

Clusters/networks promote food innovations

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Abstract

Innovations are necessary for growth and competitiveness, but few are taking place in the food industry. Clusters and networks in regions/countries are seen as one way of increasing the chances to compete, based on Porter's theories in 1990. Before that some articles existed about agglomeration, clustering of industries etc. but not many examples in the food industry seem to have been studied. This paper describes the major innovations and changes since 1945 in the food sector, based on open-ended interviews with experts in the field, and the society is analysed in line with the factors proposed by Porter in his "diamond". Frozen food was seen as the really new innovation on the Swedish market and the paper describes how this new technology was introduced and gained acceptance. A network of individuals and organisations assembled around the Frozen Food Institute, backed by the government, and worked on creating and getting the information across to everyone in the supply chain. A cluster of food producers and supporting industries formed spontaneously in the south of Sweden and existed until the technology became a commodity. In the terms of current literature the cluster was a "bottom-up" initiative, with several entrepreneurs involved. The chances for radical or new food innovations are discussed, but they are going to require other actors and to overcome the generally negative attitude today towards industry and the food industry in particular.

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1. Introduction

"Innovation in the food industry combines technological innovation with social and cultural innovation" writes Earle (1997) but studies indicate that very little innovation is taking place in the food industry (Christensen Lindgaard, Rama, & Tunzelmann, 1996; Lagnevik, Sjöholm, Lareke, & Östberg, 2003). Radical or really new innovations are not often introduced on the market, although a number of new technologies are available or being further investigated and could be of interest. Consumers seem reluctant to accept new products based on new technologies such as gene technology (Koivisto Hursti, Magnusson, & Algers, 2002; Miles, Ueland, & Frewer, 2005) or func-

tional foods (Frewer, Scholderer, & Lambert, 2003). This reluctance may well be related to the fact that consumers are very much oriented towards aversion of risks (Galizzi & Venturini, 1996). Yet the food industry is historically considered to be good at applying technologies from other industries, like the pharmaceutical industry, biotechnology etc. (Christensen Lindgaard et al., 1996). But many of the visible innovations are taking place in packaging (Ettlie, 1983).

Clusters, networks and other organised ways of collaborating to increase the competitiveness of a region and a country have become a very real political issue with the discussions of globalisation on one hand and integration within the EU on the other. Porter (1998) defines clusters as "Geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also co-operate". If For-

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tune smiles and conditions are right, a climate for innovations is created.

According to Porter (1990) an innovation “includes both improvements in technology and better methods or ways of doing things. It can be manifested in product changes, process changes, new approaches to marketing, new forms of distribution, and new conceptions of scope”. Different levels of innovations, from radical to incremental, are described in the literature. Garcia and Calantone (2002) propose the following definitions: “Radical innovations are innovations that cause marketing *and* technological discontinuities *on* both a macro *and* micro level. Incremental innovations occur only at a micro level and cause either a marketing *or* technological discontinuity but *not* both. Really new innovations cover the combinations in between these two extremes.” These definitions are used in this study.

The food industry and supporting industries, such as the packaging and equipment companies and the trade, are exposed to the same diffusion from major industrial inventions as the rest of the industry and have successfully applied innovations based on technologies that made the industrialisation possible in the past. Going back to the end of the 19th century it was the electric motor, mass production, etc. that were the major innovations, then the wider spread and applications of electricity and the increased availability of cars, whereas we are now into innovations and applications made possible by microprocessors from the second half of the 20th century.

The signals and trends for a more consumer-oriented food sector, where the focus was shifted from raw materials to more processed food according to the wishes and needs of the consumer, were to be found already before World War II in the USA (Goldblith, 1989; Earle, 1997; Welch & Mitchell, 2000). Even in the 1930s one could find self-service stores filled with prepared and packaged foods—canned, bottled and frozen—in addition to ordinary grocery items. The Second World War itself acted as an incentive for developing new food preservation methods and packaging for supplying a variety of food to the soldiers, food that also had to be distributed efficiently (Goldblith, 1989)—but still nearly two-thirds of the food supplies for the Allied forces were in cans (Cancentral, 2004). In pre-war Europe most of the foods, or rather food ingredients, were sold in loose weight or volume.

This work started as a study of the major innovations and changes behind the development of the food sector and its supporting industries in Sweden from 1945 until today, as the development in the 1950s–1960s was exceptional, in spite of a much-regulated market for food and agricultural products. The situation was similar in many other European countries with limited possibilities to export or import food or food related products and raw materials. When analysing the results, the trends and the way the market developed, it seems to fit into a more general picture of how an innovation could be introduced and

gain acceptance, even if times and circumstances have changed and continue to do so.

The study concentrates on food for the consumer market, not the catering/food service or the development of beverages.

1.1. Purpose

The purpose of the work presented in this paper is to

- identify the major innovations in the food sector and the society since 1945;
- analyse the major innovation and how it was introduced and developed to gain acceptance;
- discuss the cluster and network that formed and the possible relevance for new innovations and compare with current literature.

1.2. Methods

The study goes back to 1945, which means that there are still some people who remember and were part of the development. To identify them was a natural first step, interviewing them was the second step and with the results from the interviews as a background, to study the relevant literature.

1.3. Interviews

Open-ended interviews (Yin, 2003) were carried out with two groups:

- (1) A group of eleven persons were selected based on their knowledge and wide and long experience in the food industry, packaging science and development, food processing, logistics or retailing in Sweden and especially those with an international outlook. The selection was based on the author’s personal experience and on advice from others now active in the field. The respondents were around 60 years old or more and everybody approached agreed to participate.
- (2) An additional group of eight persons was selected based on suggestions from the first group or identified when analysing the answers of the first group. The participants of the second group were more specialised. Six persons had experience from the food industry: product- processing- or packaging development, food marketing, and one person had a background in logistics research and another one in network and cluster research.

The first question for group 1 was:

In your opinion, which were the major innovations that really had an impact on the Swedish food sector in the widest sense after 1945?

They had to volunteer an answer, which could contain several innovations or major events in society.

The answers were followed up with additional questions:

Why do you consider this of importance, *how* did the innovation/event develop, *from where* did it come, about *when* did it happen, *what* were the driving forces behind it, *who* contributed and *why* did it happen?

To verify and develop the answers given by the first group, the respondents in the second group were asked more specific questions, particularly concerning details about what really happened and why, key persons involved, how the collaboration among the different actors took place etc.

1.4. Literature search

The first phase was to try to find literature about the Swedish food and packaging companies, retailers etc. and how they have developed since WW II. In parallel, literature about innovations in the food and packaging industry worldwide and its history was searched (Beckeman, 2004). This, combined with the interviews, led to more general issues around innovation, development, organisation, motivation etc. and caused us to look more specifically into contributions of specific individuals, “Edisons” (Beckeman, submitted for publication), and clusters and networks. A summary of some of the more recent articles on clusters and networks is included in the results.

2. Results and discussion

This section is structured as follows:

After presenting the results of the interviews, the way the major innovation was developed and introduced is described, including the cluster and network that emerged. “Cluster” as a phenomenon is very much linked to Porter and his “diamond” for competitive advantage (1990). Hence the Swedish food sector around 1950–1960 is analysed according to the factors used by Porter. As neither cluster nor network were concepts that were widely known at that time, the theories in the literature are reviewed and compared with the cluster and network that formed earlier in Sweden. In the last part the chances for new food innovations are discussed and whether the historical experience to work in networks and/or clusters presented seems likely to be repeated.

2.1. The development and changes in the Swedish food sector after 1945

Keeping the selected group of interviewees in mind, representing the food supply chain from producers to the trade, the number of persons answering the first question *In your opinion, which were the major innovations that really had an impact on the Swedish food sector in the widest sense after 1945?* were

These were followed by, in descending order:

Event	Number
Frozen food	11
Self-service stores	8
Chilled/fresh food	8
Dual income households	7
Political decisions	6
Distribution	6
Food safety	6
Information gap	6

Traceability, globalisation, computerisation (ordering, labeling, inventory etc.), new eating and purchasing habits, retailers’ own brands, aseptic process and packaging, microwave, nutrition, canning, plastics, car availability, immigration, individualism, quality guarantee, cartons for liquids, smart packaging systems, low-price shops, ecology, EU.

The numbers above can by no means be considered quantification but rather an indication by the selected group of experienced respondents. Frozen food was clearly considered to have been the innovation, followed by self-service, introduced more or less in parallel with frozen food and chilled/fresh (prepared) food, from the 1980s.

2.2. Frozen food developed in a network and a cluster

Frozen food was an original innovation, starting in the USA in 1923 with Clarence Birdseye and the technology is based on historic knowledge of food preservation (Williams, 1963). Enthusiasts among retailers and industry, who imported products for limited sale or experimented with freezing during the war, brought it to Sweden. KF, the cooperative wholesaler and retailer, test-launched on the consumer market in 1944, but it was Findus, launching in 1945, that became the leader (Bäckström et al., 1992).

The government and the Swedish Royal Academy of Engineering Sciences (IVA) took an interest and a Committee for “cold treated food” was founded directly after the war with interested members from industry, trade etc. (Bäckström et al., 1992). The committee was succeeded in 1953 by the Frozen Food Institute, “Djupfrysningbyrån”, and with four founding companies:

- Findus, the leading producer of frozen food.
- KF, the cooperative and leading chain with wholesale and retail and its own food manufacturing at the time, and who was first to launch frozen food and self-service.
- Helsingborgs Fryshus/Frigoscandia, storage, distribution and development of equipment for freezing.
- ElektroHelios, producer of refrigerators and freezers.

The first CEO of the Frozen Food Institute came from the government circle so the necessary laws and regulations for time/temperature went through very quickly. This

direct link to the government cannot be underestimated, as the new laws helped to reinforce quality. The Frozen Food Institute had to be neutral; it worked as an active consumer organization, co-ordinated most of the activities and guided, informed and educated the public, the trade and the producers all over the country (Bäckström et al., 1992). The institute became the “spider” in a network of interested companies and individuals. The term “network”, when it comes to linking people, can be defined as “a group of people, organisations etc. that are connected or that work together” and networking as “the practice of meeting other people involved in the same kind of work, to share information, support each other etc.” (Longman, 1995).

The Swedish frozen food network more or less dissolved once frozen food was established on the market. The Frozen Food Institute still exists but is now mainly handling statistics and marketing activities towards the trade.

The whole chain for frozen food, from selecting and growing the right varieties of ingredients to the end consumer, needing a freezer and knowledge about how to use the product and to market and sell, was, if not a radical innovation, then a really new innovation on the Swedish market. It caused both marketing and technological discontinuities, mentioned in the definitions by Garcia and Calantone (2002), as a whole new supply chain had to be created and marketing had to be combined with informing and educating the consumers.

A spontaneous cluster of food industries and supporting industries assembled in the south of Sweden, particularly around frozen food and with more or less strong links to the network. Clusters increase competitiveness and “a cluster allows each member to benefit *as if* it had greater scale or *as if* it had joined with others without sacrificing its flexibility” (Porter, 1998).

The main reason for food producers to locate in the south was that the conditions there were best for those vegetables and berries that are at all possible to economically grow in the country. Findus, KF and Felix are examples of food producers in the south who came to be part of the frozen food cluster. Many suppliers, needing to be close to their customers, accompanied the producers. When it became apparent that freezing maintains the quality at a level hitherto unknown, the next step was to develop the best varieties of raw material for freezing, control growth and harvesting and to fill the farmers with enthusiasm for the new demands and sign them up as contract growers and partners in the cluster.

Much knowledge and equipment could initially be gathered or imported from the USA and the UK but it soon became evident that further development was needed to achieve the best possible quality. This was realised by Frigoscandia, who located in the south and started to develop new systems and equipment for quick freezing of different products and systems for storage and distribution. The company has since developed into a world-leading company of its kind (Beckeman, 2004). New distribution, a consequence of the changes, came rather high on the list

of major changes by the interviewees, but not packaging. When asked, the general opinion was that packaging never was an issue, as the packaging companies worked very closely with the producing companies and developed the packaging alongside with the needs. Åkerlund and Rausing, one of the two major packaging suppliers for frozen food, was already situated in the south and supplying many of the food companies with a variety of packaging (Beckeman & Olsson, 2005).

The original cluster seems to have died when frozen food started to become a commodity, and that started to happen already in the 1980s. Functioning equipment and packaging were available to anyone, in Sweden or in other countries, and what remained for the food producers as a competitive edge were the formulations of the products versus cost/price. Additional ideas, such as to improve the quality by developing the ingredients or innovative processing of some of the products before freezing were not given proper attention by the food companies, according to some of the interviewees. The same was true for better adapting the products to microwave preparation, and here the packaging companies were more active.

2.3. The Swedish food sector and Porter's Diamond

Cluster as a phenomenon came with Porter (1990), linking clusters of industries and other actors to his theories of a nation's competitive advantage. The notion that a number of companies with similar and/or complementary activities and located close to each other should find ways to not only compete but also collaborate with each other is old. Marshall in 1920 talked about industrial districts (Tallman, Jenkins, Henry, & Pinch, 2004) and other words beside cluster are new industrial area, agglomeration, embeddedness, milieu, complex, etc. (Gordon & McCann, 2000).

The factors of importance in Porter's diamond (Porter, 1990) are:

1. *Factor conditions.* The nation's position in factors of production, such as skilled labour or infrastructure, necessary to compete in a given industry.
2. *Demand conditions.* The nature of home demand for the industry's product or service.
3. *Related or supporting industries.* The presence or absence in the nation of supplier industries and related industries that are internationally competitive.
4. *Firm strategy, structure, and rivalry.* The conditions in the nation governing how companies are created, organized, and managed, and the nature of domestic rivalry.

Porter completes the picture with the role of chance and the role of the government.

If we compare with Porter (1990), many of the factors in his “diamond”, “Determinants of National Advantage” could be found in the 1940s–1960s in the food sector in Sweden:

- (1) Sweden had continued its industrialisation after the crisis in 1930; the war delayed some of the changes but the factors to successfully produce were there and women increasingly went to work outside their homes, creating a demand for more convenience. Education and infrastructure were important and a food institute, SIK, was founded in 1946 (Goldblith, 1972; Hallström, 1971) and new roads increased the communication and the commercial traffic (Schön, 2000).
- (2) Demands for more convenient food products were growing as the society changed and the introduction of self-service stores accelerated the development from unpackaged to packaged food (Louis, 1999).
- (3) The food industry could not export most of their products, but the supplying industries could. Some of them became internationally competitive like Å&R, out of which Tetra Pak grew, and Frigoscandia, who became world leader in frozen food technology and equipment. Knowledge could be exported, so in 1962 Nestlé bought Findus, the brand and the knowledge, with the ambition of expanding frozen food in Europe.
- (4) Domestic rivalry existed among the food companies, retailers and supporting industries. In addition, the wholesalers became retailing chains and invested in their own food production, like frozen food (Bäckström et al., 1992).

The role of chance might be attributed to Sweden's not becoming involved in the Second World War, and could thus afford to look into the US development and get a head start. The roles of the government changed as they became more active in forming the economic policy and were strongly influenced by theories by particularly J.M. Keynes (Schön, 2000). Very simplified, the goal of the economic policy should be to counteract the disturbances occurring in the society by continuous interventions in order to maintain full occupation, low inflation rate etc. Examples of such activities that took place were controlling and regulating housing constructions and establishing norms for everything from kitchen equipment to education and selecting locations for new stores – and to actively support frozen food, as previously mentioned.

2.4. Theories about networks and clusters and the Swedish experience

When analysing the introduction of frozen food some sixty years ago, it does seem as though a spontaneous cluster formed in the south of Sweden and a network around the Frozen Food Institute. Hence it is interesting to look at some of the recent literature about clusters and networks, and compare that with what seems to have happened sixty years ago, when very little had been published about these issues.

Network might be a denomination for one form – of three – of clustering (Gordon & McCann, 2000), based

on trust and private relationship and its members', not having to be located together, see below.

Barringer and Harrison (2000) follow a similar line when comparing six of the most common forms of interorganisational relationships, of which network is one. It is described as being tightly coupled and having “A hub and wheel configuration with a local firm at the hub organizing the interdependencies of a complex array of firms” (Barringer & Harrison, 2000). They also write, “Networks are constellations of businesses that organize through the establishment of social, rather than legally binding, contracts”. One apparent advantage is that each firm in the network concentrates on its speciality, that other activities are left to others and that the network structure among other things is flexible. The network is said to be difficult to manage and has an inherent power imbalance between the hub firm and the smaller firms involved.

Håkansson and Ford (2002) describe a network in its most abstract form as “a structure where a number of nodes are related to each other by specific threads”. And each node or business unit is bound by relationships. The companies involved are not free to act in isolation from the others in the network and the relationship creates possibilities for innovation but also a risk for inertia that limits innovations.

Cox, Mowatt, and Prevezer (2003) have specifically looked at inter-firm networks for the chilled ready-meal industry in the UK and identified two types in this sector: a control network and a network for innovation. The former is a result of the computerised information management systems that are basically controlled by the retailers. The network of control also gives input to new product development, initiated by the retailers among the producers and suppliers, a network of innovation. This will be further discussed below, when discussing the likelihood of new food innovations in Sweden.

Hence a network is one way of collaborating, mainly based on trust and relations, and could be one way of “clustering”. In this context we will use it as an example of collaboration, not based on proximity and not necessarily producing physical products.

Clusters arrived with Porter in 1990. Martin and Sunley (2003), and others, have tried to tone down the importance of clusters and particularly Porter's theories as lacking in evaluation and precision of definition and limits. Nevertheless, the presence of the work by Martin and Stanley and of others dealing with clusters speaks for the importance of the concept, creating competitiveness among the right types of industries and under the right circumstances.

2.5. Some theories in the literature

2.5.1. Why clusters?

- “It is widely believed that industrial clusters can help to improve the performance of regional economies by fostering innovation and strengthening the competitiveness

of firms, thereby generating growth and employment” (Cappellin, 2004).

- “No theory attempting to explain the existence of the cluster can be based only on the reduction of transport, information and transaction costs” (Maskell, 2001), which are the reasons usually mentioned in the literature.
- Steinle and Schiele (2002) remark that not all industries are affected by clustering because they do not fulfil the “necessary condition” – divisibility of process and transportability of product – and the “sufficient condition” – flexible co-ordination of several distinct actors.

2.5.2. Different forms of clustering

- Gordon and McCann (2000) propose three basic forms of clustering: pure agglomeration, the industrial complex model and the network. Agglomeration is based on local co-operation between companies and other actors as long as it is of advantage and without any special loyalty, i.e., relations are not static. The industrial-complex model is static, with local members acting as in a “closed club”, having decided for different reasons (like costs) to work together. The network form depends on interpersonal trust and private relationships based on a common history and ongoing collective actions and the members are not necessarily geographically located together, although that might facilitate the work.
- “Three features of clusters: their bunching nature (major innovations tend to cluster in time), their discontinuous nature (they tend to reflect breaks with the past) and their disruptive nature (major innovations bring about transformations in the economic and institutional structure)” (Boschma, 1999).

2.5.3. Different initiatives to cluster

- Top-down initiatives by the public sector and policy makers and bottom-up by private actors (Fromhold-Eisebith & Eisebith, 2005). Entrepreneurs are important in forming industrial clusters as they have the ability to attract support and know the area and the history in which they operate (Feldman, Francis, & Bercovitz, 2005). Feldman et al. do not believe that a cluster is formed as a result of economic development policies, and Audresch (1998) is of the same opinion.
- Porter (1998) believes that most clusters form where local advantages exist and without government initiatives and often in spite of them. The danger of internal rigidity developing in a cluster is at least as big as the risk of external threats.

2.5.4. Clusters develop over time

- Three phases, according to Feldman et al. (2005): the emergent phase, the phase of self-organisation of the cluster and among the entrepreneurs, institutions and

resources and the third phase of maturation. In the second phase, networks and community contribute to further development, whereas in the third phase new start-ups and spin-offs might happen and increase competition.

- A cluster has a life cycle: incubation, take-off and maturity or declining stage (Rosenfeld, 2003). The first stage comes from an innovation and the cluster is unplanned and unanticipated. Then entrepreneurs and competitors come in and take-off is reached. With more entrants, cost becomes more important and maturity is reached. Since companies in other locations might produce more cheaply, the cluster must increase productivity and/or save costs and/or produce value added or niche products and services. The cluster will decline if no new products have been identified earlier.

After studying the literature on networks, we choose the definition by Barringer and Harrison (2000) describing a network as having “A hub and wheel configuration with a local firm at the hub organizing the interdependencies of a complex array of firms”. The relations are based on trust, but the involved actors do not need to be geographically close together (Gordon & McCann, 2000).

In what we describe as our network, the Frozen Food Institute served as the “hub” in the wheel configuration and the aim and outcome was to create an acceptance and an awareness among all involved partners and all potential consumers about the benefits of frozen food. The product of the network was information, not physical products, and the partners participated ad hoc and could be individuals as well as organisations. In a way one could also claim that this network was close to a network of control as described by Cox et al. (2003), based on the means of information available at the time. It is not surprising that the network and the role of the Frozen Food Institute changed once the aim was fulfilled. The importance of the individuals in the process of gaining acceptance is described in a separate paper (Beckeman, submitted for publication).

The cluster that formed in Sweden was a “bottom-up” initiative (Fromhold-Eisebith & Eisebith, 2005) and with several entrepreneurs (packaging, equipment etc.) getting involved (Feldman et al., 2005). The cluster developed over time and declined as the technology passed its maturity - and as no new products had been identified earlier (Rosenfeld, 2003).

2.6. Likelihood of more food innovations in Sweden by networks and/or clusters?

The modern food sector after World War II, with frozen food and self-service as the key elements, grew out of an atmosphere of willingness and openness to change in the society, fuelled by what could be learnt in the USA. “Industry” meant progress and almost everything seemed possible. The timing was right and the country was ready

for change. Many entrepreneurs and others, from industry and trade, visited the States before or directly after the war and came back with ideas and visions for the new society. As an example, people from the trade mentioned numerous trips to the States to study modern retailing, and how they imported and implemented new procedures to make self-service function. It is in this atmosphere the ready acceptance of frozen food has to be seen; it was supported and affected by changes in Swedish society like increases in dual income families and private cars, political decisions, globalisation etc.

Since the introduction of frozen food, no new food innovation of major importance has been introduced in Sweden, considering the number of new food industries of a certain size since 1945 (Livsmedelsföretagen, 2005), except for one, perhaps: the growth of chilled/fresh products from the 1980s that has promoted the expansion of already existing industries and of the range offered by the retailers.

Cox, Mowatt, and Prevezer (2002) analysed the processed food sector in the UK and describe how frozen ready-made meals have gradually been replaced by chilled versions. This transition has only been possible thanks to the new information and communication technologies. They write, “Frozen food was part of the revolution in branded, packed consumer goods that relied on the introduction of proprietary technologies in food processing and allied developments in packaging”, which we have described happened also in Sweden. The driving force behind chilled ready meals is the development of non-proprietary technologies in information management and not new technologies in food preservation according to Cox et al. (2002). The shift in power down the line from producers to retailers has been visible for many years. Cox et al. point out that the short shelf life of the chilled products and the delivery on demand that can only be controlled by the retailers, have contributed to this shift. It has also meant a change from mass production back to batch processes of the size determined by the demands. They identify two inter-organisational networks in this sector, a control network and a network for innovation, both based on the knowledge available at the retailer in his interface with the consumers (Cox et al., 2003).

The future of chilled prepared food in Sweden might become the same as in the UK, with chilled food more or less taking over from frozen food. But there are also factors speaking against this development in Sweden, not the least being the small population spread over a big surface and few major cities. However, it was suggested by some of the interviewees that a similar network as the one for frozen food should be set up for chilled products, known to be distributed and stored at too high temperatures in Sweden (Björklund, 2002; Karlberg & Klevås, 2002). The example of the UK with networks for chilled ready meals seems worthwhile to study further.

Taking into account the shift of power from the producers to the retailers one might ask, “Who in the future will

develop radical or new innovations? And how could it be done?” The cluster developed for frozen food was a bottom-up type, originating in a region with a certain kind and amount of suitable advantages and around a new innovation, and the network included a number of actors from the inside and outside. But the network was not bound by geography.

Nilsson, Svensson-Henning, and Wilkenson (2002) have analysed potential clusters in the south of Sweden, and conclude that for the food sector there is a “cluster tendency” in the southern region of Sweden/Denmark, almost 60 years after the food sector started to boom in Sweden. Lagnevik et al. (2003) have introduced the southern region of Sweden plus Denmark as a cluster of competence in the food area, with examples of innovative products that have been developed and brought into the market, but not really having any major impact; at least not yet. Their approach is more top-down, and doubts about chances of success in forming such a cluster can be found in the literature; see above. In theory, at least it seems much more efficient to first generate a great idea in an area of competitive advantages for the country/region, and then let competent people and organisations that feel passionate about the idea involve themselves and find ways to collaborate. They might end up in a cluster and/or a network.

With the availability of new communications and the globalisation trend the idea of proximity for a cluster seems unrealistic and even more so, as the retailers are the ones who should take the lead or at least be heavily involved. Retailers are not likely to be found in one area and they are today partners in international groups. A virtual cluster or rather a network? Personally we do not believe that really new or radical innovations can be organised beforehand, but an open climate and attitude can, so that a radical or really new innovation is recognised when appearing. The hardest step for any new technology will be to find ways to overcome the negative attitudes towards the food industry and new technologies that exist among the consumers.

3. Conclusions

- Frozen food was the major innovation after 1945 in Sweden, but not a radical innovation, rather a really new innovation on the market.
- A network of interested individuals and organisations formed around the Frozen Food Institute. The objective became to produce information and gain acceptance of the new technology.
- The Frozen Food Institute had links to the government and laws and regulations to ensure quality could be enforced.
- A spontaneous cluster of food industries and supporting industries assembled in the south of Sweden – a bottom up approach according to modern literature – and died when the technology became a commodity.

- The situation in the Swedish food sector in the 1940s–1960s fitted quite well with Porter’s “diamond” and theories of factors promoting competitive advantages.
- After frozen food, no major new food innovation has been introduced, except for chilled products in the 1980s, that is, so far of limited impact in Sweden, contrary to in the UK.
- Clusters/networks in the previous forms might not be replicated directly today but different actors could take the lead and find ways to collaborate, much in the same way as for frozen food in the past.

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