



# Improving internal communication between marketing and technology functions for successful new food product development

Lina Fogt Jacobsen<sup>a,\*</sup>,  
Klaus G. Grunert<sup>a</sup>,  
Helle Alsted Søndergaard<sup>a</sup>,  
Bea Steenbekkers<sup>b</sup>,  
Matthijs Dekker<sup>b</sup> and  
Liisa Lähteenmäki<sup>a</sup>

<sup>a</sup>MAPP Centre for Research on Customer Relations in the Food Sector, Aarhus University, Bartholins Allé 10, 8000 Aarhus C, Denmark (Tel.: +45 25146589; e-mail: [linaj@asb.dk](mailto:linaj@asb.dk))

<sup>b</sup>Food Quality and Design Group, Wageningen University, PO Box 17, 6700 AA Wageningen, The Netherlands

In order to increase the new product development (NPD) success for novel food products, it is crucial to understand how information can be optimally disseminated within companies. This systematic literature review concentrates on factors influencing internal communication between market and

technology experts within the NPD process from a food industry point of view. The review provides practical implications for improving internal communication in food companies and identifies knowledge gaps. By focussing on optimising organisational structure, team composition, management support, and knowledge management, food companies can enhance internal communication between market and technology functions during the NPD process.

## Introduction

To succeed in a highly competitive market, food companies must develop new successful products valued by consumers (Barrena & Sánchez, 2012; Grunert, Larsen, Madsen, & Baadsgaard, 1996; Stewart-Knox & Mitchell, 2003). The new product development (NPD) literature explains the desired outcome of a new product development process as the commercialisation of a successful and profitable product within a reasonable time frame (Griffin & Hauser, 1996), and the most important determinant for successful NPD performance is having a superior product as perceived by consumers (Cooper & Kleinschmidt, 2007; Henard & Szymanski, 2001). Increased sales can only be realised if the product satisfies the needs of the target consumers (Costa & Jongen, 2006). Yet, a significant percentage of food products fail in the market causing high costs for the food companies (Gresham, Hafer, & Markowski, 2006; Rudolph, 1995). Although much research has emphasised the necessity of integrating ‘the voice of the consumer’ in NPD by focussing on external communication between consumers and companies, consumer information must not only be acquired, but also disseminated and applied within the company, calling attention to the importance of internal communication (Gresham *et al.*, 2006; Kohli & Jaworski, 1990). Improving the NPD process requires input from both market and technical experts (Calantone & Benedetto, 1988; Cooper & Kleinschmidt, 2007; van Trijp & Steenkamp, 2001), and it is therefore necessary to clarify how better communication can be established between the marketing and research & development (R&D) departments of a company.

The issue of internal communication has only scarcely been addressed in research conducted in the food industry. This review takes a food industry perspective on internal communication by considering on the one hand exchange of information between marketing and R&D during the NPD process, and on the other hand the factors that influence internal communication within the food industry or

\* Corresponding author.

similar industries. The objective of this literature review is 1) to find out what are the barriers and facilitators of internal communication between technology and market/consumer experts and 2) to translate the current knowledge into practical implications for internal communication in the NPD processes in the food industry as well as 3) to reveal the existing knowledge gaps.

This review will concentrate on product innovation, and process innovation will hence not be dealt with. The NPD process is usually viewed as consisting of different sequential phases, and in this review Grunert et al.'s (1996) presentation of Urban and Hauser's theory, which divides the NPD process into four phases: *opportunity phase*, *design phase*, *testing phase*, and *introduction phase*, is used. Information about consumers and competitors is to be gathered by the marketing function in the first phase, communicated to the R&D function, used in the design and testing phase, resulting in a final product ready for introduction in the last phase. However, it should be noted that this sequential modelling of the NPD process serves a normative purpose. In reality, the NPD process is not a linear system, and often activities are occurring in parallel rather than in sequence, and interactivity in form of looping, iteration, and back-and-forth play is characterising each stage (Cooper, 2008; van Trijp & Steenkamp, 2001).

## Methods

This paper is based on a systematic literature review. The literature included was limited to peer-reviewed articles dating no longer back than 1990, with focus on product or technology innovation in the food industry or similar industries. Similar industries are characterised as low and medium technology SMEs, since the food industry mainly consists of SMEs (FoodDrinkEurope, 2013; Traill & Grunert, 1997). In the effort to find food related literature, cross-industry studies including food companies were also included.

The search was conducted in four databases: *ProQuest*, *Science Direct*, *Scopus*, and *Ebsco*, by using the keywords 'innovation', 'new technology development', or 'NPD' in the title or abstract (phase 1). In order to narrow down the results stepwise, an internal search (phase 2) for literature including 'communication', 'R&D', or 'cross-functional communication' was conducted. In phase 3, an internal search was

made for literature including 'knowledge management' or 'market orientation' in title or abstract. In *Ebsco* this phase was skipped since it revealed a too narrow number of results. In phase 4, an internal search was made on literature including 'NPD', 'food innovation' or 'communication'. This revealed a feasible pool of literature for *Scopus* and *Ebsco*, but for *Science Direct* 'internal communication' had to be added to narrow the results to a manageable number. For *ProQuest* an additional narrowing had to be made which was based on the search for 'food' and 'NPD' (Table 1).

The articles found ( $N = 1604$ ) were scanned based on titles and/or abstracts, and relevant articles ( $N = 28$ ) were extracted and read thoroughly in full length. In addition, relevant and central references within this literature were identified ( $N = 9$ ) bringing the total number of articles to 37. Of these, 13 articles specifically addressed the food industry, and 9 articles partially addressed the food industry by including food companies in their data collection. The remaining articles addressed industries considered to be similar to the food industry. These were included to support or challenge the findings. For literature to be finally included in the review it had to 1) conceptually, theoretically, or empirically address internal communication in the food or similar industry with regard to new product development, and 2) be peer-reviewed and published in a scientific journal. Most of the articles were excluded due to their focus on high technology industries or for not addressing internal communication with regard to new product or technology development.

The literature on innovation, especially in a special domain such as food, is scattered among different disciplines and therefore difficult to reach by systematic approaches in databases that cover only part of the material. It is therefore acknowledged that the literature screening criteria may have excluded relevant literature. However, in order to minimise potential omissions, different databases were used in the search and keywords for the different stages in the search process were discussed and agreed upon by the authors. Similarly, to reduce the role of subjective evaluation, the screening criteria for including or excluding the abstracts in the first round of extracted literature were discussed and agreed upon by the authors.

A first perusal of the extracted literature showed that two types of factors were found to influence the effectiveness

**Table 1. Phases of literature conduct (numbers refer to number of articles extracted).**

Database (10/5/2012)	Phase 1: innovation OR new technology development OR NPD	Phase 2: communication OR R&D OR cross-functional communication	Phase 3: knowledge management OR market orientation	Phase 4: NPD OR food innovation OR (internal)* communication	Phase 5: food and NPD	Extraction based on abstract	Adding central references	Total	Specifically/partly addressing food industry
Scopus	770,265	179,871	3708	316	—	7			
Ebsco	42,834	2079		367	—	4			
ScienceDirect	28,482	16,657	2980	*809	—	14			
ProQuest	20,080	14,817	8517	4879	112	3			
<b>Sum</b>					<b>1604</b>	<b>28</b>	<b>9</b>	<b>37</b>	<b>13/9</b>

and efficiency of the internal communication process: first, the need for internal communication varies according to level of uncertainty and NPD phase, and second, there are structural and process mechanisms that can facilitate communication. In this review, we first look at these internal communication facilitators, namely the organisational structure, team composition, management support, and knowledge management, and then factors that influence the required level of communication. The final part of the manuscript derives the recommendations for facilitating the internal communication process and acknowledges the knowledge gaps requiring further research at the end (Fig. 1).

### Facilitators of internal communication

#### Organisational structure

One structural mechanism influencing internal communication is the organisation structure. Structure can be defined as the “rules, policies, procedures, processes, hierarchy of reporting relationships, incentive systems, and departmental boundaries that organize tasks within the firm” (Dasgupta & Gupta, 2009, p. 213).

Both the level of formalisation and the level of centralisation are aspects of the organisational structure that affect how communication flows in NPDs. *Formalisation* is described as “the emphasis placed on following rules and procedures in job performance” (Moenaert, Souder, De Meyer, & Deschoolmeester, 1994, p. 34) and requires explicit performance standards, clear division of responsibilities, and well-defined guidelines (Griffin & Hauser, 1996; Moenaert, Caeldries, Lievens, & Wauters, 2000). Formalised procedures will improve internal communication by forcing team members to share information at fixed time intervals by for example having scheduled face-to-face meetings. Without these formal procedures, information sharing will only happen rarely and on the specific initiative of the team members (Moenaert et al., 2000). In line with these results, Costa and Jongen (2006) suggested that one of the main-barriers to consumer-led food product

development is the lack of concrete formal guidelines for implementing consumer-led NPD in the daily practices of the food companies. Knowledge on market, competitors, and consumers collected by the marketing department must be implemented in the development of the product already in the early NPD phases, which requires clear guidelines on how to disseminate and use this information within the company (Costa & Jongen, 2006). However, too much formalisation may discourage participation in discussion and leave disputes to be solved by formal rules instead of negotiations (Song & Thieme, 2006; Souder & Moenaert, 1992).

Moenaert et al. (2000) suggest that communication can be improved by setting well-defined goals. Lack of common goals is often impeding dissemination of information within companies leading to functions working in different directions, either because information is not shared or because shared information is interpreted differently between functions (Adams, Day, & Dougherty, 1998). Dayan and Basarir (2010) found that goal clarity, i.e. the team’s shared awareness of what should be achieved, facilitates better dissemination of information between team members by keeping a clear view of what the team is aiming at. For example, the market problems with a new product experienced by FoodCorp (a food company included in the research) were due to the lack of goal congruence resulting in low credibility and transparency of the communication across functions involved in the NPD (Moenaert et al., 2000).

Turning to the other aspect of the organisational structure, *centralisation* refers to the level at which organisational decision-making is carried out (Song, Neeley, & Zhao, 1996). Focus is on at which level in the organisation decision-making is carried out. In centralised organisations, decisions are made at the higher levels of the organisation, whereas in de-centralised organisations, teams are empowered to make decisions (Song et al., 1996). Dayan and Basarir (2010) found the empowerment of teams to be a significant influencer on the team’s ability to swiftly adapt to changing circumstances, indicating ability to disseminate

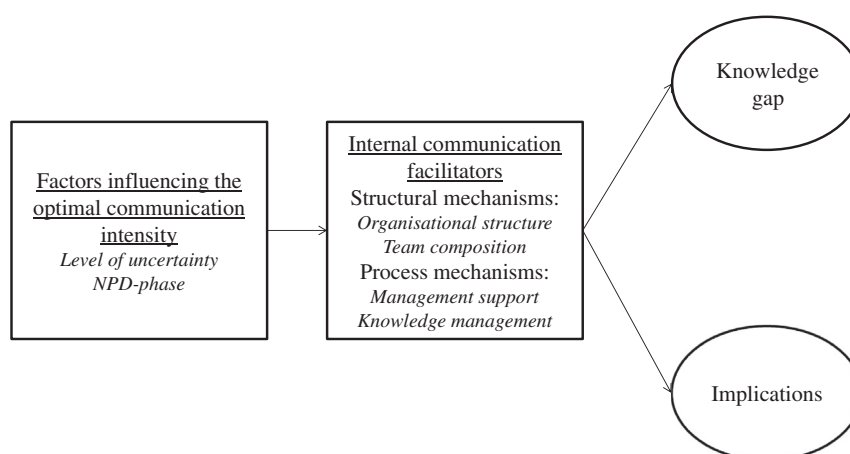


Fig. 1. Overview of areas addressed in the literature review.

information promptly. Team members' power to manage their own team encourages members to openly express their views in decision-making during the NPD process, leading to better communication flow between marketing and R&D (Moenaert et al., 2000). A high level of centralisation may hinder information exchange between functions (Song et al., 1996). However, in many companies a high level of centralisation characterises the organisational structure, indicating problems in overcoming this barrier to internal communication (Griffin & Hauser, 1996; Lee & Wong, 2011; Suwannaporn & Speece, 2003).

#### Team composition

Another structural mechanism facilitating internal communication is building *cross-functional teams* that consist of experts from different functions (Dasgupta & Gupta, 2009; Griffin & Hauser, 1996; Song et al., 1996; Suwannaporn & Speece, 2003). However, research indicates that many companies are not able to establish well-working cross-functional teams (Adams et al., 1998; Jespersen, 2007). Lack of trust related to personality or stereotype barriers is considered to be one of the most difficult barriers to overcome (Griffin & Hauser, 1996). García, Sanzo, and Trespalcios (2008) used trust to measure the inter-functional climate in various companies, including food companies, and found trust to be positively related to inter-functional integration. To encourage trust, they suggested that managers foster physical proximity among team members, ensure team members' positional stability, use formal programs for developing better understanding among functions, and encourage personal mobility.

In the food industry, the major problem is that only a very limited amount of market knowledge is actually integrated in the NPD process (Suwannaporn & Speece, 2000, 2003). The NPD process may begin with a consensus among functions, but it then develops into independent activities carried out in isolation from each other. For example, marketing may give the product specification to R&D, but R&D then develops the product with no further communication with marketing. This lack of communication is likely to cause failure of the food product as market research is not structurally included in the NPD process (Suwannaporn & Speece, 2000).

In order to obtain a better internal communication flow, internal linkages between different functions need to be strong. For inter-functional integration to succeed, different partners in cooperation need a common goal to work towards (García et al., 2008). This requires cross-functional collaboration in teams that goes beyond formal communication like for example exchange of documents (Adams et al., 1998). In FoodCorp, face-to-face team meetings were found to be crucial for the collaboration during the NPD (Moenaert et al., 2000). The better the relationship between the functions, the higher the quality and quantity of the information exchanged between them (Song et al., 1996).

Still, a challenge facing many companies is the physical distance between functions (Griffin & Hauser, 1996; Moenaert et al., 2000; Song et al., 1996). Even small food companies, similar to other SMEs, face this challenge, as they often collaborate with external consumer experts (Avermaete et al., 2004; Munksgaard & Freytag, 2011). Actually, this practice is regarded as crucial for small, low-tech firms, and therefore firms recognising the importance of market research often cooperate with an external market research institute (Avermaete et al., 2004). As a result, consumer experts and technology experts are often located in different companies resulting not only in a physical distance between them, but also a possible discrepancy in goal priorities. Still, also in situations requiring external partners, cross-functional teamwork is important. For example, in a study by Munksgaard and Freytag (2011), an important characteristic of the relationship between the food company and its external partner was the creation of an innovation forum allowing face-to-face meetings between partners, leading to more collaboration.

#### Management support

One process mechanism facilitating internal communication is management support. Management can facilitate internal communication between functions by proactively supporting an interactive culture in the company (Anderson, 2008; Griffin & Hauser, 1996). Confirming this with an empirical study made in the food sector, Brachos, Kostopoulos, Söderquist, and Prastacos (2007) found that top management support of interactions between functions is crucial for facilitating knowledge sharing within the companies. Top managers can show their support of knowledge transfer for example by frequently emphasising the importance of knowledge sharing for their employees and by establishing the right organisational context to facilitate the knowledge sharing. This organisational context may be established by an appropriate reward system for both functions based on the NPD success. However, often the marketing function is rewarded based on measures such as increased market share, whereas the R&D function is rewarded based on technology development or technology improvements. This will lead to the two functions targeting different focus areas and therefore limit the knowledge transfer between functions. Instead of rewarding persons or functions individually, Griffin and Hauser (1996) suggested a joint reward system where both marketing and R&D are rewarded for success.

Furthermore, high interactional justice, i.e. "the quality of interpersonal treatment people receive from decision makers during the decision-making procedures" (García et al., 2008, p. 723) is suggested to facilitate trust, whereas low perceived interactional justice decreases trust and thereby the level of inter-functional integration (García et al., 2008). The perceived lack of justice may appear if managers are biased towards advocating their own area of interest as being the most important factor in NPD success.



Results from the food industry showed a general lack of top management support for inter-functional communication due to managers' bias towards their individual expertise areas (Suwannaporn & Speece, 2010).

#### Knowledge management

Another process mechanism influencing internal communication is knowledge management. Knowledge management can be defined as “a system that promotes collaborative environment for capturing and sharing existing knowledge, creates opportunities to generate new knowledge, and provides the tools and approaches needed to apply what the organisation knows in its effort to meet its strategic goals” (Dasgupta & Gupta, 2009, p. 208). Systematic and effective knowledge management enables better knowledge sharing across functions (Dasgupta & Gupta, 2009). However, research within the food industry has shown that even though many companies are aware of the importance of knowledge management, they fail to develop a deliberate policy for it (Massa & Testa, 2009, 2011).

There are two strategic approaches to knowledge management, *personalisation strategy* and *codification strategy*, which may also be used in combination. With the *personalisation strategy*, knowledge is connected to the individual person and shared by human-to-human interaction (tacit knowledge) (Dasgupta & Gupta, 2009; López-Nicolás & Meroño-Cerdán, 2011). Personalisation improves the quality and the ability to innovate (López-Nicolás & Meroño-Cerdán, 2011). With the *codification strategy*, knowledge is codified and stored in documents or databases where everyone within the company can make use of it (explicit knowledge) (Cillo, 2005; Dasgupta & Gupta, 2009). Codification is a way to enhance communication between people by improving access and usability of the knowledge (López-Nicolás & Meroño-Cerdán, 2011).

Different types of knowledge management systems will fit different companies (Cooper, 2003). If companies are market oriented, they focus on consumer and market trends and therefore their knowledge management systems support knowledge acquisition, storing, and distribution, entailing a certain level of codification. The technology oriented companies obtain information from few external sources such as research centres and universities, and the knowledge management systems mainly support knowledge application, implying a certain level of personalisation (Massa & Testa, 2009, 2011). Within the food industry companies often rely on tacit knowledge and ignore that codification may be used to improve the NPD process, thus making acquired information difficult to share (Benner et al., 2003; Scozzi, Garavelli, & Crowston, 2005). Investigating codified knowledge management, a case study by Cillo (2005) included one food company which used internal brokers in its knowledge management. Internal brokers are individuals or teams within the organisation who modify market knowledge or technology knowledge before transferring it from one context to another in

order to ensure effective dissemination of information between various functions. The results showed that the knowledge broker enables better communication between functions by translating the knowledge obtained on consumers and the food technology and making it useful for different departments (Cillo, 2005). Importantly, for bigger companies needing much information in NPD, a certain level of codification will be necessary in order to ensure optimal knowledge sharing (Massa & Testa, 2011; Scozzi et al., 2005). Even for SMEs with a lack of own specialised resources, codification of information for NPD may be helpful in order to structure and exploit the knowledge (Scozzi et al., 2005). Thus, a certain level of codification may be helpful in food companies, as they often rely on information from external experts (Avermaete et al., 2004). Yet, codification may also act as a barrier to appropriate information acquisition, because people try to avoid ambiguity by re-defining appearing problems into already existing scenarios for which they have the knowledge (Adams et al., 1998).

Quality Function Deployment (QFD) is one of the most cited tools that help translating market information into useful knowledge for different functions involved in NPD (Cillo, 2005; Griffin & Hauser, 1996). Based on QFD, Benner et al. (2003) presented a conceptual model on how to disseminate information between consumer experts and technology experts for successful NPD within the food industry. By structuring the relevant information, the model provides the information needed for each actor in the NPD process and it forces actors in the NPD to review the information systematically to determine the best option (Benner et al., 2003).

#### Factors influencing the optimal communication intensity

Whether increasing interaction of functions leads to more successful NPD, depends on several factors. The optimum level of interaction can be matched with the level needed for reducing uncertainty in the NPD process (Griffin & Hauser, 1996), which entails that different situational determinants will influence the need for internal communication.

##### Uncertainty and optimal communication intensity

###### *External uncertainty*

External uncertainty in NPD refers to the competitive intensity, market turbulence, and technological change in the market (Lee & Wong, 2011). The higher the level of external uncertainty, the higher the need for environmental scanning including obtaining and sharing information in the development of new products (Carbonell & Rodríguez-Escudero, 2009; Lee & Wong, 2011; Ngamkroekjoti & Speece, 2008; Ngamkroekjoti, Speece, & Dimmitt, 2005; Weerawardena, O' Cass, & Julian, 2006). As indicated by Ju (2012), the food industry is highly market driven and market research is the most important influencer

of NPD success, indicating a relatively high level of external uncertainty and therefore a stronger need for cross-functional collaboration to deal with this external uncertainty. In line with this, Gemser and Leenders (2011) found that under conditions of perceived low external uncertainty investments in cross-functional communication may be a waste of resources, since companies not prioritising cross-functional teams will be likely to achieve the same results as those investing large amounts in cross-functional communication. This is especially important for SMEs that have no ambitions to develop radically new products and that need to be aware of the level of external uncertainty when planning their NPD activities due to their limited resources.

#### Internal uncertainty

Internal uncertainty refers to the uncertainty related to innovation strategy and goals of NPD within the company. Incremental innovation causes low levels of internal uncertainty, whereas radical innovation means a high level of internal uncertainty (Carbonell & Rodríguez-Escudero, 2009). According to several authors (Cooper, 2003; García et al., 2008; Gomes, de Weerd-Nederhof, Pearson, & Cunha, 2003), the more complex a project is, the higher is the risk of failure and thereby the uncertainty, which requires better knowledge sharing.

In general, SMEs are dependent on shelf space at retailers, which is difficult to obtain with radical innovations. This will make these food companies more inclined to limit their screening activities for truly new products and focus on incremental innovations which require low level of investments and carry low perceived risk. As screening activities are best practiced by cross-functional teams interacting

at early NPD phases where decisions are made about goals and product-related quality (Gomes et al., 2003), the cross-functional communication may be considered of less worth in companies with limited novelty of innovation goals (Jespersen, 2007).

#### NPD phase and optimal communication intensity

Due to the ability of cross-functional collaboration to integrate market and technology information into the early NPD stage where primary decisions about the goals and product-related quality are made (Gomes et al., 2003), in the early phases of NPD more internal communication is needed compared to the later phases (Becker & Lillemark, 2006; Gomes et al., 2003; Griffin & Hauser, 1996; Song & Montoya-Weiss, 1998). Thus, cross-functional synergies will mainly appear in relation to opportunity identification and engineering, which take place in the first part of the NPD process, but not in relation to the marketing of the product, which takes place in the last part of the NPD process (Love & Roper, 2009). This prioritisation may help to avoid product failure without wasting resources. As the food industry is highly market driven, enabling companies to incorporate consumer demands from the beginning of the process by using appropriate market research is crucial (Suwannaporn & Speece, 2003).

#### Implications for the food industry: recommendations to improve internal communication

Fig. 2 provides a schematic overview of our results. Internal communication between market and technology experts is enabled by organisational structure, team composition, management support, and knowledge management. The level of communication needed depends on

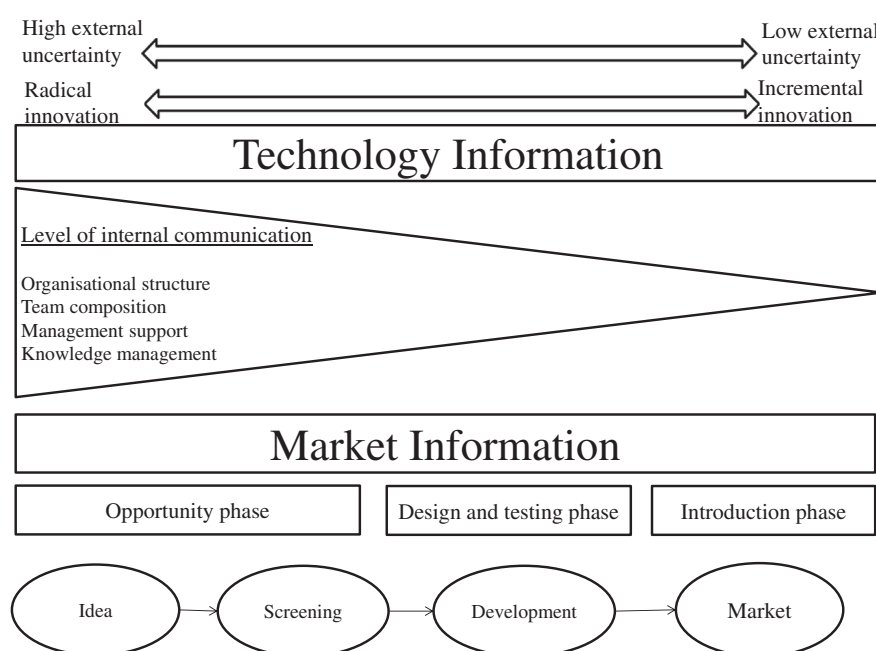


Fig. 2. Schematic overview of the internal communication between market and technology experts in the NPD process.

<b>Recommendation</b>	<b>Explanation</b>
In the opportunity phase of NPD, market and technology information should be integrated	Integrating market information and technology information is mainly relevant in the early phases of NPD. In the later phases, marketing and R&D may benefit from working more independently as long as common understanding and goals have been established in the beginning.
The level of internal communication should increase with the degree of novelty in product development. Radical innovations require more internal communication than incremental innovations	A higher level of internal communication is needed for radical product developments, due to the higher level of internal technological uncertainty.
Rapid changes in market conditions require a higher level of internal communication within NPD	With rapid changing external conditions leading to high external uncertainty, companies must be able to quickly adapt to changing consumer and competitor trends, requiring a higher level of internal communication.
Marketing and technology experts should set shared goals	In order to ensure that all functions are working in the same direction, clear goals should be established that are interpreted similarly by various functions. This requires a common language between the functions.
A balance between centralisation and formalisation should be established	Parallel to shared goals, the individual work teams should be empowered to make decisions, as this may motivate them to collaborate to a higher extent.
Teamwork consisting of marketing and R&D personnel should be prioritised if internal communication is needed	Formal communication is not enough to establish a high level of collaboration—informal activities are required as well. Collaboration should be established between the functions on a daily basis ensuring informal activities in addition to formal activities.
Top managers should prioritise the development of a trustful and collaborative climate	A trustful and collaborative climate can be established by managers keeping an open mind towards various functions and by encouraging open discussions.
A platform of existing knowledge should be established on which to base problem solving: By building capability to exploit explicit knowledge	Both implicit and explicit knowledge management is important in innovation. Explicit knowledge can be stored in databases in a form that is understandable for all functions in need for this information. A certain level of explicit knowledge management is necessary to support the concept of continuous learning.
By building capability to exploit implicit knowledge	Sharing of implicit knowledge should be encouraged by establishing a trustful climate for employees to discuss formally as well as informally. Implicit knowledge should be recognised as important input to the NPD process in order not to limit innovation.

1) the level of external uncertainty, 2) the level of internal (technological) uncertainty characterising the innovation strategy (radical vs. incremental), and 3) the specific phase of the NPD. These will influence the need for internal communication independently.

Our findings can be translated to a set of implications for the food industry (Table 2). Food companies are encouraged to integrate technology and market information, especially in the opportunity phase and to some extent during the development phase. Furthermore, the level of internal communication should increase with the radicalness of the product to be developed. Regarding the external environment, with rapid changing conditions leading to high external uncertainty, companies must be able to quickly adapt to changing consumer and competitor trends which requires a higher level of internal communication. The food industry is currently primarily characterised by incremental innovation, but in order to establish more radical

innovation increasing internal communication should be emphasised accordingly. Furthermore, due to the food industry being highly market driven, the importance of internal communication should be stressed.

Turning towards the structural mechanisms enabling internal communication, well-defined goals that are interpreted similarly by various functions should be established in order to ensure that all functions are working in the same direction. Thus, market and technology experts should interact and set shared goals together. Still, a balance between centralisation and formalisation must be established, where individual work teams are empowered to make decisions. Teamwork consisting of marketing and R&D personnel should be prioritised when internal communication is needed, including informal activities on a daily basis. Formal communication is not enough to establish a high level of collaboration.

Regarding process mechanisms enabling internal communication, top managers in food companies are

encouraged to prioritise the development of a trustful and collaborative climate by showing appreciation and keeping an open mind towards various functions, and by encouraging open discussions. A platform of existing knowledge building capability to exploit explicit and implicit knowledge should be established as a basic tool that can be used in problem solving. Explicit knowledge can be stored in databases in a form that is understandable for all functions in need for this information. A certain level of explicit knowledge management is necessary to support the concept of continuous learning. Sharing of tacit knowledge should be encouraged by establishing a trustful climate for employees to discuss formally as well as informally. Tacit knowledge should be recognised as important input to the NPD process in order to foster innovation.

### Limitations and future research

Integration of product and technology knowledge with marketing information in food product development could benefit from more research carried out specifically within the food industry. Even though recommendations are given based on the results obtained from combining the food industry with other industries represented by low-tech SMEs, food companies may have specific characteristics that could be considered in more detail in relation to the need for internal communication. Furthermore, much of the research actually conducted within the food industry is carried out in a geographically limited area, mainly Asia (from the 13 extracted articles specifically focussing on the food industry, 6 where based on data collected in Asia), which may have a very different organisational approach to internal communication compared to Western companies. Therefore, more research is needed in European/Western food companies to account for the possible differences in organisational environments between Eastern and Western cultures (Hofstede & McGrae, 2004).

Finally, research is mainly concentrated on communication between marketing and R&D functions within the company. There is an outsourcing tendency in the food industry, and as food companies often collaborate with both consumer scientists and technology experts from outside the company, future research could look at the communication with such external collaboration partners. This review concentrated on NPD as a process happening within the company, but we need to improve our understanding of how communication could facilitate success of innovation processes when developing capabilities, e.g. new technologies for radical innovations, in complex knowledge networks with partners from various commercial and academic organisations. Future research should investigate how the communication in this more complex cross-organisational structure can be facilitated and how knowledge can be communicated optimally *via* personal and codified knowledge management systems. It is therefore relevant for future research to look into where and when

communication is most beneficial in relation to product success in the food industry.

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