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Scenarios for the Food Industry in 2010

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Abstract

While predicting the future is impossible, corporate decision-makers have to decide which competencies to develop precisely on this basis. This article presents the results of a research project on scenario analyses in the Danish food industry. The aim of the study is to look at alternative visions of the future of the food industry and to assess their implications for competence requirements. Given the uncertain nature of the environment, food companies cannot rely on today's competencies being sufficient to fulfil the demands of tomorrow's markets. However, predicting the determinants of success in the food industry 10 years hence is a daunting task. Scenario techniques can be very useful in this respect (VON REIBNITZ, 1988).

The contribution of the article is the methodological approach to scenario building, which combines academic and industry input and translates the scenarios into the required competencies in each scenario. From an industry point of view, the competencies identified in each scenario can stimulate discussions of strategic choice in the food sector.

Keywords: Scenarios; food industry; competence requirements

Zusammenfassung

Die Zukunft vorherzusagen ist unmöglich, aber unternehmerische Entscheidungsträger müssen trotzdem Entscheidungen darüber treffen, welche Kompetenzen in der Unternehmung weiterentwickelt werden sollen. Der vorliegende Beitrag präsentiert die Ergebnisse eines Forschungsprojektes über Zukunftsszenarien für die dänische Lebensmittelindustrie. Ziel der Studie ist, alternative Visionen über die Zukunft der Lebensmittelindustrie zu betrachten und deren Implikationen für die unternehmerische Kompetenzentwicklung zu analysieren. Aufgrund der unsicheren Entwicklung in der Umgebung kann man nicht darauf vertrauen, dass die Kompetenzen von heute ausreichend sein werden um die Nachfrage von morgen zu befriedigen. Die Vorhersage von Erfolgsdeterminanten in 10 Jahren ist ein schwieriges Unterfangen, und die Szenarientechnik kann in diesem Zusammenhang sehr nützlich sein (VON REIBNITZ, 1988). Der vorliegende Artikel macht einen methodologischen Beitrag zur Ableitung von Szenarien, indem Beiträge aus Wissenschaft und Praxis kombiniert wurden und die Szenarien in Kompetenzanforderungen übersetzt wurden. Für die Industrie können die für jedes Szenario identifizierten Kompetenzanforderungen die Diskussion über strategische Wahlmöglichkeiten stimulieren.

Schlüsselwörter: Szenarien; Lebensmittelindustrie; Kompetenzanforderungen

1 Introduction and aim

Companies and other actors in the food industry often have to make decisions that will affect their future competitiveness. This requires knowledge of the future, the position they want to occupy in that future, and the actions they need to take to achieve this. Visions of the future can either be intuitive or an educated guess based on cause-and-effect relationships.

The aim of this article is to use the scenario method to identify the competencies required to compete in the various possible futures in the food industry.

The scenario methodology has been called “*disciplined intuition*” (WRIGHT et al., 1987) – *intuitive in the sense that it evokes unconstrained future thinking, and disciplined in that it is a systematized and managed process*. On the face of it, the scenario method is a strategic planning tool aimed at dynamic competence development, but it is of limited value unless used imaginatively (ERIKSEN et al., 1997). A scenario can be thought of as a means of predicting possible futures, and thus provide a basis for decision-making (SCHWARTZ, 1991). However, the aim of scenarios is not to forecast the future per se, but to develop views of alternative possible futures. It is the structure of the future that is of interest rather than the exact details. Unlike traditional business forecasting, scenarios do not merely extend present trends, but provide alternative images of the future.

The purpose of scenario planning is to help people deal with an uncertain and complex future (WENNERHOLM et al., 1996). One widely accepted definition of a scenario is: *A tool for ordering one's perceptions about alternative future environments in which one's decisions might be played out* (SCHWARTZ, 1991).

Ideally, the aim is to reduce the level of uncertainty (MITCHELL et al., 1979), but a more modest objective is to

identify, articulate and control uncertainty factors (ERIKSEN et al., 1997; FAHEY et al., 1998; OGILVY, 1992). An institutionalized use of scenario planning will shape a company's ability to act rather than react in a volatile environment. Emerging weak signals (i.e. indicators of change) will be intercepted at a much earlier point in time. Decoding weak signals can prevent sudden emergency situations or materialize into unexpected opportunities to be exploited before competitors (SCHOEMAKER, 1995).

2 Theoretical approach – scenario methods

While scenarios can be constructed in a number of ways, they all have certain similarities. They begin by identifying the factors that are expected to affect the issue concerned (SCHNAARS, 1987). The challenge then is to separate the largely certain from the largely uncertain, or to separate predetermined elements from uncertainties. While the logic that distinguishes and drives the scenarios is shaped by the most important and uncertain forces, other significant factors should also be involved (SCHWARTZ et al., 1998). Each of the key factors and trends should be given some attention in at least one of the scenarios, while the predetermined elements are likely to show up in all of them.

Most authors recommend creating between two and four scenarios, based on the following criteria (FAHEY et al., 1998; VAN DER HEIJDEN, 1996; GODET et al., 1996):

- *Plausibility*, i.e. scenarios should be possible and credible.
- *Internal consistency*, i.e. events in the scenario cannot be mutually exclusive. For example, it is difficult to imagine a scenario describing a situation with a high rate of inflation and a low interest rate.
- *Challenging*, i.e. scenarios should challenge people's mindset and stretch their perception of the future.
- *Relevance*. To have an impact, scenarios should connect with the mental maps and concerns of the users and be relevant to the issue concerned.
- *Archetypal*, i.e. describe generically different futures rather than variations on a theme – scenarios should cover a wide range of possibilities and highlight competing perspectives (SCHOEMAKER, 1995).

3 Research process

The scenarios and accompanying competency requirements for the Danish food industry were developed through a research design covering four phases.

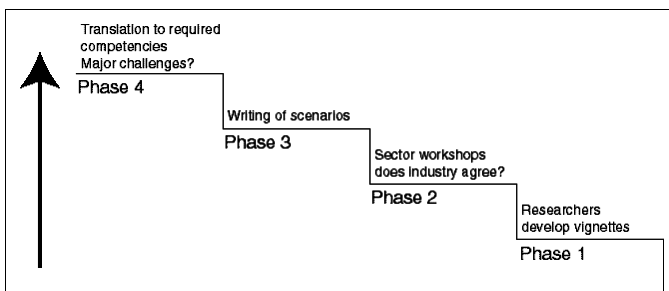


Figure 1

3.1 Creation of research-based vignettes

As mentioned above, the first step in the creation of scenarios is to identify the factors that will influence the future. This can generally be done in two ways. One way, called future forward (FAHEY et al., 1998), is to look at important trends and extend them. The other, called future backwards (FAHEY et al., 1998), is to imagine the future or aspects of the future, and deduce the main factors or forces underlying it. We have chosen the latter to ensure creativity and visionary thinking in the initial phases of the project.

We began by asking a number of Danish and international academics in food research for their opinion on what the future will look like for the industry in ten years. Academics are used to taking a long-term perspective, which was clearly an advantage at this phase in the process. Moreover, they must be considered experts within their field, and thus able to make educated guesses about possible developments over a ten-year period. This resulted in a number of small stories, or *vignettes*, describing possible developments with regard to both technology and market forces. Each vignette described an episode or situation in 2010, including the chain of events leading up to it.

An example of a vignette is presented below.

60% of all households do not have a kitchen anymore
 Food culture has changed. Previously, cooking and eating was an intense experience with involvement in both activities – it was almost regarded as an art form. This is history now. Today, only a very few people value the preparation of a meal and set aside the time it takes to cook one. Now, everything is ready-to-go, either in the form of take-aways or eating at one of the numerous small restaurants that have sprouted everywhere. The convenience concept has revolutionized food culture. Kitchen firms' only source of income today is in kitchen removals. The kitchen has become a thing of the past, out of touch with reality and the spirit of the times.

We received a total of 65 vignettes, which were grouped into six broad categories. This was done independently by two researchers, and resulted in the following categories: convenience, adventure foods, health and environment, production methods, distribution and retail structure, and macroenvironment.

3.2 Workshop discussions with actors in the food industry

In phase two of the project, to validate and extend this material, we invited representatives from four sectors of the Danish food industry (dairy, meat, fish, fruit & vegetables) to discuss the future of the industry. We organized four separate workshops, one for each sector. In order to obtain as wide a range of views on the future as possible, participants were selected from different parts of the food chain, including primary production, food manufacturers, consumer rights groups, retail chains, trade unions and organizations, and various authorities.

Participants were sent copies of all vignettes well in advance of the workshop to enable them to familiarize themselves with the material. During the workshop, participants were asked to take part in group discussions on the plausibility of each vignette. This was done to eliminate implausible scenarios (with reference to the scenario criteria mentioned in section 2). Participants were also asked to concretise the likely development in their particular sector with the aim of developing sector-specific scenarios. The work-

shop leader made sure everyone understood that consensus was not a requirement in the discussion. In addition, participants were encouraged to supplement the material with their own ideas on possible future developments.

Through these workshop discussions with managers and other actors in the food industry, we developed an understanding of which factors are unlikely to change and which are uncertain over a ten-year horizon. This, together with the research-based vignettes, formed the basis of the three end-scenarios created in phase three of the project.

3.3 Data analysis and scenario-building

Our scenario construction method was inspired by SCHWARTZ (1991). Thus, when analysing the workshop data, we looked for trends, pre-determined elements, and critical uncertainties. We focused especially on the latter, since, although important factors in determining the future of the industry, they are difficult to predict. Each vignette discussed in the workshops was rated according to degree of uncertainty and importance. This was done independently for all four sector workshops by two members of the project team.

A comparison of the results for the four sectors showed a high degree of consistency in which factors were perceived as uncertain and important, which we felt justified creating one set of generic scenarios rather than one set for each sector.

Once we had identified the critical uncertainties, the next step was to analyse the possible development of these factors. We started by outlining the official future, by which is meant the conventional wisdom about what the future or outcome will be if present trends are extrapolated into the future. The official future represents the base case, which some authors recommend using as a starting point for scenario-building for two reasons (SCHRIEFER, 1995; JOUVENEL 2000): the created scenarios need to challenge conventional wisdom, and the official future is also a part of the plausible outcome.

We also examined existing reports regarding the official future of the critical uncertainties considered. What, for example, is the general view regarding the development of functional foods in Denmark, or what will things look like in ten years if we extended present trends in demand for organic products? This desk research also provided insights into the prerequisites for and consequences of different possible developments for these uncertainties.

Having arrived at a list of critical uncertainties and key trends, we then looked for main driving forces, which steer developments one way or the other, and thus separate the scenarios. By grouping the factors according to potential common denominators and examining the mutual dynamics between them, we arrived at a number of main driving forces. To help identify the driving forces and understand the relationship between the variables in our analysis, we constructed an influence diagram. According to VAN DER HEIJDEN (1996), variables in an influence diagram are linked by arrows, indicating the influence they exert on each other. Factors that play a central role in such a system are likely to be driving forces.

These driving forces and predetermined factors constituted the 'scenario skeleton', which was filled in with the different outcomes for the remaining uncertain and impor-

tant factors in accordance with the logical coherence and consistency of the basic structure (SCHWARTZ, 1991).

This process resulted in three descriptive and qualitative scenarios, representing three equally justified future end states, i.e. no probabilities can be ascribed to the individual scenarios. The scenarios are archetypal or borderline scenarios, whose purpose is to shed light on the extremes of the future developments and thereby hopefully challenge conventional wisdom and stimulate visionary thinking. The relevance and plausibility of the three scenarios was validated through the workshops, while their internal consistency was ensured via influence diagrams and several rounds of analysis.

The time frame chosen is approximately 10 years, which is regarded as realistic, balancing the ability for creative thinking while still maintaining a high degree of uncertainty.

3.4 Deducing implications for the development of industry competencies

The scenarios constituted a starting point for identifying the competencies required for competing in the various future situations. To achieve this, workshops for the four sectors (dairy, meat, fish, and fruit and vegetables) were again organized. The concept of company competence was chosen, since, in theory, this can be seen as a driver of company competitiveness (HAMEL et al., 1994). And, from an application perspective, in the long term competencies are within the control of the company, and therefore relevant in strategic discussions about the future.

We used the laddering method to deduce competencies and competence elements. Laddering is a tool for revealing subjective causal chains in qualitative interviews (GRUNERT et al., 1995). In laddering, a series of consecutive questions are used to prompt the respondents to develop causal chains. In laddering interviews, the interviewer usually starts at the more concrete level (typically product attributes) and ends at the more abstract level (personal values). Here, however, interviews start with the abstract and end at the more concrete (HARMSSEN et al., 2000).

We outlined the most important characteristics of each scenario and asked participants to translate these into competence requirements. After listing the competencies they believed to be important, we then asked participants about the qualities needed to be good at them, and thus to list competence elements at a more concrete level.

In laddering interviews, the interviewer usually continues to ask questions until the respondent runs out of answers. However, we stopped asking questions after the second level, both due to lack of time and because it was unlikely that a high degree of detail could be deduced about competencies that will be relevant in 10 years' time. One of the advantages of using this method was the ability to structure the discussion rather than just encouraging a general discussion of the scenarios (GRUNERT et al., 1995). Another advantage was that the structured data made comparison across the four sectors possible.

The laddering interviews resulted in tree diagrams of links between a scenario and the required general competencies and underlying competence elements.

4 Results

The research results consist of the three scenarios for the food industry in 2010, together with the competence trees describing the competencies required for successful operation in the different futures.

4.1 The three scenarios

The three scenarios presented are borderline scenarios, as illustrated in figure 2. In other words, the most likely future development will probably include elements from each scenario, and the three scenarios can occur sequentially or simultaneously in different market segments or different parts of the world (SCHRIEFER, 1995).

The scenarios presented here are shortened versions of the original scenarios.

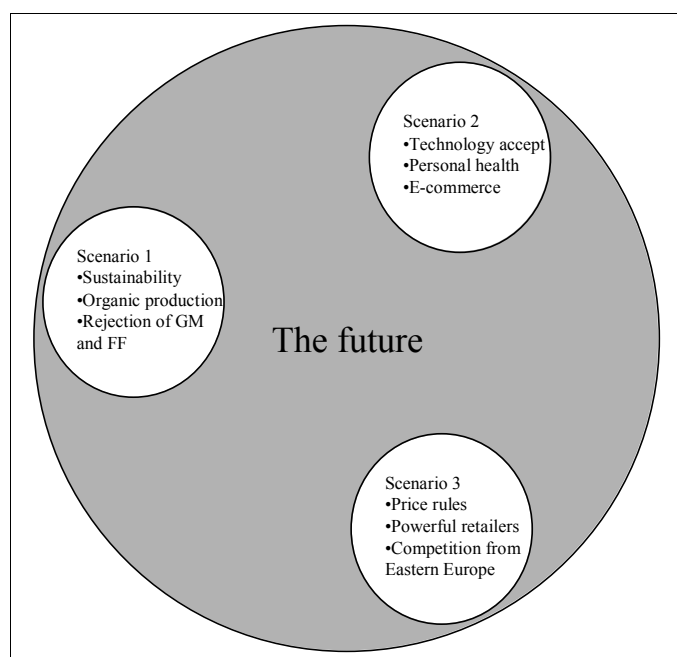


Figure 2

4.1.1 Naturalness (scenario 1)

This scenario is based on consumers' mistrust of conventional food production and rejection of genetic modification and other biotechnological advances. This, together with a deteriorating environment and a series of food scandals, has resulted in organic farming being the dominant production method. Consumers show great interest in sustainability from farm to table and consider organic products to be more wholesome.

Production and processing have undergone radical restructuring, which has helped restore confidence in the food sector. The food sector has responded swiftly to consumer demands for naturalness, fewer additives and increased transparency. Product development and the quality improvement of organic products, together with larger volumes, have lowered the price differential of organic products compared to conventional products, which in turn have contributed to the success of these products.

Organic production has developed in two directions. One trend, which represents an attempt to meet the retail trade's requirements for homogenous and stable supplies at relatively low prices, is based on specialisation and large-scale

sales to the industry. The other trend is based on small local units with a versatile and safe production. The few remaining conventional farmers try to market their products as "light green" with a minimum use of pesticides.

Danish exports are targeted at foreign consumers who demand soft quality parameters and who are prepared to pay for them. Denmark – as opposed to other countries – has thus declared itself a GM-free zone, which has reinforced its green image.

Though Danish consumers have rejected functional foods per se, producers have focused heavily on the optimisation of natural health-promoting substances, e.g. by making fruit juices from fruits and berries that contain a high level of vitamins. Most people think that good health depends on a wholesome and varied diet. The focus is on food quality and high-quality raw materials. Home cooking has a high priority, especially at weekends, though convenience foods are still in demand when it comes to whole organic meals or choice components.

The number of small specialty shops is increasing, both as shop-in-shops in supermarkets and as independent specialty shops. These outlets offer advice on how to prepare and cook the products, and enjoy the confidence of consumers. To a large degree the retail trade stocks locally produced food products. Within certain product categories retail chains no longer require large-scale, uniform, nationwide supplies, which has enabled small producers to supply supermarkets. Standard products are sold via the Internet, and net stores sell organic products which are delivered directly from the farm. In general, there is great interest in more direct contact between producers and consumers.

Recruiting staff is a problem in the processing industry, which has focused attention on the work environment. The agenda of value-based management includes good working conditions, which the ordinary consumer also has in mind when shopping for food. Having been won over to environment-friendly food products, consumers are now turning their attention to social consciousness and improved working conditions.

4.1.2 Technology-driven health (scenario 2)

There are three driving forces of this scenario: consumer acceptance of new technology (such as functional foods, genetically modified foods and intelligent materials), a hitherto unseen consumer focus on personal health, and more liberal legislation – especially as regards labelling and research.

Consumers have confidence in food production – they feel well informed and believe they have a realistic picture of modern food production. Consumers have gained confidence in the quality of food products through systems that control traceability and documentation, such as intelligent packaging, which continually check product quality. The large brand manufacturers carry out their own laboratory checks and contribute to the development of traceability systems. In primary production, confidence has been restored by changing those elements which attracted the most consumer criticism. For example, factory calves and battery hens no longer exist.

Food products and the health sciences are more closely linked than ever before. Since documented health effects have been allowed on product labels, many companies have

started producing functional foods. Especially products that are assumed to have a beneficial effect on such widespread diseases as cardiovascular disease, obesity and diabetes are popular, e.g. low-fat products and fibre- and vitamin-enriched products.

Consumers are very knowledgeable about which food products are healthy for them, and therefore demand that producers provide relevant information. This has led to the increased individualisation of products, e.g. adaptations of the same basic product to fit the health and nutrition requirements of various target groups.

Research has shown that genetic modification not only offers manufacturers advantages, but that it may also be a vital element in combating animal and human disease, and can even effectively curb certain types of pollution. This has persuaded consumers to accept genetic modification, and gene technology is now also permitted in Danish primary production and processing. Vast amounts of public research funds are spent to ensure that genetic modification does not cause imbalances in the ecosystem and to monitor long-term effects.

Today's lifestyles have left little time for cooking, which has resulted in a heavy demand for convenience products and take-aways. Part of this rise in demand can be attributed to improved quality, which has been achieved through the use of better raw materials and improved packaging and manufacturing processes that ensure product freshness with a reduced use of additives.

Organic farms are few and far between. The demand for organic products is constrained by the fact that organic farmers reject the use of genetic modification and the use of unnatural substances, which has resulted in relatively dearer products.

The retail chains give priority mainly to well-documented brands, downgrading their own products as manufacturers' brand strategy has become dependent on research in control and health. E-commerce has become normal, and consumers buy standard goods and foods, as well as more individualized products, on the net. Net outlets store information about consumers' individual preferences, and the home is run by means of information technology, e.g. the fridge automatically re-orders groceries from the preferred supplier via the Internet.

The small cohorts entering the labour market have intensified the struggle for manpower. The food industry automated monotonous and strenuous manual work as soon as became technically possible, but is still experiencing problems with employees leaving for other industries.

4.1.3 Tight spending (scenario 3)

This scenario is based on lower disposable real income and extensive internationalisation. Price has become the main criterion of choice of both Danish and foreign consumers. For example, many consumers only demand convenience if it is cheaper than cooking from scratch.

Danish food products are under increasing price competition from Eastern Europe. East European products are cheaper because they do not have to meet the same environmental requirements, they are not subject to the same level of duties, and East European wages are lower. However, East European products do meet basic EU requirements, and as more East European countries have entered

the EU, consumer scepticism has faded. More and more consumers are thus demanding these low-priced products, which are also of fair quality.

High-quality products and soft quality parameters have a limited market, which is largely characterized by the intensified competitive situation. While the main competitive focus is on price, producers also have to meet rigorous demands on quality and food safety in order to enter these markets, which has therefore made this market considerably less attractive.

Primary production has become international. Parts of the Danish food industry buy cheap raw materials abroad, while others own Eastern European companies that process regional food products. Danish primary producers set up outside the country to avoid duties and environmental requirements, leading to a slump in Danish primary production. Some of the former primary producers now make a living from selling know-how to Eastern Europe, among others. Organic products are no longer in demand, prices being far too high for price-conscious consumers.

The retail trade is dominated by powerful international chains. Most domestic chains are owned by, or work in close collaboration with, multinational retail chains. All retail chains are members of global buying organisations, which generate an extremely high and stable demand for products. The power this confers is used to put pressure on producers as regards price, as well as to gain the value added from own labels. Consumer trust is shifting towards the retail chains and their labels, which, among other things, guarantee food safety. As a countermove, some brand producers are trying to launch joint e-businesses in an attempt to reach consumers directly.

Health is still a top issue. There is a large international market for cut-price functional foods, which are regarded as an inexpensive way of staying healthy. The Danish food industry has not enjoyed much success with functional foods, partly due to restrictive labelling regulations and partly due to minimal R&D investments in this area.

Denmark is at a crossroads with regard to genetic modification in food production, a situation which has not been made easier by the fact that consumer attitudes towards genetic modification have become less clear-cut. Some consumers have begun to accept GM products, whereas others stick to GM-free supermarkets. This has therefore resulted in intensive research in high-yielding GM crops and products.

The recession and resulting unemployment have alleviated the recruitment problem – at least in the short term. However, companies with old-fashioned attitudes to the work environment are still experiencing problems in recruiting young staff.

The three borderline scenarios presented above can be used in several ways. Typically, they will be used to stimulate strategic discussion at either the company or industry level. In the following, we use them as a starting point for identifying the critical competencies required to compete successfully in the various futures described in the scenarios.

4.2 Competence requirements

In the second round of workshops, the scenarios were presented to managers and other actors from the fish, dairy,

meat, and fruit and vegetables sectors. Four separate workshops were then held to discuss the competencies required for each sector to succeed in the three different futures and identify the main future challenges compared with today. This resulted in diagrams of the links between scenarios, general competencies and competence elements. Here, we present the main results of the workshop for the meat sector. In the following, some of the competencies have the same general headline. Competing in any of the three scenarios requires production competencies, of course. The nuances between the three scenarios lie in the specific application of the competence, which is also discussed.

4.2.1 Competence requirements for scenario 1: Naturalness

Image competence

Being able to create and communicate an image of sustainable, ethical, and organic production is necessary, both in relation to consumers and present and potential employees. For *consumers*, ethical behaviour with regard to animal welfare and working conditions is important throughout the entire production chain. In order to meet this consumer concern, food producers will need a higher degree of openness and transparency. Being in closer contact with consumers is also a necessary competence.

Employees will be attracted to employers with a good image. A good image allows employees to take pride in the company they work for and the products they produce. Of course, efforts to create jobs with variation is also important to employees.

Production competence

Food safety is no less a requirement under organic and sustainable production than under conventional production. At present, it is debatable whether producers can live up to the standards set for food products. Thus, knowledge on and implementation of food safety in organic production is needed.

A future characterized by sustainability in primary production will probably be accompanied by a decrease in output. Sustainable agricultural production demands larger geographical areas than conventional production systems in order to achieve the same output. Thus, if this future is to include food production for export and not merely for the home market, better knowledge of production efficiency in sustainable primary production is a competence requirement. Knowledge about how modern technology can contribute to greater efficiency in sustainable production is also required.

Eating quality and organic production do not necessarily go hand in hand. A high level of objective quality for organic products is required, which in turn requires product development competencies supplemented with more knowledge of the links between objective and sensory quality.

Logistics competence

Organic food products, which contain little or no preservatives, typically have a shorter life than conventional products, which puts big demands on logistics competencies and extensive co-operation throughout the food chain.

Service competence

The large number of specialty shops and value added products, together with high levels of consumer involvement, require much more service and product knowledge at the retail level. Staff training must include knowledge about the products they sell and their possible uses. Responsibility for this training could be both at the level of the retailer and the level of the food processing company.

To sum up, scenario 1 especially requires competencies to handle the high expectations of and closer relationship to consumers and the specific challenges of large-scale organic production.

4.2.2 Competence requirements for scenario 2: Technology-driven health

Documentation competence

Product documentation is critical in a world where new technologies are being developed all the time. Traceability is one aspect of documentation, which is an important competence in markets which require a high degree of food safety. The Danish food industry has a long history of vertical integration, which is a good starting point for being able to track food products from farm to table. However, a higher degree of traceability, strong vertical integration and/or coordination requires more advanced certifying systems in primary production.

Another required competence is the documentation of effects. Documentation of the effects of new technologies is crucial. This relates both to the environmental consequences of new technologies and the health effects on the individual consumer. While part of this knowledge creation will probably be public, another part will be created in private companies, which will require new competencies in R&D.

Production competence

This scenario requires a high degree of product differentiation. The ability to handle many more differentiated raw materials is therefore a central competence requirement. The technical requirements, especially with regard to GM products, begin at the level of primary production, and are not merely a matter of production competencies at the processing level. Being able to produce various types of primary products for different types of consumers with different types of health concerns is also a competence requirement.

It follows that flexible processing competence is required. There is less mass production and therefore a need for a different production set-up, enabling companies to shift rapidly from producing one variant to another.

Product development competence

A highly differentiated demand makes product development competence very important. The type and scope of product development will be more advanced, knowledge-intensive, and challenging than it is today. When producing functional foods, knowledge of the health effects of adding various ingredients to a food product is necessary. This concerns the effect of consuming both individual functional foods and different functional foods together. This competence and knowledge can either be built up internally in the

company or obtained from external partners such as suppliers or medical companies. This means that product development will probably involve a larger number of internal and external partners, requiring more advanced project and knowledge management.

Communications competence

Communications skills are an important competence with regard to the marketing of both functional foods and GM food products. The more technically advanced and complex products are, the more important it becomes to communicate the added benefits of these products to consumers. The ability to understand the needs of the increasing number of different consumer segments is also a prerequisite for success in this scenario.

Thus, even though GM and other new technologies in food production have been accepted, communication competencies are required to communicate their benefits to consumers. This requires both general communications skills and research-based documentation. While some of this documentation is produced by the authorities, some will be produced by the companies, e.g. the specific effects of a given product. Such communication will be more knowledge-intensive and segmented than it is today.

The competence to build and sustain brands is also central. To consumers, brands will be symbols of a high level of knowledge and documentation. Since this will largely be company-specific, the importance of branding is critical in this scenario.

To sum up, this scenario requires many complex competencies. It envisages a much more knowledge-intensive industry, which should also be able to successfully handle international brand building.

4.2.3 Competence requirements for scenario 3: Tight spending

Production competence

In this scenario large-scale, uniform and low-priced supplies to the powerful international retail chains are required. Production competencies which focus on efficiency are therefore central. Competencies such as production control, increased automation and cost minimizing in processes in particular will have to be developed further in order to operate successfully in this scenario.

Furthermore, there is a need for structural rationalisations throughout the value chain. Thus, primary producers need to invest in large-scale production and automation in order to supply cheaper raw materials for subsequent links in the value chain. In addition, further mergers within the various sectors are required.

Logistics competence

This scenario also calls for the development of the logistics competence to guarantee delivery, more frequent supplies and the lowest price. To meet these requirements, the industry must specialize in fewer variants. Intensifying research on how to increase product shelf life is another way of facilitating logistics, thereby keeping costs low.

Global understanding

Extensive internationalisation is another central feature of this scenario, which makes global understanding an important competence requirement. One area in which this can be

seen is in low-priced convenience foods. Danish wages are too high to produce low-priced convenience food, which makes it necessary to consider global supplies of raw materials, e.g. from Third World countries. Mergers with or the purchase of foreign competitors are another form of global understanding, since this makes it possible to obtain economies of scale at a higher level in a purely Danish company.

In order to take advantage of Eastern European cost levels, it may become necessary to separate certain parts of production from, for example, product development. This will also require the ability to think and act globally. International competitiveness can be obtained by focusing either on large international private label supplies or on one or few international brands.

Relationship management

Mastering relationship management is an important prerequisite of success in this scenario. Thus, skilful relationship management is one way of handling powerful retail chains. One important strategic choice, requiring insight into the retail market, is to grow with the right retail chain(s). Suppliers need to make themselves indispensable. Among other things, this requires an understanding of the retail chains' needs and how best to fulfil both these and consumers' needs. Such understanding requires a good market analysis competence.

In conclusion, this scenario requires a highly efficient food industry with an international profile.

5 Discussion and limitations

The three scenarios and related competencies raise a number of issues related to the methodology and the application of the results.

The scenarios can be used in several ways. We have used them to identify competencies that are perceived to be important to compete successfully in the various futures. But they can also be used in a more traditional way as a basis for making long-term decisions and identifying major threats and opportunities. Merely by discussing the scenarios, the personal beliefs of a management group will become much more articulate and transparent, and both agreements and disagreements will be important for developing some sort of shared perception of where the company will or should be in the future. It is also important to note that the various actors in an industry naturally also influence the future. Thus, the scenarios can also be used as a starting point for discussions about the ideal direction the company should take in the future, and what it can actively do to influence this. Whether opting for adaptation or proactively influencing the future, an important step is to identify the main events that have to take place for the specific scenario to become a reality, and to track these signals in order to monitor the direction in which the industry is moving.

The competence portfolios can be used for gap analysis in individual companies or at industry level. What are the biggest challenges in relation to the three scenarios? Where are our competence gaps, and should we start trying to fill them?

Scenario 1 requires a change of attitude among food producers and in society in general. A big challenge here is

that the Danish food industry must accept that its role will change from being an important exporting industry to an industry mainly supplying the home market. Industry participants agreed that this scenario could only be realized with a much smaller production. From a societal point of view, it therefore requires the further growth of other industries to replace the important position of the food industry. More knowledge about efficiency in organic and sustainable production is also needed for this scenario to succeed. Another challenge is to define sustainable production and standardize rules and regulations. Consumer attitudes are an important aspect of this scenario. The scenario builds heavily on the belief that consumers want more sustainable production and that they are willing to pay for it. This needs to be confirmed, since these are important conditions for the realisation of this scenario.

The biggest challenges with regard to the future outlined in scenario 2 is the accumulation of knowledge that has to take place. This future requires a lot of research and development, and it is questionable whether individual companies will be able to finance this. Workshop participants believed that more research collaboration between industry and government is needed if Danish companies are to succeed and compete with multinational enterprises in this future. This, of course, requires a proactive research and development strategy from the government rather than just a liberalization of rules and regulations with regard to functional foods and GM food. Another requirement is consumer acceptance of new technologies in food. This is an aspect that should be monitored closely, since at the moment it appears to be one of the major obstacles to this scenario – so far, consumers have been very reluctant to accept GM food products.

Scenario 3 is the only one which involves an economic recession, and naturally this is an aspect that is easy to monitor. It is also the most important issue, as the key driving force in scenario 3 is consumers' focus on price. Consumer attitudes to prices should also be followed. Since retailers occupy a central position in this future, it will be important to choose the right retail chain(s) as partner(s) and start developing good relationship management.

This study is subject to several limitations, of course. The scenario process is highly qualitative, and results are dependent on the participants we have included in the process, which in turn involves speculative input that cannot be validated. While we have tried to increase the plausibility of the scenarios by holding several rounds of group discussions, it could be argued that, in this way, we have eliminated the wildest ideas that could really challenge current thinking. The limitations of qualitative research also apply to the part of the process in which we have identified the competencies required to compete successfully in the three futures. The validity of the identified competencies rests on the participants' ability to accurately identify what it takes to compete successfully. In future studies, it would be useful to carry out parallel sessions with industry participants from the same sector.

We started the process by gathering pieces of the future from vignettes developed by researchers. We believe that researchers' horizon is a fairly long-term one, and that their knowledge within their respective fields, both about results and new developments, is a good indication of where the industry will be in ten years. Others take a different ap-

proach to identifying key driving forces, and there is currently no overview of what has worked best in scenario-building in the past.

This study has been based on the Danish food industry. However, it is impossible to say anything about the extent to which the scenarios are relevant for food sectors in other countries. The scenarios are international to the extent that we have asked industry participants to consider their relevant markets in the process. The dairy, meat and fish industries are heavily export oriented, while fruit and vegetables are less so. The scenarios are therefore a mixture of more and less international perspectives. In future research, a clearer delimitation of the scenarios would be preferred.

Scenarios can be developed at different levels of analysis. Often, they are developed for a specific company, which means that, among other things, positioning in the industry and the existence of different consumer segments would be taken into account. At the other end of the spectrum, global scenarios can be developed, taking into account all kinds of macroeconomic factors. Our scenarios are industry-level scenarios, and do not include either the variation within specific industries or considerations about factors like global population growth, global environmental problems or global political developments.

We have tried to develop scenarios for the year 2010. However, we found it very difficult to stick precisely to this time perspective. Participants seem to have a different view of the time frame of ten years – some see it as just around the corner, while for others it is far in the future. This makes it difficult to evaluate whether the various inputs actually relate to the same point in time. This is a problematic aspect of the scenario method which requires further methodological developments.

We will continue with this project by inviting researchers working on food-related topics to a seminar, the aim of which is to translate the competence portfolios into research projects. The intention is to discuss the kind of knowledge researchers will have to provide to the food industry in relation to the three scenarios. In this way, we hope to stimulate discussions of future research strategies.

To sum up, we have tried to approach the scenario method from a structured perspective, to make scenario-building transparent and easy to discuss. We regard this, together with the combination of researcher and industry input and the translation to competence portfolios, as the main contributions of this project. Whether we have fallen into the trap that scenarios sometimes say more about how people perceive the present than the future, we will have to wait until 2010 to find out.

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