ABSTRACT
 Few disagree on the advantage of market oriented product development. However, can a well-known theory on consumer behaviour be used as a catalyst for achieving it? This paper describes a case study where a means-end chain (MEC) approach was introduced to a cross-functional development team at two different stages of the development process. Results show that MEC data is perceived as a good way of gaining knowledge about consumers; that the information serves well as the basis of discussions and for keeping project goals fixed. The results also indicate that MEC data are most valuable to the team in the early stages of the development process.

INTRODUCTION
 The Means-end chain (MEC) theory is widely used in consumer research and for the development of advertising strategy [1,2]. This paper shows an attempt to apply a MEC approach to the development of new products. The aim is to investigate how the introduction of means-end chain data to the NPD process influences some of the critical factors that support successful product development.

When looking into the vast literature on success and failure in new product development it is clear that certain groups of factors are especially vital for the success of new product development [3,4]. Two of the central themes are market orientation and inter-functional integration between functions in the development process. Due to the way means-end chain data are collected and to the nature of the data it seems an adequate instrument for influencing these two vital areas in new product development.

A MEANS-END CHAIN APPROACH TO NEW PRODUCT DEVELOPMENT
 The means-end chain theory of consumer behaviour is based on the assumption that consumers demand products because of the expected positive consequences of using the products [1,5,6]. Products are usually described in terms of their attributes, even though the consequences of using them are more important, since these may be related to the realisation of life values. A means-end chain illustrates the connections between product attributes, consequences and values, where the means is the product and the end is the desired value state. The purpose of the MEC theory is to explain how product preference and choice is related to the achievement of central life values [1]. Figure 1 illustrates a means-end chain for apples. It can illustrate that we buy apples not only for the sake of the apples but e.g. because they taste good and give us a sense of satisfaction when eating them, which perhaps helps us to a moment of quality in our lives.
The most important practical application of the means-end chain concept has been for the development of advertising strategy. For this purpose, the ‘Means-Ends Conceptualisation of the Components of Advertising Strategy’ (MECCAS) model has been developed which builds on positioning products in terms of personal relevance to the consumer [7,8]. According to Gutman (1982) and Olson and Reynolds (1983) the means-end chain approach is also applicable in product development [1,9]. However, the application of the approach to product development has been sparse [6,10].

Information about the consumers most important means-end chains for a product category may give companies the necessary knowledge to develop products that give consumers the desired consequences of using the product and which help them obtain central life values. It is therefore expected that a means-end chain approach to product development is able to affect areas central to successful market oriented product development. These areas are identified in the following paragraph.

**SUCCESSFUL MARKET ORIENTED NEW PRODUCT DEVELOPMENT**

The understanding of customer needs with the purpose of supplying superior customer value is central both to market orientation [11,12] and to new product development [13,14,15]. Most definitions of market orientation include reference to both the use of market information and inter-functional coordination. Market oriented new product development can, with inspiration from Kohli and Jaworski (1990) be defined as [16]:

“The development of new products, which is based on the generation of market information, the dissemination of the information across departments and responsiveness of various departments to it.” [17].

**The use of market information in NPD**

One of the primary goals of the collection and use of market information in NPD is the identification of customer preferences [18]. Empirical studies show that the customer focus part of market orientation is central to the success of innovation [19,20]. However, there is still much to know about the role of market information product development [21]. In their study Ottum and Moore (1997) show that the use of market information has a direct positive effect on new product success, and stress the importance of using the information effectively [22]. Market information may be used in different ways in connection with product development, either *instrumentally* (the use of information for decision making, implementation and evaluation of decisions) or
conceptually (the information is valued and the company has processes for converting information to knowledge) [23]. The barriers inhibiting market orientation are many and complex [24]. In their study Adams, et. al. (1998) find that some of the barriers can be overcome by broadening the functional participation in acquiring, interpreting and using market data. Furthermore, the collected data should be vivid and in an understandable language [25].

**Inter-functional integration in NPD**

The relationship between functions, especially R&D and Marketing, in product development has been the interest of a large body of literature in NPD [26,27,28,29,30,31,32,33]. Although there is agreement in the literature that integration is a question of both communication and cooperation there has been no uniform way of analysing the concept. This is criticised by Kahn (1996, 2001) who in his studies show that although *communication* is essential for integration it is *collaboration*, which correlates with success [34,35]. Integration between R&D and Marketing is primarily important in the early stages of the development process [36]. The barriers to integration identified in Gupta et. al. (1985) can be overcome by promoting mutual understanding, encouraging teamwork, by being more responsive to market needs and by improving marketing research [37,30].

The two areas; the use of market information and inter-functional integration may be interconnected since the use of market information is seen as a way of overcoming the barriers of integration and visa versa. The way in which the factors are expected to be influenced by a means-end approach and in turn affect successful new product development is illustrated in figure 2 below.

![Figure 2: How the MEC- approach is expected to influence the new product development process.](image)

Due to the way MEC data is collected and to the nature of the data it seems an adequate instrument for influencing the use of market information and inter-functional integration. MEC data gives information about consumer attitudes on three levels of abstraction: attributes, consequences and values. In order to develop products with superior value for customers it is important for the NPD team to be aware of the motivations that lie behind consumer preferences...
Furthermore, since MEC data are presented in the words of the consumers it is easily understood by all members of the development team, which is essential for the cross-functional communication and integration of activities in the development process [25,37].

RESEARCH METHOD

The research method for the project is a case study approach with an element of action research where a ‘means-end chain-intervention’ involves MEC data being collected and made available to the product development team in the case company for a specific project. Prior to the development task team members are interviewed about NPD routines in the company and again afterwards about their experience with using MEC data in the development process. The action research process is illustrated in figure 3 below.

Figure 3: The phases of the action research process

The MEC-intervention involves MEC data being made available to the product development team for the specific NPD project. First, the team is introduced to the means-end chain theory and to how it allegedly conveys links between attributes, consequences and values in the consumers mind. Concurrently, MEC data is collected for the chosen NPD project. Then the data is introduced to the development team, which is left to develop product concepts. After the MEC-intervention, team members were interviewed about their experiences using the MEC approach in the process of developing product concepts for the specific project. The interview guide for the final interviews was developed on the basis of a literature review focusing on market information and inter-functional integration in product development. The guide is shown in table 1 below.

<table>
<thead>
<tr>
<th>The use of market information:</th>
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<tbody>
<tr>
<td>Attitudes to market information:</td>
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<tr>
<td>- What do you think of the information in the hierarchical value maps (commitment, recognise the value)?</td>
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<tr>
<td>- Are they understandable (relevance, credibility, comprehensibility)?</td>
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<tr>
<td>- Did you feel like using it?</td>
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<tr>
<td>Moeneart and Souder (1996)</td>
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<td>Adams et. al. (1998)</td>
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<td>Moorman (1995)</td>
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<td>The use of market information:</td>
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<tr>
<td>- Directly/instrumental use (in connection with decision making, implementation and evaluation of decisions)?</td>
</tr>
<tr>
<td>- Indirectly/conceptual use (by conversion of information into knowledge and understanding)</td>
</tr>
<tr>
<td>Moorman (1995)</td>
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**Inter-functional integration:**

<table>
<thead>
<tr>
<th>Communication between functions:</th>
<th>Kahn (1996)</th>
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<tr>
<td>• Has the information been used in the communication between R&amp;D and Marketing (how)?</td>
<td>Griffin and Hauser (1992)</td>
</tr>
<tr>
<td>• What effect has the information had?</td>
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<tr>
<td>• What type of information has been exchanged?</td>
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<tr>
<th>Cooperation between functions:</th>
<th>Gupta (1990)</th>
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<tr>
<td>• How has the cooperation between R&amp;D and Marketing taken place during the project? (the role of the information)?</td>
<td>Gupta et. al. (1985)</td>
</tr>
<tr>
<td>- Teamwork, shared vision, mutual understanding, shared knowledge and resources?</td>
<td>Kahn (1996)</td>
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<th>Co-ordination of tasks:</th>
<th>Griffin and Hauser (1992)</th>
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<tr>
<td>• How has the co-ordination been between the development of the product, advertising, packaging etc.?</td>
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**Table 1: Guide for the post intervention interviews**

This paper draws on empirical evidence from a case study where MEC data was collected and made available to a new product development team, which represented both marketing and technical development. The study is part of a project conducted in cooperation with a Danish food manufacturer with the purpose of developing nutritious frozen products for children based on organic vegetables. The collection of MEC data took place in two different phases of the development process. The first round of MEC data collection was carried out during the early stages of the development process in order to give the development team initial material to work with. The second round of MEC data collection was designed as a concept test of the product concepts, developed by the team. The MEC data was achieved by conducting laddering interviews, which is the most common way of collecting MEC data [38,39]. Thirty respondents participated in each round of data collection. The software programme Ladder Map was used to develop the hierarchical value maps (HVM) from the coded interviews.

**Design and results of the MEC data collection in the case company**

Drawing on initial focus group interviews with children and parents six broad meal categories were identified for the first round of MEC data collection. Respondents, which were parents of children aged 2-14, were first asked to rank and then generate ladders for the following six descriptions of food categories, all based on organic vegetables:

- Frozen accompaniment for the family
- Fresh accompaniment for the family
- Frozen accompaniment for children
- Frozen ready-made dish for children
- Frozen snack for children
- Fresh snack for children
Unhealthy

Easy to prepare

Gives no energy

More time for family

Part of upbringing children

Same food for all

Easy to prepare

Bad taste, quality

Unhealthy

No vitamins

No energy

Healthy

Clean earth

Good for environment

Variation

Accompaniment

For the family

Frozen

Vegetables

Organic

Freedom of choice

Togetherness

Quality of life

Joy of cooking

Well-being

Frozen accompaniment for the family

Figure 4: Hierarchical value map for ‘frozen accompaniment for the family’

One of the meal categories that the respondents ranked highest in the first round of data collection was ‘frozen accompaniment for the family’. See figure 4 above for the hierarchical value map for this category. As can be seen from the HVM, parents perceive this type of product in a positive manner due to the fact that it is an accompaniment for the whole of the family and not just the children. Furthermore, it is easy to prepare and it is possible to serve the same food product for the whole of the family instead of having to prepare separate food for the children. This is important for the manner in which parents wish to bring up their children regarding food and meals.

After data collection and analysis, the six hierarchical value maps from the collected MEC data were introduced to the development team and they were left to develop new product ideas. After a period of time the team came up with seven different product ideas, which were used as product concepts in the second round of MEC data collection (One of the concepts developed was ‘Indian mix’, a product based on frozen rice with peas, corn and carrots). The respondents were asked to rank a number of products showed to them as pictures, see appendix for an example. The hierarchical value map showing parent’s perceptions of ‘Indian mix’ is shown in figure 5 below.
The HVM shows that parents perceived it as a negative attribute that the product is frozen. At the same time the ingredients are perceived as good, which is important for the good taste and for ones desire to eat. The central consequence is healthy eating habits and health, which gives energy, makes one able to cope and is important for ones quality of life. After considerations about economic feasibility and strategic fit of the ‘Indian mix’, the participating company decided not to launch the product. However, other product concepts, which received better evaluations are still in the refining process and will be launched within a year. The ‘Indian mix’ product serves as an example of the hierarchical value maps and their use in the development process.

RESULTS AND IMPLICATIONS

The final interviews with members of the development team show that the MEC intervention clearly led the team to use the available information on consumer motivations as inspiration for the development of product concepts. Furthermore, the instrument gave the teams a very good basis for discussion during project meetings and it helped to maintain development goals clear and fixed. The effects of the first round of MEC data collection are shown in figure 6 below.
The use of market information:
- The information is easy to grasp and understand
- It gives useful knowledge of consumers (although knowledge of taste is lacking)
- The information is converted into useful information for the company
- It is used for decisions regarding concepts and product ideas
- The information is converted into knowledge for the project

Communication and collaboration:
- The information is used for discussions about the direction of the project
- and for maintaining the chosen direction
- The converted knowledge is shared between the project participants

Figure 6: Empirical results of the MEC-intervention (first round of MEC data collection)

The team members expressed a high degree of satisfaction with information from the first round of MEC data collection. Regarding the second round of MEC data collection the team preferred that the respondents had been able to taste prototypes of the developed concepts. This indicates that for the use of the means-end approach in the food industry it may be preferable to include an opportunity for the respondents to taste the product. It was clear from the interviews with the team members that the results from the first round of MEC data collection were used to a much larger extent than results from the second round. The team indicated that since the maps from the second round of data collection (based on product concepts) supplied information at a different level of abstraction the information gave little further inspiration to the development process and would have been more useful for the design of communication and advertising. This result is consistent with expectations for the usefulness of the MEC-approach in product development, which is expected to be highest for the early phases of the development process where ideas are generated and concepts developed at a more abstract level.

The means-end chain approach has clear advantages for market oriented product development. Product developers perceive the MEC data presented in hierarchical value maps as easily accessible information about consumer perceptions regarding product attributes and perceived consequences. They understand that negative consequences identified by consumers should be avoided while the positive should be emphasized as suggested by MEC literature [8]. The information in the hierarchical value maps is
suitable for discussions about the goals of the development process and for keeping the project on track. Further work should be done regarding the appropriate design of the data collection in order to take into account the special demands of a development process in the food industry where taste is paramount. Without the element of taste the use of the MEC approach as a concept test is only useful for indications of trial purchase. For repeat purchase it is necessary to include the liking of taste in the test.

The MEC intervention was not able to secure that the NPD process takes place in a collaborative manner. The organisational structures and routines around the new product development process are crucial for the extent of collaboration and are difficult to influence. This points towards a possible analysis of the effects of a MEC-intervention with an organisational learning perspective, where the company’s degree of orientation towards learning (or willingness to change) mediates the possible influence of a means-end approach on product development. A learning orientation (defined as commitment to learning, shared vision, open-mindedness and intra-organisational knowledge sharing) has in Calantone et. al. (2002) been shown to affect both firm innovativeness and firm performance [40]. The role of learning orientation in this study may be illustrated as in figure 7 below where the learning orientation acts as a mediator on the way the MEC-intervention affects the use of market information and inter-functional integration and on the way these factors affect successful product development.

Figure 7: The possible effect of a learning orientation on a MEC-intervention.

It is important for further research in the use of a MEC-approach for enhancing market oriented product development to take into account that the changes, which most likely will take place in central areas, may be dependent on the learning orientation of the company. A certain willingness to change may be a prerequisite for the successful implementation of the instrument. It would be relevant to look further into the effects of learning orientation on ‘change projects’ in companies. It is also important for companies to be aware of the limited effects of a MEC-approach to product development (or other instruments) if the company as a whole or certain functions are unwilling to accept changes to the daily routines. This should not deter the companies from initiating changes.
only make them aware of the importance of the company’s willingness to change and learning orientation.

APPENDIX

**Indian mix**

Content: Organic boiled white rice, organic peas, organic carrots, organic corn.  
Use: Can be used as an accompaniment or as a cold salad.  
Preparation: Bring 2 pints of water to the boil and add the mix, when the water boils again pour through a strainer.

REFERENCES


