

Cooperation between farmers in feed production and use of manure

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Abstract:

The objective of the research project was to explain the benefits or advantages of cooperation in manure management and feed production from the point of view of the agricultural entrepreneur and also describe the (strategic) significance/relevance of these cooperation forms for the whole farm business. The role of risk in land management and various innovative approaches regarding mutual cooperation and the importance of trust and commitment was sought for. The theoretical background is based on the theory of strategic management on farms as well as resource based theory. Semi-structured interviews with eight farmers were carried out in the region northern Savo in eastern Finland in March-September 2015. The interview transcripts were categorized by conventional and directed content analysis. The cooperation between crop and animal husbandry farmers could be classified in various categories of looser and closer strategic cooperation. Benefits mentioned were partly clear economic benefits like reduction of costs, savings in labour time but also a range of benefits not explicitly economic like guaranteed deposition of produce. Access to organic nutrients as well as access to farm land for manure spreading, better crop yields, better crop rotation and land management were other direct benefits mentioned. Economic benefits could be divided between short-run (one year or less) and long-run (5-10 years) benefits. Farmers mentioned trust in one another and well working personal relationships as the particular condition for cooperation, which was also obvious by the lack of written contracts. Cooperation mainly was regarded as reducing risks even though in three cases cooperation also was seen as involving risks. Commitments varied from mutual cooperative arrangements to quite concrete short-run practical arrangements which can be categorized according to two axes: organizational bonds and managerial bonds. Themes which clearly emerged from the interviews were long-term goals, understanding of the operational environment as well as the competitive factors arising from resources of the farm.

Keywords: Cooperation, networks, farms, strategic management, trust, risk, manure, feed

1. Management and leadership of farms in changing environment

In order to better analyse the operational environment of a farm enterprise, a division is made between internal and external operational environment. The external operational environment consists of forces that “are considering decision-making and actions of a farm enterprise” (Haapanen et al 2004). This refers to clients, business partners, competitors and other external factors. The latter includes matters affecting national economy, political decisions, technological improvement, environment and nature. Daft (1997, 75) divides the external operational environment further in two. The primary external environment consists of the indirect social, demographical and economical forces affecting the enterprise and direct external environment of the competitors, suppliers and clients of an enterprise.

The Common Agricultural Policy (CAP) is part of the external operational environment. The emphasis of CAP is moving from farm support with interventions, restrictions of production to decoupled subsidies and setting environmental obligations to farmers (Niemi et al. 2014). At the beginning of new Rural Development Policy period also the greening element, meaning stricter environmental guidelines as a condition for subsidies, has gained more importance (ibid). The milk quotas as a restriction of production have ceased to exist from the beginning of the year 2015 (European Commission 2009). These actions mentioned above can be considered to reduce the restrictions of production and competition and also to liberate the operational environment of farm enterprises.

Society also appears to have an interest in environmental conditions and handling of nutrients in primary production. The Finnish Government has made a commitment to reach a good environmental state of the Finnish Archipelago Sea and this is carried out by improving the nutrient recycling efficiency by using the tools of the current Rural Development Programme. The aim is to be a model country of nutrient recycling by the year 2020. (Ministry of Agriculture and Forestry 2015) In recent research of consumer preferences the environmental effects and sustainability of food production have also been noted (Peltoniemi & Yrjölä 2012, Latvala & Koistinen 2012, Heikkurinen et al.2012).

The increasing market dependency and removing the control mechanisms of production can be seen as a challenge for Finnish agriculture. The external operational environment has become more unpredictable. A recent example of this development is the crisis in Ukraine and the harsh effect of Russian counter sanctions to the Finnish food industry market and especially in milk production. The producer price of milk in October 2015 was 14 percent lower than in October 2014 (Luke 2015).

The Finnish food market is part of the international food markets. An individual farm enterprise is a price taker, i.e. it cannot determine the price of its product (Sipiläinen et al 2012), but it can try to modify the cost structure of production techniques and business partners on the horizontal level (Laitila et al 2014). Direct business to consumer marketing changes the position an individual company has regarding the price levels, but it is still rare in the Finnish food market (Luke 2014).

1.1 Strategic management and resource-based view

”Strategy is not a detailed plan or program of instructions; it is a unifying theme that gives coherence and direction to the actions and decisions of an individual or an organization.” Although Grant (2002, 4) above tells that strategy is not a detailed instruction program, it is flexible to be described in a certain framework. The cornerstones of a strategy are long-term, mutually agreed-on goals, in-depth understanding of operational environment and competitors and analysis of resources in use. A successful strategy is always put into practice (Grant 2002, 4). Strategy tells us which way is chosen and how value is being created. (Miles & Snow 2005) The concept of strategy is not unequivocal: according to Mintzberg (1987) strategy can be described as a plan, ploy, pattern, position and perspective.

Out of Mintzberg's (1987) classifications, especially strategy as a position is useful for our purpose. Position is a company's place in its environment, so strategic positioning is the linkage between internal and external operational environment (Mintzberg 1987, ref. Hofer & Schendel 1978,4). In the farm enterprise case, strategy is crystallized in combining the production factors in an economically optimal (most profitable) way. This assumption is rooted in the fact that the fixed production factors used in agricultural production cannot be acquired quickly and with low cost. If a farm does not possess all production factors it needs for profitable production, it will most likely try to get access to them on its own or with business partners.

Resource can refer to anything which can be a strength or weakness to a firm (Wernerfelt 1984). Tangible objects such as land and production facilities are resources as are also intangible information-based concepts like know-how and organizational culture (Itami & Roehl 1991). The resource-based view can be condensed to a thought of strategic resources scattered unequally to firms, which can reach competitive advantage by following a strategy exploiting internal strengths and avoiding internal weaknesses and external threats (Barney 1991).

Understanding the meaning of resources and exploiting earlier unconscious resources are challenges for management and leadership. Itami & Roehl (1991, 12-13) describe intangible resources as a true source of competitive advantage and ability to adapt. Intangible resources are mostly difficult to access, they can be used for many purposes simultaneously and they can be both inputs and outputs in production processes.

Controlling intangible resources as the competitive advantage's starting point is the base of a resource-based view (Barney 1991). In the case of farm enterprises the use of resource-based theory in monitoring strategic choices of entrepreneurs can be based on the non-transformable and unmoving nature of such basic elements of internal operational environment as fields, other land and their location. The form of tangible resources is unique in every farm. The internal infrastructure of a farm in the form of field locations in relation to buildings, routes and water resources can either give good possibilities to operate as a single farm or push the farm to exploit its networks and to co-operate with other farms to control machinery costs. Also Inderhees and Theuvsen (2009, 256) look at strategy from this viewpoint. Although the tangible resources are easily noticed, also the intangible resources play their role in the operational environment. The know-how of entrepreneur and the paid workers have and their way to communicate and operate are also the base of the strategy work a farm enterprise is executing. One long-term strategy can be co-operating with other entrepreneurs to control or reach competitive advantage relative to other farm entrepreneurs operating in the same area.

Minimizing costs while being mostly price taker in product selling is the ground for fitting farm enterprises into cost leadership strategy followers. When a farm enterprise is producing and selling special niche products to consumers or retailing it can be described as a differentiating strategy (Laitila et al 2014). Fulfilling the quality demand of food industry is the unavoidable basis for a farm producing unspecified milk, meat or grain products. Also the scale of enterprise is smaller than ordinary industry company aiming towards cost minimization. Without creating comprehensive definition of cost efficiency (for example Harju & Koivukoski 2014; Laitila et al 2012; Mäkijärvi 2012), it is said to be better applicable to farm enterprises when compared to pure cost minimizing strategy (Vihtonen 2007, 11)

1.2. Classification systems for networks from earlier research

Farms that are cooperating with each other can be classified in many different ways. Laitila et al (2014) is classifying farm according to Figure 1.

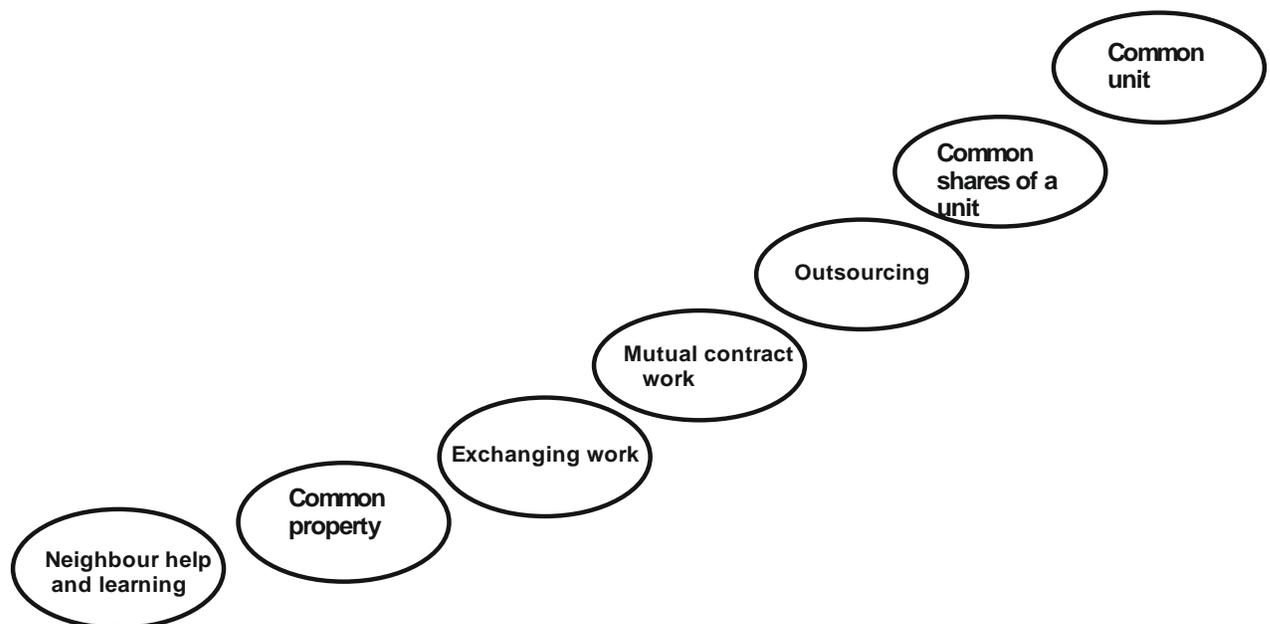


Figure 1. Adapted from Ryhänen and Laitila et al (ed.) 2014

According to Ryhänen and Laitila (2014) the cooperation can be classified on a scale of deepening cooperation as neighbour help and learning, common property, exchange of work, mutual contract work, outsourcing, common shares of a unit and a common unit.

Vesalainen and Asikainen classify the firms in the SME sector according to purchaser-buyer relation, agreement (e.g. agency, licence, franchising or outsourcing), exchange of resources, common use of resources, joint venture and acquisition or fusion of firms.

Varamäki (2001) and Varamäki and Vesalainen (2003) as well as Hakanen (2007) use the classification presented in Figure 2.



Figure 2 Classification of multilateral cooperation. Adapted after Hakanen et al. (2007) and Varamäki (2001)

A development ring as presented in Figure 2 is a free forum for exchanges of information and interaction. A cooperation ring is a further development of the development ring where a common resource has been acquired and to which the members have a use right. The aim of a project group is to improve the strategical comparative advantage of the members or to reduce transaction costs. A common enterprise is a further integration of cooperation where a common business has been developed while members maintain their own business strategy. A common unit finally merges the business strategies of the members.

A common strategy can be evaluated also with the evaluation criteria (elements and ties) developed by Vesalainen (2002) presented in Figure 3.

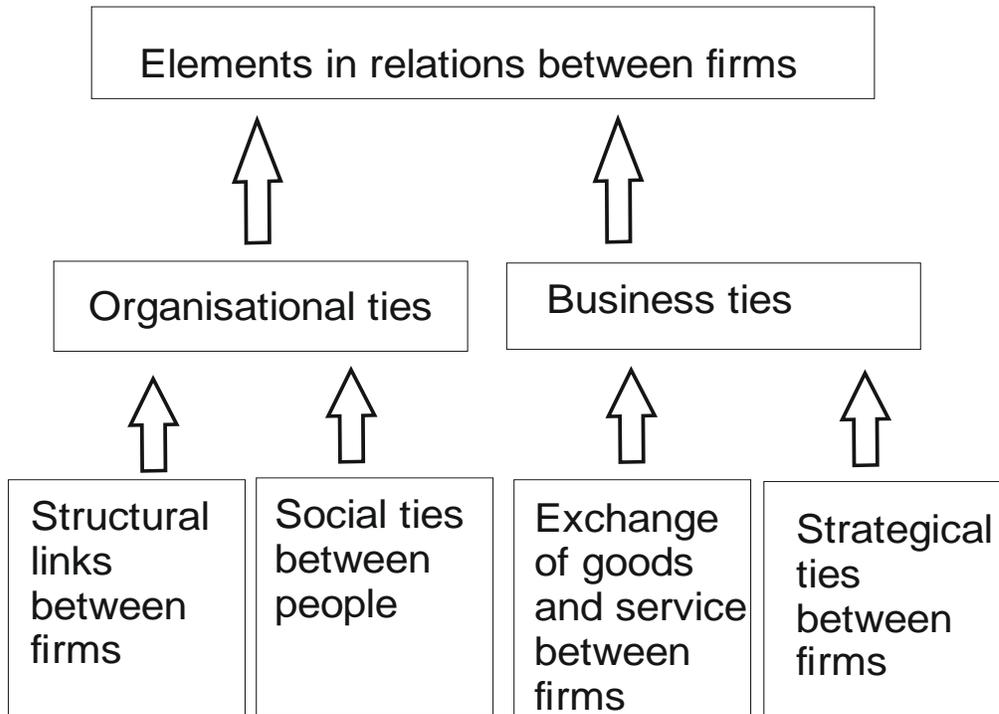


Figure 3 Elements in relations between firms. Adapted after Vesalainen (2002)

The organisational ties in Figure 3 are both structural and social. Thus, in the criteria used by Vesalainen also the social commitment is observed. Business ties and commitment divides into exchange of good and services on the one hand and strategical significance on the other hand. Strategic ties may be based on specialization and complementary skills while the strategical goals are the same according to Vesalainen. The development from a market-based relationship to a partnership is illustrated in Figure 4.

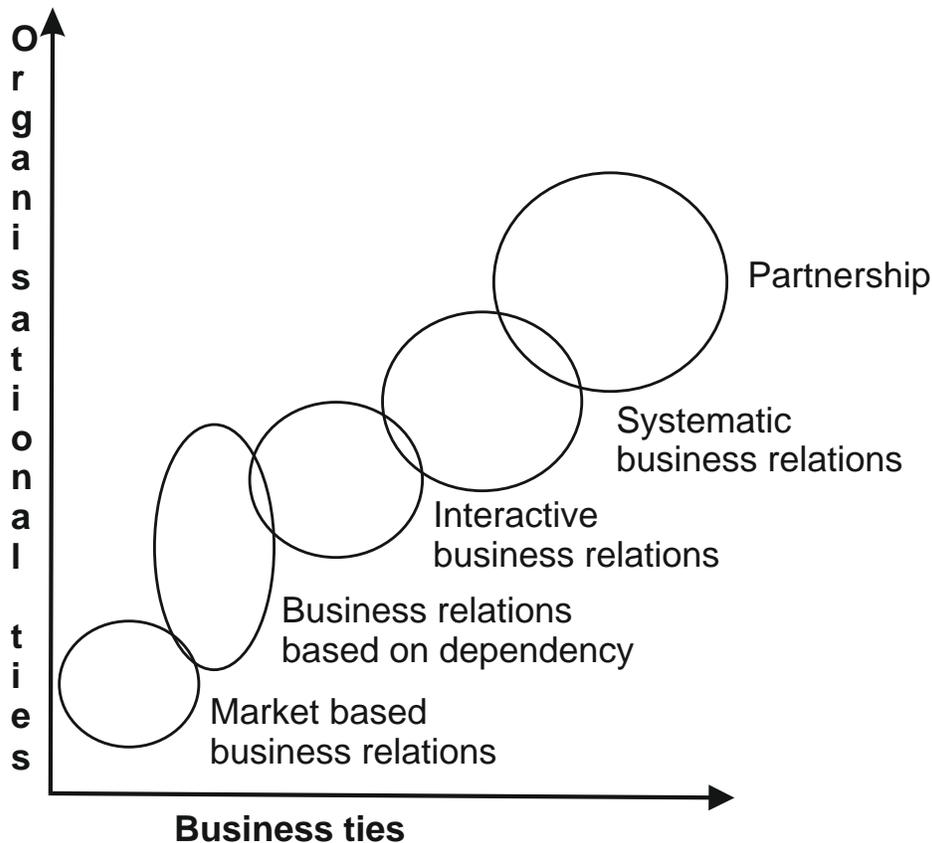


Figure 4. Network based development stages. Adapted after Hakanen (2007) according to Vesalainen (2002)

Market-based relationships are based on physical exchange of goods. Relationship based on increasing interaction differ in that the dependence based on social ties and trust are more developed. The deepest form of cooperation is based on ties where all core functions and work have become common for the cooperating parts.

2. Aim of the present study

The aim of this study was to understand cooperation between farmers from the point of the entrepreneur and to find some regularities in the forms of cooperation between farmers. A specific aim was to investigate what significance the particular co-operation had for each farm size and what kind of costs and benefits arise from this cooperation. This aim was realized through a set of more specific questions:

What is the history and current state of cooperation at the moment?

Which are the main goals of the farmers for cooperation?

What kind of management means do the interviewed farmers mention?

How do the farmers experience their benefit from cooperation?

What has been agreed on and how do farmers explain commitment to cooperation as well as the risks arising from it?

What kind of pricing models and models for cost distribution and practical division of tasks do the farmers mention?

What is the strategical significance of cooperation?

What kind of future plans, plans for development and needs have been created through cooperation networks and how has the cooperation evolved?

2.1 Outline of the study

This qualitative study was carried out as a multi-case study through eight theme interviews. The interviews were all carried out in North Savo region, Eastern Finland. Regional restriction was made for ensuring the equal environment of activities for all interviewed entrepreneurs.

The study was supported by local rural consultant organization, ProAgria North Savo. Support was given in form of a name list of potential entrepreneurs. Contact was made by the researcher. The interviewed entrepreneurs were chosen purely by the cooperation form they were practising, not by the economical or physical size of farms or by the intensity of their production. The interviews were iterated by exact words except when some family members interfered. The interviews gave saturation i.e. same observations started repeating themselves) (Hirsjärvi ym. 1997, 171). The number of investigated networks was six whereas eight interviews were carried out.

The material has been classified into tables partly based on the repetition of observations, partly based on earlier theory. The classification is presented in Table X. Both conventional and directed content analysis was applied according to the definition of Hsieh and Shannon (2005)

Ways of leadership, types of cooperation and agreements has been based on earlier investigations. The depth of cooperation is based on scales developed by Laitila et al (2014), Hakanen et al (2007) and Vesalainen (2002).

The eight interviews were not carried out with farmers participating in similar forms of cooperation. A deeper examination of cooperation could have been possible if the study had been limited to partners of only one network

3. Results

3.1 The current situation of the cooperation

The ongoing cooperation form was for five interviewees cooperation between a cattle and a grain farm. This kind of cooperation included selling grain, smashed grain, hay or silage, and using cattle manure also for the grain farm's fields. Two interviewed entrepreneurs also had plans concerning cooperation in manure use but currently cooperated only by buying feed for cattle from a grain farm. One interviewed entrepreneur had recently reduced the intensity of cooperation and it included only selling grain and renting fields to a cattle farm.

The common nominator for all eight interviewed entrepreneurs was the complex network of cooperation relationships. The most important cooperation form included also paying work with work, buying labour or selling it to cooperation partner and cooperation was also practiced with other, less important partners. Four entrepreneurs had machinery or buildings owned together with other farmers. All interviewed had also former experience from cooperation but the importance of the former cooperation form varied.

The initiative for cooperation between farms was taken in four cases from a cattle farm. The other four entrepreneurs did not clearly indicate the initiative. The need for additional resources for cattle farm as more field to use cattle manure or to ensure feeding when production was expanded was the reason for the initiative. Also two more entrepreneurs had sought cooperation relationship because of lack of labour resources.

The duration of cooperation relationship was under three years in five cases, which included both feed production and manure use. The duration of the cooperation for the other three interviewed entrepreneurs was over three years and in one of these cases also the parents of current owner were already practicing some kind of cooperation with the same partner. The distance between cooperative farms was most commonly under 15 kilometres.

3.2. The goals of the activities according to the farmers

The interviewed entrepreneurs named from one to three main goals to their business. Both economical and non-economic goals were named by three entrepreneurs, two entrepreneurs named only economical goals to their business and the last two named only non-economical, production orientated goals.

Five of eight interviewed entrepreneurs named economic success or improving their financial situation as a main goal for their business. Economic success was presented for example as a goal to receive adequate level of income for two adult persons, as a goal to make profit or as efficiency goals, which result in increasing profits or decreasing costs. An efficiency goal was for example lower feeding costs compared to other possibilities of acquiring feed. Most of the farm enterprises claiming economic goals were practicing animal husbandry.

Five interviewed entrepreneurs named developing crop production as the main goal for their business. Goals in this category were named as a product with good quality, high yield, and diversification of land use and taking care of the environment. It is possible and perhaps even likely that economic goals can be set behind these production-oriented goals, but in this study economic goals were only directly named as economic by the interviewed person (see Figure 5).

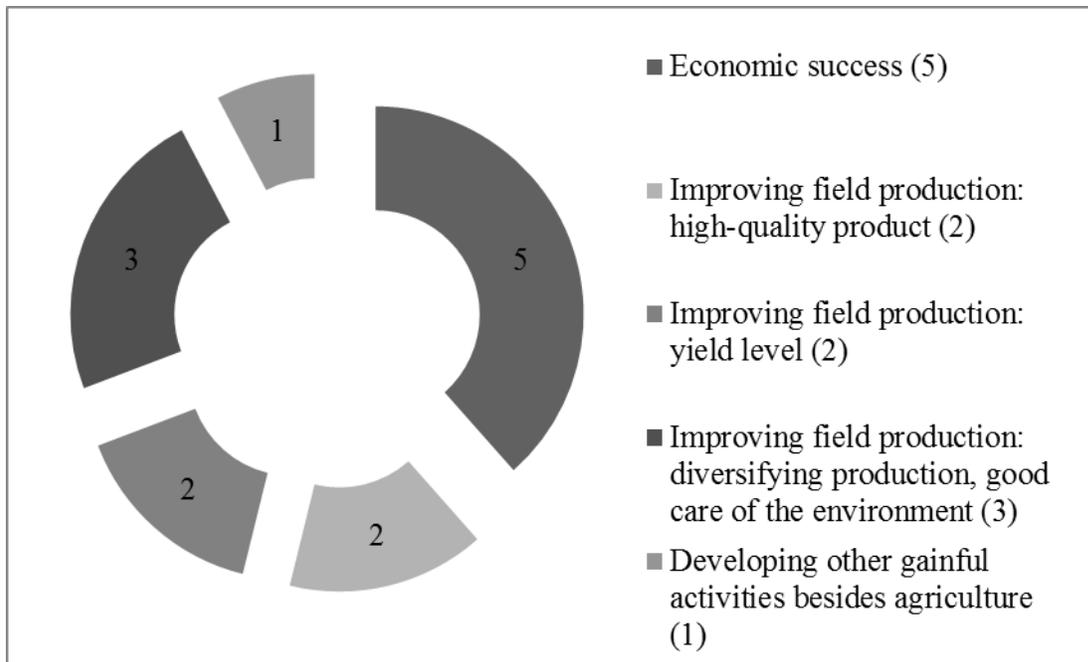


Figure 5. Main goal of the farm enterprise according to the farmer

The data in this study supported the assumption of former research: farm enterprises having both economic and non-economic goals. The latter category would for example frame situations when the main reason for practicing agriculture is the chance to have a rural living style or work without given working hours, not to make economic profit. In this study the goals verified slightly according to the cattle or non-cattle status of the farm.

3.3. Leading and managing the business

The interviewed entrepreneurs were asked to describe their financial management practices. Making calculations and analysing them especially when the company is in investing phase has in some earlier research been connected to the economic success or efficiency of the farm enterprise (Puig-Junoy & Argiles 2004). Thorough control of the economic state of the farm has been seen as being useful for the entrepreneur (Harrison 2006). Also personality and competencies of an individual entrepreneur has been weighted, when exploring the connection between the practices of financial management in use and the economic success. (Mäkinen 2013; Öhlmer & Lönnstedt 2004; Tarabla & Dodd 1990)

In the interviews of this study, the practices of financial management were not listed for the interviewed entrepreneurs: they named and described them autonomously. This style of questioning could have led to a situation, in which the interviewed person did not list all the actual practices, if part of them were completely intuitive and non-conscious and therefore difficult to describe.

The interviewed entrepreneurs named spontaneously from one to five practices or tools for financial management. Altogether nine tools or practices were named. Three from nine named practices were actually announcements which were demanded from the entrepreneur by the

officials: bookkeeping, applying for monetary subsidies for agriculture and making the annual tax announcement. These practices could not be taken purely as free-willingly carried out activities. Despite this, planning the application for subsidies and taxation can have concrete results in turnover and economic success of a farm.

Other mentioned practices of financial management were budgeting, analysing the last year from an economic perspective, following the actions in the farm's bank account, pay back method and gross margin calculation. Analysing last complete year, making tax announcements, creating a long-term cash-flow sheet and applying for subsidies were most commonly bought as services from a consult.

Earlier research has concluded, that the entrepreneur's view of the economic situation of the farm enterprise is more optimistic than the common key ratios used in research and that the assumptions are based on short-term cash-flow projections (Mäkinen et al. 2009). Three of the eight entrepreneurs in this study named only practices of short-term financial management and five of eight named both short-term and long-term practices. From these five, four entrepreneurs also mentioned long-term or medium-term economic planning and there was included discussion from production-based point of view in which the cooperation activities were included. Four out of five interviewed naming long-term financial management practices had also named economic success as a main goal for their enterprise. From these four entrepreneurs one had only crop production. Analysing the last full year from an economic perspective, payback time calculations, long term cash-flow projections and applying for monetary agricultural subsidies were classified as long term practices or tools in this study. The last one was counted as a long-term practice because in the beginning of the new Rural Program season entrepreneurs make decisions which cover the whole five-year program period.

3.4. How do the farmers perceive benefits of cooperation?

The interviewed entrepreneurs perceived that they received several different advantages through cooperating with other farmers. Three out of eight interviewed persons named at least two different advantages. Direct financial advantage meaning decreased costs based on increased efficiency, increased profits or time advantage was mentioned altogether by six interviewed entrepreneurs. Time advantage was named by three interviewees, in which case the labour input of the entrepreneur was not sufficient to fill all labour demand of the farm enterprise, and the entrepreneur needed to ensure the missing amount of input by outsourcing or cooperation. These experiences of advantage achieved by cooperation were in connection to the earlier study, in which one of the advantage bundles of cooperation were actions which were extremely seasonal like silage making and in which the demand for labour input was over normal level (Laitila et al. 2014).

Other group of advantages included the possibilities to improve crop production. Three entrepreneurs of crop farms named as advantages the positive effect the cattle manure has to soil structure and the abilities the cattle manure has as a supplement for industrially produced fertilizers. Also one of these three mentioned the possibilities cooperation gives to improve monoculture on the field as an advantage.

The indirect advantages were discussed by four interviewed entrepreneurs. These advantages were described as remarkable as the direct financial advantage or saved labour input gained through cooperation. One interviewed had difficulties to describe the advantages gained through cooperation at all. The altogether advantage of cooperation seemed to consist of monetary or

temporal share and less perceptible, non-monetary or option-shaped share. The total monetary value of cooperation was therefore not unequivocally represented but could also include possibilities which were not yet exploited.

There was a connection between the economic success and the advantage experienced through cooperation: the three entrepreneurs who named economic success as a main goal for their business also named cost savings or improved efficiency of the production as the advantage of cooperation. In this were included the entrepreneurs who named time advantage as an advantage. Besides this, the five entrepreneurs who named quality of the product, high yield, taking care of the environment or avoiding monoculture in crop production as a main goal, described guaranteed market for their product, nutrients in manure or diversifying crop production as advantages gained through cooperation.

3.5. Strategic importance of practised cooperation forms

The importance of cooperation form was analysed in this study through paying attention to comments about risk, trust, and commitment. Cooperation classifications from Vesalainen and Varamäki were then applied to cooperation forms found in this study.

Three of the eight interviewed entrepreneurs saw, that practicing cooperation with other farms included risk. One of these was a cattle farm and two were crop farms. On the other hand, other two entrepreneurs of crop farms described the cooperation precisely with this partner did not include risk or included only marginal amount of risk.

The main conclusion concerning risk is that seven out of eight entrepreneurs described cooperation with other farms as an element reducing the total risk of their business. The risk-decreasing effect of cooperation was according to the entrepreneurs based on the increased leeway on land use and optimizing crop choices for own fields. The burden of on-field activities was partly taken by the cooperation partner or the extra land in use through cooperation helped in following the environmental guidelines the entrepreneur was pledged to when applying agricultural subsidies. Also the existence of networks was a safety net which secured the farms ability to function normally when abnormal, unpredictable situations occur.

The level of commitment to the cooperation was described by seven out of eight entrepreneurs. The discussion of the meaning of the cooperation included also inconsistency. When asked, the practised cooperation form was described as binding both partners, although there was no written contract of the cooperation or the contract was only made when some officials demanded it. In two cases the interviewed entrepreneur first heavily weighted the independent position of his/her farm and then admitted the importance of the practised cooperation for controlling the farm entity. For example, one entrepreneur first described the non-strategic nature of the cooperation, then underlined the binding nature of an oral contract and at last reported, that actually having cooperation partners was obligatory for him, while he could not manage all the labour his farm needed all by himself. Another entrepreneur also underlined his independent state, despite the fact that half of the production of one of the most important inputs was in hands of his cooperation partners. The experiences of risk in cooperation could be affected by the business partners' commitment to the cooperation form. If commitment is weak, it is easier to describe the total effect of practicing cooperation as risk-minimizing.

Trust in present cooperation partner as individuals was highlighted. Four entrepreneurs mentioned, that precisely with current partner the cooperation could be done without a written contract, because the partner as a person was reliable. As a basic condition for cooperation all eight interviewed entrepreneurs mentioned the meaning of mutual trust and compatible mind-sets. These prerequisites for successful cooperation are also noticed in earlier research (Laitila et al 2014).

There was variation in the pricing methods used in inter-partner transactions between eight cases when selling and buying grain or other feed. Five interviewed entrepreneurs told that they used the current price of the day, one told that the price of the day was fixed individually if one partner used others' storing capacity. In two cases out of these five, grain drying was part of the cooperation, and in these cases the price of the day for drying was also taken into account.

According to other three interviews which covered two separate cooperation forms the regional price of the day was only a starting point. It was the basis for long term price agreement between partners or a value on which all the different deliveries were taken into account and then the actual price was calculated.

The following Figure 7 represents the description from Vesalainen (2002) of strategic linkages in cooperation. The six arrows are the six cooperation forms discussed in eight interviews in this study. The perspective of cooperation networks and nature of cooperation Vesalainen has fits in studying farm enterprises. It recognizes the typical social linkages and personal ties of small enterprises and also tangible and intangible resources, of which especially the possibilities of land use are important to farm entrepreneurs.

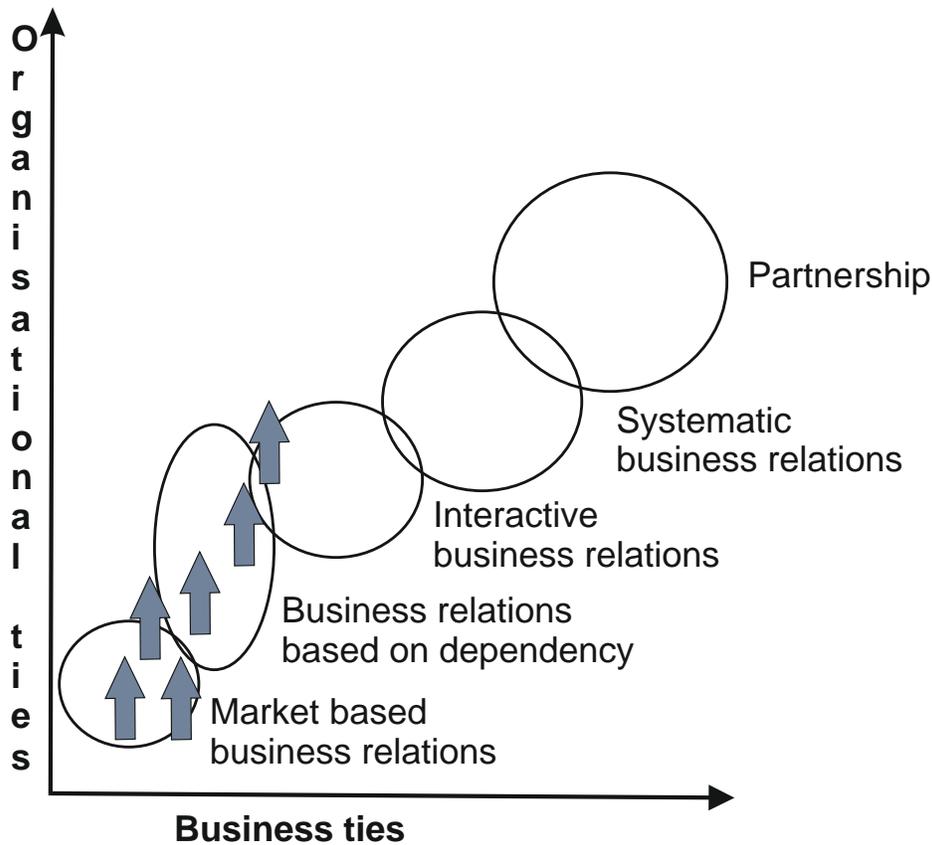


Figure 6. Adapted according to Hakanen et al 2007. Types of cooperation in the material according to the discussions with the farmer-entrepreneurs.

Five interviewed entrepreneurs represented three different cooperation relationships, which all included cooperation both in feed production and manure use. These five interviews included most of the sequences describing interactive business relations. This is illustrated in Figure 6 by the position of three flashes positioned most far away from the origin. These types of cooperation had most interaction based on social ties and trust. More interactive business relations than markets based relations were found in these relations. They included some logistic services in addition to supply of material. Increasing recognition of the mutual benefits of cooperation were found in these relations. Also common systems of measurement, learning and developing together were reinforced in these relationships. The rest of the cooperation relations covered selling or buying of roughage and exchange of labour. They could be called marked-based cooperation relations. Partnership should include risk-taking together as well as some more core functions than existed in the material. Willingness to deepen the forms of cooperation was anyhow recorded. Table 1 expresses this observation.

In three of the interviews there were two relations of cooperation which included clear price definition of the mutual cooperation, quite exactly designed pricing. These three interviewees expressed their willingness to deepen the cooperation. Typical for them was that in addition to the marked-based price for cooperation that the farmers also took into account use of storage or a services carried out like drainage. The other three which were not interested in deepening the cooperation only had market prices as a base for their pricing of cooperation.

Table 1. Forms of pricing in relation to willingness to deepen cooperation.

Basis of pricing calculation	Future plans for cooperation
Market price (3)	– no notice of deepening current forms of cooperation
Market price and services (2)	– notice of potential deepening of cooperation
Individually defined pricing (3)	– clear notice of potential future deepening of cooperation

4. Discussion and conclusions

Long term objectives, understanding of the operating environment and the competitive situation as well as the resources and goals of the firm are the basis of strategic planning (Grant 2002, 4). These factors arose as central out of this study in spite of a small sample of interviewed farmers. Because of the small sample no generalizations can be made but some of the themes which were central could form a basis for comparison with earlier studies.

Farmers thought the benefits of cooperation mainly consisted in reduction of production costs or the improvement of production processes. Farmers mentioning a high quality product, a good yield or an improvement of crop rotation as main goals of cooperation were mostly crop production farms. They often saw cooperation as a potential possibility rather than purely a means of cost reduction. The benefits from cooperation and the main goal of the business seem to be consistent. Cooperation is often seen as a way to acquire a missing resource.

The basis of the benefits of cooperation was often said to be cost reduction. This was particularly the case if costs of transport reduced as a result of developing working practices between partners and if external inputs purchased outside cooperation could be reduced and if the cooperation does not increase other costs or decreases the returns. Two animal farms saw the benefits arising from the point of view of crop production farms. However, they also saw some indirect benefits arising like potentially positive effects of doing things together.

There were some indications of cooperation moving to a more strategic direction. However, there was also an increasing unwillingness to formalize a personal commitment of trust through a written contract. The interviewees saw formalized written contracts as unnecessary. This probably is a consequence of earlier social networks or a personal relation with the other partner (Gulati 1998). However, written contracts could be a way to evaluate more carefully the benefits of cooperation. When the benefits and the opportunity costs of own actions are better recognized it would also be clear if one can commit oneself to a formal written contract (Bogetoft & Ballebye 2002). If the opportunity costs are unknown an oral agreement may feel like a less risky alternative.

The structural development of agriculture has been forecasted to continue. For expanding animal farms new cooperation partners can be found from former animal farms used to use manure as an organic nutrient. While farm size is increasing also the size of the cooperation and the risks connected to this cooperation can be regarded as increasing. A written, formal agreement can be considered one way to control such a risk.

In regions dominated by animal production cooperation with crop husbandry farms will to some degree make it easier to take care of the manure in a more balanced way. Technological change maybe makes it possible in the future to cooperate with farms situated further away. In this case the requirements on cooperation and on the principles defined between cooperating partners will increase in order to make this cooperation economically sensible.

Further research on this area could focus more in depth on all the members in a particular network and their points of view.

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