

Consumer-Oriented New Product Development

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Introduction

For most companies, the introduction of successful new products is critical to the achievement of the short- and long-term corporate strategic goals of profitability, growth, and continuity. As an illustration, more than 25% of the current retail food sales in the US have been reported to consist of products introduced within the past 5 years (Hughes, 1994). Similarly, US marketing managers indicated that they expect 40% of the company profit made in 5 years' time would come from products not currently on the market (Booz *et al.*, 1982). Within the well-established product-market expansion matrix for growth (Ansoff, 1957), new product development (NPD) is identified as one of the important growth strategies of the firm.

Despite the fact that successful NPD is crucial to profitability and growth ambitions, the actual success rates of new product introductions are fairly disappointing. Although there is a lack of reliable data on actual success and failure rates, reported failure rates are ranging anywhere between 40% (e.g., Barczak *et al.*, 2009) and as high as 90% (e.g., Gourville, 2006). One reason for this lack of insight into actual success and failure rates stems from how success rates are being defined (Castellion and Markham, 2013). Success rates have been expressed as the percentage of commercialized new products that not only meet their marketing (e.g., market share and profit contribution) objectives, but also relative to the number of initial ideas that have entered the NPD selection process. Research on the 2003 the Product Development and Management Association best practices study (Barczak *et al.*, 2009) suggests that approximately 15% of the new product ideas and approximately 60% of the new products actually introduced into the market place make it to a commercial success in the market.

Whatever the exact metric and the exact percentage be, failure rates of new product introduction are an important concern to academics and practitioners alike, as new product introductions require substantial up-front investments that are not necessarily recouped from the new product's financial returns.

Bottom-line, NPD is an activity that is both necessary in light of market turbulence, but at the same time quite uncertain and risky in terms of potential failure. Not surprisingly, the NPD process has received a lot of attention in the marketing and management literatures (see Hart, 1996 for an overview).

New Product Development

NPD is an important activity within firms because of market turbulence; products do not have an infinite life. Rather, they go through a so-called product life cycle (PLC), which a

company needs to anticipate to ensure that new products are added to the product portfolio to timely replace products that are nearing the end of their PLC. Also, NPD is identified as one of the basic growth strategies of companies.

Why New Product Development is Important

New product development as growth strategy

Early research by Ansoff (1957) suggested that growth strategies can be classified as to whether they use new or existing products and whether they address new or existing markets. Next to penetration strategy (increasing market share of existing products in current markets) and market development strategy (entering new markets with existing products), new product strategy involves developing new products for present markets and also plays a key role in the so-called diversification strategies where the company develops new products to enter new markets. Without new products, companies cannot grow over time as their existing products would gradually get 'outdated' against changing consumer needs and wants and new generations of products introduced by competitors.

Market turbulence

The need for NPD essentially arises from market turbulence on both the demand and the supply side (Van Trijp and Steenkamp, 2005). Consumer needs are subject to change over time, as are the specific ways in which consumers seek to satisfy these needs through the purchase and consumption of specific products ('demand'). Such changes may occur as a result of demographic, socio-economic, and cultural changes in society.

Turbulence also occurs at the supply side of the market. Changes in the political and legal environment trigger NPD through new requirements from (food) laws and regulations (e.g., increased minimal levels of animal welfare). Changes in the economic environment, such as increased or reduced purchasing power of consumers, will trigger innovation and development of new products that will deliver similar consumer benefits, but at a lower cost. Business strategies in terms of internal resources and business objectives also trigger innovation and predetermine in which categories and directions such innovation is to be found. Importantly, breakthroughs in (food) technology may provide new and unprecedented opportunities to both deliver new product-related benefits to the consumer and deliver existing benefits more effectively and efficiently. Finally, much of innovation activity is triggered by changes in the competitive environment, as new products introduced by competitors may change consumers' value perception of existing products in the market place. Together these developments create a highly dynamic context in which companies operate and compete for consumer loyalty.

The concept of product life cycle

A useful framework to think about the need for NPD is that of PLC. The concept of PLC implies that products, in terms of their sales and profits to the company, go through a four stage process (see Figure 1). At the introduction stage, sales are limited, costs per customer are high, and profit to the company tends to be negative as the necessary up-front investments in the new product cannot (yet) be recouped from sales and margins. At the introduction stage the clientele base for the new product primarily comes from the so-called innovator customers. At the growth stage of the PLC sales are rising not just among the segment of innovators, but also by attracting the so-called early adopters within the consumer population. At this stage of the PLC, companies attempt to increase their market share. Once a solid market share has been achieved, successful new products enter the maturity stage where profits increase and are managed. At this stage, the clientele base is expanded to include middle adopters, seriously reducing the costs per customer. But inevitably most products at some point reach a decline stage, where sales are declining because new products have already been introduced that more effectively or efficiently meet the (changing) consumer demand.

The importance of successful new product development

The concept of PLC nicely illustrates the importance of successful NPD. NPD activity requires substantial upfront investments which need to be recouped from the new product's performance in the market place. However, as is evident from Figure 1, it takes time before the product will take off, and generate sufficient margin and profit to compensate for the upfront investments. As a result, and in light of NPD failure rates, successful new products not only need to earn back their own investment costs, but also of those new products that fail to become successful. Next to the financial conditions, success in NPD also has an impact on the image of the company, as it makes the company more attractive to investors, but also helps to attract and retain creative employees. Successful NPD may help the firm to develop a learning curve on how to effectively synergize between the different functional departments of

marketing, engineering, management, and production as well as sales. As an outcome of successful NPD, the firm may be able to create the so-called first mover barriers, for example, through patents that preempt competition from other companies trying to do the same thing.

Different Degrees of Innovativeness

New products introduced in the market place may differ considerably in their levels of newness, each with their own challenges and potential. Several classifications for innovativeness have been proposed, such as that between continuous (innovations with minimal impact on behavioral patterns of consumers), dynamically continuous (products with a higher degree of newness, but that still relate to products currently in use), and discontinuous innovations that violate some of the essential perceptions and habits and aim at creating new behavioral patterns on the part of the consumer (e.g., Gatignon and Robertson, 1991). A well-known classification from a company perspective is that of Booz *et al.* (1982), based on newness to the market and newness to the company, resulting in six categories.

At low levels of innovativeness, the category of 'cost reductions' involves new products that provide similar performance at lower cost, and the category of 'improvements and revisions of existing products,' similarly provide limited levels of newness in that they concern improved performance or greater perceived value with the aim to directly replace existing products. At medium levels of innovativeness, 'repositionings' also hold a limited level of innovativeness, as they are existing products that are repositioned to target new markets or market segments. 'Additions to existing product lines' carry a higher level of innovativeness in that these new products are designed to supplement existing product lines. They typically come as new flavors, new packaging (sizes), and the like. At the higher end of innovativeness, 'new product lines' bring a higher level of newness to the firm, but not necessarily to the market as such. New products aim to allow the company to enter an established market for the first time, and 'new-to-the-world products' are products that are so innovative that they actually

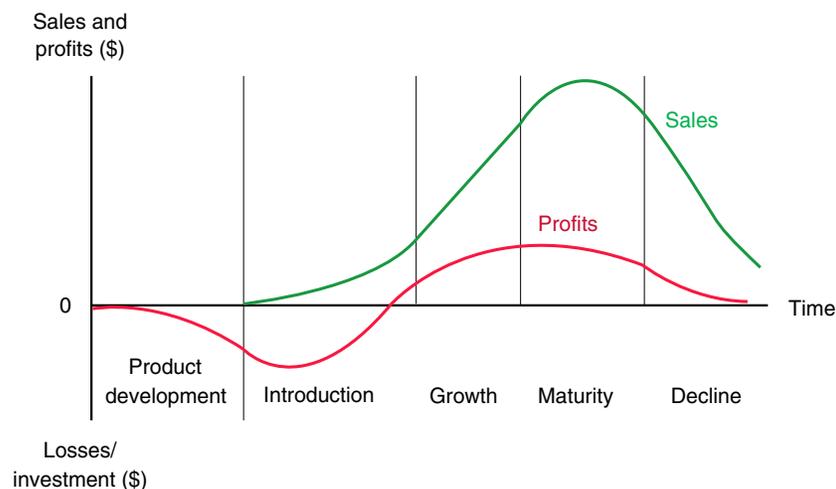


Figure 1 The product life cycle.

create a new market (Booz *et al.*, 1982). The vast majority of new products introduced in the market place involve improvements, additions to existing lines and product lines that are new to the company but not necessarily to the market. Importantly, the really innovative and new to the world products make up less than 10% of all NPD activity (e.g., Costa and Jongen, 2006), and the contribution of both this category and the new product lines category seem to be decreasing over time (Barczak *et al.*, 2009). Although there are no reliable figures for the level of innovativeness in food specifically, the situation in foods is unlikely to be very different. Food is seen as a traditional category with limited real breakthrough innovation.

Success and Failure Factors in New Product Development

There has been a lot of research into the success and failure factors of NPD. Much of this research is generic in nature with only a limited number of studies focusing specifically on NPD success factors in food (see Stewart-Knox and Mitchell, 2003; Kristensen *et al.*, 1998 for exceptions). Research on success and failure factors has essentially progressed along three dominant approaches.

Team performance approaches

Early work on the NPD process has focused on the use of structured processes for innovation management such as the stage-gate process. This line of research, popularized by Cooper and Kleinschmidt (1995), has taken NPD teams and their performance as the unit of analysis. For a wide variety of NPD teams, information has been collected on whether and how different steps in the stage-gate process were executed and at which level. This detailed information was then related to the NPD projects' market success, to identify crucial activities and performance that could differentiate the successful from unsuccessful projects. Based on this analysis, Cooper (1999) summarized the 'invisible success factors in product innovation' as follows:

- solid up-front homework – to define the product and justify the project;
- voice of the customer – a slave-like dedication to the market and customer inputs throughout the project;
- product advantage – differentiated, unique benefits, superior value for the customer;
- sharp, stable, and early product definition – before development begins;
- a well-planned, adequately resourced, and proficiently executed launch;
- tough go/kill decision points or gates – funnels, not tunnels;
- accountable, dedicated, supported cross-functional teams with strong leaders;
- an international orientation – international teams, multi country market research, and global or 'glocal' products.

Meta-analyses across scientific studies

A second approach takes the drivers of new product performance beyond team performance and process competencies, and

uses scientific research publications as a basis. Through the so-called meta-analysis, consistency in reported relationships across different academic studies is extracted as a basis of strength of evidence for drivers of the NPD process. Henard and Szymanski (2001) differentiate between four broad clusters of drivers of NPD success, namely product-related factors (characteristics of the new product in terms of newness, sophistication, and product advantage), process-related factors (a structured NPD approach and proficiency in the various disciplines that need to be integrated for successful NPD), strategy-related factors (such as resourcing and cross-functional synergies), and market-related factors (such as competitive intensity and market potential). From these findings, Henard and Szymanski (2001) identified a more limited set of drivers that together account for no less than 59% of the explanation of innovation success. These factors are:

- product advantage (product related);
- product innovativeness (product related);
- marketing synergy (strategy related);
- technological synergy (strategy related);
- structured approach (process related);
- market orientation (process related);
- cross-functional integration (process related);
- competitive response intensity (market related).

A more recent update on Henard and Szymanski's (2001) meta-analysis (Evanschinsky *et al.*, 2012) confirms many of these success factors, but with smaller effect sizes and emphasizes the importance of culture as a moderator to the process, with generally weaker effect sizes for individualistic countries and stronger effects for risk-averse countries. Product advantage, together with market orientation, comes out as the strongest determinants together with many process-related factors.

Monitoring of specific new products and their (marketing) context

A final approach zooms in more on the new product itself and the marketing context in which it is being positioned in the market place. For example taken by Steenkamp and Gielens (2003) and later extended to an international context (Gielens and Steenkamp, 2007). In this approach, 239 new product introductions in the consumer packaged goods sector were followed during 12 months period for their uptake in a household panel ($N=3687$). This approach takes four groups of determinants: marketing strategy (including relative newness and price), marketing communication (such as advertising and promotions), as well as product category-related factors (such as number of brands in the category, type of category, and advertising intensity in the category). Because the unit of analysis is household/consumer trial of the new product, this study also includes consumer characteristics (level of innovativeness and socio-demographics) as a determinant of new product success. Results on product-related factors are largely in line with those from other approaches, and confirm that the uptake of new products may differ between different consumer segments on the basis of their innovativeness as would be predicted from the product-lifecycle framework.

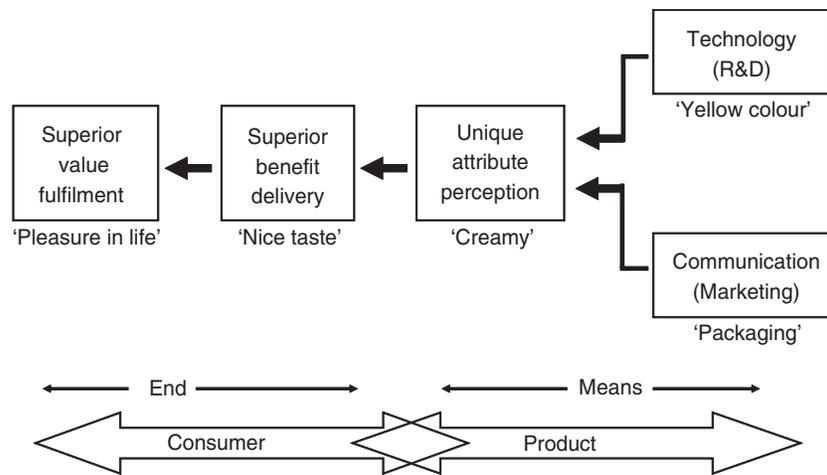


Figure 2 Products as a means to an end. Adapted from Van Trijp, J.C.M., Steenkamp, J.E.B.M., 2005. Consumer-oriented new product development: Principles and practice. In: Jongen, W.M.F., Meulenberg, M.T.G. (Eds.), *Innovation in Agri-Food Systems: Product Quality and Consumer Acceptance*. Wageningen: Wageningen Academic Press, pp. 87–124.

Integration of Success and Failure Factors

Although these three lines of research each take slightly different perspectives, they converge to a large degree, namely, that new products are more likely to be successful in the market place if:

- the product delivers something meaningful which is perceived of value by the consumer;
- in a way that is distinctive from competitive product offerings;
- the innovation is closely aligned to the capabilities of the company in that it synergizes between the marketing and technology competencies;
- the new product is brought forward through a well-designed and well-executed NPD process that is receiving sufficient support within the culture of the organization (market orientation).

Together these identified drivers of successful NPD form the basis of consumer-oriented NPD.

Consumer-Oriented New Product Development

The Essence of Consumer-Oriented New Product Development

Authors define consumer-oriented NPD as the challenge to the company to “optimally exploit and synergize its technological and marketing capabilities to deliver a distinctive product that is aligned to consumer needs and wants, with the aim to generate product trial and ultimately product loyalty” (cf. Van Trijp and Steenkamp, 2005). The latter addition is particularly important to the context of food and other the so-called fast moving consumer goods. Different from durable consumer goods, fast moving consumer goods are purchased and consumed (and hence re-purchased) on a regular basis. For such products the (product) quality experiences at the moment of consumption are critically important as they form the basis for

the consumer decision to repurchase the product at a later stage.

New products as a means to an end

A key determinant of NPD success is the degree of fit between the new product and consumer needs (Grunert *et al.*, 1997). A useful framework to think of consumer-oriented NPD is that of means-end chain analysis (Gutman, 1982). Building on Lancaster’s (1966) new consumer theory, means-end chain analysis assumes that consumers do not value products per se, but rather for the benefits that these products are believed to deliver on consumption. Figure 2 illustrates this means-end chain perspective for a hypothetical case of mayonnaise. Technology can be exploited to change the color of the mayonnaise and marketing can be used to design an appropriate packaging (say glass jar). Consumers will interpret (perceive) these product features (say yellow color) by inferring attribute perceptions (e.g., ‘the mayonnaise is creamy,’ because consumers may infer that the yellow color comes from egg yolk which is believed to contribute to the creaminess of the mayonnaise). Such inferences in the form of attribute perception of the product may be relevant to the consumer, because he/she believes that creamy mayonnaises have better taste (hence superior benefit delivery). And finally, superior taste as a product benefit may, in the consumer’s eyes, contribute to higher eating pleasure contributing to overall pleasure in life (superior value fulfilment).

Identifying these relevant links between product knowledge and consumers’ self knowledge is central to means-end chain analysis and allows to understand why certain products are valued higher than others (Grunert, 2010; Gutman, 1997; Walker and Olson, 1991).

The process of linking product perception to consumers’ value perceptions can be approached from different perspectives, sometimes referred to as different generations of innovation models (Berkhout and Van der Duin, 2007). A first generation of innovation, known as the ‘technology push’ model, started at the new technology side: new products were designed from technological opportunity and tested against

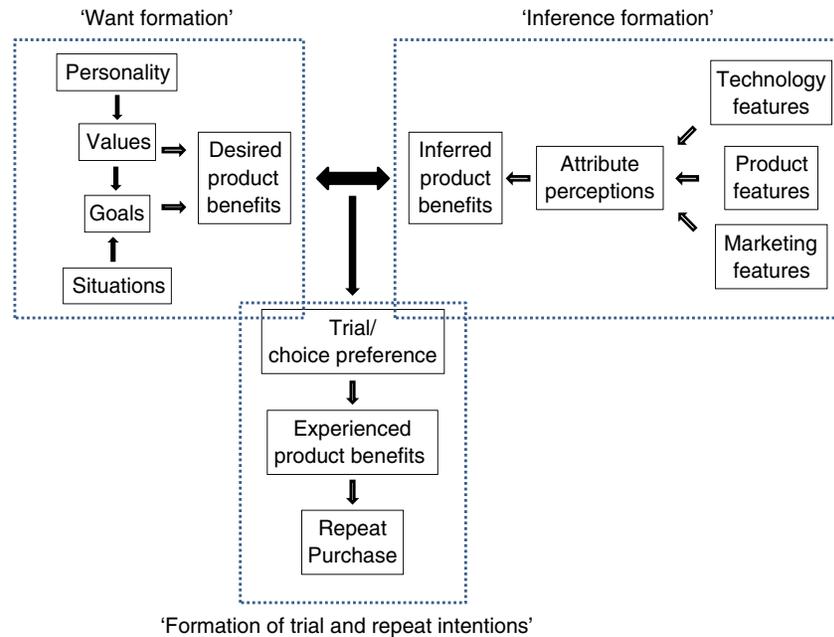


Figure 3 A simplified framework of how consumers decide on new products.

consumer perception and preference. The second generation started at the consumer side, also known as the ‘market pull’ model: if consumer needs and wants were understood, these could be reverse engineered into an optimal product design. The third generation, and also in line with consumer-oriented NPD as authors propose, attempts to find a more balanced input from both the consumer and technology sides throughout the process. This ‘new’ generation of innovation models takes consumer understanding as an integral part at all stages of a well-designed stage-gate process.

How Consumers Make Product Choice Decisions

Central to consumer-oriented NPD is the understanding of consumer behavior as the target of NPD success, next to technology and marketing understanding as a means to deliver a valued product proposition. **Figure 3** illustrates a simplified representation on how consumer decision-making comes about as a function of three components: want formation, inference formation, and formation of trial and repeat purchases.

The architecture of the model is based on a simple marketing idea: consumers buy products not for their own sake, but because they think the product has characteristics that lead to desired benefits (Lancaster, 1966). This perceived match between wants and perception leads to preference and trial choice which, if delivering the promised benefits on consumption, will lead to repeat purchases. If the experience with the product after the first trial is positive, that is, the (new) product lives up to the consumer’s expectations, the consumer may want to buy the product again.

The model has three major components: want formation, inference formation, and formation of trial and repeat intentions. Want formation deals with which benefits a consumer would like to obtain from a product at any moment in time, and this will be determined by both enduring personal (e.g.,

values) and situational factors (e.g., goals). Inference formation deals with how the consumer forms expectations about which attributes the product has and which benefits these attributes are believed to bring about for him/her inferred from available cues. Finally, formation of intentions for trial and repeat deals with how the comparison of wanted and inferred benefits leads, in comparison to the price of the product, to an intention to make a first-time purchase of the product, and how the subsequent experience with the product will affect intentions to keep on buying the product or not.

Consumers’ want formation

The benefits that a consumer expects from a product are determined by both enduring and situational factors. Enduring factors are related to the consumers’ values. Human values have been defined as “concepts or beliefs about desirable end states or behaviors that transcend specific situations, guide the selection or evaluation of behavior and events, and are ordered by relative importance” (Schwartz, 1992). Values are a popular and useful concept in the explanation of consumer wants, because they represent the ultimate human motivators with regard to a range of behaviors, including the purchase of products and services, and because there is a solid body of knowledge in social psychology on value types and their measurement. Various typologies of universal human values have been proposed, of which the one that has received most empirical support is the value domain model proposed by Schwartz (Schwartz, 1992; Schwartz and Bilsky, 1987). Schwartz proposes that human values can be grouped into 10 domains: power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, conformity, tradition, and security, which can be grouped in a circular representation spanned by the axes of individualistic versus collective values, and conservative versus change-oriented values. The value domains are universal in the sense that they apply to all

human beings, but people will differ in the relative weight they attach to these values. Values have been used widely to explain consumer choices (e.g., Beatty *et al.*, 1985; Kahle, 1986; Kamakura and Mazzon, 1991), but their main advantage, namely that they are stable across situations and time, is also a disadvantage: abstract values, while often related to specific product choices, are relatively weak predictors of such specific behaviors, which are influenced by a host of other likewise more specific factors. Values provide the enduring motivational aspects of consumer wants, but to explain consumer choice, they will usually have to be supplemented by other factors taking into account situational factors.

Goals have a higher degree of specificity than values, and they have a situational component. When buying food, a consumer can have a goal of pleasing the family, of rewarding himself, of losing weight, or a host of other things. A goal of pleasing the family will be linked to underlying values, like benevolence and security, but will also have a situational component, as pleasing the family is not relevant, for example, when buying food in the canteen of one's workplace. Several goals can and mostly will be salient with regard to any particular food choice, and they can be in conflict with each other, such as when a goal of losing weight conflicts with a goal of rewarding oneself with a pleasurable experience. Developing products that solve goal conflicts is one important avenue to pursue in NPD in the food sector.

People differ in which goals are usually dominant when they choose food, and instruments have been developed to measure these differences and segment consumers accordingly. The food-related lifestyle approach has been a popular approach to this end (Brunso *et al.*, 2004; Grunert *et al.*, 2001). Food-related lifestyle designates different ways in which people use food to attain life values and leads to generic consumer types that differ with regard to dominant goals and ways of shopping, meal preparation, and eating. The generic types identified are the uninvolved consumers, who are really not very interested in food, the careless consumers, who emphasize novelty and convenience, the conservative consumer, who puts priority on traditional meals and generally uses eating to establish a sense of security, the adventurous consumer, with an emphasis on social and innovative goals in preparing and eating meals, and finally the rational consumer, who has a reasoned approach to food choice and values healthfulness highly. This instrument has been popular in Europe and has even been applied in China (Grunert *et al.*, 2011).

Goals thus point at desired benefits that the consumer wants to get out of the product to be bought. Desired benefits can be many things, but from social dilemma theory (Van Lange *et al.* (2013) and Construal Level Theory (CTL) (Trope *et al.*, 2007), it is suggested that they can meaningfully be classified as to whether they deliver benefit to the self or to others, and whether they deliver direct gratification or delayed gratification (e.g., Van Trijp and Fischer, 2011). Directly gratifying self-oriented benefits include the sensory properties of the food, its convenience, and its price. Self-oriented delayed benefits include the health value of products. Other-directed benefits with relatively direct reinforcement value include motivations of local production to stimulate regional economic development and animal welfare motivations. Delayed, other-directed benefits include sustainability

considerations and the impact of new food technologies on the environment and impact on society.

Research from the CTL tradition suggests that self-oriented benefits that deliver instantaneous gratification ('feasibilities') are more likely to be driving forces in situations of low psychological construal (such as the choice situation), whereas preferences for other-directed benefits with delayed gratification (the 'good intentions') take priority in situations of high psychological distance (such as in survey situations). Thus, identifying desired benefits in any particular situation is a methodologically challenging task.

Consumers' inference formation

To infer whether any of the available products matches the desired product benefits, the consumer makes inferences about the available options in the product assortment. This is the process of inference making and benefit perception (Kardes *et al.*, 2004). Based on the characteristics of the product as delivered by its features, description, and positioning, consumers will extract attribute perceptions from which expectations are formed, in a means-end framework, regarding the benefits that the product will deliver. Such benefit inferences carry a degree of uncertainty. In many instances these inferences can build on product associations that are learned from previous experience. Product benefits for which this is possible are known as experience qualities of the product (e.g., Steenkamp, 1990). If a product has delivered good taste, convenience in use and other benefits that are directly perceivable on consumption, this will strengthen the expectation on the next consumption occasion. For many product qualities, the so-called credence qualities (Darbi and Kerny, 1973), such learning from experience is however not possible. For example, to what extent a product delivers health, sustainability, or animal welfare, cannot be verified from personal experience, not even after normal consumption. Yet, consumers form beliefs about such credence qualities through two important psychological processes, known as informational and inferential belief formation (Fishbein and Ajzen, 1975). In information belief formation, consumers make inferences from information provided by relevant and authoritative others, such as through the use of labels, claims on the packaging, and recommendations from, for example, consumer organizations. In inferential belief formation, consumers use their own rules of thumb in what they believe are informative relationships. As a result, packaging cues such as color (say green) may trigger inferences about credence quality attributes such as that the product is probably natural and sustainable. Inferential belief formation based on the so-called quality signals or quality cues (Grunert, 2005) constitute an important consumer strategy when the benefits expected from the product are unknown, and when previous experience is of no help.

The way in which consumers make inferences from quality cues will not necessarily lead to 'correct' inferences in the sense that they will correctly predict the benefits that the product will deliver. For example, consumers are known to use color and fat content of meat as an indicator of taste and tenderness (Brunso *et al.*, 2005) and organic production as an indicator of superior taste of vegetables (Padel and Foster, 2005). Both of these inferences are, from an objective point of view, at least questionable. Consumers' ability to make such inferences will

depend on their level of knowledge and competence with regard to the product (Selnes and Troye, 1989). When asking consumers which information about a piece of meat they believe to be predictive of taste and tenderness, many consumers believe that information about breed, age of animal, and slaughtering date are predictive of these qualities. But few consumers feel confident in using them, i.e., making the right inferences based on this type of information, because they are not meat experts. Thus, consumers end up making inferences based on cues with which they feel confident, like color of meat and visible fat content, even though they may be aware of the fact that these characteristics are not always highly predictive of taste and tenderness. Such inferences can be deliberate, but often they will be done in a semiconscious, almost automatic way.

Inference processes are getting more complex as new products carry more and more information. A new product that comes on the market will have a brand name, carry nutritional information, may have quality marks and sustainability labels, and carry nutrition and/or health claims. This information may be supplemented by soft claims like the product being natural or good for you, and all this will be embedded in packaging that makes use of colors, pictures, and various stylistic elements. It is the complete array of this, together with the context in which the product is displayed and promoted, that forms the basis for consumer inferences.

The way in which consumers make inferences about product benefits from available cues is based on consumers' product knowledge. When combine consumers' product knowledge, i.e., knowledge about how to infer product benefits from an array of cues, with consumers' knowledge about themselves, i.e., with knowledge about how product benefits will help them attain their goals and values, a complete means-end chain is obtained, as shown in Figure 2. A means-end chain is thus a device to show how consumers become motivated to buy a product based on the combination of knowledge about the product and knowledge about oneself.

Formation of trial and repeat intentions

The extent to which the product benefits that consumers infer from a new product will have matches with the benefits that they desire will be related to the consumer's willingness to try the product, i.e., buy it for the first time. However, the perception of benefits will lead to purchase only when the benefits are perceived as high enough for the consumer to be willing to pay the price demanded in the shop. Measuring willingness to pay and how willingness to pay depends on product characteristics is an established research area in agricultural economics and marketing, and a range of methods is available to this purpose (e.g., Miller *et al.*, 2011). In determining willingness to pay, consumers will try to find points of comparison. Consumers may be familiar with average prices in the product category of which the new product is a member, and will then usually use these as a benchmark. If the new product has an above-average price within the category, willingness to pay will depend on whether the expected benefits clearly exceed the benefits of those products that are already on the market. For a product with a high degree of innovativeness, categorization into an established category may be more difficult and reference prices hence also more difficult to base a

judgment on, but consumers will in most cases try to find some point of comparison based on previous experience that allows them to come up with a judgment on the price of the product.

After a product has been bought once, the consumer will have an experience with the product, and this experience will have an important influence on whether the consumer wants to buy the product again. Because, as already noted in the Section Consumers' inference formation, only some benefits that a consumer may expect from a food product can in fact be experienced, mostly taste and convenience, authors may tend to conclude that the decision on whether to buy the product again will depend mainly on the experience with these particular benefits. To a large extent, this is true: a product with a bad taste will not usually be bought again, in spite of other benefits in terms of healthfulness and sustainability. Also, there is evidence that the relative weight of those benefits that indeed can be experienced increases after the purchase at the expense of those that cannot be experienced. In other words, after consumption, taste plays a bigger role in the evaluation of the product compared to healthfulness, than before the purchase. However, the mechanisms at work are more complicated. When a range of competing products do not differ a lot in terms of taste and other benefits that can be experienced, the more intangible benefits will play a larger role, also when it comes to repeat purchases. Inferences in the prepurchase phase and perceptions in the consumption phase may influence one another, such as when a consumer believes that an organically produced product indeed has a better taste than competing products with an identical sensory profile, simply because this is what was expected and the experience is assimilated toward the expectation. Also, during preparation and consumption, new cues may arise that can strengthen or weaken the consumer's perception of the presence of benefits that cannot be experienced. For example, the consumer may think that the feel of the packaging is not very sustainable, or that the taste of the product indicates that it may after all not be very healthy.

The sensory experience with the product, together with convenience, are therefore still decisive for whether a trial purchase of a new product turns into a repeat purchase. But this is mainly a factor that can prevent a repeat purchase, if the product clearly disappoints in terms of taste and convenience compared to competing products. An acceptable taste may not be enough to encourage repeat purchase in an era where new food products are increasingly positioned in terms of intangible benefits like healthfulness, sustainability, naturalness, and authenticity. These benefits being intangible, not amenable to experience, implies that food manufacturers need to ensure that the belief in these benefits is kept alive in the mind of consumers throughout repeat purchases, to prevent that these benefits are, over time, crowded out in the mind of the consumer by the more tangible benefits.

Integrative Approaches to Consumer-Oriented New Product Development

The consumer decision-making process, described in the Section How Consumers Make Product Choice Decisions, forms the heart of consumer-oriented NPD, where the aim is to design new products (product and technology features) and to

position these in the market place (marketing features) in a way that they are aligned with consumer-desired benefits in a distinctive way, such that trial (from product quality expectations) and repeat purchase (from experienced product quality) is induced.

This is a challenging task that requires close interaction between the technological and marketing/consumer science capabilities within the company. Market orientation plays a crucial role in this process.

Market orientation

The importance of market orientation as a driver of company performance and success in the market place is one of the best established findings within the marketing literature (see Kirca *et al.*, 2005 for a review). Market orientation involves the organizational norms and values to behave consistent with market orientation, as evidenced in closely monitoring customers and competitors with a focus on inter-functional coordination within the company (Narver and Slater, 1990). The behavioral perspective on market orientation (e.g., Kohli and Jaworski, 1990) emphasizes the activities of generation of information about customers and the market place, the dissemination of this information across different functional disciplines within the company, and use of this information as a basis for a coordinated and responsive marketing approach and market offering. Market orientation enhances a company's performance through a higher level of innovativeness, which serves as a basis for customer loyalty and perceived product quality delivered to the market place (Kirca *et al.*, 2005). Market orientation has both a responsive (aligning with existing consumer needs and wants) and a proactive (addressing latent and emerging consumer needs) component to it (Narver *et al.*, 2004), and hence forms a strong basis for NPD.

Quality function deployment as an overarching framework

Dissemination of customer information across the functional disciplines, and particularly between the marketing and technology departments, is crucial to designing an optimal response in the form of new product introductions. However, such effective communication between the marketing and technology disciplines within the company is often poorly developed (Atuahene and Evangelista, 2000) and a source of NPD failure (Souder and Chakrabarti, 1978).

Quality function deployment (QFD) has been proposed in the early 1970s as a highly structured planning tool to make explicit the 'translation' process of relating consumer and customer inputs to technical design parameters and product requirements. QFD has been applied in many different industries (Hofmeister, 1991), including the food industry (e.g., Costa *et al.*, 2001). QFD consists of four modules of which the first one, the so-called House of Quality, has most relevance for consumer-oriented NPD (e.g., Hauser and Clausing, 1988), as it specifically focuses on the translation of consumer choice criteria into (technical and marketing) product design parameters. Figure 4 provides a simplified version of the House of Quality.

The House of Quality structure integrates the key questions that form the heart of NPD as will be outlined below, referring to numbering in Figure 4.

1. What are the product characteristics desired by the consumer? This 'box' refers to the identification of the key needs and desires that drive consumer choices in the product category. It includes those desires that are necessary to meet and surpass competition and those on which the new product will have improved or unique delivery. Marketing and consumer research are the key tools for identifying the consumer needs and desires as well as their

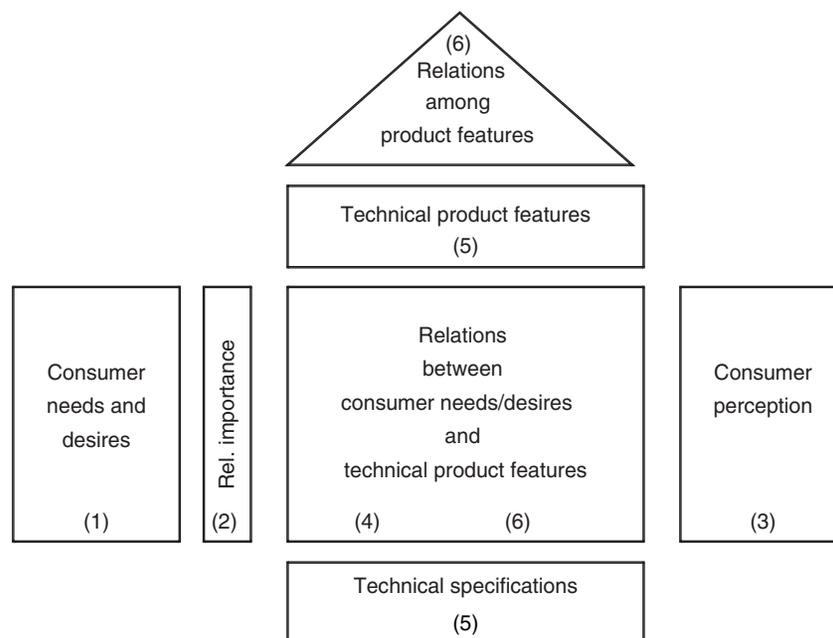


Figure 4 The House of Quality within Quality Function Deployment. Adapted from Van Trijp, J.C.M., Steenkamp, J.E.B.M., 2005. Consumer-oriented new product development: Principles and practice. In: Jongen, W.M.F., Meulenberg, M.T.G. (Eds.), *Innovation in Agri-Food Systems: Product Quality and Consumer Acceptance*. Wageningen: Wageningen Academic Press, pp. 87–124.

- hierarchical nesting. Several techniques are available for this purpose (see Griffin and Hauser, 1993 for an overview), including exploratory qualitative techniques such as in-depth interviews and focus groups as well as more structured approaches such as Kelly's Repertory Grid and Free Elicitation (see Steenkamp and Van Trijp, 1997). A particularly useful technique for revealing the hierarchical nesting of need levels within the means-end chain paradigm is that of laddering (Reynolds and Gutman, 1988).
2. How important are each of the product characteristics to the consumer? Box 2 recognizes that some needs may be more important than others in driving consumer choice within the targeted product category. Identification of attribute important is a crucial step in QFD as any company will prefer to spend its limited resources where they matter most to the customer. Attribute importance is a complex and not always well-defined concept, for which a number of measurement methodologies are available (Van Ittersum *et al.*, 2007). An important distinction needs to be made between attributes that are important in an absolute sense and those that are determinant in consumer choice behavior, as some attributes are a 'conditio sine qua non.'
 3. Will adjustments on a consumer attribute lead to competitive advantage? This box addresses the issues of whether changes introduced through the new product will be recognized by the consumer as a competitive edge vis-à-vis competing products already in the market place. Marketing and consumer research are conducted here in the form of the so-called quantitative perceptual mapping techniques (Urban and Hauser, 1993; Steenkamp *et al.*, 1994; Steenkamp and Van Trijp, 1996b). Perceptual mapping research identifies how the consumer perceived product alternatives on key attributes.
 4. What are the implications for technical adjustments to the product? The so-called relationship matrix forms the heart of the House of Quality in that it links "what the product is aimed to deliver" (the marketing opportunity) to "how this can be realized" (the product design) in the form of engineering characteristics of the new product. At this stage, relationships are established on how product design features affect consumer perceptions and need satisfaction, and if so how strong these relationships are. Typically these relationships are not of a one-to-one nature, as multiple engineering characteristics combine and interact into a consumer perception of the product. Also, and particularly in the food domain, these engineering characteristics are not orthogonal implying that they cannot necessarily be manipulated independently of each other. These correlations between the engineering characteristics are reflected in the 'roof' of the House of Quality. A statistical implication of the dependence between engineering characteristics is that complex multivariate statistical methods are required for the translation process from marketing opportunity to new product design as reflected, for example, in the Quality Guidance model (Steenkamp and Van Trijp, 1996a).
 5. Do consumer attributes have physico-chemical counterparts? Once the relationships have been established, profiling a selection of potential new product alternatives in terms of their engineering characteristics is an integral part of the analysis. Together with insights into the consumer perceptions, this provides highly diagnostic information. For example, a situation may occur where two products show differences in consumer perception (box 3) but not in terms of engineering characteristics. In such case, the new product design needs to be complemented with marketing communication and positioning to realize the desired product image and to gain competitive advantage in the market place.
 6. What is the effect of technical adjustments on other consumer attributes? As a final step, this box brings into the picture to what extent technical improvements on one consumer attributes may go at the expense of consumer perception and delivery on other relevant consumer attributes. This step is often overlooked because of some degree of product myopia. For example, reducing the salt levels in a soup will improve the healthfulness of the product, but at the same time may also negatively impact on the (perceived) taste of the product. Such trade offs need to be carefully considered in the process of new food product development.
- In summary, QFD provides a highly structured framework for identifying the relevant relationships in the process of translating new product opportunity to product design. However, the structured nature is both a strength and a weakness. Particularly in the food context the product characteristics and design features often interact in highly complex ways and can rarely be manipulated independent of one another. This may partly explain, why QFD has been influential in the food sectors as a thought process, but not as an actual practice. Nevertheless, QFD has served as an important source of inspiration to food-specific quality perception models as a basis for new food product development, such as the Quality Guidance Model (Steenkamp and Van Trijp, 1996a) and the Total Food Quality Model (Grunert *et al.*, 1996).

Structured Approaches to New Product Development

NPD success strongly benefits from the adoption and execution of highly structured innovation processes, with continuous feedback on (anticipated) consumer response. Most innovation projects follow the general NPD stage-gate process, consisting of a number of phases after every of which a go-no-go decision is made on the basis of relevant feedback from the market place.

The New Product Development Stage-Gate Process Model

Structured approaches to NPD conceive it as consisting of a number of phases or stages (Trott, 2008), although the exact number and the naming of the stages differs. Authors follow Van Kleef *et al.* (2005), who distinguish between the stages of opportunity identification, development, optimization, and launch. Structured processes as particularly important as they identify the critical steps in moving from initial idea conception all the way through to the actual 'product as marketed' being launched into the market place. Up-front investment costs to the company increase from the left to the right of the

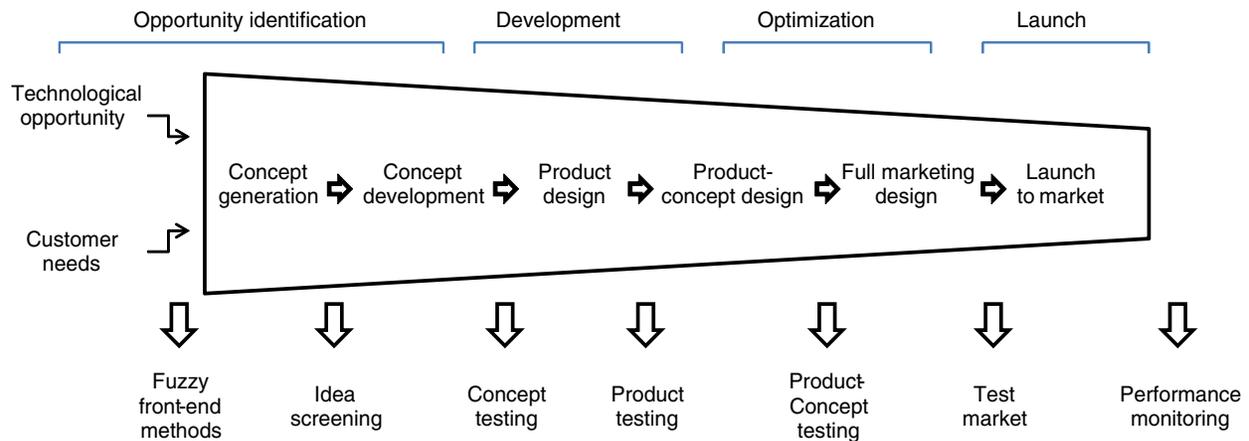


Figure 5 The formal stage-gate process to NPD.

stage-gate process and hence also the (financial) risk to the company. This is why ‘gates’ are introduced in the process at which the feasibility of the new product, in different stages of development, is critically assessed and reviewed. Crucial stages in the process, where costs increase sharply are the actual development process (i.e., product design), the full marketing development, and the market launch stage.

Figure 5 represents the stage-gate process, including the activities and the critical gates which are implemented through consumer/market testing. First, new market opportunities have to be identified from both understanding of consumer and customer needs as well as new technological opportunities. From this, new product ideas are being developed and screened for their potential to the company, including their technical and economic feasibility. From this insight, product concepts are being developed which essentially reflect a very concise description in consumer terminology of the product’s core benefit proposition: “the unique benefits that the product is to provide to customers as well as those benefits required to meet and surpass competition” (Urban and Hauser, 1993, p. 164). If the results from concept testing are promising, the new product may actually be designed; first as a product prototype and later in combination with its intended positioning in the market place (product-concept design). If product and product-concepts tests with customers and consumers yield positive results, the marketing mix of the product may be further developed, including the packaging and the advertising materials. In some specific situations, the product may then be tested in a test market (either real or experimental) as a basis for the final product launch into the market place.

Consumer research for the stage-gate process

Consumer research methodology for most of the gates in the stage-gate process is well developed and documented, particularly for the design and optimization stages (e.g., Ozer, 1999; Kaul and Rao, 1995; MacFie, 2007), with the aim to screen out new product ideas, concepts, and prototypes that may be unsuccessful in the market place. However, increasingly it is being recognized that NPD effectiveness and efficiency relies as much on ‘screening-in’ promising ideas and opportunities upfront (known as the ‘fuzzy front end of

innovation’) as it does on ‘screening-out’ options during later phases.

Consumer input at the fuzzy front end has been challenged by some authors on the argument that many existing consumer research techniques are better equipped for measuring consumer response to presented new product ideas (i.e., product screening) rather than using consumers as a source of new idea generation (Eliashberg *et al.*, 1997). Mainstream consumers are seen as a poor source of inspiration and creativity, because of their ‘status-quo bias,’ through which their thinking is heavily restricted by their current experiences (e.g., Lilien *et al.*, 2002). Yet, all research on NPD success indicates that ‘bringing the voice of the customer upfront’ already in the fuzzy front-end of NPD is an important success factor. Selection of market and consumer research methodologies at the fuzzy front end of NPD is hence crucially important, and a variety of research methods are available to enhance actionability without limiting creativity (Van Kleef *et al.*, 2005).

Consumer acceptance of new products

More generic research on consumer acceptance of innovations and new products largely originates from the early work by Rogers (1995). Rogers identified five the so-called innovation characteristics, perceived product attributes of an innovation, which affect the rate of adoption of new product innovations. These innovation characteristics are as follows:

- relative advantage: the degree to which the innovation is perceived as better than the product it replaces;
- complexity: the degree to which an innovation is perceived as difficult to understand and use;
- compatibility: the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters;
- trialability: the degree to which an innovation may be experimented with on a limited basis;
- observability: the degree to which the results of an innovation are visible to others.

All five factors are highly relevant to the acceptance of new food products and particularly the first two factors have become central to the research tradition of Technology Acceptance Models (e.g., Venkatesh *et al.*, 2003), where they have be

re-labeled as 'Usefulness' and 'Ease of Use.' This research confirms that innovation are more likely to be accepted and adopted by end user, if they add value over and above the products currently in use, and are easy to understand and use.

However, in the specific case of new food products, aspects of compatibility play an important role too, next to relative advantage and (low levels of) complexity. A first reason why compatibility is important in new food product acceptance is that new (an unknown) technologies applied to foods, which are actually ingested into the human body, are often approached with reluctance on the part of the consumer (Siegrist, 2008; Ronteltap *et al.*, 2007). This is not because of product performance-related inferences but because of socio-political attitudes that consumers hold with the technology (Frewer *et al.*, 2004; Scholderer and Frewer, 2003). Importantly also, food behaviors have a strong cultural and habitual component to them, which makes consumers reluctant to accept new products that require adjustment in existing food routines (e.g., Van Trijp and Van Kleef, 2008). Hence for new food products (e.g., Rozin, 1976), generating consumer acceptance may even be more challenging than for products outside the food domain (Szymanski *et al.*, 2007).

Concluding Remarks

As started off this article by stating that NPD is a necessary yet high risk activity for the firm. However, throughout this article it has been argued that this risk can, at least to some extent be managed. Authors provided evidence that consumer relevance of the product advantage and market orientation throughout the process are key identified factors for NPD process. Authors developed a simplified model of how consumers make decisions regarding (new) product decisions, and used this as a basis for consumer-oriented NPD. Incorporating this consumer perspective throughout a structured and well-executed NPD process enhances the changes of NPD success.

References

- Ansoff, H.I., 1957. Strategies for diversification. *Harvard Business Review* 35, 113–124.
- Atuahene, G., Evangelista, F., 2000. Cross-functional influence in new product development: An exploratory study of marketing and R&D perspectives. *Management Science* 46, 1269–1284.
- Barczak, G., Griffin, A., Kahn, K.B., 2009. Perspective: Trends and drivers of success in NPD practices: Results of the 2003 PDMA best practice study. *Journal of Product Innovation Management* 26, 3–23.
- Beatty, S.E., Kahle, L.R., Homer, P., Misra, S., 1985. Alternative measurement approaches to consumer values: The list of values and the Rokeach value survey. *Psychology and Marketing* 2, 181–200.
- Berkhout, A.J., Van der Duin, P.A., 2007. New ways of innovation: An application of the cyclic innovation model to the mobile telecom industry. *International Journal of Technology Management* 40 (4), 294–309.
- Booz, Allen, and Hamilton, 1982. *New Product Management for the 1980s*. New York: Booz, Allen, and Hamilton.
- Brunso, K., Bredahl, L., Grunert, K.G., Scholderer, J., 2005. Consumer perception of the quality of beef resulting from various fattening regimes. *Livestock Production Science* 94, 83–93.
- Brunso, K., Scholderer, J., Grunert, K.G., 2004. Closing the gap between values and behavior – a means-end theory of lifestyle. *Journal of Business Research* 57, 665–670.
- Castellion, G., Markham, S.K., 2013. New product failure rates: influence of *Argumentum ad Populum* and self-interest. *Journal of Product Innovation Management* 30 (5), 976–979.
- Cooper, R.G., 1999. From experience – the invisible success factors in new product innovation. *Journal of Product Innovation Management* 16 (2), 115–133.
- Cooper, R.G., Kleinschmidt, E.J., 1995. Benchmarking the firm's critical success factors in new product development. *Journal of Product Innovation Management* 16, 115–133.
- 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.
- Costa, A.I.A., Jongen, W.M.F., 2006. New insights into consumer-led food product development. *Trends in Food Science and Technology* 17, 457–465.
- Darby, M.R., Karni, E., 1973. Free competition and the optimal amount of fraud. *Journal of Law and Economics* 16, 73–88.
- Eliashberg, J., Lilien, G.L., Rao, V.R., 1997. Minimizing technological oversight: A marketing research perspective. In: Garud, R., Nayyar, P.R., Shapira, Z.R. (Eds.), *Technological Innovation: Oversights and Foresights*. New York: Cambridge University Press, pp. 214–230.
- Evanschinsky, H., Eisend, M., Calantone, R.J., Jiang, Y., 2012. Success factors of product innovation: An updated meta-analysis. *Journal of Product Innovation Management* 29 (S1), 21–37.
- Fishbein, M., Ajzen, I., 1975. *Belief, Attitude, Intention and Behavior*. Reading, MA: Addison-Wesley.
- Frewer, L.F., Lassen, J., Kettlitz, B., *et al.*, 2004. Societal aspects of genetically modified foods. *Food and Chemical Toxicology* 42, 1181–1193.
- Gatignon, H., Robertson, T., 1991. Innovative decision processes. In: Robertson, T., Kassarjian, H. (Eds.), *Handbook of Consumer Behavior*. Englewood Cliffs, NJ: Prentice Hall, pp. 316–348.
- Gielens, K., Steenkamp, J.B.E.M., 2007. Drivers of consumer acceptance of new packaged goods: An investigation across products and countries. *International Journal of Research in Marketing* 24, 97–111.
- Gourville, J.T., 2006. Eager sellers and stony buyers: Understanding the psychology of new product adoption. *Harvard Business Review* 84 (6), 98–106.
- Griffin, A., Hauser, J.R., 1993. The voice of the customer. *Marketing Science* 12 (1), 1–27.
- Grunert, K.G., 2005. Food quality and safety: Consumer perception and demand. *European Review of Agricultural Economics* 32, 369–391.
- Grunert, K.G., 2010. Means-end chains – a means to which end? *Marketing – Journal of Research and Management* 6, 30–38.
- Grunert, K.G., Baadsgaard, H., Larsen, H., Masden, T.K., 1996. *Market Orientation in Food and Agriculture*. Boston, MA: Kluwer Academic Publishers.
- Grunert, K.G., Brunso, K., Bredahl, L., Bech, A.C., 2001. Food-related lifestyle: A segmentation approach to European food consumers. In: Frewer, L.J., Risvik, E., Schifferstein, H.N.J. (Eds.), *Food, People and Society: A European Perspective of Consumers' Food Choices*. London: Springer, pp. 211–230.
- Grunert, K.G., Harmsen, H., Larsen, H.H., Sorensen, E., Bisp, S., 1997. New areas in agricultural and food marketing. In: Wierenga, B., Van Tilburg, A., Grunert, K.G., Steenkamp, J.B.E.M., Wedel, M. (Eds.), *Agricultural Marketing and Consumer Behavior in a Changing World*. Boston, MA: Kluwer Academic Publishers, pp. 3–30.
- Grunert, K., Perrea, T., Zhou, Y., *et al.*, 2011. Is food-related lifestyle (FRL) able to reveal food consumption patterns in nonWestern cultural environments? Its adaptation and application in urban China. *Appetite* 56, 357–367.
- Gutman, J., 1982. A means-end chain model based on consumer categorization processes. *Journal of Marketing* 46, 60–72.
- Gutman, J., 1997. Means-end chains as goal hierarchies. *Psychology & Marketing* 14, 545–560.
- Hart, S., 1996. *New Product Development: A Reader*. London: The Dryden Press.
- Hauser, J.R., Clausing, D., 1988. The house of quality. *Harvard Business Review* 66 (3), 63–73.
- Henard, D.H., Szymanski, D.M., 2001. Why some new products are more successful than others. *Journal of Marketing Research* 38, 362–375.
- Hofmeister, K.R., 1991. Quality function deployment: Market success through customer-driven products. In: Graf, E., Saguy, I.S. (Eds.), *Food Product Development*. New York: Van Nostrand Reinhold, pp. 189–210.
- Hughes, D., 1994. *Breaking with Tradition: Building Partnerships and Alliances in the European Food Industry*. Wye: Wye College Press.
- Kahle, L.R., 1986. The nine nations of North America and the value basis of geographic segmentation. *Journal of Marketing* 50, 37–47.
- Kamakura, W.A., Mazzon, J.A., 1991. Value segmentation: A model for the measurement of values and value systems. *Journal of Consumer Research* 18, 208–218.

- Kardes, F.R., Posavac, S.S., Cronley, M.L., 2004. Consumer inference: A review of processes, bases, and judgment contexts. *Journal of Consumer Psychology* 14 (3), 230–256.
- Kaul, A., Rao, V., 1995. Research for product positioning and design decisions: An integrative review. *International Journal of Research in Marketing* 12 (4), 293–320.
- Kirca, A.H., Jayachandran, S., Bearden, W.O., 2005. Market orientation: A meta-analytic review and assessment of its antecedents and impact on performance. *Journal of Marketing* 69 (April), 24–41.
- Kohli, A., Jaworski, B., 1990. Market orientation: The construct, research propositions, and managerial implications. *Journal of Marketing* 54 (2), 1–18.
- Kristensen, K., Ostergaard, P., Juhl, H.J., 1998. Success and failure of product development in the Danish food sector. *Food Quality and Preference* 9, 333–342.
- Lancaster, K., 1966. A new approach to consumer theory. *Journal of Political Economy* 74, 567–585.
- Lilien, G.L., Morrison, P.D., Searls, K., Sonnack, M., Von Hippel, E., 2002. Performance assessment of the lead user idea-generation process for new product development. *Management Science* 48 (8), 1042–1059.
- MacFie, H. (Ed.), 2007. *Consumer-led Food Product Development*. Cambridge: Woodhead Publishing Limited.
- Miller, K.M., Hofstetter, R., Krohmer, H., Zhang, J., 2011. How should consumers' willingness to pay be measured? An empirical comparison of state-of-the-art approaches. *Journal of Marketing Research* 48 (1), 172–184.
- Narver, J.C., Slater, S.F., 1990. The effect of market orientation on business profitability. *Journal of Marketing* 54 (3), 20–35.
- Narver, J.C., Slater, S.F., MacLachlan, D.L., 2004. Responsive and proactive market orientation and new product success. *Journal of Product Innovation Management* 21, 334–347.
- Ozer, M., 1999. A survey of new product evaluation models. *Journal of Product Innovation Management* 16, 77–94.
- Padel, S., Foster, C., 2005. Exploring the gap between attitudes and behavior: Understanding why consumers buy or do not buy organic food. *British Food Journal* 107, 606–625.
- Reynolds, T.J., Gutman, J., 1988. Laddering theory, method, analysis and interpretation. *Journal of Advertising Research* 28 (1), 11–31.
- Rogers, E.M., 1995. *Diffusion of Innovations*. New York: The Free Press.
- Ronteltap, A., Van Trijp, H.C.M., Renes, R.J., Frewer, L.J., 2007. Consumer acceptance of technology-based food innovations: Lessons for the future of nutrigenomics. *Appetite* 49, 1–17.
- Rozin, P., 1976. The selection of foods by rats, humans, and other animals. In: Lehrman, D., Hinde, R.A., Shaw, E. (Eds.), *Advances in the Study of Behavior*, vol. 6. New York: Academic Press, pp. 21–76.
- Scholderer, J., Frewer, L.J., 2003. The biotechnology communication paradox: Experimental evidence and the need for a new strategy. *Journal of Consumer Policy* 26, 125–157.
- Schwartz, S.H., 1992. Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In: Zanna, M.P. (Ed.), *Advances in Experimental Social Psychology*, vol. 25. San Diego, CA: Academic Press, pp. 1–65.
- Schwartz, S.H., Bilsky, W., 1987. Toward a universal psychological structure of human values. *Journal of Personality and Social Psychology* 53, 550–562.
- Selnes, F., Troye, S.V., 1989. Buying expertise, information search, and problem solving. *Journal of Economic Psychology* 10, 411–428.
- Siegrist, M., 2008. Factors influencing public acceptance of innovative food technologies and products. *Trends in Food Science and Technology* 19, 603–608.
- Souder, W.E., Chakrabarti, A.K., 1978. The R&D/Marketing Interface: Results from an empirical study of innovation projects. *IEEE Transactions on Engineering Management*, EM 25, 88–93.
- Steenkamp, J.B.E.M., 1990. A conceptual model of the quality perception process. *Journal of Business Research* 21, 309–333.
- Steenkamp, J.B.E.M., Gielens, K., 2003. Consumer and market drivers of the trial probability of new consumer packaged goods. *Journal of Consumer Research* 30, 368–384.
- Steenkamp, J.B.E.M., Van Trijp, H.C.M., Ten Berge, J.M.F., 1994. Perceptual mapping based on idiosyncratic sets of attributes. *Journal of Marketing Research* 31 (February), 15–27.
- Steenkamp, J.B.E.M., Van Trijp, H.C.M., 1996a. Quality guidance: A consumer-based approach to food quality improvement using partial least squares. *European Review of Agricultural Economics* 23, 195–215.
- Steenkamp, J.B.E.M., Van Trijp, H.C.M., 1996b. Task experience and validity in perceptual mapping: A comparison of two consumer adaptive techniques. *International Journal of Research in Marketing* 13 (3), 265–276.
- Steenkamp, J.B.E.M., Van Trijp, H.C.M., 1997. Attribute elicitation in consumer research: A comparison of three methods. *Marketing Letters* 8 (2), 153–165.
- Stewart-Knox, B., Mitchell, P., 2003. What separates the winners from the losers in new product development. *Trends in Food Science and Technology* 14, 58–64.
- Szymanski, D.M., Kroff, M.W., Troy, L.C., 2007. Innovativeness and new product success: Insights from the cumulative evidence. *Journal of the Academy of Marketing Science* 35, 35–52.
- Trope, Y., Liberman, N., Wakslak, C., 2007. Construal levels and psychological distance: Effects on representation, prediction, evaluation, and behavior. *Journal of Consumer Psychology* 17, 83–95.
- Trott, P., 2008. *Innovation Management and New Product Development*, fourth ed. Harlow: Prentice Hall.
- Urban, G.L., Hauser, J.R., 1993. *Design and Marketing of New Products*, second ed. Englewood Cliffs, NJ: Prentice Hall.
- Van Ittersum, K., Pennings, J.M.E., Wansink, B., Van Trijp, H.C.M., 2007. The validity of attribute-importance measurement: A review. *Journal of Business Research* 60, 1177–1190.
- Van Kleef, E., Van Trijp, H.C.M., Luning, P., 2005. Consumer research in the early stages of new product development: A critical review of methods and techniques. *Food Quality and Preference* 16, 181–201.
- Van Lange, P.A.M., Joireman, J.A., Parks, C.D., Van Dijk, E., 2013. The psychology of social dilemmas: A review. *Organizational Behavior and Human Decision Processes* 120, 125–141.
- Van Trijp, H.C.M., Fischer, A.R.H., 2011. Mobilizing consumer demand for sustainable development. In: Van Latesteijn, H., Andeweg, K. (Eds.), *The TransForum Model: Transforming Agro Innovation Toward Sustainable Development*. Dordrecht, Heidelberg, London, New York: Springer Science +Business Media B.V., pp. 73–97.
- Van Trijp, J.C.M., Steenkamp, J.B.E.M., 2005. Consumer-oriented new product development: Principles and practice. In: Jongen, W.M.F., Meulenberg, M.T.G. (Eds.), *Innovation in Agri-Food Systems: Product Quality and Consumer Acceptance*. Wageningen: Wageningen Academic Press, pp. 87–124.
- Van Trijp, H.C.M., Van Kleef, E., 2008. Newness, value and new product performance. *Trends in Food Science and Technology* 19, 562–573.
- Venkatesh, V., Morris, M.G., Davis, G.B., Davis, F.D., 2003. User acceptance of information technology: Toward a unified view. *MIS Quarterly* 27 (3), 425–478.
- Walker, B.A., Olson, J.C., 1991. Means-end chains: Connecting products with self. *Journal of Business Research* 22, 111–118.