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Developing Exchange in Short Local Foods Supply Chains

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ABSTRACT

The supply chain management of foods is commonly associated with modernistic large-scale production. This involves long transport distances of foods to reach consumers. In the case of local foods, supply chains are shorter. Based on a case study of five local foods producer's supply of their products to a common retailer, the supply chain of local foods is modelled conceptually and modes of development are pointed out based on contingency theory and supply chain management literature. Findings reveal that since these chains are transparent, reciprocal interdependency is abundant mainly because human perception creates a sufficient understanding of the operations management issues pertinent within this simple inter-organisational structure. Local foods supply chains are similar to service supply chains. This includes that both are short in nature and associated with bi-directional interaction between the customer and supplier. Developing short supply chains in local foods supply is associated with improving the exchange economy found in short supply chains. This also implies that development of local foods supply is associated with two paths which may be complementary. First, the use of improved intensive technology associated with reciprocal interdependency to develop efficiencies in the bi-directional and somewhat complex interaction. Alternatively local foods suppliers may seek to reduce this form of reciprocal interdependency thereby increasing the impact of pooled interdependencies and enabling using mediating technology involving standardising interaction such as through increased standardised products and packaging as well as automation of information connectivity.

Keywords. Local foods; Short supply chains; Logistics; Contingency theory; Interdependencies; Exchange economy.

1 Introduction

This study is concerned with how producers of food network to supply goods through short supply chains in what commonly is termed as "local foods" distribution. Abatekassa and Peterson (2011) reveal how food markets are increasingly globalized. Starting from the times of the industrial revolution, the food industry has adopted modernistic forms of distribution. Modernism implies, according to Giddens (1991: 5), among many things self-identity becomes "…a reflexively organised endeavour". This means that people in the modern age are not bound by a local from of space. A local "product" (including services) may therefore be consumed anywhere in the world. Modernism also encompasses the industrial revolution, the mechanization of "man" and mass production to achieve economies of scale. Pfeffer and Salancik (1978: 137-138) state" …that growth increases the organizations control over critical activities and reduces problematic dependence". This implies another reason for large scale food production, that of network power and control The same authors criticize the view that economies of scale is the prime reason for large scale production referring to research by Bain (1954) proving that economies of scale may also be found in small specialized firms. Scientific management embraces this view of production efficiency (Thompson 1967: 5).

Pfeffer and Salancik (1978: 35) differentiate between efficiency and effectiveness as purpose of organisations. Measurable effectiveness implies providing "service" (Penrose 1959) in accordance with customer requirements. Modernistic food production involves accordingly producing long series of low-priced standardised consumer goods at locations at a distance from their consumption. However, this does not rule out those local foods necessarily inefficient. They are more likely powerless in the market, and need to navigate. The rise of local foods production may accordingly be associated both with effectiveness and efficiency.

In a marketplace dominated by powerful industrialized food production a gradual opposite trend associated with small-scale "local foods" production has emerged in our now relatively post-modern society. This trend is as of now mainly associated with heightened affluence in the Western developed world (Magid et al., 2002). Studies show that food consumers in developed nations are increasingly willing to pay the higher demanded price for locally produced quality foods (Wolf et al., 2005). This increase in demand for quality local foods in the supermarket and other more specialized shops have marked the re-emergence of local food producers in the food chains in developed countries.

While logistics in industrialised food production is predominately influenced by modernistic economies of scale solutions regarding efficient transport, storage and warehouse handling activities, the emergence of increasing amounts of small-scale local foods distribution directs attention effectiveness measures to what characterizes the economies of small scale in local foods production including its logistics. Exchange, how people interact in supply chains, is an important topic associated with its role in supporting food supply. This is a supply chain management (SCM) topic since the applied supply chain involves collaboration between several networked firms. The research topic of this paper includes essentially how efficiencies in local foods supply, its logistics, may be achieved through inter-organisational integration facilitating process coordination through effective supply chain interaction. This integration is associated with what we term as "the exchange economy" (Hammervoll 2014). As "economy", exchange processes may be measured as more or less efficient detached conceptually from "production" involving effectiveness as focus on how the support production including logistics processes. The logistics of local foods supply involves relatively short networked logistics processes including multiple actors in the supply chain (Engelseth 2015). This fundamental assumption regarding the importance of networking in short or local foods supply chains lies in that local foods producers are small companies. This food business smallness, as revealed by Engelseth (2015), implies therefore a need to cooperate with other companies in order to efficiently supply local foods on the marketplace. In cases of local foods supply this implies variation in the organisational structure supply chain management (SCM) is associated with.

This study develops an empirically-based conceptual model of the supply chain structure of local foods logistics; transport, inventory and goods handling. Logistics is assumed to vary in relation to industry, in this case food product supply, small scale production, inventory and handling together with short transport distance. Given the fundamental definition of SCM as an enabler of efficient and effective logistics processes, through developing inter-organisational integration, this study focuses on how SCM supports the logistics of local foods. This involves directing attention to:

- Through conceptual modelling what constitutes a short food supply chain and
- Based on this modelling effort how such short foods supply chains can be managed.

A case study of local foods supply in Western Norway has been conducted to ground this research effort empirically. According to Mehl (2012), there are currently between 1,500 and 1,700 local food producers in Norway so this is a pertinent research issue. A detailed case description of a local foods supply network in Norway is provided from a hub and spoke perspective. The case narrative is organised as a description of local foods supplies from 5 local foods suppliers to an upmarket-positioned food retailer.

2 Literature review

Following Darby et al. (2008) and King et al. (2010), the local food system consists of three issues:

1. How and where food is produced,
2. How food will be distributed to consumers and
3. Consumer food preferences & options.

Demand for local foods is associated with consumer behaviour. Viewpoints regarding "local foods" are dependent on the consumers' socio-cultural backgrounds, attitudes and behaviours (Zepeda and Li, 2006). The socio-cultural background refers to consumers' emotional attachment to local people and a desire to support the local economy and improve the local environment (Zepeda and Levit-Reid, 2004) and membership in environmental advocacy group (Brown, 2003). According to Wolf et al., (2005), the typical buyers of local foods in developed countries are women, college educated and those with above average incomes. This market segment also allows food distributors to precisely segment this target market in their branding and promotion. This marketing effort must also be followed up with trustworthy logistics systems and traceability to convince consumers that the "quality foods" actually are what they are promoted as. Deller and Brown (2012) characterize local food producers based on "production techniques" they use and by features of their products; "commodity" versus "non-commodity" products. These characteristics of local food producers are neither well defined nor systematically oriented to define local food producers. The quality and authenticity aspects are vital in local foods production. In particular, it is assumed that local food producers use less chemicals and more natural ingredients. Therefore, environmentally friendly production methods and local food are characterized as "organic foods". Also an important premise behind this reference point is that the shorter the distance food travels, the more secure and safe it is (Saunders et al., 2006).
A concept of "local foods" needs to be established to relate it to SCM. "Local foods" refers to food products produced close to consumers (Martinez et al., 2010); a reflexive concept associated with all activities related to the method of food production and distribution constrained by geographical measures and socio-cultural emotions (Amilien et al., 2008). No universal definition of what constitutes a "local food system" exists. Consumers are therefore left to decide for themselves what "local foods" means to them (GRACE, 2014). Local food producers can be defined in accordance with different parameters ranging from the nature of business ownership, methods of production, the size of a business, availability, nature of end products and its relationship to place (Kvam and Magnus, 2012). A common assumption of food production method is that local producers are micro or medium scale and their market size is limited within a given geographic boundaries and they use natural ingredients; they are producers using sustainable techniques to produce quality organic foods. Of these local food producers are methods for producing mostly "related to sustainable agriculture, while the global industrial food system is dependent industrial agriculture" (GRACE, 2014).

Defining local food producers commonly based on the content of the final product in a dichotomous way (commodity versus non-commodity crops), facing other forms of local producers and their end products. One of the most common definitions of what characterizes local food producers is that it involves that food manufacturers process and sells products within a given geo-political boundaries. Marsden et al. (2000) refers to these characteristics as "relationship to place". However, this definition has been disputed by other factors. For example, Low and Vogel (2011) introduced local ownership, size and scale including marketing channels as the most important defining factors for conceptualizing local producers. According to this view, local food producers (farms) are owned by local people. Consequently, local food producers are small and medium scale companies. These three questions represent the epicentre of a local foods system. The Consolidated Farm and Rural Development Act, as enacted by the U.S. Congress in 2008 as HR 2419, defines the term "local foods" as associated with 1) the locality or region in which the final product is marketed, so that the total distance that the product is transported is less than 400 miles (640 Km) from the origin of the product, or 2) the State in which the product is manufactured. In sum, local foods are associated with short transport distances, and involve short supply chain structures.

Producers of local foods obtain access to the market through marketing channels. There are two main forms of marketing channels in the local food system that local food manufacturers use to reach their customers. These are:

1. Direct distribution
2. The use of intermediaries

Both these forms may be organized in many ways, with the use of intermediaries naturally involving a higher degree of network complexity. When direct distribution is applied there is an immediate relationship between producer and consumer. The local foods marketing channel may be organized through local markets (eg. Farmer's market), manufacturers' sales offices, community-based units, localized exhibition program and other mechanisms that manufacturers use to sell their products directly to consumers such as consumers coming to the farm or to fishermen (Bioforsk, 2012). Intermediaries in marketing channels create a bridge between producers and consumers, a simplification of marketing efforts for the food raw materials producer. These intermediary roles are limited only to local producers selling agent. Local manufacturers often supply their products directly to localized food "hubs" which is a "central location where local manufacturers distribute their products through one or more entities"

(GRACE, 2014). Local foods are distributed to consumers through logistics flows applying a local foods system (Martinez et al., 2010). Final products are marketed directly to consumers or through intermediaries marketing channels (Martinez et al., 2010; GRACE, 2014). These characteristics of local food producers are, however, not universal.

The traditional market arrangement, such as that found in developing countries today, involves use of a direct producer-consumer relationship. This is a marketing channel arrangement where consumers buy directly from producers at farmers' markets or producers sell through their own proprietary facilities (Dunne et al., 2011). Because of the constantly growing demand for local foods in more developed countries, retailers and grocery stores increasingly carry local foods in their stock. According to Dunne et. al, (2011), traditional and direct relationships between producers and consumers have gradually been replaced by a more complex and modernistic network of companies including manufacturers, distributors, retailers and the consumers themselves. This involves importantly information technology supported systems securing connectivity in the small and relatively simple local foods logistics systems since in this network of relations between actors there is a need for an efficient and integrated supply chain to support logistics performance (Deller and Brown, 2011).

All food supply may be analytically regarded as organised through an entity which is commonly termed as the "supply chain". The Global Supply Chain Forum (GSCF) has defined the SCM as: “the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders” (Lambert et al., 1998). A supply chain is a network of partners who collectively convert a basic commodity found upstream in the flow of goods into a finished product further downstream that is valued by end-customers, and who manage returns at each stage (Harrison and Hoek 2008). The supply chain is associated with the flow of goods and services and is therefore the *context* of logistics processes. The chain as metaphor emphasizes how companies, from a normative view, should be bound together in a common cause of achieving quality supply. However, as Christopher (2011) points out, this metaphor does not capture well the actual network structure of how companies in practice work together to carry out goods supply.

In a state of increased globalization SCM may be regarded as a key business driver for the keeping foods suppliers competitive. Ellram and Cooper (1993) define SCM as "an integrating philosophy to manage the total flow of a distribution channel from supplier to ultimate customer". Monczka and Morgan (1997) state that "integrated supply chain management is about going from the external customer and then managing all the processes that are needed to provide the customer with value in a horizontal way". The horizontal way concerns networking with partners that may also take the role as competitors and not limited to long-linked cooperation through tiers of suppliers. This quality goods provision is dependent on both inter-firm and intra-firm integration. SCM is accordingly a means for enterprises to gain competitive advantage in a marketplace through collective action by firms that are cooperating to improve the upstream and downstream relations and integrating the information flow, material flow and finances flow in the supply chain. This clearly indicates that the main purpose of SCM is logistical, to try to reduce costs and maximize the added value in logistics processes. SCM provides the normative organizational context highlighting the functional principle of integration. The question evoked in this study concerns what constitutes "SCM" in the context of local foods supply chains.

While SCM characterises the organizational chain structure, local foods supply is technically characterized by its logistics. According to Lambert et al., (1998) logistics is that part of the supply chain process that plans, implements, and controls the efficient and effective flow and storage of goods, services and related information from the point-of-origin to the point-of-consumption in order to meet customers’ requirements. As a subset of SCM, logistics is the task of coordinating the material flow and the information flow across the supply chain. Harrison and van Hoek (2008) state that the logistics task of managing the material flow with its supporting information flow is a key part of the overall task of supply chain management. In relation to logistics pertinent questions include how foods are stored, transported and handled in local foods supply. In addition, therefore, a question arises as to how SCM supports the particular logistics needs of *local foods suppliers*.

We now turn to developing a research approach to conceptually model the short local foods supply chain. Taking a contingency theory approach (Thompson 1967), food supply, being a physical form of distribution, is associated with using long-linked technology involving sequential interdependencies in a chain organizational structure. This is what ordinarily is considered the supply structure of food industry. This view where production is organised into sequentially interdependent stages of goods transformation is typical of modernistic supply. However, following Thompson’s (1967) understanding of contingency theory, in a supply chain, industries may possess other types of resource interdependencies that express the logic of production in a specific industry.

While sequential interdependency is prevalent when activities must follow one another, and therefore involve a fundamental form of supply *chain* production logic, this production may also reveal pooled and reciprocal interdependencies. According to Thompson (1967), pooled interdependencies are found in all types of industry and are associated with a mediating technology. The task in pooled interdependencies is to get resources and activities to fit together as a sort of jigsaw puzzle. In cases of production where pooled interdependencies are prevalent standardisation is an important mediating tool. Where pooled interdependencies are prevalent, production may also be easily automated since the main challenge in pooling is to mediate. Engelseth (2016) points out in the case of seafood export from Norway to Japan, supply chain alignment takes place through a series of commodity markets characterised by pooled and reciprocal interdependencies. This implies that in the case of food supply, the nature of sequential interdependencies, tough existent, is not clear-cut even though food supply is a form of physical distribution also in cases of industrialized food production. Interactions are a stronger driving force than the sequentially interdependent processes of long-linked technology.

In cases of reciprocal interdependencies, production is dependent on knowledge interaction that involves use of intensive technology, i.e. information exchange to curb the prevalent perceptions of complexity and uncertainty when involved in managing production. According to Stabell end Fjeldstad (1998), pooled and reciprocal interdependencies are typical of services. They characterize two types of services, one such as airline travel and telephoning where mediating technology use is prevalent to produce, and another where intensive technology use is prevalent, such as in ship construction engineering or medical patient diagnosis. Sampson (2000) describes two different types of service supply chains. The first type is the single level bi-directional supply chain that involves bi-directional interaction between the service supplier and its customer. This service supplier is again dependent on goods supplied through long-linked technology from its own suppliers upstream in the supply chain. The other type of service chain is termed two-level bidirectional supply chain. In this form supplier to the service supplier also involve bi-directional interaction. Bringing in the concept of service supply chains" in to the discussion regards considering to what degree local foods supply is similar or different from service supply chains. This implies considering the degree of reciprocal interdependencies in local foods supply and discussing reasons for based on analysis of interdependencies in the short supply chains. Although local foods should be characterised as predominately sequentially interdependent flows of goods, the shortness of transport combined with fragmentation and a heightened need to network, entails increased importance of sales and purchasing functions associated with the exchange economy. This in turn entails heightened reciprocal interdependencies, as well as increased potential to pool resources with other smaller or more specialised firms they have outsourced tasks to. This also entails considering local foods suppliers as more resembling service providers than manufacturing firms.

Based on voluntarism, implying a key role decision-making associated with degrees of rationality in organizations, Parsons (1960) classified organizations as having three distinct levels of responsibility and control: (1) technical, (2) managerial, and (3) institutional. In supply chains the technical level is associated with a production economy where deliverables are conceived and resources transformed to create supply. Following Hammervoll (2014) the supply chain may accordingly be understood as consisting of an exchange economy supporting a production economy. The exchange economy encompasses the managerial level. This view of local foods supply chains is illustrated in figure 1:

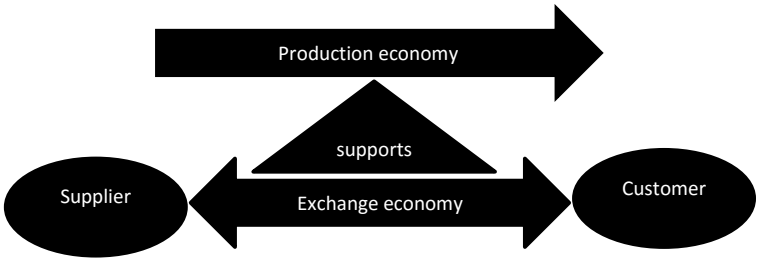

Figure 1. The production economy supported by the exchange economy. (Based on Hammervoll 2014)

The institutional level may be viewed as the organisational discourse embedded in this structure, visible as processes patterns; the business culture. SCM is commonly focused on the production economy that includes the logistics function. The exchange economy encompasses administrative processes; importantly purchasing and sales. Production involves how value creation through time, place and form transformation takes place while exchange involves transactions of product ownership. This represents functionalism institutionalised; the supply chain is clearly associated with what may be characterised at the strategic level as a static purpose. This view is different from contingency theory where functions are

viewed as dynamic; created in context. Still, these views may be complementary, the functionalistic approach used to model supply chain structure and contingency theory to account for the dynamics of operations within this structure.

This view of production implies that friction between institutionalised processes and managers' perceptions of "function" needs to be accounted for when considering how to manage in different types of production characterised by variation in interdependencies. In modernistic food industry, function is spread along the chain with different sequentially interdependent actors perceiving different positions in the chain. In shorter supply chains this is not an equally great obstacle to integration since the actors are grouped together in a smaller space; they are local. This short space entails managing through both mediating and intensive technology; mediating technology demanding investment in standardised interaction forms, intensive technology involving investments in developing forms of interconnectivity to support production.

3 Method

Sterns et al. (1998) view research as a phenomenological approach implying successive use of theory and fieldwork to develop a conceptual framework. The framework in this study emerged in a similar iterative fashion from the research process. Ours is a single case study; with detail provided in the material and we elaborate on this, detail rather than count or compare incidents. This involved designing the research process that led to “observations [that] generated new questions on which further interviews could be based” and eventually “added new dimensions to the subject, which eventually resulted in a new view of the phenomenon itself” (Dubois and Gadde 2002). Our study was conducted in and in the vicinity of the small town Molde, which is located on the Northwestern coast of Norway, overlooking a fiord. In this area, farming has traditionally been combined with harvesting from the riches of nature, in the form of fishing, hunting, and gathering. This legacy is reflected in the current local foods production in the area.

A case study research strategy was applied involving a first interview with a supermarket known for its large assortment of local foods. This main interview was supplemented by 5 interviews of different local foods producers. The local food producers were selected by using a snowball sampling procedure. The respondents contact information was gained through the supermarket manager and then a sample of producers was selected coming from different categories. This method excluded some local food companies, because they did not sell to the supermarket. Snowball sampling is a nonprobability sampling technique. The selection of the sample is not random. It is therefore impossible to determine a possible sampling error. We chose the informants mainly by geographical convenience and accessibility. This may influence our results. So representativeness of the sample is not guaranteed (Kotz et al., 1999).

Personal interviews were applied as the main form of collection. We went to the respondents’ home or company office directly with a prepared interview guide. We had three types of interview guide, tailored for retailer, producer, and government. The interview guide of retailer focused on their perspective, attitude and activity of local food. For the producers interview guide the focus is around the whole supply chain of local food from harvesting and processing until the customer picks it up. Besides, we included some questions about their personal information which may indicate the future development of local food. The interview guide to the government official contains questions about policies for helping local farmers and future development about local foods in general in the county the supermarket is located in. A limitation of personal interviews is that many pieces of information may be incorrect or exaggerated, because some respondents see the interview as a market promotion. So there may exist errors in our case study research. The data analysis is using a qualitative method because there are no accurate numbers collected during interviews. Most of the data collected are found in transcripts.

4 The Norwegian local foods network case

Supermarket hub

The studied food retailer has a variety of local foods like jam, honey, cheese, fish, cured meat, eggs, lefse, bread, concentrated juice, sodas, mineral water, carrots and strawberries, almost covering all kinds of categories. Lefse is a traditional sweet snack in Norway. This is a large super market retailer has 135 million NOK turnover per year making it in a relatively large retailer in the Norwegian market. This retailer strategically prioritizes local foods and as had a local section in their store since 2006. The turnover of local foods from this retailer has is tripled since 2006 with local food sales now accounting for 7 - 8% of the total sales volume. From the retailer's point of view, local foods are defined as food produced within their county. The main reason why the retailer sells local foods is customer preferences. The profit margin of

local food is slightly higher than ordinary foods. Customers express preferences for local foods, especially those brands that are associated with local culture which people can't buy in other places. Local foods are perceived by customers as being fresh, having good quality, are healthy and taste good. Local fish and cheese are comparatively more important than other local foods. Many types of local cheeses is only sold through the studied retailer; you can't buy them in other places except some special shops in Oslo or directly from the producer.

For fresh salmon and cod, they are all 100% local. The retailer meets the fish supplier at the port 6:00 am every day. What's more, the fish supplier can refill twice every day to suit Coop's orders. There are two distribution ways from farmers to the retailer. Many local farmers choose to deliver products by themselves. They come to the supermarket to ask if they need the foods they can supply. The delivery costs are then paid by the local foods suppliers. Another way is to sell through the retailer's regional distribution centre located in Trondheim, about 6 hours driving time away. Farmers transport their products to the distribution centre in their own vehicles. Then trucks from Coop deliver products to the shop about once a week.

The retailer has three procedures used to purchase local food. One is through PDA (Personal digital assistant) which is a mobile electronic device that functions as a personal information manager. This is the common way to purchase goods for the supermarket and applies to local foods distributed through the distribution centre in Trondheim. This mode of purchase is accordingly to a small degree associated with local foods supplies. Another is that the retailer orders goods from the local foods supplier by telephone. The most common purchasing procedure is that farmers first contact the supermarket directly by phone to enquire about demand. The quantity of goods ordered is such that local farmers can have a stable profit margin. Because of this retailer, these small local suppliers may survive. They are very dependent on Coop since there is only one more supermarket the same city that has some degree of local foods in their assortment.

Food safety regulations in Norway are very strict and administered by the government through Mattilsynet (http://www.mattilsynet.no/language/english). Local food suppliers are likewise as industrial food producers required to have the barcode and ingredient label on the packaging of the products. There are no special requirements compared to ordinary food. Furthermore the supermarket is required to take responsibility to check the quality through visual control and check the smell. Local farmers usually have a long term contract with the supermarket. Most contracts are signed or renewed in Coop's distribution centre. The contract will be for one year. The contract specifies the barcode label in details. What's more, local suppliers may through the contract not be allowed to supply their products to other Coop's competitors. The studied supply chains leading into the supermarket are illustrated in figure 2:

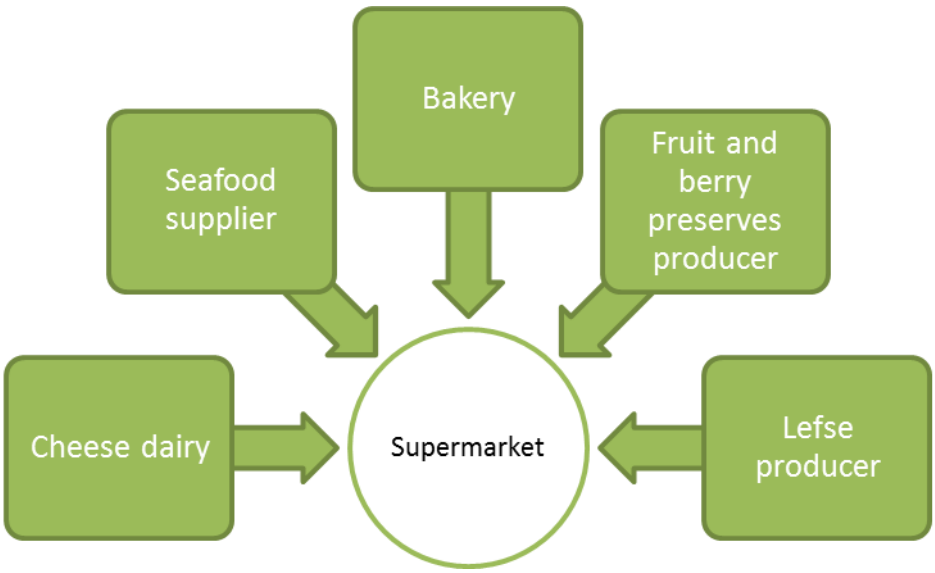

Figure 2. The studied local foods network

Seafood supplier

The retailer purchases all its fresh seafood from the studied fish retailer. It sells fish in its own store located in the city center, as well as to hotels, restaurants, schools etc. It has 5 staff members in the store: one driver, two salesmen, one main staff and the owner who operates the computer and phone. Most of

the fish is sold locally, only a small quantity of fish is from other places. It has four main local suppliers. In the morning the fish retailer calls them to purchase fish. Suppliers use third party logistics to transport fish. Every evening at eight and next morning at five, the fish store receives fish by cars or trucks from the small fishing ports in the vicinity.

The fish retailer receives around 1000 kg different kinds of fish every day. 700-800 kg of fish are used for trade. The seafood supplier provides 80% of its received fish volume to the studied retailer. The retailer will every night when the store is closed order the fish goods by fax. The ordered fish will be delivered to Coat the supermarket at 8 am the next morning. The whole period is less than 24 hours to insure freshness and quality. The fish retailer uses its own truck to transport fish locally.

Bakery

The local bakery is differentiated from other bakery goods suppliers through the quality of its foods. It is a handmade bakery which located in the centre of town. This location also functions as a trendy café. Besides bakery products, the bakery also sells coffee, chocolates and olive. In contrast to industry bakeries, handmade craft means doing almost everything by hand except dough mixing. What's more, the bakery does not use any artificial ingredients. They prefer to use ordinary whole milk and eggs rather than powered milk or egg powder. The bread they make is fresh and healthy which can only store for 2-3 days. The bakery has yet to earn a profit since its foundation 7 years ago, but the business has expanded from 1.4 million to 7.8 million gross annual turnovers. It even went bankrupt in 2011. The main reason was that they had high night salaries for bakers. Shop assistants had to make bread at night. They now they pay more attention to lean production and work therefore mostly at daytime which is less costly. A new store just opened at a better location than the previous one. Everything is going the right way now. There are 17 employees in the shop and some of them do part-time work.

The retailer was one of the first business customers of the bakery. The bakery chooses to cooperate with Coop and spends much time on this relationship to secure its sales. The retailer is the main customer and accounts for 42-45% of total sales volume. What's more, they both describe having a good personal tone of interaction with each other. They also supply a few bakery products to the other supermarket in the town that has taken in some local foods. Their operation is flexible. Canteens and coffee shops daily call in their orders to the bakery. Some business companies also order bread for meetings and other types of events. The bakery also supplies six of the canteens of the biggest companies in the town. Transport is carried out using its own van. It drives directly to the customers at 7-10 in the morning every day. One hotel is the first customer which wants to receive deliveries before 7 am. The retailer has a list of different products every day they want delivery before 8.30 am. However, one customer they have in neighbouring Ålesund uses its own transportation. They drive to Molde to pick up bread every Friday.

Lefse producer

Picture: Lefse production

The lefse producer was founded in 2002 when it was awarded government financing. The lefse producer mainly supplies products to the studied retailer and some other retailers in the region. People can also come to order fresh products and cakes for meeting and party. Lefse is made with potatoes, flour, butter, and milk or cream. It is baked on a griddle. It generally resembles a pancake or flatbread and has butter, sugar and cream inside. 6 different types of lefse are produced. Some of them are named according to the origin of the recipe. Potato lefse is a new type this year. Lefse cannot be stored for a long time in room temperature so it needs to be frozen. The sales of lefse are seasonal. It has a sales peak in the period of Christmas. Because Lefse sells very well, the profit margin of the company is good. The production of lefse follows an inventory push scheme, meaning they produce not based on orders, but capacity-based plans.

Their production plans are simple, they will stop production when the freezer is full. Now there are four people working there including part-time job.

The lefse producer delivers its products by their own reefer truck. They drive to the retailers once a week and twice a week to customers Trondheim. All the raw materials like butter, sugar and cream are ordinary raw material food supplies. They don't have local suppliers. The production craft is simple, but the recipes of lefse are old and local. It was learnt from their ancestors. The main reason why they operate the company is to increase income and help local people. The company was established with several owners. Because the two owners now are retired, the future development of the company is based on the young people they have hired.

Cheese dairy

The cheese dairy is located at a farm. Cheese and the production of other dairy products production started in 2003 using the farm's own milk production. The dairy is one several local cheese suppliers of the retailer. The motivation for local foods production is to work on their own farm since farming itself provides limited revenues. The self-produced cheese adds more culture and tastes therefore richer. The cheese dairy produces 9 kinds of cheese and other dairy products like yoghurts. They haven't developed any new products in the past few years. Cheese can be classified as soft cheese, half hard cheese and hard cheese. The production time is 3-4 weeks, 8-10 weeks and more than half a year respectively. Soft cheese can keep for 10 weeks while hard cheese can keep for 2 years. But if hard cheese is cut, the durability will shorten. Besides cheese and yoghurts, the cheese dairy also sells at their farm shop some local jams and syrups from other local foods producers in the same municipality. Local famers also help each other to sell and transport products. The organic milk is produced in their own farm. The total milk production of this farm is 20 000 litres per year. The production is continuous all year around. Besides cheese production, the farm also operates another business hosting local social events, and people have meetings here. They are served a lunch based on their own produced cheese.

In summer, many tourists visit the farm in the shop, where they taste products, in their coffee shop. The two owners of the farm both have other jobs. Besides the owners, the farm only has one part- time hired worker. During the last couple of years the dairy farm also distributes its products to a range of farmers' markets. However, last year they only attended two big markets in Ålesund (the largest city in Møre and Romsdal county) and Oslo because they didn't have a sufficient level of cheese production. Over time selling the products has become easier because of its developed market reputation. Local cheese usually has quite high price, but there is also a lot of work to produce these cheeses. It's handmade and takes time. The sales volume of dairy products is almost stable. With selling more and more yoghurt, they increased revenues since yoghurts use less milk raw material than cheese production. Since it is a milk producer it also is a shareholder of Tine which is the largest Norwegian cooperative dairy company. Tine's distribution system covers all of Norway. It helps local farms to pick up goods and send directly to their customers. The cheese dairy sells its cheeses to restaurants and hotels at tourist attractions in their region and in some special stores in Oslo and Bergen through Tine's transportation system. In the first year, they travelled around as salesmen, called some restaurants and asked about if they wanted to taste it. The yoghurt was delivered there every two weeks based on orders delivered by phone or email. The cheese dairy also sells cheese to various regional supermarkets. The studied retailer is the cheese dairy's fourth biggest customer. It orders products once a month by text messages on the phone. These deliveries are transported using the farmer's own van because they quite often they have something else to do when in town. When transporting to another supermarket in another city close by they use Tine system because they don't go there as often. Both cities are about 30 minutes driving time from the location of the farm.

Fruit and berry preserves producer

The fruit and berry preserves producer is located at a farm in the vicinity of the chees producer and these two farms cooperate in selling each other's products. The owner runs a small farm raising sheep and chicken and growing herbs and berries. The owner started the business because her child was born at that time, and she didn't want to leave the farm so she had to create her own job. Twenty years ago, the land of the farm was poor. It was a swamp. In the beginning, people just came to the farm for brief visits. Now, it can offer space for small functions, conferences and courses. It has a dining area and accommodation. Therefore more and more groups come here to hold meetings. The farm shop has many kinds of products made or processed from the farm. Most are seasonal. These are a variety of jams, juices, syrups and handmade soap. Additionally, it also sells spices, tea, herbs and eggs in the shop. Some these products come from other producers. These goods are differentiated since the production craft is old and traditional. Some recipes are regional and traditional. You can also find some products from other local farmers. The local farmers share products with each other. The farm shop only sells products locally

because the transportation cost is high and glass bottles are heavy. The farm is not profitable. Its turnover is very small. But the farmer enjoys running its business. Its main customer is the studied retailer and a few other local shops around their location. Glass bottles and sugar are the two biggest supplied products. The farm receives them once a year. The preserves producer delivers products to its customers once a month by its own truck. On the way back, it also loads some products from other farmers. They also sell these products in their own farm shop. In this way, it helps local farmers build network to transport together. It can reduce the empty transportation costs and share products among local farmers.

5 Analysis

Table 1.
Supply logistics of the studied companies

Table 1 below provides an overview of key logistics variation between the interviewed firms:

	Seafood supplier	**Bakery**	**Lefse producer**	**Cheese dairy**	**Fruit and berry preserves producer**
Employees	4	17	4	Family, with 1 part-time	1
Main supplies	Fishermen	Industrial foods	Industrial foods	Own milking cows	Own berries.
Inventory	Supplied and made to order	Made to order	Made to stock	Made to stock	Made to stock. Seasonal.
Transport	Own van. Long distance by LSP*	Own van	Own van	Own private car. Tine system for long distance supplies	Own private car
Frequency to Coop Mega	Daily	Daily	Weekly	Monthly	Monthly

For most of local producers, working to produce local foods is economically speaking not deemed as good because of low income and a heavy workload. Some of the producers also seem to have limited choice because of very different reasons. They are local producers because the resources have been inherited. They grew up on the farm, or the company was started by a grandfather as in the case of the fish supplier. For most producers supplying their local foods is clearly a passion that is hard to part with. The reason can be divided into two parts, internal and external. The internal reason is the desire to take care of own children, land and hobby, while the external reason is that it is hard to find a job and some are compelled by traditional culture. The internal reason is related to gender, since women take more care of family and children; the main purpose is to have sufficient earnings instead of expanding, although some want to expand. Some local foods producers also provide service add-ons to attract people like accommodation, meetings, tourism, restaurant etc. These kinds of activities can boost its main business and help them survive in a brutal competitive environment. The competition is from both industrial food companies and similar local food producers. Almost all of the producer informants in this study expressed that “a lot of local producers disappear each year”. The local foods supply chain is accordingly characterized by a vague borderline between the private and professional sphere of the local foods producers.

The transportation method is mainly self-transport. That gives the local food producers flexibility, fast delivery and high frequency. They find simple synergies through their transport function in their loosely coupled logistics system. They can do different things at the same time during transportation like shopping, purchasing, meetings, including the delivery. Self-delivery provides accordingly more flexibility for the farmers’ private life and shows how the borderline between business and pleasure in local foods production is moving and not entirely clear. For more distant destinations, they use joint distribution, or third-party logistics by wholesaler. The logistics of the local foods suppliers is short, but this is only natural given their small size and that they have not yet expanded to handling a larger market except for minor surplus foods. However, in cases of distributing foods over longer distances, the local foods producers employ the use of logistics service providers. This shows potential for that the local foods producers are not strictly bound to being local if a business opportunity is found at a greater distance.

Logistics is in this network case often carried out by the local producers themselves. This applies mainly to deliveries in the local market region. Because their operation is small sized with not many full-time workers and the production volume is quite small, they express they have no need for outsourcing their transport operations. In cases of fresh local foods, the use of inventory is limited for finished goods limiting this aspect of logistics. The lefse producer freezes their products and may buffer supply. In general small local producers are responsible for simple packaging, warehousing, and transportation. The inventory strategy involves different types. One way is routine and contract-based, a form of push strategy. The other is inventory based. When inventories are low, an order is placed indicating a pull strategy. In cases where supplies are daily to Coop Mega, supplies are based on a relatively predictable contract-driven flow that is more push-based. The lefse supplier and the preserves producer follow an inventory-based strategy. Their products can be stored. For lefse, they will stop production when the freezer is full. That is also true for two cheese producers, at least regarding hard cheeses. There are many challenges to local foods producers like small company size, quite tough market competition, deficient raw material supply, high transportation cost to distant places, etc. Local producers have a limited possibility to break these limitations. They seem therefore inherently in need of government aid. The government can provide help in terms of finance, technology and resources. There are several strategies to help local producers develop. They have started to build a local food hub to establish an efficient logistics system through horizontal integration with other local foods suppliers.

The supply chain of local foods is clearly shorter than for the modernistic industrialized food system. The local foods system is quite dynamic since this smallness also creates flexibility, essentially because most production has a strong manual proportion and complexity is low meaning that a single person can comprehend how to manage their supply chain. This short supply chain has the advantage of fast reaction, short lead time, and direct relationship. The inventory and production strategy they used is based on the product shelf life. Normally, the production will not stop unless the freezer is full. Also the durability affects the transportation strategy applied where more freshness will require more frequency and small volume each time. The local foods suppliers are generally focused on networking and developing relationship ties with suppliers, and most distinctively, with partner local foods suppliers. Developing efficiencies of small scale in the logistics of local foods chains is a pertinent path of local foods development. Close buyer-supplier relationships are characterized by relatively routine problem-solving interaction. From the perspective of the food retailer, these interactions are of minor importance; each local foods supplier a small supply chain actor. Still, possibly due to the upmarket quality character of the local foods, quality interaction is valued in the relationship. The supplier often meets up in person with the goods at the supermarket. Some suppliers are more important since they account for a very visible supply in the supermarket, such as the bakery and fish supplier. The local foods supply chain can based on Sampson (2000) model of service supply chains be modelled accordingly:

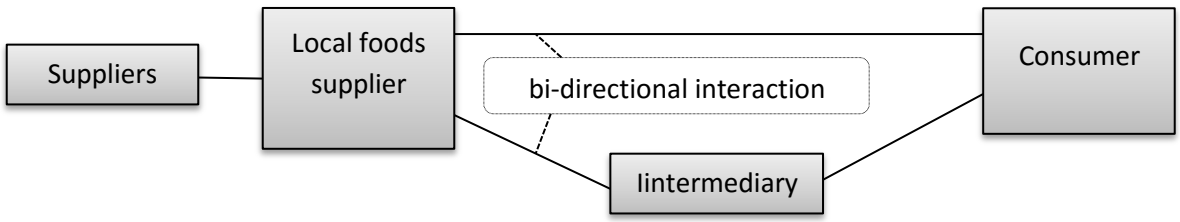

Figure 3. The local foods supply chain

The interdependency between Coop Mega and its local suppliers is relatively high. This is a reciprocal form of interdependency. This feature differentiates local foods supply from modernistic industrialised food supply. Interaction between the food retailer and its local foods supplier is foundation for supplies of local foods. This supply, being manual, indicates trading similar to what Sampson (2000) terms bi-directional interaction. This indicates operational similarity with service supplies even though in cases of local foods supply, this is physical distribution. These local foods suppliers are however small, so the impact of these relationships on the food retailer own identity and market positioning are limited but still represents an important component in its branding effort. It is fair to say that the local foods suppliers are more in need of their supermarket customer than vice versa. However, the local marketplace being relatively transparent, the food retailer is clearly careful in maintaining good relationships with their local foods suppliers, not mainly to make large sums of money on this small sector of business, but to ensure the totality of the supermarket.

The exchange economy is therefore vital in local foods logistics systems to support trading and ensure quality logistics. The local foods supply chain may be described as similar to service supply chains given the use of intensive technology. The local foods chains are naturally grouped given the proximity of actors in the supply chain facilitating the economic use of intensive technology. This use of technology is relatively effective since the scale of production is small, people enabled because of this small sizer to easily manage trading and logistics in these chains. The efficiency is, however, dependent on the hard work of the local foods suppliers. The quality of interaction and logistics efficiency is dependent on communication skills of the actors involved. These interactions are, however, not associated with high levels of uncertainty nor of complexity. This entails that the use of intensive technology is a luxury that the local foods chains use simply because the shortness of the chains makes this use of exchange resources cheap.

To a lesser degree the local foods chains utilize long linked technology as management principle involving planning to level the flow, forecast or buffer. These features exist, but do not characterize local foods supply. A potential to develop the chains is according found through improving the mediating technology. This implies standardizing products and the information flow. This may involve developing reasonably-priced information systems that interlink the local foods with their customer. Such systems may also improve their direct distributing efforts through interlinking them with consumers directly. As the costs of using information technology decreases, including the use of mobile phones and computers that may both be used for private and professional purposes, the main challenge is understanding the potential of new information technology as well as adapted systems.

6 Conclusion

This study indicates accordingly that local foods supply is fundamentally different from modernistic industrialized food production and distribution. The only grain of power they possess in their market is their reputation coupled with customer awareness of this reputation expressed through their brand. All in all they are weak network actors and need therefore to predominately manage *navigation* in the supply chain. Complexity is abundant and production and exchange therefore predominately emergent. They therefore need to be proficient networking agents.

Efficiencies are still pertinent to local foods production and are associated with a high degree of manual labour use and specialized production of few products using the same resources as well as flexible transport using resources that have multiple uses. Interdependencies in modernistic food supply are predominately sequential involving long-linked technology. Since efficiencies are associated with flexible resource use, the manual aspect in production, and the transport resources, in local foods supply networking is the all-important supply chain activity to sustain local foods production. These efficiencies are tightly coupled with effectiveness measures informed by customers through dialogue.

This implies that reciprocal interdependencies are most predominant in this form of physical distribution and is directly associated with local foods supply effectiveness and indirectly with its efficiencies. This also provides a view that as an industry structure, local foods production has much in common with many forms of reciprocally interdependent service supplies. These local foods supplies are short in structure due to the logistical proximity of the supply chain actors, just as in service supply chains. This structure is effective to the degree its structure facilitates quality interaction with customers. It is efficient since it is simpler to organize production with few flexible resources in such a chain. Though not a part of the services industry, local foods supply is mainly a service organisation.

Since effectiveness is the prime challenge of local foods supply, this also implies that in developing local foods supplies efficiencies can clearly be found in developing the exchange economy, how the local foods producers interact in the supply chain with other actors. This involves both vertical and horizontal integration. Simply stated local foods suppliers are recommended based on this developed conceptual model and associated understanding of interdependencies in the exchange economy to develop their business as a service offering and not on the premises of modernistic food supply structure. How this may be done in practical terms represents a direction for future research. If the local foods suppliers wish to develop their logistics systems, developing interconnectivity, the exchange economy in their supply chains through use of low-priced information technology is recommended. Future research may account for such development based on the theoretical framework developed through this research. Future research may also attempt to provide more detailed empirical evidence regarding how local foods supply may be regarded as both efficient and effective, how these aims are interrelated in the context of short local foods supply chains. This endeavour may be studied in the context of both developing as well as developed nations where traditional forms of distribution have different roles.

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