, 1997). On the other hand, the lower number of ladders for some of the specific ready meals might have been caused by the subjects' fatigue or time constraints. The ladder length per subject ranged between 2 and 8, with an average of 3.5 ± 0.6. This can be taken as a preliminary indication that subjects were able to generate fairly complete ACV sequences for most of the different meal alternatives and ready meals, given that we have considered 4 hierarchical levels during analysis. One must note, however, that means-end theory does not require every ladder to end in a value, or to include all hierarchical levels of meaning (Peter & Olson, 1999).

Less than twenty subjects provided ladders for homemade meals, ready meals and take-out meals on the weekend, and for the chilled pasta, the dried pasta and the canned soup. Therefore, further coding and aggregation of these ladders did not take place. Appendices 5.2.1 (a-f) show the ACV labels generated for these meal alternatives and ready meals, together with the number of subjects who mentioned each label. Based on this information, a qualitative analysis of the labels obtained for the ready meals can take place at this point. The analysis of the labels for meal alternatives on weekends will take place in the next section, together with the analysis of the aggregated results of the their weekdays counterparts.

The chilled Oriental-style pasta was frequently the fourth most likely choice of the subjects, who accordingly generated mostly reasons why this product was not often seen as a likely choice for dinner. The product was generally judged to have a very poor appearance and nutritional value, and to be unbalanced in terms of composition ("lots of pasta and little of anything else"), as well as unhealthy. This negative evaluation of the product's appearance and nutritional value is similar to the one obtained in previous studies with a fairly similar sample of subjects and products (Costa *et al.*, 2002a). Subjects also thought that it is equally easy and quick to make one's own oriental-style pasta, with a much tastier and nutritious outcome. This general negative evaluation of the products' attributes lead to mostly negative consequences, like deriving little enjoyment and/or nourishment from its consumption. The few subjects who were somewhat positive about the product appreciated it for its convenience and high carbohydrate content, which they associated with having more free time and physical energy to devote to the optimisation of the performance of important activities.

The dried Italian-style pasta was frequently the third most likely choice of ready meal for subjects. Besides finding the composition of this product very unbalanced, subjects also generally disliked its taste and the fact that no extra ingredients of their own choice could be added to it during preparation. Nevertheless, most subjects appreciated its convenience attributes and the time savings associated to them. One middle-aged mother stated: "*The children still get a full hot meal even if I don't have enough time to cook. So they are properly fed and learn the importance of having one decent meal per day. This is something that is my duty to teach them. It is important to their future"*.

Subjects were overwhelmingly negative about eating the canned soup, which contradicts, to a certain extent, the results of the elicitation task. The composition and portion size were found highly inadequate, and the overall taste evaluation was also very negative. Moreover, subjects were, in general, worried about the effects of its consumption on diet and health. These soups were perceived to be salty, extensively processed (thus not containing the adequate amounts of

essential micro-nutrients) and to contain excessive amounts of food additives. However, its storage properties and ease of preparation were positively evaluated.

Generally speaking, subjects perceived the chilled pasta, the dried pasta and the canned soup as representing an highly unfavourable trade-off between convenience, on one side, and satisfaction, nutritional value and healthiness on the other. This rendered them highly unlikely dinner alternatives in their eyes. A similar perception of ready meals among Dutch subjects of this geographical area has also been reported in earlier means-end studies (Oude Ophuis *et al.*, 1994).

5.2.3-2 Aggregation of the interview results – hierarchical value maps

Figure 5.1.2 and Figures 5.2.1 through 5.2.6 depict the HVM generated for ready meals (originated by subjects not using ready meals), homemade meals, ready meals (originated by subjects using ready meals), take-out meals, eating out on weekends, frozen pizza and chilled hot pot, respectively. The relative frequency of the association of two elements by subjects is represented in the HVM by lines of varying width. This width is directly proportional to the relative frequency of association between each pair of elements. There is, however, no relationship between the area of the shapes representing the different elements and the number of subjects who mentioned each element. Captions provide information about the average consistency index for each HVM generated, as well as the percentage of direct relationships present in the different implication matrices which are actually depicted in the associated HVM. This percentage can be taken as an index of the ability of the HVM to express the aggregated data contained in the implication matrix (Reynolds & Gutman, 2001). Different cut-off points were chosen for building the HVM, given the differences in the number of subjects who laddered upon each meal alternative and specific ready meal. Difficulties in generating a simultaneously clear and complete HVM for the ready meal category confirmed expectations regarding the heterogeneity of the subjects' views on this matter, given the sample's profile (Table 5.2.1). Based on the assumption that the different levels of ready meal usage across subjects could have been a major source of heterogeneity in the data, subjects were accordingly divided into two usage groups, with independent implication matrices and HVM being generated separately for each group.

The concrete attributes of homemade meals mentioned by subjects were *fresh* (*i.e.*, prepared from scratch everyday, based on raw ingredients), *daily task*, *low cost*, *shared*, *simple* (*i.e.*, with few ingredients, using basic cooking methods and rarely resorting to herbs, spices or sauces) and *made by me* (Figure 5.2.1). These attributes can be divided into those that have

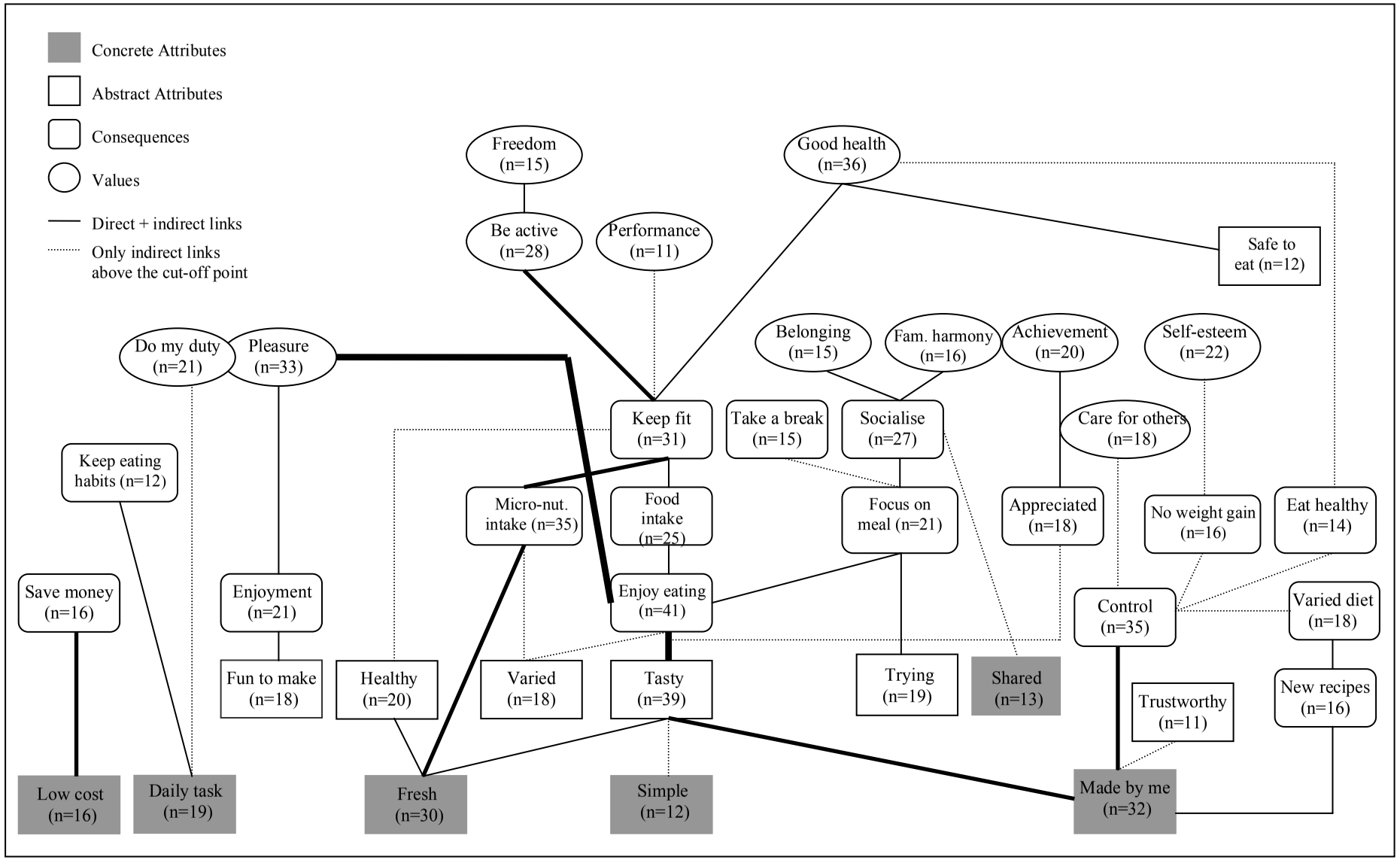

Figure 5.2.1 – Hierarchical value map of homemade meals (n=48, cut-off point = 8). This HVM represents 42% of all direct links between two codes mentioned during the laddering interviews. Average consistency index = 10.0

to do with the characteristics of the meal itself and those related to cooking. The aspects attributed to cooking were directly associated to self-relevant consequences and values, like *doing my duty*, *keep eating habits*, *enjoyment/fun – pleasure*, *save money*, *socialising – family harmon*y or *socialising-belonging*, and *control*. This can be taken as an indication of the subjects' high involvement with this activity (Bech-Larsen, 1996). The meal characteristics themselves were associated to abstract attributes, like *healthy*, *tasty* and *good quality*. Other, independently mentioned, abstract attributes were *trying* (as in demanding time, attention and effort), *varied* (*i.e.*, composition not the same every day) and *safe to eat*. This last attribute was related to the use of biologically-grown meal ingredients (which were viewed by subjects as being more natural and pure), as well as to homemade meals not being the result of an industrial process. Core consequences, values and links related to homemade meal consumption were of hedonic character (*enjoy eating-pleasure*) and social character (*focus on meal – socialise – belonging/family harmony*). Other central associations had to do with the maintenance of good physical condition and high levels of activity (*ensure adequate micro-nutrient intake – keep fit – be active* or *keep fit-good health*), and the relation between diet, health and well-being (*control over what you eat – eat healthy or eat varied or no weight gain – good health or self-esteem*). Taken together, these results indicate that the subjects in this study considered homemade meals as an essential means of achieving highly relevant ends in their lives that can be directly associated with food consumption. This is yet another indication of the high involvement of the subjects with the cooking of their own meals, which probably had a great impact on their evaluation of other meal alternatives. These findings are similar to those obtained in previous qualitative studies, in which consumers were asked about their views on homemade meals (Costa *et al.*, 2003 & 2002a; Milburn, 1995).

Ten subjects laddered upon homemade meal consumption on weekends. The main attributes mentioned in this context were an increased complexity and sophistication of the meals cooked, which were also more often shared with family, friends and guests. This led to more time and effort being put into cooking, which was seen as a source of enjoyment and reward. This, in turn, positively differentiated meal preparation and consumption on weekends from that on weekdays. Our findings reflect the tendency of some consumers, already described by Verlegh & Candel (1999), to value time and effort savings in cooking differently according to the meal's social setting.

It is interesting to see that both non-users and users of ready meals on weekdays have positively- and negatively formulated chains of meanings regarding this category (Figures 5.1.2 and 5.2.2).

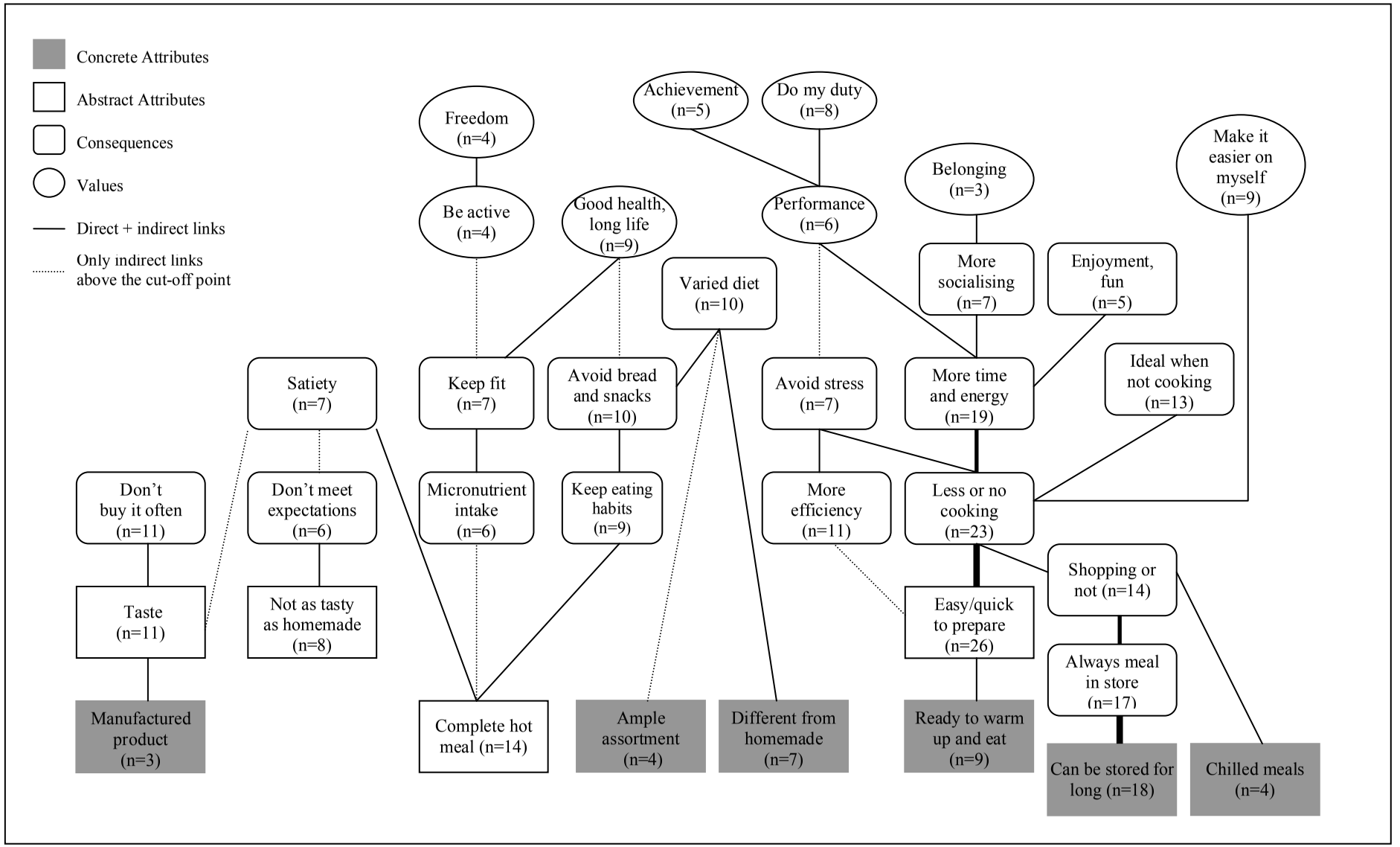

Figure 5.2.2 – Hierarchical value map of ready meals for users of these products (frequency of use ≥ 2-3 times/month, n=30, cut-off point = 3). This HVM map represents 47% of all direct links between two codes mentioned during the laddering interviews. Average consistency index = 5.0

Users and non-users of ready meals alike recognised the convenient aspects of its purchase (*can be stored – always meal in store – no shopping*) and consumption (*ready to warm up and eat – easy/quick to prepare – less cooking – more time/energy for other activities*). For users (mostly the younger subjects), however, the benefits of ready meal consumption went beyond having more time for social activities, to positively impact on their work and sports' performance. In turn, these subjects viewed performance optimisation as a duty towards themselves and others. Furthermore, avoiding stress and having a more "easy-going" life-style were also seen as positive consequences of spending less time and energy in cooking the daily meals. These views were shared by the 10 subjects who chose ready meals as their first or second most likely meal choice on weekends. On the other hand, non-users felt that not spending enough time and energy in cooking was a source of reproach and regret, precisely because one is then not complying with one's duties towards him- or herself and relevant others. Nevertheless, users and non-users agreed that ready meals are full hot meals that, though not as tasty and satiating as their own, are still preferable to snacking and bread-based meals. Major obstacles to ready meal use were the association between industrial processing and poor taste (both users and non-users), health-related aspects (*poor nutritional value*, *fatty and salty*), preparation aspects (*microwave ownership*, *add other ingredients*) and loss of control over meal preparation leading to the consumption of unsafe foods (for non-users).

Conflicting valuations of self-relevant outcomes stemming from the same product attribute have been reported in other studies about the motivations behind food choice (Bredahl, 1999)[5]. It is thought that these valuations make consumers choice more difficult by leading them to more often weigh the positive against the negative outcomes of product use before a purchase decision. This can not only restrain the purchase frequency of users, but also become a major obstacle to the introduction of new products, especially if the negative outcomes are perceived by consumers to often outweigh the positive ones. Previous studies had already pointed out that ready meal consumption may, to a large extent, be dependent on the outcome of consumers' trade-offs between convenience aspects, on one side, and sensory- and health-related aspects on the other (Costa *et al.*, 2003, 2002a; Oude Ophuis *et al.*, 1994). Nevertheless, our findings introduce evidence of what could be also an important determinant of choice and consumption of ready meals – a negative valuation of convenience attributes, caused by the view that plenty of effort, attention and time should be put into meal preparation. By being associated with feelings of guilt, regret and not complying with one's duty, ready meal consumption might become very undesirable for some precisely because it is so convenient. The low moral status of

convenience food consumption has already been recognised in several sociological studies (Mäkelä, 2000; Gofton, 1995).

Subjects who laddered upon take-out meals, either on weekdays or weekends, stated that their preference for these meals was mainly related to their degree of readiness for consumption, which eliminated the need to devote time and energy to shopping, cooking and eating (Figure 5.2.3). Nevertheless, some disliked the fact that this degree of readiness implied having to go out just before dinner to buy them. A few subjects mentioned *appearance* and *taste* as attributes leading to the consumption of these meals, although others stated that a poor taste, together with price and health-related considerations, was the major obstacle to a more frequent consumption. These results do not support previous findings, which indicated that take-out meals could be a more preferred meal alternative than ready meals (Costa *et al.*, 2003).

The majority of the subjects in this study viewed eating out as a meal alternative only suitable on weekends (Figure 5.2.4). Restaurant meals were found to be too demanding, in terms of both time and money, to be consumed on a normal weekday. Nevertheless, they were seen as a means of achieving valued ends like *pleasure* (through the enjoyment of both the food and the location), *family harmony* (through an increased level of socialisation during meal time) and *excitement, adventure* (by creating the opportunity to come in contact with different eating cultures). These findings support the notion that, for Dutch consumers, eating out is more valued by its recreational aspects than by its convenience or functionality, being thus reserved for special occasions (Verlegh & Candel, 1999).

Subjects' choice of frozen pizza as the most likely ready meal to be used was mainly based on their positive evaluation of the convenience (in storage and preparation) and sensory characteristics of this product, *vis-à-vis* the homemade version (Figure 5.2.5). Some subjects thought that most frozen pizzas contained few toppings. However, this was seen as only a minor shortcoming, since it gave subjects the opportunity to add extra ingredients. The addition of extra ingredients, in their opinion, improved the nutritional and sensory quality of the product considerably. Moreover, it gave them a degree of control over and participation in the meal preparation that was highly appreciated.

The subjects who laddered upon the chilled hot pot had mostly a negative opinion about the characteristics of this product (Figure 5.2.6). From the product's appearance, composition and preparation method they inferred a poor sensory, nutritional and microbiological quality, and not even the recognition of some level of time and effort-saving properties outweighed this judgement. The fact that most subjects considered the homemade version of this product already very easy to prepare also contributed to the underrating of the convenience level offered.

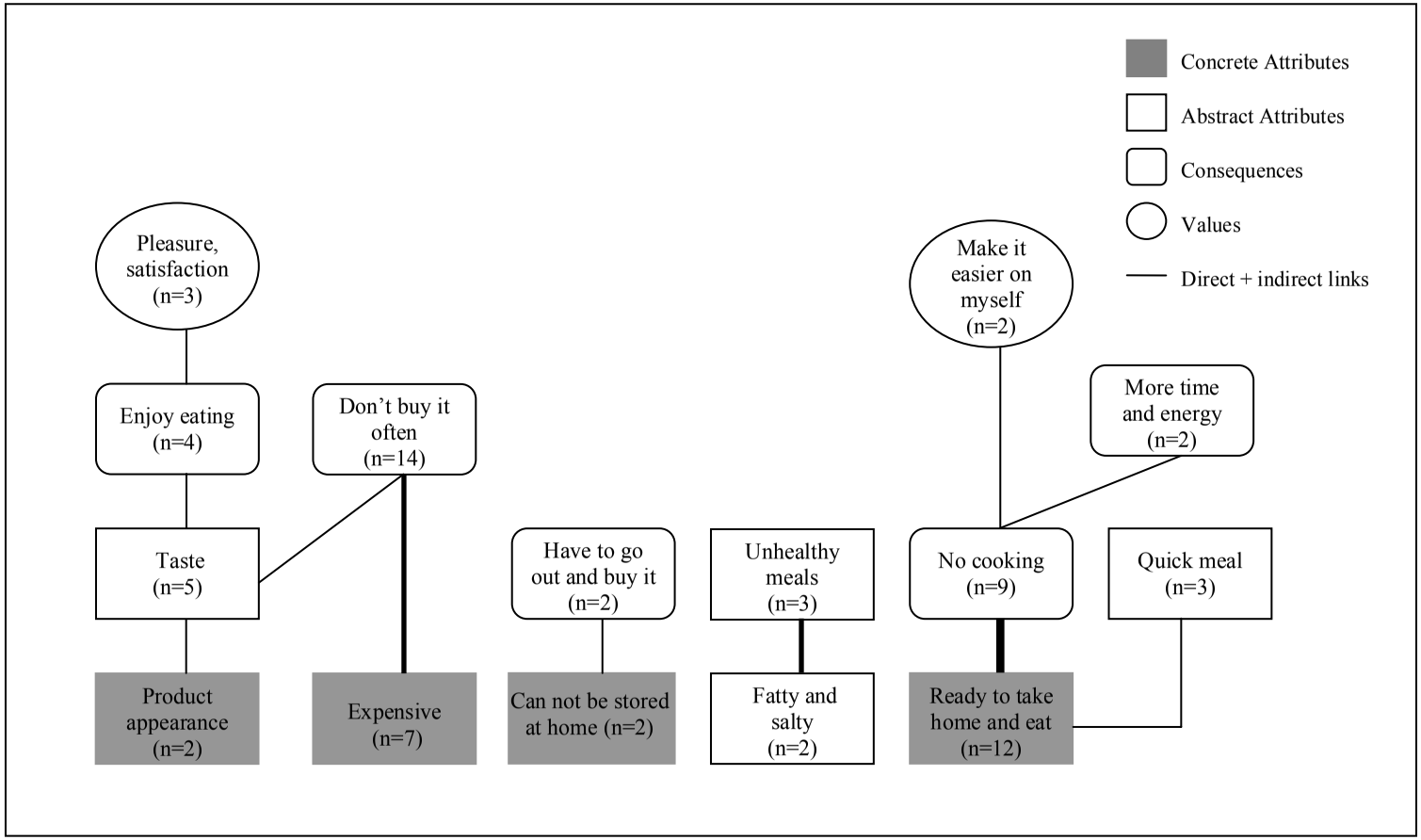

Figure 5.2.3 – Hierarchical value map of takeout meals (n=21, cut-off point = 2). This HVM represents 57% of all direct links between two codes mentioned during the laddering interviews. Average consistency index = 0.5

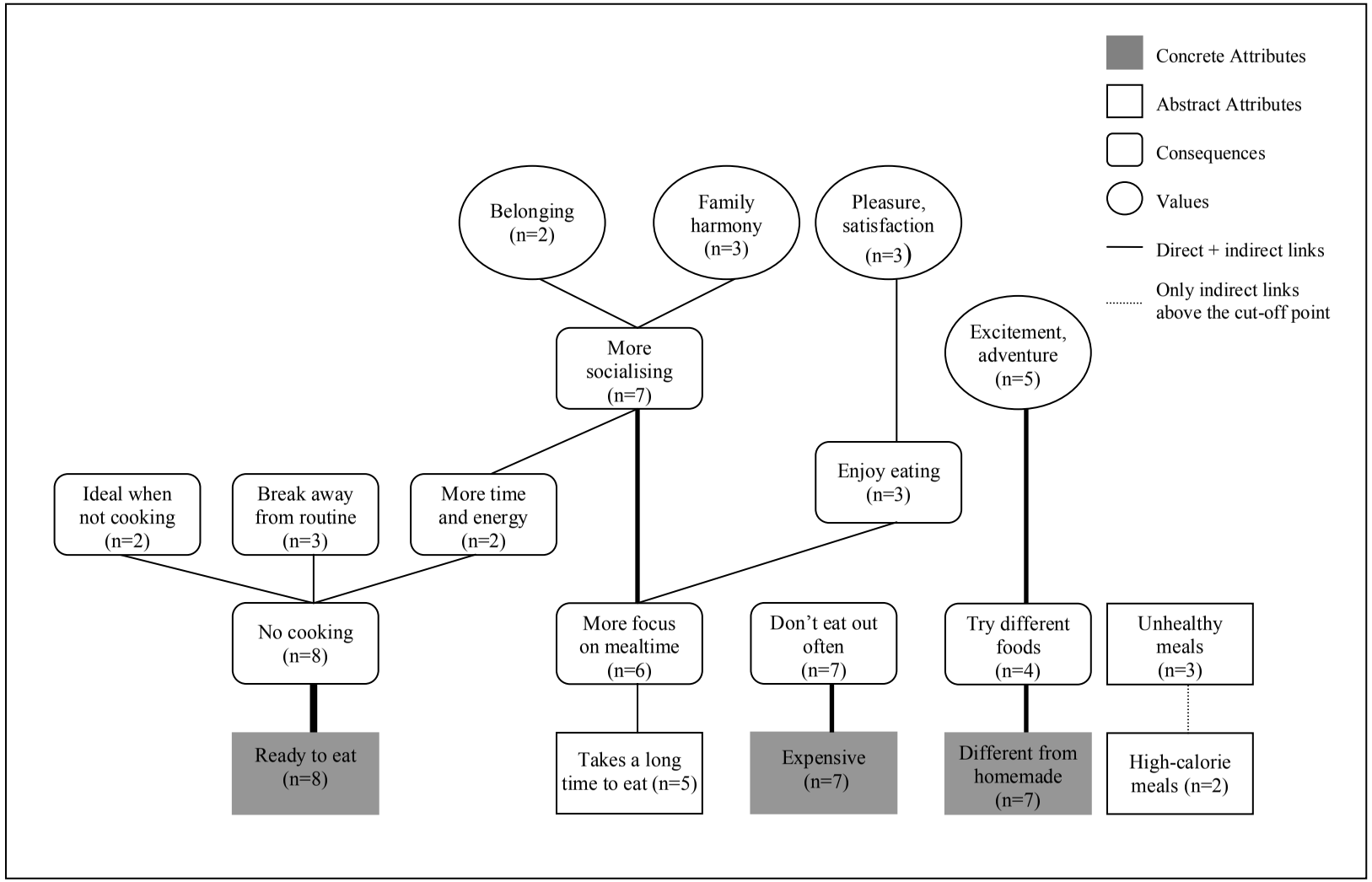

Figure 5.2.4 – Hierarchical value map of eating out on weekends (n=23, cut-off point = 2). This HVM represents 66% of all direct links between two codes mentioned during the laddering interviews. Average consistency index = 1.1

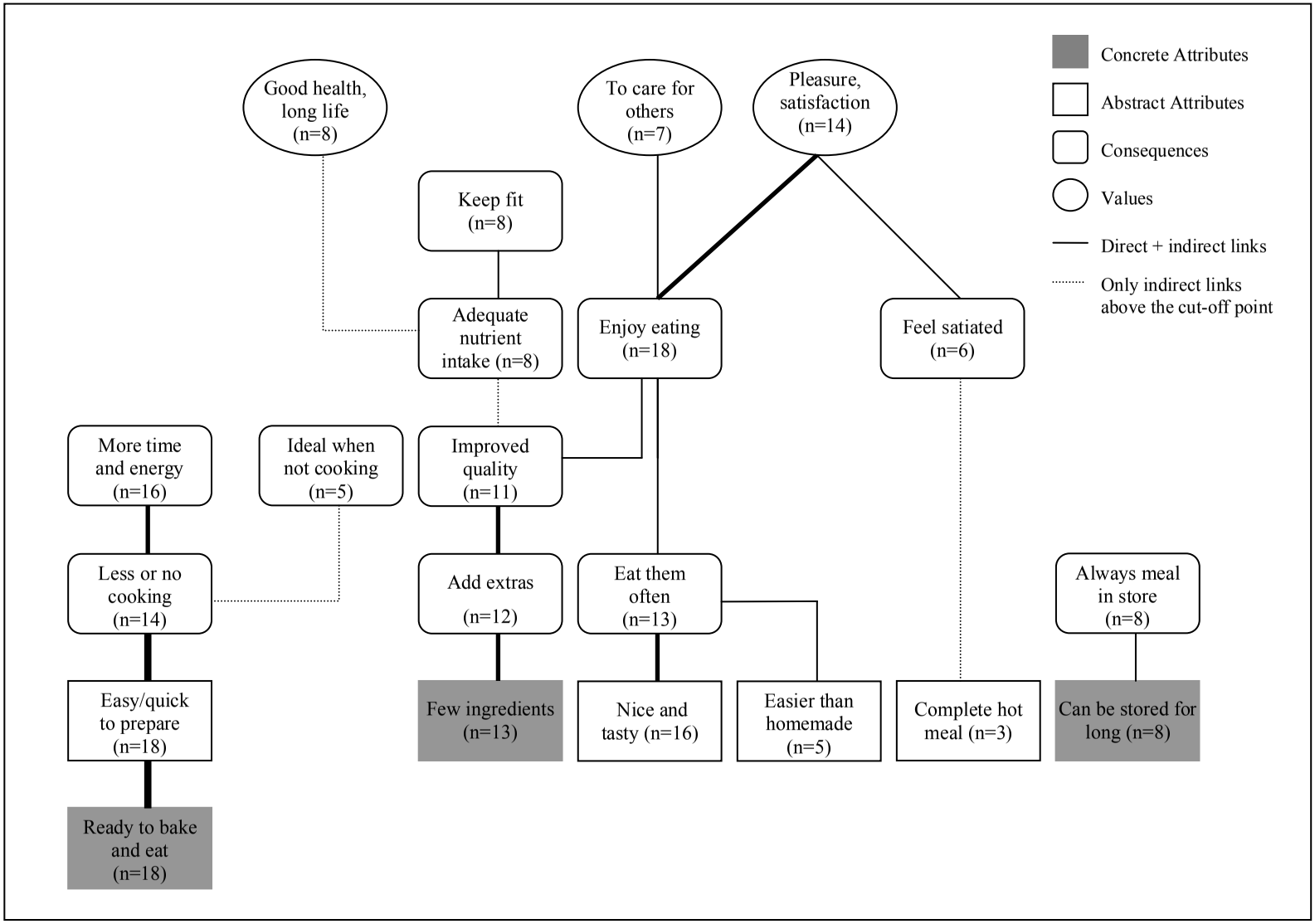

Figure 5.2.5 – Hierarchical value map of frozen pizza (n=31, cut-off point = 4). This HVM represents 47% of all direct links between two codes mentioned during the laddering interviews. Average consistency index = 3.5

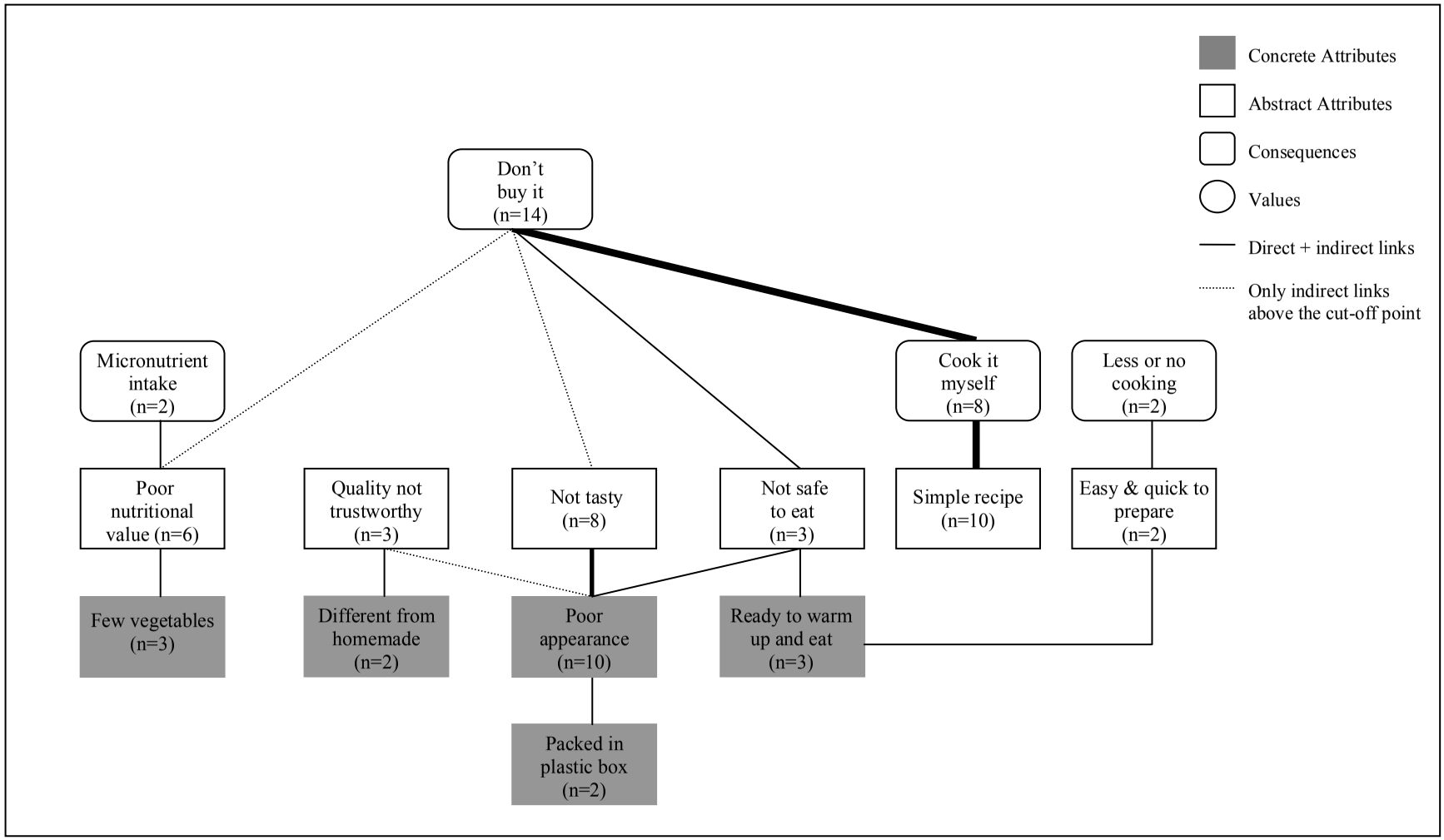

Figure 5.2.6 – Hierarchical value map of chilled hot pot (n=21, cut-off point = 2). This HVM represents 69% of all direct links between two codes mentioned during the laddering interviews. Average consistency index = 0.5

Our findings provide further support to the notion that, for some Dutch consumers, ready meal usage represents a fairly unsatisfactory and unnecessary trade-off between the positive aspects of homemade meals and time or effort savings in meal preparation (Oude Ophuis & Candel, 1994). Overall, the results concerning specific ready meals indicate that the subjects' negative evaluation of the wholesomeness and the nutritional and sensory quality of these products constitutes an obstacle to their consumption, even for those who are attracted by the idea of replacing homemade by ready meals in the first place.

5.2.4 Conclusions and recommendations for future research

Through the performance of a means-end and laddering study involving 50 Dutch consumers, we have approached the issue of the motivations behind the choice of meals and meal replacing alternatives. We were able to generate hierarchical value maps for a number of different meal alternatives and ready meals likely to be consumed during the week, while providing a preliminary description of how consumers view the use of these types of meals on weekends. Naturally, there are some limitations to the scope of the conclusions that may be drawn from this study. First of all, our motivational approach of the MEC theory determines the almost exclusively qualitative nature of the findings, which should thus not be rashly generalised beyond the scope of the study. The level of the abstractness of some of the objects laddered upon by subjects, together with the few constrains imposed to the profile of our sample, probably influenced the ability of some of the HVM to perfectly represent the corresponding views of the subjects. This is expressed by the high average consistency indices displayed by the HVM for homemade meals and ready meals (for the sub-sample of users). Nevertheless, we would like to point out that the evaluation of a HVM's ability to accurately express consumers' knowledge structures remains a fairly subjective and unreported topic. Little is known about how software type, cut-off point selection, content analysis procedure, stimuli's abstraction level, sample heterogeneity (in terms of socio-demographic, as well as cognitive, affective or behavioural aspects) affect a HVM's content validity (Grunert & Grunert, 1995).

After careful comparison of the results depicted by the HVM generated and the transcripts of the interviews conducted in this study, we are convinced that these maps portray a fairly accurate and complete picture of the aspects mentioned by subjects regarding the motivations behind their meal choice. We believe that our findings constitute a solid basis for the formulation of hypotheses and the design of studies aiming to uncover the relevance of the different meal-related MEC for different consumer segments. Of particular importance is, in our opinion, the determination of how the outcome of the trade-off between convenience and health-related

aspects of meal consumption varies across different segments and settings. Furthermore, it would be interesting to find out whether, for whom and to what extent moral issues, associated with the use of convenience-delivering foods and meals, are determining food-related attitudes and behaviours. We also believe that our findings can be taken as a starting point in the search for sources of improvement of the image and quality of meal alternatives, as well as in the development of new meal replacing concepts.

5.2.5 References

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[1] This sub-chapter has been submitted for publication as: Costa, A.I.A., Schoolmeester, D., Dekker, M. & Jongen, W.M.F. (2003). To cook or not to cook: a means-end study of the motivations behind meal choice.

[2] Whether cooked from scratch or with the help of prepared meal components.

[3] Also co-author of the publication that originated this sub-chapter, Diane Schoolmeester.

[4] Each direct or indirect link established between two codes is only counted once per subject, independently of the number of times each subject has mentioned it.

[5] These conflicting valuations are, nevertheless, well accommodated by the MEC theory (Peter & Olson, 1999; Reynolds & Gutman, 2001).

Appendix 5.2.1 (a): ACV labels regarding the consumption of Oriental-style chilled pasta, together with the number of subjects who mentioned each label (n=15).

Concrete Attributes

- Contains many herbs and spices 1
- Foreign recipe 1
- Packed in plastic box 1
- Does not look tasty 3
- Wrong colour 1
- One big, sticky lump of pasta 3
- Soft, soggy, moistly 1
- Different from homemade 1
- Unknown product 2
- Few vegetables 4
- Incomplete meal 1
- Expensive 2
- Requires frying 1

Abstract Attributes

- Not cooked by me 1
- Can be easily made at home 1
- Easy and quick to prepare 2
- Unhealthy 1
- Tasty 3
- Overwhelming starchy taste 1
- Tasteless 3
- Salty 2
- Overcooked 1
- Poor nutritional value 2
- Not fresh 1
- Good value for money 1

Consequences

- Infer it is not tasty 2
- Can't feel the taste of the ingredients 1
- Don't buy it 6
- Don't like it 1
- Don't feel satiated 1
- Enjoy eating 1
- Varied diet 1
- Not good for my health 1
- Easy to digest 1
- Hard to digest 1
- No control over the ingredients used 1
- More free time 1
- Waste time 1
- Less time, effort and attention put into cooking 2
- Plenty of energy readily available 1
- Feel good 1
- Keep fit 1
- Enjoyment, fun 1

Values

- Happiness and well-being 1
- Pleasure, satisfaction 1
- Optimal performance 1

Appendix 5.2.1 (b): ACV labels regarding the consumption of Italian-style dried pasta, together with the number of subjects who mentioned each label (n= 13).

Concrete Attributes

- Full hot meal 2
- Unknown product 3
- Unbalanced composition (too much pasta) 2

Abstract Attributes

- Can be easily made at home 1
- Easy and quick to prepare 3
- Can't add extra ingredients 1
- Tasty 3
- Tasteless 1
- Artificial taste 1

Consequences

- Avoid bread 1
- Keep daily eating habits 1
- Set good example for the children 1
- Please my family 1

Consequences (cont.)

- More focus on meal time 1
- Socialise more 1
- Quicker meal 1
- Efficient time management 1
- More free time 1
- Don't buy it 5
- Gain weight 1
- Hard to digest 1
- Adequate food intake 2
- Keep fit 1
- Not good for my health 2

Values

- Achievement 1
- Optimal performance 2
- Care for others 1
- Family harmony 1
- Meet expectations 1

Appendix 5.2.1 (c): ACV labels regarding the consumption of canned soup, together with the number of subjects who mentioned each label (n=16).

Concrete Attributes

- Few ingredients 1
- Incomplete meal 9
- Too much for just one person 1
- Can be stored for long periods 2
- Extensively processed 1
- Preparation requires warming up 2

Abstract Attributes

- Contains additives, chemicals 2
- Easy and quick to prepare 2
- Easier than homemade 1
- Not quicker than homemade 1
- Watery, not thick enough 3
- Salty 5
- Tasty 1
- Artificial taste 2
- Can't taste the individual ingredients 1
- Not as good as my own 1
- Tastes bad 4
- Poor nutritional value 1
- Appropriate for lunch 1
- Poor quality 4

Consequences

- Ideal when there is no time to cook 1
- No cooking 2
- Efficient time management 1
- Less stress 1
- More free time1
- Don't buy it 6
- Don't like it 2
- Ensure adequate food intake 1
- Feel satiated 2
- Don't feel satiated 1
- Snacking 1
- Poor diet 1
- One-sided diet 2
- Keep fit 1
- Avoid illness 1
- Not good for my health 4
- Have left-overs 1
- Throw food away 1
- Always extra meal available 2
- Add extra ingredients 3
- Improved quality 1

Values

- Good health, long-life 1
- Food should not be thrown away 1

Appendix 5.2.1 (d): ACV labels regarding the consumption of homemade meals on the weekend, together with the number of subjects who mentioned each label (n=10).

Concrete Attributes

- Sophisticated, complex 7
- Different from daily meal (recipe, ingredients) 4

Abstract Attributes

- Cooked by me 1
- Served to guests 3
- Tasty 1
- Cooked together with partner 1
- Fun to prepare 2
- Social event 1

Consequences

- More time, effort and care put into cooking 9
- Less time and energy left 1
- Try new recipes 3
- Break routine 2
- Enjoyment, fun 2
- Use creativity 1
- Enjoy eating 2
- Adequate food intake 1
- Avoid snacking 1
- Varied diet 1
- Good mental health 2
- Focus on meal time 4
- Socialise more 7
- Meal complies with expectations 1
- Get compliments 3
- More money 1
- Spoil ourselves 1
- Feel modern, updated 1

Values

- Happiness and well-being 1
- Family harmony 3
- Belonging 3
- Adventure, excitement 1
- Self-development 1
- Pleasure, satisfaction 3
- Meet expectations 1
- Achievement 4

Appendix 5.2.1 (e): ACV labels regarding the consumption of ready meals on the weekend, together with the number of subjects who mentioned each label (n=10)

Concrete Attributes

- Cannot be stored 1
- Looks tasty 1
- Simple, plain 1
- Full hot meal 1

Abstract Attributes

- Easy, quick to prepare 3
- Not fresh 1
- Not cooked by me 1
- Not tasty 1

Consequences

- Add fresh vegetables 1
- Varied diet 1
- Adequate micro-nutrient intake 1
- Feel satiated 1
- Feel you have cooked 1
- Less free time 1
- More time and energy left 2
- Break routine 2
- Weekends feel different 3
- Follow routine 2
- Must shop 2
- No cooking 3
- Keep daily eating habits 1
- No control over ingredients used 1
- Not trustworthy 1
- Meal does not meet expectations 1
- Not appropriate for weekends 1
- Don't enjoy eating 1
- Don't used often 3
- Socialise more 1

Values

- Good health, long life 1
- Happiness and well-being 1
- Belonging 1
- Be independent, free 1
- Adventure, excitement 2
- Pleasure, satisfaction 1
- Self-development 1
- Self-esteem, self-respect 1

Appendix 5.2.1 (f): ACV labels regarding the consumption of take-out meals on the weekend, together with the number of subjects who mentioned each label (n=8).

Concrete Attributes

- Small assortment 1
- Different from homemade 3
- Mostly fried snacks 1
- Inadequate portion size 1
- Ready to eat 5
- Must be ordered 1

Abstract Attributes

- Not convenient 1
- Contains fresh ingredients 1
- Associated with loneliness 1
- To be shared 1
- Better than homemade version 1
- Tasty 1
- Unhealthy 1

Consequences

- Don't use it often 2
- Enjoy eating 1
- Feel satiated 1
- Left-overs 1
- Throw away food 1
- Varied diet 3
- For special occasions only 2
- Used on Sundays 2
- No shopping 1
- No cooking 3
- More time and energy left 1
- Socialise more 2

Values

- Belonging 2
- Adventure, excitement 2
- Make it easier on myself 1
- Food should not be thrown away 1

Understanding consumers' resistance to convenience-related innovations in foods: measurement of moral issues related to meal preparation

This sub-chapter addresses the issue of the identification and measurement of barriers to consumer innovation adoption, by describing the conceptualisation, development and validation of a psychographic measure of the moral issues surrounding meal preparation. Forty-nine items, likely to comprise suitable measures of the latent constructs under investigation, were administered to a convenience sample of 590 subjects. An exploratory factor and reliability analysis of the results yielded four valid factors: Cooking as a daily task, Feeling guilty for using ready meals, Health concerns regarding ready meals and Adding something extra to ready meals. Three other previously validated scales – Involvement with foods, Cooking Enjoyment and Convenience-orientation -, were also satisfactorily recovered. Future research encompasses the test of the measures' unidimensionality and nomological validity with LISREL, cross-validation with additional samples, and the testing of hypotheses formulated in the context of the Theory of Planned Behaviour.

5.3.1 Introduction

The selection, purchase and consumption of foods are, to a great extent, determined by the circumstances in which a meal is to be prepared and eaten. Parallel, but yet related, to considerations regarding the eating occasion, place and commensals, the decision about the appropriate level of time, effort and care to be put in a meal's purchase and preparation is an important determinant of the type of products that are bought and, ultimately, consumed. (Marshall, 1995; Meiselman, 2000). This assumption is well supported by several studies demonstrating that convenience in preparation is one of the main criteria consumers use in their food choice (Rappoport, Peters, Huff-Corzine & Downey, 1992; Steptoe, Pollard & Wardle, 1995).

Relatively few studies have attempted to determine how and to what extent convenience shapes food-related behaviours. Studies initially paid considerable attention to the influence of socio-demographic and economic determinants, such as employment status, household composition, age and income (Bonke, 1996; Dare, 1988; Darian & Tucci, 1992; Kim, 1989; Park & Capps,

1997). This line of research was usually motivated by societal changes concerning the role of women in the labour force and their potential implications to food preparation and consumption practices at the household level.

More recently, research has moved beyond socio-economic factors towards the investigation of the more individual, psychological factors, like convenience-orientation, role-overload or perceived stress, which can be associated with convenience-related food consumption (Bellizi & Hitte, 1986; Candel, 2001; Cowan, Cronin & Gannon, 2001; Madill-Marshall, Heslop & Duxbury, 1995; Reilly, 1982; Veenma *et al.*, 1995). Few studies have, nevertheless, been able to convincingly demonstrate the existence of important relations between the time and energy consumers are able, and willing, to devote to food-related behaviours, and the type of meals they finally end up choosing (McEnally, 1998). Several explanations have been provided for this shortcoming. Some refer to the lack of a suitable definition of convenience foods and meals (and respective sub-categories), which complicates the measurement of associated behaviours (Reilly, 1982; Yale & Venkatesh, 1986). Others mention the need to develop more appropriate measures of the actual (and perceived) available time and energy of consumers (Axelson & Brinberg, 1989). Others, yet, suggest that consumers are resorting to alternative time- and effort-saving strategies which have not been fully considered so far, such as warming up left-overs, skipping meals, cooking simpler recipes or eating out (Bowers, 2000, Candel, 2001; Darian & Tucci, 1992; Madill-Marshall *et al.*, 1995). The general aim of this sub-chapter is to examine yet another potential explanation for this apparent lack of relationship: What if consumers, in spite of the time and energy constraints they perceive to have, do not resort to convenience-based food consumption because they think this is not the appropriate thing to do?

Though poorly understood, the issue of the low moral status of convenience-based food consumption is by no means a novelty. Already in 1950, the classic shopping list study (Haire, 1950) showed that some consumers viewed hypothetical buyers of instant coffee as lazy, badly organised and spendthrift housewives. Later, other researchers have also recognised the existence of moral judgements regarding housewives who, due to time constraints related to their jobs or other activities, replaced their own cooking by some kind of semi-prepared or fully prepared meals (Dare, 1988; Gofton, 1995). But with the rise of dual-earner families, which, at least apparently, redefined the role of women within the household and the society, such judgements were promptly dismissed and stated to be “on the verge of extinction” (Antil, 1987; Webster & von Pechmann, 1970; Yale & Venkatesh, 1986). Nevertheless, recent studies indicate that consumers continue to feel guilty when they do not cook and are reluctant to replace their homemade meals by other alternatives. Moreover, these feelings do no longer seem

to be restricted to a certain gender, age or culture (Costa, Dekker & Jongen, 2003a,b; Mäkelä, 2000; Murcott, 1995; Thompson, 1996; Voedingscentrum, 2001). A 41-year old, North-American working woman stated, during an interview (Thompson, 1996):

> *"…but I'm from the generation where a lot of us still carry those guilt feelings around if your family can't come home to homemade bread and a hot meal every night. I know that's unrealistic, but I still sort of feel that's my responsibility."*

A 38-year old female entrepreneur declared, in a similar interview:

> "*The poor kids have to make do with, you know, canned ravioli, or fish sticks, or whatever I can round up. I run into the guilt type thing I guess. Like I should be performing what my mother did, cooking the good wholesome meal with the potatoes and the green vegetables and the meat."*

Mäkelä (2000) and Murcott (1995) analysed the cultural definitions of a proper meal in Finland and the UK, respectively. They concluded that, in these countries, meals are only seen as proper if they are cooked at home with enough time and care. This leads consumers to name the use of convenience foods or meals as "an exception".
Recently, a 23-year old, Dutch male student declared during a focus group (Costa *et al.*, 2003b):

> *"Ready meals are for people who do not bother to cook for themselves. They are a form of laziness, because everybody knows it is one's duty to cook. Lack of time is not an excuse for using ready meals, since you only need 10 minutes to cook a meal anyway."*

Similarly, a young female student stated:

> *"I think that a lot of the prejudice against ready meals comes from the fact that you haven't cooked yourself, as you should. You feel guilty because you haven't put any time or effort into the preparation of the meal you're eating, except for the fact that you bought it."*

A link between the consumption of ready meals and feelings of guilt was also present in the means-end structure of a group of Dutch consumers. Here, guilt was equally associated with the belief that the use of such products implied less time and effort put into cooking, which, in turn, was seen as failing to respect one's duties towards him- or herself and relevant others (Costa *et al.*, 2003a). According to the Dutch Nutrition Centre, similar views on meal preparation are generally hold by the Dutch population (Voedingscentrum, 2001). Guilt has also been previously associated with consumption experiences in general (Richins, 1997).

On the whole, we believe there is enough evidence justifying the investigation of the moral issues related to meal preparation and how they might affect food consumption. Such an investigation should follow two main lines of questioning:

- How can the moral issues surrounding meal preparation be conceptualised? That is, within which theoretic framework can we analyse their influence on food consumption behaviour?
- How can moral issues and their influence on behaviour be measured in a valid way?

We expect that the answers to these questions will contribute to the identification of consumer segments whose moral-based views on convenience in meal preparation (or their absence) significantly determine their food consumption. This knowledge can be used to better tailor nutrition education efforts and help manufacturers in the design and positioning of new *Home Meal Replacements* (HMR) (Costa, Dekker, Beumer, Rombouts & Jongen, 2001).

This sub-chapter starts by positioning moral issues regarding meal preparation within the framework of the *Theory of Planned Behaviour* (TPB) (Ajzen, 1985 & 1991). Next, the development and validation of a measurement instrument for these issues, based on qualitative (item generation) and quantitative (investigation of the measures' dimensional structure and reliability with exploratory factor analysis) research, is described. Finally, based on the results obtained so far, some conclusions are drawn and plans for future research discussed.

5.3.2 Theoretical framework

It has been proposed that the relation between personal moral obligation (or sense of moral responsibility) and the performance (or the refusal to perform) certain behaviours can be examined in the context of the *Theory of Planned Behaviour* (TPB) (Ajzen, 1985 & 1991). This theory aims to explain and predict the influence of attitudes and personality traits on human

behaviour, through the measurement of the factors that determine a person's intention to act. Originally, these factors were expressed through three model components (Fishbein, 1967):

- The degree to which a person holds a favourable or unfavourable assessment of a behaviour (*i.e.*, the attitude);
- The perceived social pressure to perform the behaviour (subjective norm);
- The internal, moral pressures to perform the behaviour (moral values).

The third component was, however, dropped, since it was thought to serve merely as an alternative measure of behavioural intention. The resulting two-component model was named *Theory of Reasoned Action* (TRA) (Ajzen & Fishbein, 1980; Ajzen & Fishbein, 1975). Later on, with the aim of extending this theory to actions over which people have only incomplete volitional control, the perceived ease or difficulty to perform a specific behaviour (behavioural control) was added to the model. This became then known as the TPB.

In spite of the above-mentioned development, the topic of the influence of moral norms on behaviour has continued to receive the attention of attitude theory and research literature (Eagly & Chaiken, 1993). Furthermore, several empirical studies have demonstrated the relevance of including the influence of perceived moral obligation in the prediction of behaviour. This inclusion is thought to be relevant not only in contexts with a clear moral or ethical dimension – organ (Schwartz & Tessler, 1972) and blood (Zuckerman & Reis, 1978) donation, church attendance (Gorsuch & Orteberg, 1983), driving violations (Parker, Manstead & Stradling, 1995), condom use (Boyd & Wandersman, 1991), cheating, lying and shoplifting (Beck & Ajzen, 1991), etc. - but also in less obvious moral domains, such as food choice. Concerning the last, perceived moral and ethical obligations have been associated with milk choice (Raats, Shepherd & Sparks, 1995), consumption of foods with additives or high sugar level (Shepherd & Raats, 1996) and consumption of foods produced by gene technology (Sparks, Shepherd & Frewer, 1995). This association was shown to prevail either through a direct influence on behavioural intention or the mediation of the attitudinal component.

Taking also into account the qualitative findings presented in the Introduction, there seems to be enough theoretical and empirical support for an analysis of the moral issues regarding meal preparation in the context of TPB. Two issues must, nevertheless, be addressed at this point. The first is the establishment of the exact location of perceived moral obligation within the TPB model. Here, an important aspect is whether moral issues should be assumed to influence behaviour directly or only be allowed to affect it through attitudes. Another relevant aspect is

the distinction between perceived moral obligations, which are supposed to be personal and internalised, and norms imposed externally, which should already be accounted for by the subjective norm component (Sparks *et al.*, 1995; Verlegh & Candel, 1999). Since there do not seem to be yet any definite conclusions on this matter, it would be wise to consider all possibilities. The second matter is the establishment of valid measures of the moral issues surrounding meal preparation and meal replacement and their influence on food consumption behaviour.

To our knowledge, only a few studies have reported the development of measures for psychographic constructs related to meal preparation. Madill-Marshall *et al.* (1995) proposed the existence of significant negative relationships between the construct *Enjoyment of food preparation* (measured by a 5-item, Likert-type scale) and the consumption of several foods and meals traditionally associated with the demand for convenience in cooking. Verlegh & Candel. (1999) used the TRA and associated measures (Ajzen *et al.*, 1980) to investigate the influence of reference groups and eating situations on the intention to consume TV dinners, as well as on the reported consumption frequency. They observed a significant effect of social setting and subjective norm. No measures of attitudes or other psychographic constructs specifically related to convenience in meal preparation were, however, developed in the context of this study. Grunert, Brunsø & Bisp (1997) have developed a set of scales to measure food-related lifestyle in different European countries, which includes scales related to meal preparation and convenience. These are *Interest in cooking* (level of time and effort put into cooking), *Looking for new ways* (inclination to try new recipes and ways of cooking), *Convenience* (tendency to use time- and effort-saving foods and appliances), *Whole family* (tendency to distribute cooking tasks among family members), *Planning* (inclination to plan meals in advance), and *Woman's task* (tendency to view cooking as the housewife's task). Additional related items concern viewing eating out as a social event and cooking as a source of praise and self-esteem. Nevertheless, during the exploratory factor analysis that presided to the scales' development, it was observed that many items had poor loadings. This, in turn, lead to the low reliabilities displayed by most of the measures. Such results were attributed to both the characteristics of the sample and the low discriminative power of the items.

Candel (2001) has recently presented what is, perhaps, the most interesting conceptualization and measure construction in the area of food-related convenience so far. His study reported the development and validation of a scale to measure consumers' convenience orientation towards meal preparation (CONVOR). In the same study, two other scales measuring constructs thought to be closely related with convenience orientation – *Enjoyment of meal preparation* and

Involvement with foods – , were also validated. Importantly, this study shows the application of structural equation modeling (SEM) (Jöreskog & Sörbom, 1993) in the evaluation of the convergent and nomological validity of measures of convenience-related psychographic constructs (Steenkamp & van Trijp, 1991), as well as an analysis of the relationships between these and other constructs and variables of interest. SEM has been already successfully employed in the context of TPB (Sapp, 1991). Its use has been also recommended for the exploration of the relationships between perceived moral obligation and other TPB components (Raats, 1992). To our knowledge, there are, nevertheless, no published studies presenting a validated measure of perceived moral obligation in the context of meal preparation and meal replacement, or exploring its relationships with other psychographic constructs through SEM.

5.3.3 Materials and methods

5.3.3-1 Item generation

In the first phase of the development of the measurement instrument, we screened data, resulting from three previous qualitative studies, for sentences and expressions related to the moral issues surrounding meal preparation (Costa *et al.*, 2003a,b, 2002). Our screening was based on the different aspects of the concept of *guilt*. Guilt encompasses both a state of being - like the one associated to someone who has committed a breach of conduct or a legal transgression-, and a state of mind, which is linked to transgressions of morals, personal values or social norms. This last condition, which is the most interesting for this study, can be defined as the state of consciousness of one who (1) has committed an offence, (2) has failed to respect one's duty, or (3) feels responsible for the negative outcomes of his or her acts (Landman, 1993; Zeelenberg, 1996). Therefore, we can assume that when subjects stated to feel guilty for using ready meals, they could be referring to:

- The commitment of an offence towards themselves and/or family members;
- The failure to respect their duties within the household;
- Feelings of responsibility for the potentially negative outcomes of this usage (related with health, hedonic or socialising aspects, for instance).

Subjects' sentences and expressions related to all these different aspects of guilt were then used to generate a list of 58 items. Especial care was put into the elimination of sentences and expressions containing the words "guilt" or "guilty" (Candel, 2001). The list was pre-tested for clarity, scope and comprehension with 5 Wageningen University staff members, with

knowledge about consumer research, and 3 undergraduate students. Those items that were not understood or formulated in a clear manner, as well as those encompassing more than one main idea, were either reformulated or discarded. This procedure yielded a list of 49 items, including items specifically formulated for subjects who were married, living together and/or had children.

5.3.3-2 Questionnaire

The 49 items, based on the above-discussed sentences and expressions of subjects, served as basis for a written questionnaire with the aim of collecting the data necessary to the development and validation of the measurement instrument. This questionnaire started with a very general and brief description of the study and its aim (stated as "to ask your opinion about meal preparation"), and instructions for its filling in and return[1]. There was also the reference to a reward - a 1.5 EUR donation to charity organisations for each properly filled in questionnaire returned, and the participation in a lottery for a first prize of 25 EUR in the form of a gift voucher. An explanation of what should be understood with the expressions *complete hot meal*, *meal preparation* and *cooking at home*, *convenience ingredients for cooking*, *ready meals*, *take out*, *home delivery* and *eating out* used throughout the questionnaire, was also provided at the start[2]. This was done to make sure that all subjects would have an appropriate and similar comprehension of the expressions.

The actual questionnaire began with queries covering measures of behavioural variables of interest, like frequency of cooking and trying new recipes, appliances' ownership, frequency of use of convenience ingredients, ready meals, home-delivered meals and take out, and frequency of eating out, eating bread-based meals and skipping dinner. These were thought to encompass the majority of possible homemade meals and their replacements (Costa *et al.*, 2001, 2003a). Having in mind the test of the nomological validity of the scales to be developed, as well as their inclusion in a TPB framework, three previously validated psychographic measures – the CONVOR, the *Enjoyment of meal preparation* and the *Involvement with foods* scales (Candel, 2001) - were intercalated among the 49 items already present in the questionnaire. All items were scored on a 5-point, Likert type scale, with categories ranging from "strongly disagree" to "strongly agree". The questionnaire ended with queries regarding socio-demographic variables. Some free space was left for subjects to report any difficulties felt when answering the questions and comments or suggestions.

5.3.3-3 Subjects

During the months of March and April 2002, 1200 numbered questionnaires were distributed to Dutch citizens (over 18 years old) across the country. From these, 590 questionnaires properly filled in were returned (response rate = 49%). The corresponding 590 subjects constituted our convenience sample for this study, the general profile of which is described in Table 5.3.1.

Gender	
Female	70%
Male	30%
Age	
Range	18-85 years old
Mean ± SD	42.4 ± 14.6
Household Size	
Range	1-5 persons
Mean ± SD	2.6 ± 1.3
Marital Status	
Married or living together	75%
Not married or living together	25%
Children at home	
Yes	37%
No	63%
Education level	
Low	11%
Middle	37%
High	52%
Main Activity	
Paid job > 30 hours	37%
Paid job 15-29 hours	20%
Paid job < 15 hours	6%
No paid job	37%
Dutch Provinces	
Groningen, Friesland, Drenthe	6%
Overijssel, Gelderland, Utrecht	30%
Noord-Holland, Zuid-Holland	24%
Zeeland, Noord-Brabant, Limburg	40%
Daily meal preparer	
Self	64%
Partner	8%
Self plus partner	18%
Others	10%
Use of ready meals	
Never	57%
1-3 times/month	32%
1-3 times/week	10%
> 3times/week	1%
Frequency of trying new recipes	
Never	28%
1-3 times/month	61%
1-3 times/week	10%
> 3times/week	1%

Table 5.3.1 – Socio-demographic and behavioural characteristics of the sample (n=590).

5.3.3-4 Data analysis: exploratory factor and reliability analysis

The first 22 items in the questionnaire addressed the subjects' views on the matter of daily cooking. Since 18% of our subjects could not be considered as being involved in the daily preparation of their warm meals (Table 5.3.1), their answers on these items were excluded from further analysis, in order to avoid the introduction of any potential bias. The distribution of the 22 items was analysed within the new sub-sample of meal preparers (n=481). Based on this analysis, 5 items not differentiating among subjects, or with a severely skewed distribution, were discarded. Twelve items were submitted to an exploratory factor analysis (Principal Component Analysis, Varimax rotation). Items with factor loadings under .55, or not clearly loading on a single factor, were excluded from further analysis. If the pool of remaining items was large enough, only those strongly related to the respective underlying factor (*i.e.*, with factor loadings > .70) were retained. The internal reliability of the factors obtained was tested using Cronbach's alpha. The remaining 5 items, which were only answered by subjects who were married, living together and/or had children, were submitted to a similar, but separate, analytical procedure.

The last 27 items in the questionnaire addressed the subjects' views on the consumption of ready meals. Fifty-seven percent of the subjects had declared, at the beginning of the questionnaire, not to have used any ready meal in the prior month (Table 5.3.1). Their answers to the last 27 items were therefore excluded from further analysis, to avoid the introduction of any undue bias. The same happened to the answers of 19 subjects who had not report their frequency of consumption of ready meals. The distribution of the 27 items was analysed within the new sub-sample of ready meal users (n=245). Based on this analysis, three items not differentiating among subjects, or with a severely skewed distribution, were discarded. Twenty items were submitted to an exploratory factor analysis (Principal Component Analysis, Varimax rotation). Items with factor loadings under 0.55, or not clearly loading on a single factor, were excluded from further analysis. If the pool of remaining items was large enough, only those strongly related to the respective underlying factor (*i.e.*, with factor loadings > .70) were retained. The internal reliability of the factors obtained was tested using Cronbach's alpha. The remaining 4 items, which were only answered by subjects who were married, living together and/or had children, were submitted to a similar, but separate, analytical procedure.

The convergent validity and reliability of three previously validated psychographic measures – the CONVOR, the *Enjoyment of meal preparation* and the *Involvement with foods* scales (Candel, 2001), were equally assessed among the two sub-samples considered. Concerning the sub-sample of meal preparers, 1 item of the *Involvement with foods* scale was discarded, since it

displayed a severely skewed distribution. Within the sample of ready meal users, the whole *Involvement with foods* scale was discarded, since 3 from its 5 items presented a severely skewed distribution. The remaining scales were submitted to an exploratory factor analysis (Principal Component Analysis), with items loading under 0.55 being discarded. The internal reliability of the scales was tested using Cronbach's alpha.

5.3.4 Results

The analysis of the factor loadings of the 12 items addressing meal preparers' views on the matter of daily cooking, as well as the visualisation of the scree plot of the eigenvalues, resulted in the retention of 5 items loading strongly on one single factor. These items were all related with viewing cooking as a daily task; therefore the correspondent factor was named *Cooking as a daily task*. The exploratory factor analysis of the 5 items which were only answered by respondents who were married, living together and/or had children did not yield any satisfactory results. The analysis of the factor loadings of the 20 items addressing ready meals users' opinions about these products, as well as the visualisation of the scree plot of the eigenvalues, resulted in the retention of 14 items loading strongly on three factors. Factor 1 consisted of 5 statements expressing feelings of guilt related to ready meal usage and was consequently labelled *Feeling guilty for using ready meals.* Factor 2 also consisted of 5 items, this time related to concerns about health-related aspects surrounding the consumption of ready meals. This factor was therefore labelled *Health concerns regarding ready meal use*. Factor 3 encompassed 4 items expressing the need to supplement the consumption of ready meals with extra foods; it was therefore named *Adding something extra to ready meals.* The exploratory factor analysis of the 5 items which were only answered by subjects who were married, living together and/or had children did not yield any acceptable results. The four measures yielded by the exploratory factor analysis, the corresponding statements and the respective measures of convergent validity and reliability are depicted in Table 5.3.2

The results of the exploratory factor analysis of the three psychographic measures previously developed and validated by Candel (2001) are presented in Table 5.3.3. A second item of the *Involvement with foods* scale, with a factor loading of less than .70, was discarded, as enough items remained and the scale's reliability was highly improved. The entire *Enjoyment of meal preparation* scale was well recovered in both sub-samples, with all items loading higher than .87. One item of the CONVOR scale loaded lower than .50 within both sub-samples, and was consequently discarded. The removal of the first item of the CONVOR scale with a factor

Items	Mean	SD	Factor loading	Item-total correlation
Cooking as a daily task				
Preparing my hot meal everyday is something I find natural	3.60	1.01	0.82	0.72
I always cook, even when I am not in the mood for it	3.05	1.11	0.81	0.80
Cooking everyday is a habit of mine	3.66	1.00	0.80	0.80
I feel I have to cook everyday	2.91	1.10	0.79	0.84
I always cook, even when this represents a big effort to me	2.60	1.07	0.74	0.76
Eigenvalue = 3.143, Cronbach's α = 0.91, *Percentage of Variance Explained = 62.9%*				
Feeling guilty for using ready meals				
If I use ready meals often, I have the feeling that I am not dedicating enough time and effort to the preparation of my meals	2.72	1.02	0.82	0.68
If I use ready meals too often, I feel I am too easy going	3.21	1.14	0.77	0.62
The frequent use of ready meals does not appeal to me because I think that I always have to put a lot of care and energy in the preparation of my hot meals	2.57	0.96	0.75	0.60
I have less esteem for myself if I serve a ready meal	2.49	1.04	0.75	0.59
I feel better if I if I prepare my own meals than if I use ready meals	3.32	1.11	0.74	0.59
Eigenvalue = 2.935, Cronbach's α = 0.82, *Percentage of Variance Explained = 58.7%*				
Health concerns regarding ready-to-eat meal consumption				
If I use ready meals often, I feel I am not doing the right thing for my health	3.53	1.02	0.85	0.74
If I use ready meals too often, I do not get enough vitamins	3.29	1.02	0.81	0.68
If I use ready meals too often I have a one-sided eating pattern	3.35	1.00	0.79	0.65
If I use ready meals too often, I feel that I am neglecting myself	3.06	1.08	0.75	0.60
I think that preparing one's hot meals is always healthier than using ready meals	3.72	1.02	0.72	0.58
Eigenvalue = 3.086, Cronbach's α = 0.84, *Percentage of Variance Explained = 61.7%*				
Adding something extra to ready-to-eat meals				
If I use a ready meal, I always add something extra to make it tastier	2.75	1.00	0.89	0.77
If I use a ready meal, I always add something extra to make it healthier	2.84	1.03	0.83	0.68
If I use a ready meal, I always add something extra to feel I have done something myself	2.45	0.96	0.80	0.64
If I use a ready meal, I always add something extra to make it more filling	2.44	0.92	0.75	0.57
Eigenvalue = 2.672, Cronbach's α = 0.83, *Percentage of Variance Explained = 66.8%*				

Table 5.3.2 – Results of the factor and reliability analysis concerning the psychographic measures developed in this study.

loading less than .75 was attempted, yielding a higher reliability and explained variance. The removal of this item would also make sense in terms of content, since this was the only item left in the measure which addressed the issue of the effort put into meal preparation. All the remaining items concerned time inputs. However, and since we are dealing with a previously validated scale, it seems more prudent to wait for the results of a confirmatory factor analysis before proceeding to exclude any more of its items (Steenkamp & van Trijp, 1991).

Items	Mean	SD	Factor loading	Item-total correlation
Involvement with foods (sub-sample of meal preparers)				
I feel very involved with food products	3.72	0.86	0.92	0.81
I am interested in food products	3.85	0.79	0.90	0.77
Food products are very important to me	3.89	0.84	0.89	0.75
Eigenvalue = 2.434, Cronbach's α = 0.88, Percentage of Variance Explained = 81.4%				
Enjoyment of meal preparation (sub-sample of meal preparers)				
For me cooking is an important way to relax	2.92	1.01	0.90	0.82
Meal preparation brings pleasure to my life	3.20	0.97	0.93	0.86
I can put a lot of my creativity into meal preparation	3.16	1.04	0.91	0.84
Preparing meals gives me a lot of satisfaction	3.48	0.91	0.87	0.77
Eigenvalue = 3.241, Cronbach's α = 0.92, Percentage of Variance Explained = 81.0%				
Enjoyment of meal preparation (sub-sample of ready meal users)				
For me cooking is an important way to relax	2.79	1.03	0.90	0.81
Meal preparation brings pleasure to my life	3.01	1.00	0.92	0.85
I can put a lot of my creativity into meal preparation	2.99	1.04	0.89	0.81
Preparing meals gives me a lot of satisfaction	3.27	1.01	0.87	0.77
Eigenvalue = 3.204, Cronbach's α = 0.92, Percentage of Variance Explained = 80.1%				
Convenience-orientation (sub-sample of meal preparers)				
The less physical energy I need to prepare a meal, the better	2.69	1.02	0.72	0.59
Preferably, I spend as little time as possible on meal preparation	2.64	1.02	0.89	0.81
I want to spend as little time as possible cooking	2.55	1.03	0.93	0.86
At home I preferably eat meals that can be prepared quickly	2.76	0.99	0.82	0.71
It is a waste of time to spend a long time in the kitchen preparing a meal	2.30	0.98	0.80	0.68
Eigenvalue = 3.479, Cronbach's α = 0.89, Percentage of Variance Explained = 69.6%				
Convenience-orientation (sub-sample of ready meal users)				
The less physical energy I need to prepare a meal, the better	2.76	1.07	0.74	0.62
Preferably, I spend as little time as possible on meal preparation	2.86	1.06	0.91	0.84
I want to spend as little time as possible cooking	2.83	1.09	0.92	0.86
At home I preferably eat meals that can be prepared quickly	3.07	1.00	0.83	0.72
It is a waste of time to spend a long time in the kitchen preparing a meal	2.49	1.09	0.81	0.71
Eigenvalue = 3.560, Cronbach's α = 0.90, Percentage of Variance Explained = 71.2%				

Table 5.3.3 – Results of the factor and reliability analysis concerning the psychographic measures developed and validated by Candel (2001).

5.3.5 Conclusions and future research

This sub-chapter has presented the conceptualisation of moral issues surrounding meal preparation, as well as the first empirical steps leading to the development and validation of psychographic measures for such issues. These initial steps consisted in the generation of several items, likely to comprise suitable measures of the latent constructs under investigation, the items' administration to a large sample of individuals through the performance of a questionnaire, and a preliminary statistical analysis of the results obtained. Based on this analysis, it was possible to develop several measures related to the research aim, as well as recover some relevant, related measures that had been developed and validated in previous studies. All the measures obtained displayed a satisfactory level of convergent validity and reliability, which leads us to think that the outcome of a future confirmatory factor analysis will be equally satisfactory.

Findings so far indicate that considerations related with the habit of cooking - and with cooking being seen as a task or duty to be performed every day -, may underlie consumers' views on meal preparation. Feelings of guilt, associated with moral-based considerations regarding the use of ready meals, appear to partly explain the general negative attitude toward these products, as well as its low level of consumption, among our sample. Nevertheless, subjects seemed also to believe that the consumption of ready meals is not a healthy eating behaviour. This may have also led to concerns, feelings of guilt and low consumption frequency. A curious finding was that of an underlying construct, represented by factor 3, which seems to be related to the subjects' need to add extra ingredients to ready meals. Perhaps this is a way subjects find to partially mitigate feelings of guilt arising during the products' preparation and consumption (whether related to health or moral concerns). Finally, some bias, perhaps related with the subjects' need to provide socially desirable answers (Eagly & Chaiken, 1993), may be present in the results concerning the self-reported frequency of consumption of homemade meals and other meal alternatives. It was observed in previous studies that subjects tend to, consciously or unconsciously, underrate their consumption of ready meals and other HMR (Costa *et al.*, 2003a,b, 2002). It is therefore recommended that future studies make use of alternative measures of these food-related behavioural variables.

Meanwhile, the test of the dimensionality of the measures obtained in this study is being conducted through the performance of a LISREL-based confirmatory factor analysis (Steenkamp & van Trijp, 1991). So far, the results obtained (an example of which is depicted in Figure 5.3.1) are encouraging.

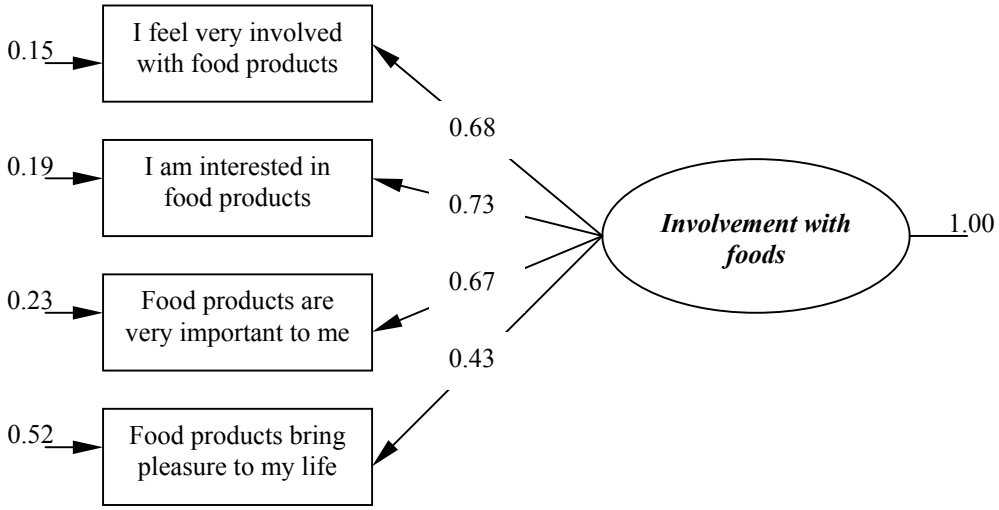

Figure 5.3.1– Dimensionality analysis of the Involvement with foods measure, sub-sample of meal preparers: χ^2 (2) = 2.74 (p<.727); RMSEA = 0.04 (P-value = 0.25).

Future research on this topic includes completing this analysis and testing the measures' nomological validity. This will not only provide further evidence of the validity of the measures developed, but also allow the investigation of relationships between moral issues and other psychographic constructs related to the topic of meal preparation. Relations with socio-demographic and behavioural variables of interested will also be investigated in this context. Additionally, we anticipate the need to test the validity of the measures obtained with other samples of subjects. Finally, and after fully validated scales are obtained, we would also like to use LISREL to test the conceptual hypotheses we have proposed in the context of the TPB, concerning the influence of moral aspects on behaviours related with meal preparation and meal replacement. We anticipate that this future research will shed more light onto these often neglected aspects of food choice.

5.3.6 References

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[1] For this purpose, a prepaid, addressed, return envelope was supplied to subjects.

[2] A copy of the questionnaire (in Dutch) can be obtained from the author of this thesis.

Chapter 6

Market opportunity refinement:
Consumers' and experts categorisations of Home Meal Replacements

Market opportunity refinement: Consumers' and experts categorisations of Home Meal Replacements

Previous research has shown that individuals spontaneously describe their food consumption in terms of meals, or meal-like dishes, instead of single foods. Nevertheless, little is known about the attributes and criteria that underlie meal perceptions and categorisations, and how they vary across different segments. Forty-four consumers and forty-six food scientists were asked to classify fifty-nine Home Meal Replacements (including one recently launched product and two meal-kit concepts) in a subjective grouping task. Not many significant differences were observed between the criteria employed by consumers and those employed experts, perhaps because the task was consumption-oriented in itself. Nevertheless, results clearly show that criteria based on expert knowledge play a significant role in the classifications of the food scientists. Consumers seem to rely more on criteria grouping meals based on main components and type of cuisine. Finally, results support the idea that some consumers may experience difficulties in categorising truly innovative products or concepts, especially if this implicates the creation of new cognitive categories.

6.1 Introduction

The concept of *consumer-oriented new product development* can be seen as a special case of market-based product innovation developed for manufacturers of consumer goods, which focuses on the share of market information pertaining to the end-users or consumers (Grunert, Baadsgaard, Larsen, & Madsen, 1996). Crucial in this concept is the ability of a company to "translate" consumers' needs regarding products into the kind of objective, technical terms that can be used in the formulation of specifications. This translation is a highly complex process, since consumers do not infer the satisfaction or dissatisfaction of their needs directly from the products' intrinsic features, but rather from their perception of these features - the *perceived attributes* (van Trijp & Steenkamp, 1998). On the other hand, R&D practitioners can only influence perceived attributes indirectly, through the manipulation of the intrinsic, physical properties of foods. The appropriate identification of the attributes consumers use to categorize products or concepts, as well as structure their knowledge about a product category, becomes then an essential first step in guaranteeing that an effective translation is achieved. For the sake

of the same effectiveness, it is also important to be able to compare consumers' perceived attributes with the attributes used by R&D practitioners, and other experts, to categorize the same type of products. Finally, a good knowledge of how consumers compare products based on perceived attributes is highly valuable in the establishment of market positioning strategies for both new and existing products.

It has been proposed that categorisation processes are essential to the formation and the configuration of individuals' cognitive structures regarding products (Gutman, 1982). In this context, the individuals' cognitive structures are viewed as hierarchical knowledge networks, in which perceived product attributes are linked to behavioural outcomes and personal values (or life goals). In this way, individuals are assumed to establish the self-relevancy of behavioural outcomes based on personally held values, while inferring their valuation from products' attributes. These sequences of attribute-consequence-value classes, also known as means-end chains (Reynolds & Gutman, 2001), enable the identification of the choice criteria used by individuals to evaluate and select among alternative products or services. Moreover, they can explain the higher-order reasons leading to the salience of these particular criteria. Nevertheless, it is essential to keep in mind that product attributes can only be taken as relevant choice criteria if, besides being perceived as instrumental in the achievement of desired outcomes, they are also critical for the differentiation among products in a consideration set (Bech-Larsen & Nielsen, 1999).

Previous research has shown that food consumption is often spontaneously described in terms of meals, or meal-like dishes, instead of single foods (Rappoport, Peters, Huff-Corzine & Downey, 1992). Moreover, due to demographic, socio-economic and life-style changes, *Home Meal Replacements* (HMR) (Costa, Dekker, Beumer, Rombouts & Jongen, 2001) are considered to constitute one of today's most promising areas for product development in Western countries (Lord, 1999). However, not much is known about the attributes, and other criteria, which underlie individuals' perceptions and categorisations of meals and meal replacements. To our knowledge, only one study so far has investigated the attributes used by consumers to discriminate among meal like-dishes (Monteleone, Raats & Mela, 1997). Based on these considerations, the aims of the study reported in this chapter were:

- To uncover the attributes (and eventually other type of criteria), based on which individuals classify HMR in the context of perceptual processes leading to choice;

- To investigate how these criteria, and the categories resulting from them, differ between regular consumers and those with knowledge and/or expertise in the field of food science and technology (*i.e.*, food experts);
- To investigate whether, and to what extent, consumers and food experts use the convenience-related criteria recently proposed by an HMR classification system (Costa *et al.*, 2001) in their own categorisation processes.

This chapter starts by describing the empirical study conducted and the data analysis performed so far. Next, the preliminary results obtained are reported and discussed. Based on these findings, some conclusions are drawn and plans for future research are discussed

6.2 Materials and methods

6.2.1 Subjects

Subjects were recruited through advertisements in the Wageningen University's newspaper, local supermarkets, students' residences or direct contact. During a first telephonic interview, or personal contact, in which details of the study were provided, potential subjects were asked a series of questions regarding socio-demographic variables, frequency of cooking and food purchasing, frequency of usage of HMR and level of knowledge about these products. If they met the criteria necessary to participate in the study, and were willing to do so, an appointment for an approximately one-hour interview at the Wageningen University (or at their own homes) was made. Forty-four regular consumers and forty-six food scientists and technologists working in the Wageningen University and associated Institutes were selected in this manner. Table 6.1 depicts the socio-demographic profile of the two samples of subjects, as well as their level of usage of ready meals and the level of knowledge about these products. All subjects were rewarded with a small gift for their participation in this study.

6.2.2 Task and stimuli

Subjects were asked to classify 59 HMR (including one recently launched product and two meal-kit concepts) in a choice-oriented, free sorting task (Michela & Contento, 1984; Steenkamp, van Trijp & ten Berge, 1994). First, a hypothetical scenario was put to the subjects: they had to picture themselves in the situation of having to select between different HMR. The product of their choice was to be bought and consumed in a coming evening, when they were expecting not to have enough time to cook their meal. Next, 59 cards depicting the names and summary descriptions of the different HMR available for selection were supplied to subjects,

	Consumers (n=44)	**Food experts** (n=46)
Gender		
Female	75%	41%
Male	25%	59%
Age		
Range	20-87 years	25-55 years
Mean ± SD	50.73 ± 20.42	38.57 ± 8.80
Marital Status		
Married/living together	50%	78%
Single	32%	22%
Widow/widower	16%	0%
Divorced	2%	0%
Housing Status		
Independent	94%	96%
Other	7%	4%
Education level		
Low	4%	0%
Middle	48%	0%
High	48%	100%
Employment Status		
Paid Job	34%	100%
Unemployed	11%	0%
Retired	30%	0%
Student	25%	0%
Use of ready meals		
Never	11%	13%
Low (≤ 1/month)	23%	28%
Middle (2-3/month)	39%	28%
High (1-3/week)	27%	31%
Knowledge about ready meals		
Low	20%	2%
Middle	20%	39%
High	60%	59%

Table 6.1 – Description of the socio-demographic, product usage and product knowledge characteristics of subjects. Product knowledge was assessed by asking subjects to provide their definition of the ready meals' category (accurateness of definition) and enumerate top-of-mind examples of these products (number of products mentioned).

together with the request to group these cards according to their choice criteria in the hypothetical situation. The concrete task asked from subjects was to organise the 59 HMR in a sort of menu that could facilitate a quick selection. Appendix 6.1 shows the list of HMR products and their descriptions, exactly as they were presented in cards to the subjects. These 59 products are known to be among the most frequent types of HMR consumed in the Netherlands (Costa, Dekker, Beumer, Rombouts & Jongen, 2002).

6.2.3 Data Analysis

The groupings, group labels and the classificatory criteria provided by the subjects in the two sub-samples were content-analysed independently. Based on this content analysis, 23 classificatory criteria were defined, which, in turn, lead to the creation of 46 groups of HMR. The groups and criteria were tallied based on the percentage of subjects of each sub-sample that generated them. A statistical analysis of some quantifiable characteristics of the group labels and classificatory criteria was performed, and their relations with the variables collected during the subjects' recruiting procedure was examined. The frequency of use of the different classificatory criteria by the two sub-samples was statistically compared. Finally, the number of times a specific HMR was classified under the different classificatory criteria was correlated.

6.3 Results and discussion

Table 6.2 depicts the groups formed during the categorisation task and the percentage of subjects forming each group, for the combined sample of 90 individuals. Tables 6.3 and 6.4 depict the criteria used in the classification task, some examples of associated group labels and the percentage of subjects employing each classificatory criterion, for the sub-samples of consumers and food experts, respectively.

Groups created by over half of the subjects were *pizzas*, *fast-food*, *starters and side-dishes*, *pastas*, *traditional Dutch meals* and *bread-based meals*. Two of these HMR correspond to two types of Italian recipes widely known, two other constitute the daily main meals in the Netherlands, and the remaining refer to foods which subjects apparently did not consider to constitute an actual meal. It was also observed that groups were often based on meal composition, namely on the type of main ingredients (protein or carbo-hydrate source). This is an attribute which is known to be used by consumers as choice criteria for *Home Meal Replacements* (Monteleone *et al.*, 1997; Rappoport *et al.*, 1992; Ritson *et al.*, 1995). Finally, it was interesting to see that, besides product features, consumers and experts also resorted to more abstract attributes to classify HMR. Such attributes, like *healthy*, *(nutritionally) complete* or *still have to cook*, could be directly related to relevant consumption outcomes. This is in good agreement with one of the main assumptions of the means-end theory (Gutman, 1982), which states that both product attributes *and* related consumption outcomes constitute consumers' purchase motivations.

Significant differences in the frequency of use between subjects in the two sub-samples were observed for the classificatory criteria marked with an asterisk in Table 6.3 (two-sided Pearson

GROUPS FORMED	SUBJECTS (n=90)
Pizza	68%
Snacks, fast-food	64%
Soups, salads, side-dishes, starters, not real meals	62%
Pasta	56%
Typical Dutch, classical, meat with vegetables and potatoes	55%
Snacks, bread, foods for lunch, cold meals	51%
Fish-based meals	50%
Oriental	50%
Frozen	47%
Take-out meals, warm, fully prepared	44%
Canned	42%
Potato-based	38%
Do it yourself, still have to cook, raw	37%
Chilled	32%
Dried	31%
Rice-based	30%
With beans	28%
Not tasty, don't like it, not my favourite, would not buy it, not my choice	24%
Salty pie, quiche	20%
Italian	19%
Ready to eat	17%
Complete, proper meals, warm meals, full meals	16%
Miscellaneous, varied, others	16%
Tasty, my first choice, attractive, would try it	16%
Fresh	14%
Multicultural, exotic, international	14%
To prepare in the oven	13%
Ready to warm up	12%
Easy and quick to prepare and/or eat	12%
With meat, not vegetarian	11%
Meals with chicken	10%
Vegetarian	10%
Healthy	10%
Incomplete meals, meal components	10%
Long shelf-life	8%
Unhealthy	7%
To prepare in the microwave	6%
For holidays	4%
Short-shelf life	3%
Cooked through steaming	3%
Food for breakfast	3%
Prefer to cook it myself	3%
Fried food	2%
For when I don't want to cook	2%
Dough-based products	2%

Table 6.2 – Groups formed during the classification task and percentage of subjects forming each group.

CRITERIA	GROUP LABELS	CONSUMERS (n=44)
Type of process	Canned, chilled, frozen, dried	48%
Main type of protein	Fish, meat, vegetarian	41%
Origin	Spanish, Italian, Dutch, Oriental	41%
Type of carbo-hydrate	Rice, beans, potatoes, pasta, pizza	39%
Place of purchase*	Fast-food outlet, take-out, Chinese restaurant	36%
Preference	What do I feel like eating, what I would never buy	36%
Degree of preparation	Ready to prepare, ready to eat, prepared meals, only minimally prepared, to cook yourself	27%
Main dish vs. side dishes	Soups, not main dishes, salads, starters, side-dishes	27%
Shelf-life	Always extra meal, can be stored or not, must eat now	27%
Nutritionally complete or not*	Soups, snacks, salads, sandwiches, full meals	25%
Easiness of preparation	Easy, not easy	20%
Method of preparation	How I get it ready, need to add something, to warm up in the microwave	20%
(Di)similar, unique, different*		18%
Healthiness	Not healthy, healthy, fatty, low on fat	16%
Moment of consumption	Lunch, dinner, breakfast, in between meals	16%
Speed of preparation	Very quick, quick, takes too long	14%
Taste	Tasty, not tasty	11%
Season	Winter, for warmer months	9%
Warm vs. cold meals		9%
For holidays	Can be kept at room temperature, light meals	7%
Familiarity	Meals that I know, don't know it	5%
Freshness		5%
Meal size	Big, small, not big enough	2%

*Table 6.3 – Classificatory criteria used by consumers, associated group labels and percentage of consumers employing each criterion. * frequency of use of criterion significantly different ($p<.05$) from that of experts.*

Chi-square, $p<.05$). *Preference*, *(nutritional) completeness*, *origin*, *product similarity* and *level of the product's readiness for consumption* were the criteria mostly used by food experts. On the other hand, consumers used mostly *type of processing*, *meal composition*, *origin* and *place of purchase* as classificatory criteria for the 59 HMR. Experts relied significantly more on classificatory criteria like *product similarity* and *(nutritional) completeness* than consumers, while these relied significantly more on the *place of purchase* than experts. Convenience-related

CRITERIA	GROUP LABELS	EXPERTS (n=46)
Preference	What do I feel like eating, what I would never buy	57%
Nutritionally complete or not	Soups, snacks, salads, sandwiches, full meals	54%
Origin	Spanish, Italian, Dutch, Oriental	39%
(Di)similar, unique, different		37%
Degree of preparation	Ready to prepare, ready to eat, prepared meals, only minimally prepared, to cook yourself	35%
Main type of protein	Fish, meat, vegetarian	35%
Type of process	Canned, chilled, frozen, dried	35%
Moment of consumption	Lunch, dinner, breakfast, in between meals	28%
Speed of preparation	Very quick, quick, takes too long	28%
Taste	Tasty, not tasty	26%
Type of carbo-hydrate	Rice, beans, potatoes, pasta, pizza	24%
Shelf-life	Always extra meal, can be stored or not, must eat now	22%
Easiness of preparation	Easy, not easy	20%
Main dish vs. side dishes	Soups, not main dishes, salads, starters, side-dishes	17%
Place of purchase	Fast-food outlet, take-out, Chinese restaurant	17%
Warm vs. cold meals		17%
Healthiness	Not healthy, healthy, fatty, low on fat	15%
Method of preparation	How I get it ready, need to add something, to warm up in the microwave	11%
Meal size	Big, small, not big enough	7%
Familiarity	Meals that I know, don't know it	4%
Freshness		4%
For holidays	Can be kept at room temperature, light meals	2%
Season	Winter, for warmer months	2%

Table 6.4 – Classificatory criteria used by food experts, associated group labels and percentage of food experts employing each criterion.

attributes, such as *degree of readiness for consumption*, *easiness and speed of preparation* and *shelf-life* were also used by subjects in both sub-samples. Among these, *degree of readiness for consumption* was the most frequently used by all subjects, though more by experts than consumers. Experts also resorted more to *speed of preparation* than consumers, and less to *shelf-life*.

Results of the statistical analysis performed on the characteristics of the labels and criteria show that consumers and food experts created on average 10 groups, based upon 5-7 classificatory

criteria. The level of product knowledge of consumers was significantly correlated (.318) with the number of groups they made, while the level of product knowledge of food experts was significantly correlated (.381) with the number of criteria they used (two-tailed Spearman's correlation coefficient, $p<.05$). The levels of knowledge and product usage of consumers were significantly inter-correlated (.366), but not those of food experts.

Fish-based meals were also classified by the total sample (n=90) as *healthy* (.426) and *attractive* (0.502) (two-sided Pearson's correlation coefficient, $p<.01$). *Chilled* meals were categorised as *fresh* (.794) and *healthy* (.263) ($p<.01$ and $p<.05$, respectively), but also as *perishable* (.829, $p<.01$), while *frozen* counterparts were seen as *nutritionally complete* and *attractive* (.269, $p<.05$ and .294, $p<.05$, respectively). Meals grouped as *pizzas*, *snacks* or *take-out* were also classified as *unhealthy* and *incomplete* ($p<.01$), though being seen as *attractive* and *convenient* ($p<.01$). The new HMR products or concepts present among the 59 items shown to the subjects (numbers 11,12 and 21 in Appendix 6.1) were only appropriately categorised in an apart group - *do it yourself, meals I still have to cook* - by 37% of the total sample. The remaining subjects classified them as *fresh*, *pizza*, *fish-based* or *unique/ different/unknown*, which indicates a lack of more concrete perceptions and judgements about these items and a consequent difficulty in categorising them.

6.4 Conclusions and future research

This study has enabled us to collect the attributes and other choice criteria that both regular consumers and food experts employ in their categorisations of HMR. Perhaps due to the choice-based nature of the task, not many significant differences were observed between the criteria employed by consumers and experts. Nonetheless, our findings clearly indicate that, as it would be expected, criteria based on expert knowledge play a significant role in the classifications of food scientists and technologists. According to our findings, experts' categorisation processes appear to be more dependent on their level of product knowledge than on the knowledge they might derive from product usage. On the other hand, consumers seem to rely more on usage-based criteria to group meals, such as main ingredients or type of cuisine. Additionally, the type of manufacturing process seems to be taken as an important indicator of several, more subjective product attributes, such as freshness, healthiness, attractiveness and convenience. Finally, the results regarding the classification of recently introduced products or concepts has provided support to the idea that consumers may experience difficulties in categorising innovative products, especially if this implicate the creation of new cognitive categories (Moreau, Markman, & Lehmann, 2001).

The fact that the subjects in this study frequently resorted to convenience-related attributes to classify HMR provides some support to the assumption of the consumer-orientation and validity of the HMR classification system recently proposed (Costa *et al.*, 2001). *Degree of readiness for consumption* and *shelf-life*, the classificatory criteria proposed by the system, were, in fact, the convenience-related attributes mostly employed by the sub-sample of consumers. However, only less than a third of the consumers resorted to this or any other type of convenience-related criteria; for most of them other criteria seemed to be more relevant. This leads us to conclude that, though valid, the classification system developed should probably be augmented with some of the relevant criteria uncovered by the present study, in order to truly reflect consumers' perceptions of HMR.

We are currently analysing how consumers and experts differed in their categorisations and criteria more in depth. We are also looking into how this can be further related to product knowledge and frequency of usage, as well to socio-demographic variables. Additionally, with the help of Homogeneity Analysis (Snelders & Stokmans, 1994), we are mapping the categorised HMR according to the classificatory criteria uncovered. We expect this to yield more insights into meals' categorisation processes and supply useful guidelines to the R&D and Marketing of HMR products.

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Appendix 6.1 – Designations and descriptions of the 59 HMR products, as their were presented to subjects

1. Chilled lasagne "Bolognese verdi" – Ham, cheese, pasta, spinach and tomato
2. Frozen Paella – Fish, chicken, rice, peas, peppers
3. Canned tuna salad – Tuna, beans, maize, onion, peppers
4. Frozen pizza "Milanese" – Pizza base, cheese, tomato, maize, onion
5. Frozen fish-based oven dish– Fish, onion, peppers, croutons
6. Canned "Bacon & beans" – Bacon, beans, onion
7. Frozen "Chicken Provence" – Chicken, rice, tomato, courgette, peppers
8. Frozen French potato dish – Ham, potatoes, cheese
9. Chilled "Chilli con carne" – Beef, kidney beans, peppers, maize, tomato
10. Hamburger sandwich (take-out from fast-food restaurant) – Beef, bread, onion
11. Chilled hot pot kit (with raw ingredients) – Meat, potatoes, onions and carrots
12. Chilled "Cook and steam" salmon dish (with raw ingredients) – Salmon, green beans and potatoes
13. Canned, meat-filled ravioli – Beef, pasta, tomato, onion, carrots
14. Knackebrod (sandwich made with crackers) filled with cheese and ham – Cheese, ham, crackers, onion, tomato
15. Chilled endive dish – Beef, potatoes, endive, onion
16. Chilled chicken curry salad meal – Chicken, potatoes, celery
17. Dried "Spaghetti Carbonara" – Cheese, bacon, pasta, mushrooms, broccoli
18. Chilled "Mihoen" (Noodles) – Beef, noodles, leek, soy bean sprouts, carrots
19. Chilled lasagne "al frutti di mare" – Seafood, cheese, pasta, tomato, onion
20. Frozen chicken curry dish – Chicken, rice, onion, peppers
21. Chilled pizza kit (raw ingredients) – pizza dough, ham and cheese pieces, tomato sauce
22. Frozen lasagne "Bolognese verdi" – Ham, cheese, pasta, spinach, tomato
23. Chilled "Huzarian" salad meal (Russian salad) – Beef, potatoes, carrots, onion, peas
24. Chilled ham & leek pie – Ham, cheese, dough, leek, mushrooms
25. Chilled lasagne "Bolognese" (take-out/home-delivery from institutional kitchen) – Pasta, beef, tomato, onion, cheese
26. Frozen egg-rolls king size – Chicken, dough, soy beans sprouts, leek, carrots, onions
27. Canned "Chilli con carne" – Beef, beans, tomato, onion, pepper, maize
28. Canned brown beans soup meal – Pork sausage, potatoes, beans, leek, onion
29. Frozen pea soup meal – Pork sausage, potatoes, peas
30. Dried, filled tortellini – cheese, mushrooms, pasta, onion, carrot, celery
31. Dried, meat-filled ravioli – pasta, beef, pork, onion
32. Frozen pizza "Quattro stagioni" – Mozarella, salami, pizza dough, peppers, maize, mushrooms
33. Cheeseburger sandwich (take-out from fast-food restaurant) – Beef, cheese, bread, onion, gherkin

34. Frozen pizza “funghi” – Beef, cheese, pizza dough, tomato, onion, mushrooms
35. Chilled “Bami Goreng” with pork (noodles) – Noodles, pork, egg, leek
36. Canned hot pot with beef – Beef, potatoes, onion, carrots
37. Frozen “Fish Florentine” – fish, potatoes, spinach
38. Frozen pizza “Spicy salami” – Salami, pizza dough, tomato, pepper, onion
39. Canned macaroni with ham and cheese – ham, cheese, pasta, tomato, pepper, courgette
40. Frozen, spicy mini-pizzas – Salami, cheese, pizza dough, tomato, pepper
41. Frozen potato dish with bacon and onions – Bacon, potatoes, onion
42. Frozen baguette with pizza filling – Salami, cheese, bread, courgette, mushrooms
43. Frozen pizza “El Greco” – Cheese, pizza dough, tomato, courgette
44. Canned “Nasi Goreng” (rice dish) – Chicken, pork, rice, onion, leek, peppers, carrots
45. “Healthy” Sandwich (take-out from fast-food outlet) – Bread, egg, cheese, tomato, cucumber
46. Take – out Chinese meal “Babi pangang” – Rice, beef, leek, soy bean sprouts, tomato
47. Farmers’ potatoes (take-out from fast-food outlet) – Bacon, potatoes, onions, mushrooms
48. Canned chicken “Tikka Massala” – chicken, rice, peppers, onion
49. Frozen “Hunter’s meal” – Beef, potatoes, onions, red cabbage
50. Frozen hot pot with sauerkraut – Pork sausage, potatoes, sauerkraut
51. Ham and Cheese pizza (take-out from pizzeria) – Ham, cheese, tomato, pizza dough
52. Canned “Hunter’s meal” – Beef, potatoes, onions, peppers, tomato
53. Chilled, salmon salad meal – Salmon, pasta, broccoli, apple, carrots
54. Frozen, ham and cheese tagliatelli – Pasta, ham, cheese, mushrooms
55. Shoarma sandwich (take-out from fast-food outlet) – Lamb, bread, salad vegetables
56. Frozen pizza “Bolognese” – Cheese, tomato, pizza dough, minced meat, onion, peppers
57. Chicken and Mushrooms’ pasta packed in a glass container - Chicken, pasta, mushrooms
58. Frozen pizza “Marguerita” – Cheese, pizza base, tomato
59. Frozen, Greek potato dish – Pork, potatoes, red pepper, courgette

Chapter 7

Conclusions and Recommendations

7. Conclusions and Recommendations

This chapter summarises the main conceptual and empirical findings of this thesis, and outlines its scope. Several avenues for future research in the area of consumer-oriented food product design are also proposed.

7.1 What this thesis was about

Chapter 1 of this thesis has extensively reviewed literature in the area of market-orientation, consumer-oriented new product development and food product design, with the aim of introducing the main concepts and methods employed in these areas. A critical analysis of the advantages and disadvantages of the implementation of consumer-oriented new product development in the food industry was for the first time attempted. Contrary to the many optimistic voices, it is concluded that, in the current circumstances, the way forward for this implementation is long, and not without drawbacks. Three of these drawbacks are worthy of more attention:

- The lack of sufficient evidence demonstrating that consumer-orientation indeed leads to a more successful product development;
- A prevailing clan mentality, which prevents the existence of the empathy and co-operation necessary to the successful implementation of cross-functional approaches;
- Few concrete implementation guidelines and methodologies.

The aim of this thesis was to address this last drawback by testing and evaluating some of the more promising methodologies that can be applied in the early stages of consumer-oriented food product design.

Chapter 2 has reviewed published reports of the implementation of Quality Function Deployment (QFD) - a consumer-oriented, technical knowledge system used in product development activities - in the food industry. From this review, it is concluded that QFD's sequential nature, the amount of information it requires, and the fact that it was not originally developed for food product design make of its full implementation a rather cumbersome and difficult process. Perhaps QFD's biggest contributions to consumer-orientation in product development are:

- To show what market and technical information companies should collect and internally disseminate on a regular basis;
- The fact that it forces people from different organisational functions to come together and join their efforts in the development of products that satisfy better consumers' needs.

Chapter 3 presented the development and validation of a consumer-oriented classification system for Home Meal Replacements (HMR), based on convenience attributes. This classification facilitates a quick and simple, convenience-based analysis of household food consumption data. Additionally, it can be easily applied to other types of data, such as category sales or checkout scanner data. It is expected that this tool, by highlighting potential gaps between supply and demand, can provide companies with valuable support in the *opportunity identification* stage of food product design.

Chapter 4 was devoted to the testing of qualitative research techniques that can be employed in the *opportunity definition* stage, namely in the collection of the so-called *Voice of the Consumer* (Griffin and Hauser, 1993). The application of classic focus group and in-depth interview techniques in the study of the perceptions of Dutch seniors regarding HMR highlighted some of its virtues and shortcomings. By focusing on overall priorities and concerns, instead of quantitative evaluations of single products, focus groups and in-depth interviews give a valuable contribution to a more holistic understanding of consumers and theirs needs. Such a holistic understanding is vital throughout every step of a consumer-oriented product development process. Nevertheless, it is recognised that the introduction of social desirability biases, as well as an almost exclusively verbo-centric nature, are inherent limitations of these techniques are hard to overcome. Therefore, in the same chapter, the development of an empirical procedure based on consumer collages, aiming to partly address these limitations, is presented. Findings show that the combined used of collages and focus groups is rather effective in collecting both the more immediate and the underlying needs of consumers.

Chapters 5 and 6 aimed to extend the scope of this thesis beyond the consumer research techniques traditionally employed in the stages of *opportunity definition* and *opportunity refinement*. A literature review and an empirical application of the means-end theory and laddering technique (MECL) have explored the possibility of moving beyond the mere collection of consumers' needs, towards a better understanding of the motivations that underlie them. Based on this review, it is concluded that methodological issues related to construct and predictive validity, together with some shortcomings associated with the specificity of food

design, and the sheer analytical work involved, pose some serious obstacles to MECL's practical implementation in consumer-oriented food product design. Nevertheless, it is believed that MECL's is a highly valid and valuable conceptual approach to understand consumers' cognitive and motivational structures, especially as an alternative to classic in-depth interviews in exploratory studies.

The findings of the consumer research performed lead to believe that the identification and measurement of barriers to innovation adoption should have its right place within a consumer-oriented product design framework. Indeed, products may not only fail because they do not meet consumers' needs in a superior and unique way, but also because they imply deviations from a satisfactory *status quo* or conflict with individually or collectively held beliefs (Ram & Sheth, 1989). Perhaps a good example of this is the consumers' resistance to convenience-related innovations in foods investigated in **Chapter 5.** Although not yet allowing the use of a fully validated measurement instrument of the moral issues surrounding meal preparation, the preliminary findings give good indications that the development of such a measure is both logic and necessary. Indeed, the results of the empirical study obtained so far confirm the initial hypothesis concerning the existence of a negative attitude towards meal replacements that is, to a certain extent, related to moral norms. Such moral-based negative attitude, or indeed its absence, may have considerable influence in food choice and dietary habits.

Chapter 6 reports preliminary findings showing that consumers structure their knowledge about HMR based on categorisation criteria that are different from those employed by food scientists and technologists. As expected, consumers' categorisations appear to be related to both product knowledge and level of usage, while those of food experts appear to be mainly based on their expertise. Some support to a hypothesis advanced in literature, which states that consumers experience difficulties in categorising innovative products, especially if this implicates the creation of new categories, was also found.

7.2 What this thesis was not about

In such a large and multidisciplinary area such as consumer-oriented food product design, perhaps the easiest way to describe the issues that have not been addressed by thesis would be simply to say: everything else. Yet, there are a few omissions that are felt to warrant some more detailed discussion. Aspects of the relation between food and people which are less frequently investigated - such as convenience, meals, moral issues and categorisations -, were consciously favoured, in detriment of those that are already extensively and competently dealt within the current food-related literature. Therefore, the readers of this thesis will not find any reference to

such important topics for product development like healthiness and nutritional aspects, taste, sensory improvement, perceptual and preference mapping, to name but a few. The same argument is valid for the selection of the methods tested and evaluated, the number and importance of which falls much shorter of what was listed in Table 1.1.

As stated in the introduction of this thesis, more advanced stages of product development, such as *Testing*, *Introduction* and *Life-cycle Management* were left out, as well as important moments of the *Design* stage. In this context, the fact that there was no time left to further develop methodologies establishing quantitative relationships between food attributes, as perceived by consumers, and measurable product characteristics, is a significant omission. Nevertheless, in an empirical study involving 98 subjects, we have investigated the relationships between convenience-related attributes and consumption benefits of frozen and chilled pizzas (as perceived by consumers), and several of these products' objective features. This was done within the framework of the Quality Guidance Model (Steenkamp & van Trijp, 1999). Preliminary findings of this study have been reported elsewhere (Nijland, 2002; Ruijschop, 2002).

Finally, though many of the findings reported have been based on the hypothetical case of a consumer-oriented design of HMR, to provide guidelines or specifications for the development of any particular product was not an aim of this thesis *per se*. Consequently, no recommendations to the food industry on the matter, beyond what was already suggested in each chapter, will be made at this point. Naturally, R&D practitioners with an interest in HMR are welcomed to make use of the results provided by this thesis. Nevertheless, care should be taken not to extrapolate the findings of the consumer research performed beyond the methodological study they were intended to support.

7.3 What future theses could be about

Throughout the different chapters of this thesis, many suggestions to future research in the area of consumer-oriented food product design have been presented. Therefore, it seems unnecessary to dwell much further on this topic. Nevertheless, there are two main avenues of research that due to their relevance, deserve special attention. The first has to do with the fact that we do not yet possess a valid measurement instrument that can assess the level of consumer-orientation of a company's NPD processe. The ability to perform this assessment is vital to provide a more definite answer to the question of whether consumer-orientation indeed increases the likelihood of new product success, and in which circumstances. The second has to do with the exciting possibilities offered by the employment of image-based, web-based or virtual reality approaches

in product design (Dahan & Hauser, 2002a,b). The development and validation of methodologies of this type for the food industry could greatly improve cross-functional co-operation, as well as increase the availability of better, real-time consumer information and involvement within NPD processes.

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SUMMARY

In today's global economy, to gain a better understanding of what consumers want, how these wants change and how these changes can be promptly addressed through innovation is becoming not only a factor of success for the agri-food business but ultimately one of mere survival. The concept of consumer-oriented New Product Development (NPD) can be seen as a special case of market-based innovation – since it focuses on the share of market intelligence pertaining to end-users or consumers –, which has been developed for the manufacturers of consumer goods. The design stage of a consumer-oriented NPD process aims to identify the key consumer benefits the new product is to provide and the positioning of these benefits *vis-à-vis* the competition. One of the major gaps in a consumer-oriented approach to food product design is the relative lack of concrete and clear guidelines on how to adequately conceptualise and implement its various phases. This deficiency is felt mostly at the early phases, which are simultaneously the less structured and the more determinant of the success of new products and technologies. Several methodologies have been developed for these phases, but their validity and the applicability to food design remains controversial and implementation reports are scarce. Therefore, the aims of this thesis are:

- To test the implementation of several of the most promising methods and tools associated with the early phases of a consumer-oriented approach to food product design;
- To improve the tested methods, or develop new ones, whenever deemed necessary;
- To use the results obtained to propose research guidelines leading to an improved implementation of consumer-orientation and related methods in food product design.

Home Meal Replacements (HMR) were selected as the category within which to carry out the theoretical and empirical research necessary to the achievement of the above-listed aims. One of the reasons for this selection was that convenience in preparation is believed to be one of the main determinants of consumers' food choice. Additionally, due to demographic, socio-economic and life-style changes, meal replacement is considered to be one of today's most promising areas for NPD in Western countries. Finally, there is an increasing call for the use of a more holistic view of food consumption in product design, instead of the current focus on individual products.

Chapter 1 of this thesis reviews literature in the area of market-orientation, consumer-oriented NPD and food product design, with the aim of introducing the main concepts and methods employed. A critical analysis of the advantages and disadvantages of the implementation of consumer-oriented product design in the food industry is performed. Contrary to many optimistic voices, it is concluded that, in the current circumstances, the path for implementation is long and not without drawbacks. Three of these drawbacks are worthy of further attention:

- The lack of sufficient evidence demonstrating that consumer-orientation indeed leads to more successful product development (and in what circumstances);
- A prevailing clan mentality which prevents the existence of the empathy and co-operation necessary to the successful implementation of cross-functional approaches;
- Few concrete implementation methodologies and guidelines.

Chapter 2 reviews published reports of the implementation of Quality Function Deployment (QFD) - a consumer-oriented, technical knowledge system used in NPD activities - in the food industry. QFD's sequential nature, the amount of information it requires and processes, and the fact that it was not originally developed for food design make of its full implementation a rather cumbersome and difficult process. On the other hand, QFD's contributions to consumer-orientation in product design are:

- To indicate what market and technical information companies should collect and internally disseminate on a regular basis;
- The fact that it forces people from different functions to come together and focus their thoughts on how to develop products that better satisfy consumers' needs.

Chapter 3 presents the development and validation of a consumer-oriented classification for Home Meal Replacements (HMR) based on convenience attributes. This classification facilitates a quick and simple, convenience-based analysis of household food consumption data, but can be easily applied to other types of data, such as category sales or checkout scanner data. This tool is expected this tool to provide valuable support to companies' product design processes by highlighting potential gaps between supply and demand.

Chapter 4 is devoted to qualitative research techniques that can be employed in the collection of consumers' needs. The application of classic focus group and in-depth interview techniques in the study of Dutch seniors' perceptions regarding HMR highlighted some of its virtues and

shortcomings. By focusing on overall priorities and concerns instead of quantitative evaluations of single products, focus groups and interviews give a valuable contribution to a more holistic understanding of consumers and their needs. However, the introduction of social desirability bias and an almost exclusively verbo-centric nature are inherent limitations that are hard to overcome. C**hapter 4** also presents the development of an empirical procedure addressing partly these limitations. The findings show that the combined used of collages and focus groups can be rather effective in collecting both the more immediate and the underlying needs of consumers.

A literature review and an empirical application of the means-end theory and laddering technique (MECL), described in **Chapter 5,** illustrate the possibility of moving beyond the mere collection of consumers' needs towards a better understanding of their underlying motivations. Methodological aspects related to construct and predictive validity of MECL, together with the sheer analytical work involved and restrictions associated with food design's specificities, pose some serious obstacles to MECL's practical implementation in consumer-oriented food design. Nevertheless, MECL's can be a valuable conceptual and empirical approach in the investigation of consumers' cognitive and motivational structures, especially as an alternative to classic in-depth interviews in exploratory studies.
The findings of the consumer research performed demonstrated that the identification and measurement of barriers to consumer innovation adoption should have its own place within a consumer-oriented product design framework. A good example of such a barrier is the resistance of certain consumers to convenience-related innovations in foods, described in **Chapter 5**. Preliminary empirical findings confirm the hypothesis regarding the existence of a negative attitude towards HMR that is, to a certain extent, related to moral norms. Such moral-based negative attitude, or its absence, may have considerable influence in food choice and dietary habits.

Chapter 6 reports preliminary findings showing that consumers structure their knowledge about HMR based on categorisation criteria which are different from those employed by food experts. Consumers' categorisations appear to be related to both product knowledge and usage, while those of food experts are mainly related to their own expertise. Evidence supporting the idea that consumers experience difficulties in categorising more innovative products, especially when this implies the creation of new cognitive categories, was also found.

Chapter 7 recaps the thesis' main findings, draws some conclusions and suggests avenues for future research.

SAMMENVATING

In de huidige globale economie is het verkrijgen van een beter begrip in wat consumenten willen, hoe deze wensen veranderen en hoe deze veranderingen accuraat kunnen worden vertaald in innovaties, niet alleen een succesfactor voor de agro- en levensmiddelenindustrie maar zelfs bepalend voor het voortbestaan van bedrijven. Het concept van consument georiënteerde product ontwikkeling kan gezien worden als een voorbeeld van marktgerichte innovatie – aangezien het zich richt op het aandeel van marktinformatie betrekking hebbend op eindgebruikers of consumenten -, die ontwikkeld is voor de producenten van consumentproducten. De ontwerpfase van een consument georiënteerde product ontwikkelingsproces is gericht op het identificeren van de sleutelfactoren voor de *benefits* dat het nieuwe product aan consumenten gaat bieden, en het positioneren van deze *benefits* ten opzichte van de concurrentie. Een van de belangrijkste tekortkomingen van een consument georiënteerde aanpak voor het ontwerp van levensmiddelen is het vrijwel ontbreken van concrete en duidelijke richtlijnen hoe de verschillende stappen van het ontwerpproces adequaat kunnen worden geconceptualiseerd en geïmplementeerd. Dit gebrek is het meest duidelijk voor de eerste ontwerpstappen, die het minst gestructureerd zijn maar die wel het meest bepalend zijn voor het succes van de nieuwe producten en technologieën. Verschillende methodes zijn ontwikkeld voor deze stappen, maar hun validiteit en toepasbaarheid voor het ontwerpen van levensmiddelen zijn controversieel en er zijn nauwelijks publicaties over de implementatie hiervan. De doelstellingen van het onderzoek dat in dit proefschrift beschreven wordt zijn:

- Het testen van de implementatie van de meest veelbelovende methodes en technieken die betrekking hebben op de eerste stappen van een consument georiënteerde benadering voor het ontwerp van levensmiddelen.
- Het verbeteren van de geteste methoden en technieken, of waar nodig het ontwikkelen van nieuwe.
- Het gebruiken van de verkregen resultaten voor het opstellen van richtlijnen voor onderzoek dat leidt tot een verbeterde implementatie van een consument georiënteerde ontwerpen van levensmiddelen en daaraan gerelateerde methoden.

Home Meal Replacements (HMR) zijn geselecteerd als de productcategorie waarbinnen het theoretisch en empirisch onderzoek uitgevoerd is om de bovenstaande doelstellingen te bereiken. Een van de redenen voor deze selectie was dat ‘gemak’ één van de belangrijkste

determinanten is voor de voedselkeuze van de consument. Bovendien worden HMR gezien als een van de meest veelbelovende gebieden voor productontwikkeling in de westerse landen, door veranderingen van demografische en sociaal economische factoren en in leefwijze. Tenslotte, komt het kiezen voor een categorie tegemoet aan de toenemende vraag aan een meer holistische benadering van voedselconsumptie bij productontwerp, in plaats van de huidige focus op individuele producten.

Hoofdstuk 1 van dit proefschrift geeft een literatuuroverzicht op het gebied van marktoriëntatie en consument georiënteerde productontwikkeling, met als doel om de belangrijkste concepten en methodes te introduceren. In dit hoofstuk wordt een kritische analyse van de voor- en nadelen van het implementeren van consument georiënteerde productontwikkeling in de levensmiddelenindustrie gegeven. In tegenstelling tot de vele optimistische geluiden, wordt er geconcludeerd dat, onder de huidige omstandigheden, het implementatiepad langdurig is en niet zonder bezwaren. Drie van deze bezwaren behoeven verdere aandacht:

- Er ontbreken voldoende bewijzen die aantonen dat consument oriëntatie inderdaad leidt tot meer succesvolle productontwikkeling (en onder welke omstandigheden);
- Er heerst een koninkrijkjesmentaliteit die voorkomt dat er empathie en samenwerking is die noodzakelijk is voor de succesvolle implementatie van een interdisciplinaire aanpak;
- Er zijn weinig concrete methoden en richtlijnen voor implementatie.

In **Hoofdstuk 2** wordt een analyse gegeven van literatuur over het implementeren van ‘Quality Function Deployment’ (QFD) – een consument georiënteerd, technisch kennis systeem gebruikt bij productontwikkelingsactiviteiten – in de levensmiddelenindustrie. De sequentiële opzet van QFD, de hoeveelheid informatie die het integreert en nodig heeft, en het feit dat QFD van oorsprong niet ontwikkeld is voor het ontwerp van levensmiddelen maken de toepassing ervan een lastig en moeizaam proces. Daarentegen zijn de bijdrages van QFD aan consument georiënteerde productontwikkeling:

- Het zichtbaar maken welke markt en technologische informatie bedrijven moeten verzamelen en regelmatig intern moeten communiceren.

- Het dwingen van het samenwerken van mensen uit verschillende disciplines en het focussen van hun inspanningen op het ontwerpen van producten die beter bijdragen aan de behoeftes van de consumenten.

Hoofdstuk 3 behandelt de ontwikkeling en validatie van een consument georiënteerd classificatie systeem voor HMR gebaseerd op gemaksattributen. De classificatie helpt bij een snelle en gemakkelijke analyse, gebaseerd op gemaksattributen, van voedselconsumptie data, maar kan ook gemakkelijk worden toegepast op andere soorten van data, zoals verkoopcijfers of kassa scandata. Dit hulpmiddel kan waardevol zijn bij ontwerp processen binnen bedrijven doordat het potentiële gaten identificeert tussen de huidige vraag en het aanbod.

Hoofdstuk 4 is geweid aan kwalitatieve onderzoekstechnieken die kunnen worden gebruikt voor het verzamelen van de behoeftes van consumenten. De toepassing van klassieke focusgroepen en diepte-interviews in een studie naar de perceptie van Nederlandse ouderen met betrekking tot HMR laat de waarde en de tekortkomingen van deze technieken zien. Door te focussen op de overall prioriteiten en zorgen met betrekking tot een productcategorie, in plaats van een kwantitatieve evaluatie van een enkel product, kunnen focusgroepen en interviews een waardevolle bijdrage leveren aan een meer holistisch begrip van consumenten en hun behoeftes. Inherente beperking van deze technieken zijn het introduceren van bias door sociaal gewenste uitspraken en hun vrijwel volledige verbaalcentrische aard. **Hoofdstuk 4** behandelt ook de ontwikkeling van een empirische procedure die gedeeltelijk oplossingen biedt voor deze beperkingen. De resultaten laten zien dat het combineren van collagetechnieken en focusgroepen effectief is voor het verzamelen van de meer directe en onderliggende behoeftes van consumenten.

Een literatuuroverzicht en een empirische toepassing van de ‘means-end’ theorie en de ‘laddering‘ techniek (MECL), zoals beschreven in **Hoofdstuk 5**, illustreren de mogelijkheden om verder te komen dan puur het verzamelen van consumentenbehoeftes, door een beter begrip te krijgen van onderliggende motivaties. Methodologische aspecten met betrekking tot de constructie en de voorspellende validiteit van MECL, het arbeidsintensieve analytische werk en de beperkingen ten aanzien van de specificiteit van het ontwerp van levensmiddelen, vormen serieuze hindernissen voor de praktische implementatie van MECL in consument georiënteerd ontwerpen van levensmiddelen. Desalniettemin kan MECL een waardevolle conceptuele en

empirische benadering betekenen in het begrijpen van de cognitieve en affectieve structuren van consumenten, vooral als alternatief voor klassieke diepte-interviews voor exploratieve studies.
De resultaten van het uitgevoerde consumenten onderzoek laten zien dat het identificeren en meten van barrières in de consumentenacceptatie van innovaties een eigen plaats moet hebben binnen het kader van consument georiënteerd ontwerpen. Een goed voorbeeld van een dergelijke barrière is de weerstand die bepaalde consumenten hebben tegen innovaties op het gebied van gemaksgerelateerde karakteristieken van levensmiddelen, zoals beschreven in **Hoofdstuk 5**. Voorlopige empirische resultaten bevestigen de hypothese met betrekking tot het bestaan van een negatieve houding ten opzichte van HMR, die tot op zekere hoogte, gerelateerd is aan morele normen. Dergelijke morele negatieve houdingen, of het ontbreken ervan, kunnen een belangrijke invloed hebben op de keuze van levensmiddelen en het voedingspatroon.

Hoofdstuk 6 behandelt voorlopige resultaten die laten zien dat consumenten hun kennis van HMR structureren op basis van criteria die anders zijn dan die van levensmiddelen experts. De classificatie van consumenten lijkt te zijn gerelateerd aan zowel productkennis als ook aan gebruikskenmerken, terwijl die van de experts voornamelijk is gerelateerd aan hun kennis. Het bleek ook dat consumenten moeilijkheden ondervinden bij het classificeren van meer innovatieve producten, met name als dit het creëren van nieuwe categorieën inhoudt.

Hoofdstuk 7 recapituleert de belangrijkste resultaten van dit proefschrift. Hieruit worden conclusies getrokken en aanbevelingen gedaan voor toekomstige onderzoekslijnen.

SUMÁRIO

No presente contexto de globalização económica, o sucesso, e até a sobrevivência financeira, do sector agro-alimentar Europeu está directamente ligado a um melhor entendimento das necessidades dos consumidores, de como esses necessidades mudam e de como uma resposta eficaz a essa mudança passa pela inovação. O conceito de um desenvolvimento de novos produtos orientado para o consumidor pode ser entendido como um caso particular de inovação baseada no mercado – uma vez que privilegia aquela fracção de informação sobre o mercado que diz respeito aos consumidores -, desenvolvido particularmente para os produtores de bens de consumo. No contexto de um processo de desenvolvimento de novos produtos orientado para o consumidor, a etapa de concepção tem como objectivo a identificação dos benefícios essenciais que o novo produto irá fornecer aos consumidores, bem como a determinação do melhor posicionamento desses benefícios face à concorrência. Uma das maiores lacunas existentes na abordagem da concepção de novos produtos alimentares orientada para o consumidor é a falta de linhas de orientação mais claras e concretas que permitam uma teorização e uma implementação adequadas das várias fases deste processo. Esta omissão é principalmente sentida nas fases iniciais, que são simultaneamente as menos bem estruturadas do ponto de vista conceptual e as mais determinantes do sucesso de novos produtos e tecnologias. Várias metodologias têm vindo a ser desenvolvidas para colmatar esta falha, mas a sua validade e aplicabilidade é ainda objecto de controvérsia. São também escassos os estudos descrevendo os resultados da implementação deste tipo de metodologias. Tendo em vista todos estes aspectos, foram definidos os seguintes objectivos para o estudo descrito nesta tese:

- Testar a implementação dos métodos e ferramentas associados às fases iniciais de uma abordagem à concepção de produtos alimentares orientada para o consumidor, que nos pareceram mais promissores;
- Melhorar os métodos e ferramentas testados, ou mesmo desenvolver novas metodologias, sempre que necessário;
- Usar os resultados obtidos para elaborar propostas de investigação que conduzam a uma melhor implementação de uma orientação para o consumidor, bem como dos métodos a ela associados.

Como categoria alimentar a utilizar na realização da investigação teórica e experimental conducente ao alcance dos objectivos acima propostos, foi seleccionada a categoria das

refeições pré-cozinhadas (independentemente da sua origem sectorial). Uma das razões desta selecção prende-se com o facto de se pensar que a conveniência, ou comodidade, é uma das principais determinantes da procura alimentar por parte dos consumidores. Adicionalmente, e devido às alterações demográficas, socio-económicas e estilos de vida verificadas nas últimas décadas, considera-se que, hoje em dia, a manufactura de refeições pré-cozinhadas nos países Ocidentais é uma das áreas com maior potencial para o desenvolvimento e introdução de novos produtos. Finalmente, há um crescente apelo ao uso de abordagens mais holísticas do consumo alimentar na concepção de novos produtos, ao invés da actual convergência excessiva em torno de produtos individuais.

O **Capítulo 1** desta tese revê bibliografia nas áreas de orientação de mercado, desenvolvimento de novos produtos orientados para o consumidor e concepção de produtos alimentares, com o objectivo de apresentar os conceitos e métodos mais relevantes neste contexto. É feita uma análise crítica das vantagens e desvantagens da implementação de uma concepção de novos produtos orientada para o consumidor no contexto da indústria alimentar. Contrariamente a afirmações mais optimistas, conclui-se que, nas actuais circunstâncias, o caminho para uma implementação de facto é ainda longo e repleto de obstáculos. Três destes obstáculos são, em nossa opinião, dignos de maior atenção:

- A falta de estudos demonstrando inequivocamente que a orientação para o consumidor de facto conduz a um desenvolvimento e introdução de novos produtos mais bem sucedidos (e em que circunstâncias);
- Uma prevalecente mentalidade de clã, que impede a existência da compreensão mútua e cooperação necessárias a uma implementação bem sucedida de abordagens inter-departamentais;
- A pequena quantidade de metodologias de implementação e linhas de orientação existente.

O **Capítulo 2** revê as publicações referentes à implementação do sistema *Quality Function Deployment* (QFD) – um sistema de processamento de conhecimento técnico orientado para o consumidor que pode ser utilizado em actividades de desenvolvimento de novos produtos – na indústria alimentar. A natureza sequencial do QFD, a quantidade informação que requer e integra, e o facto deste sistema não ter sido originalmente concebido para apoiar processos de concepção de produtos alimentares torna a sua completa implementação um processo assaz fastidioso e complexo. Por outro lado, o QFD pode contribuir de forma positiva para uma maior

orientação para o consumidor no plano da concepção de produtos alimentares, principalmente nos seguintes aspectos:

- Indicando que informação sobre mercados e tecnologias as empresas alimentares devem recolher e divulgar internamente de forma regular;
- Forçando a comunicação, a integração e o trabalho conjunto de indivíduos com diferentes funções dentro da empresa, tendo em vista o desenvolvimento de produtos que satisfaçam melhor as necessidades do consumidor.

O **Capítulo 3** apresenta o desenvolvimento e validação de um sistema de classificação de refeições pré-cozinhadas orientado para o consumidor, e baseado em características relacionadas com a conveniência. Esta classificação facilita uma rápida e simples análise do consumo alimentar das famílias baseada na conveniência, podendo também ser facilmente aplicada a outro tipo de dados, tais como vendas por categoria ou sector ou dados resultantes do emprego de aparelhos de leitura óptica em pontos de venda. É esperado que esta ferramenta, uma vez que evidencia divergências potencialmente interessantes entre a oferta e a procura, auxilie de forma decisiva os processos de concepção de novos produtos no contexto empresarial.

O **Capítulo 4** é dedicado a técnicas qualitativas de pesquisa que podem ser utilizadas na recolha de dados acerca das necessidades dos consumidores. A aplicação de técnicas clássicas, como as discussões em grupo ou entrevistas individuais aprofundadas, no estudo da percepção de idosos holandeses acerca das refeições pré-cozinhadas evidenciou algumas das virtudes e insuficiências deste tipo de técnicas. As discussões em grupo e as entrevistas aprofundadas dão um contributo valioso para uma compreensão mais holística dos consumidores e das suas necessidades, uma vez que se concentram em prioridades e preocupações gerais em vez de em avaliações quantitativas de produtos singulares. No entanto, a introdução de uma predisposição para um discurso socialmente aceite e um carácter quase exclusivamente centrado na palavra constituem limitações muito difíceis de contornar. Por tudo isto, o **Capítulo 4** apresenta também o desenvolvimento de um procedimento experimental que tem por objectivo ultrapassar algumas desta limitações. Os resultados obtidos demonstram que o uso conjunto de colagens e discussões em grupo pode ser bastante eficaz na recolha tanto das necessidades mais imediatas como do que lhes está subjacente.

Uma revisão bibliográfica e uma aplicação prática da *means-end theory and laddering* (MECL), descritas no **Capítulo 5**, exploraram a possibilidade de se avançar para além das simples recolha

das necessidades imediatas dos consumidores, na procura de uma melhor compreensão das motivações que lhes estão subjacentes. Aspectos metodológicos relacionados com a validade desta abordagem, a intensidade do trabalho de análise envolvido e limitações associadas à especificidade dos processos de concepção de produtos alimentares põem sérios obstáculos à implementação da MECL em processos de concepção orientados para o consumidor. No entanto, a MECL pode constituir uma abordagem conceptual e prática preciosa dentro do estudo das estruturas de cognição e motivação dos consumidores, especialmente enquanto alternativa às técnicas mais clássicas de entrevista em estudos de carácter exploratório.

Os resultados das pesquisas de mercado efectuadas demonstraram que a identificação e a quantificação dos obstáculos postos à adopção de inovações, por parte dos consumidores, deve ter lugar próprio no contexto de uma concepção de novos produtos orientada para o consumidor. Um bom exemplo disso é a resistência apresentada pelo consumidor holandês a inovações verificadas na área dos produtos alimentares que estejam relacionadas com a conveniência, como é descrito no **Capítulo 5**. Os resultados experimentais obtidos sugerem a existência de uma atitude negativa em relação às refeições pré-cozinhadas, que se pensa estar em certa medida relacionada com normas morais. Uma tal atitude negativa baseada em aspectos de moralidade, ou a sua ausência, pode ter uma influência considerável nos hábitos alimentares.

O **Capítulo 6** apresenta alguns resultados preliminares que indicam que consumidores e peritos da área alimentar estruturam o seu conhecimento acerca do consumo de refeições pré-cozinhadas com base em diferentes critérios de classificação. As classificações efectuadas pelos consumidores parecem estar mais relacionadas com o seu nível de conhecimento e de uso dos produtos do que aquelas efectuadas pelos peritos, que tendem a basear-se apenas no conhecimento de que dispõem enquanto tal. Ficou também comprovada uma hipótese, anteriormente avançada na literatura, de que os consumidores sentem dificuldades em categorizar produtos de carácter mais inovador, especialmente quando isso implica a criação de novas categorias cognitivas.

O **Capítulo 7** passa em revista os resultados mais relevantes apresentados ao longo da tese, lista as conclusões essenciais que deles podem ser retiradas e sugere temas de investigação que podem contribuir para o desenvolvimento futuro desta área científica.

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Ana Isabel de Almeida Costa was born in Lisbon, Portugal, on the 8th of September 1972. She received her high-school diploma from *Liceu D. João de Castro* (Lisbon) in 1990. In 1996, she received a MSc degree in Food Quality Management from the University of Ghent, Belgium, and the Mediterranean Agricultural Institute of Chania, Greece. She graduated as Agro-Industrial Engineer at the Technical University of Lisbon (*Instituto Superior de Agronomia*) in 1997. Also in 1997, she started a degree in History at the Open University in Portugal.

From October 1997, Ana Costa worked as Category Manager at the Purchase Department (Section of Perishable Products) of *Pingo Doce – Retalho Alimentar S.A.* (a Portuguese retail company) until July 1998, when she was awarded with a 4-year Ph.D. fellowship from the Portuguese Foundation for Science and Technology.

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Till today, there is nothing Ana enjoys more than a good book and a sunny day at the beach.

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