

A Take-Off from the Land: Agriculture and Social Networks in the Making of Kvänum as an Industrial District, 1930-2007

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Abstract

During the 1930s the previously predominantly agrarian Kvänum area in Western Sweden started to industrialize. Initially most of the emerging enterprises specialized in farm machinery, especially harvest handling equipment such as straw fans, straw choppers and hot air dryers. Production later diverged into a number of branches. This article discusses the making of Kvänum as an industrial district as a multifold process of interaction between agriculture and industry. It also addresses industrialisation from the point of view of social networks. Contrasting the predominant view on the role of trust and cooperation as main engines of cluster dynamics, the results from Kvänum stresses the importance of *involuntary* sharing of information, under a situation of fierce, cutting edge competition.

1 Introduction

This paper provides a local perspective on economic clusters of agricultural industries. It is based on a case study of the industrialisation on the plains surrounding the small municipality of Kvänum in western Sweden. Up until the 1930s, Kvänum was a pronounced agrarian region where almost two-thirds of the population made its living as farmers or farmhands, mainly specializing in grain. From the late 1930s, however, a rapid process of industrialisation took place, transforming the area into a dynamic ‘industrial district’ with a wide range of small, medium-sized, and even larger companies within mechanical engineering. In an initial phase, most firms manufactured farm machinery, especially harvest handling equipment

such as straw fans, straw choppers, screw conveyors and hot air dryers, a development that by 1950 had made it into the most important Swedish industrial cluster within this field of specialisation. This core production was later widened into a variety of new applications: washing machines, comfort ventilation equipment, systems for bulk handling, modular building systems for factories and oilrigs. Even today several important farm machinery manufacturers are based in the region, such as Akron and Tornum (grain dryers and storage systems), Rekordverken (straw choppers and chaff spreaders) and Scandia Elevator (grain conveyor systems).

In this article, I will discuss the making of Kvänum into an industrial district. One thread in this development was a multifold process of interaction between agriculture and industry, a topic that will be dealt with in the first part of the paper. Subsequently I will address industrialisation from the point of view of social networks. The results contrast, in some respects, the predominant view on the role of trust and cooperation as engines of cluster dynamics within industrial districts.

The paper is based on a previous larger study on the rise of industrial districts in the Swedish countryside in the post-war period.¹ One point of departure of this study was the gradual relocation of industrial employment in Sweden during the post-war period, from urban regions to previously agrarian areas in the industrial periphery. While earlier interpretations of this general development tended to concentrate on the impact of labour costs (that were supposedly lower in rural regions)² my ambition with the study was to broaden the perspective on the forces of rural industrialisation. In this context, the research on the industrial districts in 'Third Italy' and early modern proto-industrialisation served as inspiration, raising questions on cluster dynamics and the role of social structure within agrarian society. A striking pattern could be established: the regions that have experienced a rise in industrial employment since 1945 were almost without exception regions historically dominated by a strong class of free holders.³

1 Lars Nyström, *En industrialisering efter industrialiseringen. Industrialiseringsprocesser under efterkrigstiden på landsbygden i västra Sverige* [Industrialization after industrialization: The emergence of industrial districts in the Swedish countryside in the post-war period] (Måklinta 2012).

2 Mats Lundmark and Anders Malmberg, *Industrilokalisering i Sverige. Regional och strukturell förändring* (Uppsala 1988); Mats Lundmark and Anders Malmberg, 'The transformation of industry: Changes in localisation', in: Cleas Göran Alvstam (ed.), *National Atlas of Sweden: Manufacturing and services* (Stockholm 1995); Gunnar Törnqvist, *Studier i industrilokalisering* (Stockholm 1963).

3 Nyström, *En industrialisering*, 14–20.

In the case of Kvänum, this agrarian setting appeared in an almost condensed form. Up until the Second World War, agriculture was the only economic activity of importance in the area, and the family farm was its basic social and economic institution. Apart from a handful of small nuclei along the railroads, there were no urban concentrations. Instead, the settlement structure was highly dispersed, with individual farmsteads that had been spread out over the landscape since the enclosure reforms of the nineteenth-century. The terrain was flat and the soils fertile; in some parishes, almost 90 percent of the land was arable.⁴ The pronounced agrarian structure of the area makes it an ideal place to study the interaction between agriculture and industry. At the same time, the initial specialisation of local firms in farm machinery enable the analysis of the area as a cluster or industrial district. In this way, the investigation offers a twofold approach on the social and economic connections involved in the rise of clusters within agriculture industries.

Figure 1 provides an overview of the industrial employment in the seven parishes identified as the core land of the emerging industrial district. According to statistical primary material, the number of employees in firms with at least five workers in 1931 amounted to 23. Over the next seventy-five years, this number then rose constantly, reaching its historical peak with 2326 in the year 2007. In the graph, we can also see how industrial production over time gradually widened, from agricultural machinery into other braches of mechanical engineering. By 2007, there was a total of 39 industrial firms in this area, the largest one employing 600 workers. Additional firms (belonging to the same historical agglomeration) could also be found in neighbouring areas on the plain. How did this industrialisation come about? How did it interact with the agrarian structure of the area? Which were the social networks and connections involved in this process?

4 SOS Jordbruksstatistik, *Jordbruksräkningen* (1944) 55.

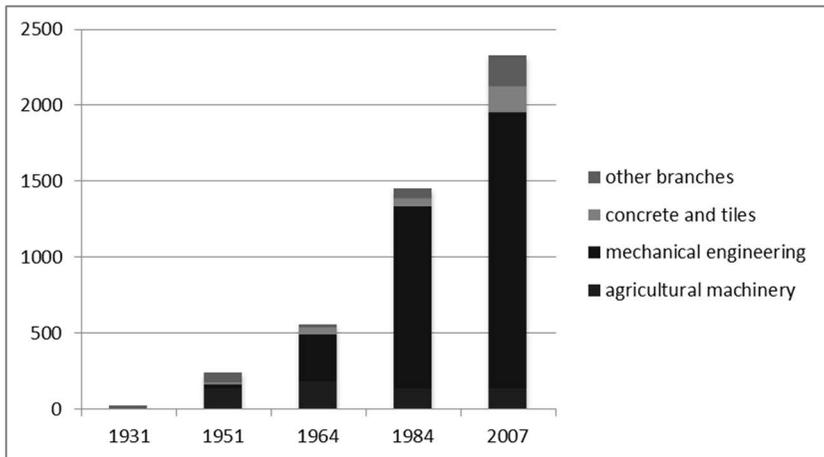


Figure 1. Industrial employment in the Kvänum-area 1931-2007 (firms ≤ 5 employees)

Notes: Employment in local manufacturing firms (≤ 5 employees) in the parishes of Kvänum, Öttum, Önum, Fyrunga, Jung, Tråvad, and Edsvära. Sources: 1931 and 1951: the National Censuses of Firms (*företagsräkningar*); 1964 and 1984: National Industry Statistics; 2007 www.allabolag.se (*Digital Register of Firms*) and information from the companies.

The study was based on a combination of a number of sources: the forms used in the collection of Swedish industrial statistics, which offer annual data on production, employment and wages within district companies; product catalogues and marketing material (that according to Swedish printing laws have been preserved at the National Library) which provide a clear image of the machinery produced; material from the National Bureau of patents, offering valuable insights into the process of innovation; registers on taxation, real estate and mortgages; which make it possible to trace the economic trajectories of individual entrepreneurs; and articles in newspapers, agricultural journals and local historical literature.

In addition, interviews were an important source. In total, 69 individuals were interviewed, mostly current or former industrial entrepreneurs, but also, for example, workers and municipal representatives. Questions focused on the background and development of the individual firms, and on the relations between this development and the wider industrial and agrarian setting. Given the potential problems with bias and omission in this type of material it is hardly surprising that it sometimes failed to give an accurate version of individual sequences of events. Nevertheless, when the 69 different narratives were added together, a clear image of the underlying social and cultural mechanisms of the district emerged, especially when combined with contemporary material.



Figure 2.

Notes: Light grey is plain (mostly arable land); the black line is the Lidan river; grey lines are roads and the double black lines railroads. The seven parishes, marked with their borders on the map, constitute the core area of the industrial district. Development within this area has been surveyed in detail regarding for instance employment, agricultural structure and the trajectories of individual firms. Additional firms, forming part of the same historical cluster, can also be found in the surrounding area on the plain. These are included in the analyses of cluster dynamics and technological developments within the district. They are however not included in statistical compilations on employment, firms or wages.

2 Interaction between agriculture and industry

At first glance Kvänum lacked the classical preconditions for industrialisation. There were no raw-materials, no advantages in terms of energy or transport, and no proto-industrial traditions, nor did firms enter from outside in search for cheap labour: Almost all enterprises emerged locally. What was at hand was agriculture, which, in several ways, served as the fuel of industrialisation.

2.1 Markets

Firstly, agriculture was the initial *market*. The first industrial pioneers were village blacksmiths who had previously assisted local farmers with all sorts of small tasks: for instance, shoeing horses, sharpening ploughshares, and

repairing horse rakes. Some of them also manufactured agricultural implements such as harrows or threshers on a minor scale. Prior to 1930, none of these workshops employed more than five persons, in most cases just one or two.⁵

In general, this village blacksmithing was a type of business that might be expected to be swept away by competition from factory production. What happened, however, was quite the opposite. During the course of the 1930s, two of these workshops – The Grönberg brothers in Öttum and Sven Kjällström in Kvänum – actually managed to gain a foothold in the emerging market of harvest-handling machinery: especially straw and hay fans and electric farm mills. During the 1940s and 1950s, a second generation of entrepreneurs among village blacksmiths and former employees followed in their footsteps, competing within the same range of production.

The major break-through for industrial production came with the introduction of the combined harvester in Swedish farming in about 1950. As a consequence, a new set of harvest handling equipment was needed at farms: screw conveyers, straw choppers, hot air dryers, grain elevators, and silo systems. Into this situation, the emerging industries in Kvänum managed to deliver competitive solutions, conquering large shares of the growing markets.⁶

In this process, Kvänum was formed as an *industrial district* – defined here as a geographical agglomeration of interrelated locally based indus-

5 The following section is based on a number of sources which provide information about firms and production: 1) Archive of Kommerskollegium: The National censuses of firms in 1931 and 1951: Primary forms from the firms (National Archives, RA, Stockholm); 2a) Archive of Kommerskollegium: The Section of statistics, the national statistics of industry: Main and special forms from the firms (1920-1962, RA); 2b) Archive of Statistiska Centralbyrån, SCB: I-byrån: sektionen för bergs- och industristatistik: Primary forms from the firms (1963-1988, RA); 3) Royal Library (KB), Stockholm: Vardagstryck: Företagstryck for local firms (uncatalogued commercial print archived in folders by company name); 4) Archive of the Royal Academy of Agriculture (KSLA), Stockholm: the collections of Instruktionsboksamlingen, Huvudkatalogsamlingen, Jordbrukstekniska institutet and Winnforska samlingen: marketing prints and manuals regarding agricultural machinery (archived according to type of machine and/or company name); 5) Archive of Statens Maskinprovning: meddelanden (reports from the testing of agricultural machinery performed by the National Bureau of Machine Tests, RA). For details, see the appendix over primary sources and Nyström, *En industrialisering*.

6 There are no statistics on regional market shares for the different types of farm machinery. Their strong position within harvest handling is evident from articles in agricultural journals and national agricultural fairs where district firms received a large share of the awards distributed for this kind of machinery. See also the case of straw choppers below.

tries, comprehensive enough to make up an essential part of a local economy.⁷ Compared to many of the classical examples of industrial districts that emerged during the same period of time in ‘Third Italy’, it should be stressed that it was a district of quite moderate dimensions. In the early 1960s there were at most 20-25 firms in the research area and its vicinity producing farm machinery, to which could be added a handful of subcontractors and commercial agents. At this stage of development, production had already started to widen into other branches of mechanical engineering. It was, however, the agrarian markets that offered Kvänum the entrance ticket to industrial production.

2.2 Labour

A second aspect of interaction between industry and agriculture is how the latter provided the former with *labour*. After the second World War, farm rationalisation accelerated, resulting in shrinking agrarian employment as machines replaced manual labour. In particular within the young generation growing up on the free holds many now looked for a future outside agriculture.

This situation offered exquisite preconditions for company growth, especially compared to urban parts of Sweden where many industries suffered from a severe shortage of labour. Still, many of the new industrial workers actually kept one foot on the family farm. The system of ‘moonlight farming’ was widespread in the region. Often industrial earnings were used to finance machine investments at the family farm – a strategy employed in order to free even more family labour for industrial employment.⁸ In this way, labour was to some extent ‘tied’ to the district, facilitating a smooth and gradual transition from the agrarian to the industrial sector.

One important factor in this context is the question of wages. Both in the discussion on proto-industrialization and in the post-war industrial expansion in many regions in the agrarian periphery, cheap labour has

7 On the concept of industrial districts see the discussion below.

8 Informants no 7 (August 29, 2005, in Kvänum), 11, 25, 29, 32 and 63 (See list at the end of the article for details).

been identified as a decisive driving force.⁹ In Kvänum, this was probably the case during the early phases of industrialisation, when job opportunities in local industry were still scarce compared to the growing surplus of agrarian labour. This meant that employers found themselves in a highly privileged position. In 1951 local firms paid wages at average of 16% beneath the national mean according to the forms used in the collection of industrial statistics. In the long run, however, this wage gap was gradually closed, partly due to national wage structure agreements between trade unions and employers' organisations, partly due to an increase in local competition over labour as factories grew and the flow of young men from agriculture started to dry up.¹⁰ As a consequence the qualitative aspects of local labour came into the forefront.

2.3 Knowledge

This leads us to a third important aspect of the interaction between industry and agriculture, namely how *knowledge* was transferred between the two sectors. Most obvious in this respect is how farming know-how was turned into know-how related to the production of farm machinery. Specializing in grain, an acquaintance with handling the harvest was deeply embedded in the local community, enabling firms to develop highly competitive products – a point which will be addressed later.

The importance of the agrarian experience among the workers might at first glance appear as less evident. Often farmers are more or less perfunctorily seen as the prototype of unskilled labour, suitable only for routine tasks. According to my interviews with local employers, however, nothing

9 Lundmark and Malmberg, *Industrilokalisering*; Lundmark and Malmberg, 'Changes in localisation'; Törnqvist, *Studier I industrilokalisering*; Peter Kriedte, Hans Medick and Jürgen Schlumbohm, *Industrialization before industrialization. Rural industry in the genesis of capitalism* (Cambridge 1981) 7; Peter Kriedte, 'The origins, the agrarian content, and the conditions in the world market', in: idem et. al. (eds.), *Industrialization before industrialization*, 22 ff. The corresponding tradition in the Italian writings on 'Third Italy' is discussed in: Anna Cento Bull and Paul Corner, *From peasant to entrepreneur. The survival of the family economy in Italy* (Oxford 1993); Sebastiano Brusco, 'Small firms and industrial districts in Italy', in: D. Keeble and E. Wever (eds.), *New firms and regional development in Europe* (London 1986); and Fabio Nutti, 'Italian industrial districts. Facts and theory', in: Giulio Cainelli and Roberto Zoboli (eds.), *The evolution of industrial districts. Changing governance, innovation and internationalisation of local capitalism in Italy* (Heidelberg 2004).

10 By 1964 wages were 5 percent lower and by 1984 1 percent lower (wages per hour within mechanical engineering according to the original forms used in the collection of industrial statistics, see: Nyström, *En industrialisering*, 321).

could be more erroneous. ‘Farmers’ sons,’ explained one factory owner, ‘were always very good. A farmers’ son – he got employed right away’.¹¹

One factor mentioned in this context is a good work ethic: ‘They were not spoiled – but of course, they were not used to anything but hard work from home.’¹² Even more important, however, was the practical ‘hands on’ knowledge acquired in farm work. Farmers and farmers’ sons were as several informants put it ‘all but all thumbs’.¹³

As farm mechanisation proceeded this matching between agrarian and industrial competence was getting more and more on target. Over time, growing up on a family farm increasingly meant a long period of practical schooling in mechanics: driving the tractor (according to the interviews often from the age of six or seven), welding, repairing harvesters, manure spreaders or straw choppers. In this way, a high degree of independence in the use of the hands and mind was also acquired. ‘A farmer’s son could rapidly adapt to all sorts of tasks; he could be used all over in production’, a former foreman in one of the leading local industries explained.¹⁴

There was, however, also a central limitation in this transfusion of agrarian knowledge, namely its gendered character. Almost exclusively (at least up until the 1960s) it was the farmers and their sons who got employed in factories – not their daughters or wives.¹⁵ Basically, industrialization took place as a prolongation of the male side of the agrarian family division of labour. So what were the women to do? As the surrounding society changed from a one to a two-income system, this lack of work for women proved to be a weak point in Kvänum’s model of industrialisation.

2.4 Entrepreneurs

So far it has been seen how agriculture provided the emerging industrial district with markets, labour, and knowledge. Another factor required for industrialisation is the existence of *entrepreneurs*. Where did they come from? The answer is that industrial entrepreneurship was also rooted in local agriculture. Among the ten largest enterprises in the research area in 2007, eight were originally started by farmers or sons of farmers, the re-

11 Informant no 10.

12 Informant no 21.

13 Informants no 8, 10 and 21

14 Informant no 3 (by telephone October 20, 2009).

15 In 1964, the share of women in the local industrial workforce was 7 percent; by 2007, it had increased to 17 percent. Sources: see Figure 1.

maining two by sons of farm hands. Minor and medium-sized companies show a pattern almost as striking.¹⁶

One important factor in this context was probably the multiple competences acquired in farm work mentioned earlier. 'As a farmer you need to know so many things', one farmer-entrepreneur pointed out in an interview. 'You need to know how to weld and how to repair. The step from welding for your own needs to weld also for others is not that big. And if you specialize in grain, you are busy during springtime and harvest. The rest of the year you have plenty of time to do other things'.¹⁷

At the theoretical level, this development can be understood using tools from two important schools on rural industrialization, namely the proto-industrial tradition of the 1960-70s and the, somewhat later, school of 'flexible specialisation' and 'Third Italy'. Although differing in other aspects, they actually agree in their agrarian analysis. What favoured rural industrialisation was a relatively strong peasantry, free from feudal oppression and despotic landowners, and with a comparably secure access to land. Yet the same land should not be too abundant; rather, a situation of scarcity was preferred.

According to the proto-industrial tradition, regions with partible inheritance – where farms were, generation after generation, divided into even smaller plots – were especially well suited. Typically, proto-industrialisation also occurred in regions with poor conditions for agriculture – where the population had no choice but to turn to the domestic industry in order to gain access to markets.¹⁸ In the case of 'Third Italy', the situation of the north and central Italian share-cropper is understood in a similar manner; they were in an independent and secure position compared to the landless peasants of the Italian south, nevertheless with holdings too small to support their families.¹⁹

16 In 2007 there was a total of 37 locally started firms within manufacturing (including firms specializing in the installation of district products) in the seven district parishes surveyed. Out these 37 firms all but 8 were originally started by farmers, farmers' sons or farm hands (sources: tax registers and interviews).

17 Informant no 19.

18 Peter Kriedte, 'The origins', 11 ff; Jürgen Schlumbohm, 'The political and institutional framework of proto-industrialization', in: idem et. al. (eds.), *Industrialization before industrialization*, 95 ff; Hans Medick, 'The proto-industrial family economic', in: idem et. al. (eds.), *Industrialization before industrialization*, 38 ff; Gary Herrigel, *Industrial constructions. The sources of German industrial power* (New York 1996) 33 ff.

19 See for example: Bull and Corner, *From peasant to entrepreneur*; Michael J. Piore and Charles F. Sabel, *The second industrial divide. Possibilities for prosperity* (New York 1984) 169 and 174 ff; Giacomo Becattini, *The catterpillar and the butterfly. An exemplary case of development in the Italy of the industrial districts* (Florence 2001) 23 and 46.

At first glance, preconditions in Kvänum appear to be almost the opposite; soils were fertile and freeholds large and well-consolidated, offering seemingly ideal conditions for a solid agrarian income. The point is, however, how this situation rapidly changed during the post-war agrarian rationalisation: In order to manage the costs of new machinery and expectations of a higher standard of living, more and more land was needed to make farming viable. This way the owner of 20 or 30 hectares of fertile land soon found himself in the same situation as a small holder in a proto-industrial district 200 years earlier: the farm was getting too small and new sources of incomes were needed. Or, as one informant expressed it: 'I could see clearly that it was no longer possible to live from agriculture. As I saw it, I had to two options: to have animals or machines in the barn.'²⁰

2.5 Capital

This way a growing *scarcity* of agrarian resources was one of the forces behind industrialization. At the same time, however, the *availability* of agrarian resources also triggered the same process. Although increasingly difficult to subsist on, farms still were still of considerable value. This *landed capital* could in several ways be liberated in order to finance an industrial expansion. One part of this development was the use of farm buildings for industrial purposes. Among the industries in the research area in 2007, almost half originally started at a family farm, often using former pigsties or cowsheds as their first shop.²¹ With free facilities, and complimentary family earnings from agriculture (and often also wage labour), the threshold to start a new business was indeed very low. In some cases the disposal of the existing livestock is also mentioned as part of the industrial financing.

Of even higher value, however, was the capital the farms represented as real estate. As landowners, freeholders belonged to the propertied segment

²⁰ Informant no 63.

²¹ In 2007 there was a total of 37 locally started firms within manufacturing (including firms specializing in the installation of district products) in the seven district parishes surveyed. Out these 37 firms 18 were originally started at a family farm. Facilities used included cowsheds, hen houses, pigsties, woodsheds, farm forges, garages, storehouses and machine shops.

of society, a factor that highly facilitated the access to capital, as land could be sold off or used as security for mortgages.²² One interesting example is Emtunga Mechanical Workshop, one of the few major enterprises that actually was *not* started by a farmer or a son of a farmer, but by the son of a farm-hand, Bertil Gustafson. His wife, however, was the daughter of a wealthy freeholder; it was the inheritance from this family that in 1945 enabled him to set up his first shop.²³ In another case, the young free holder Harry Johansson leased out his property as he in 1952 started the small mechanical workshop Plåt-Mekano together with Nils Andersson, an industrial worker and the son of a free holder. After a few years, they managed to develop a highly competitive screw conveyor, a conclusive breakthrough that opened up for production on a larger scale. The farm was now sold off and in this way, they managed to fund the investments necessary for further development.²⁴ Both of these companies eventually grew into substantial industries, employing at the most 400 and 350 work-

22 The analysis of the importance of landed capital is based on a survey of a number of sources which provide information about the economic trajectories of the individual entrepreneurs and their families; the tax and cadastral registers (the local tax registrars, *Häradsskrivare*, in the districts of Barne, Vara and Skara, Regional Archives in Gothenburg, GLA); probate inventories (Local courts, *Häradsrätt* of Valle, Skåning, Skare, Skåning och Valle, Skarabygden, and Åse, Viste, Barne och Laske districts, GLA); and registers of land transactions, *lagfartsakter*; and mortgages, *inteckningsakter* (archives of the judges' land registration in the districts of Åse, Viste, Barne, Laske, Skarabygden, Skånings och Vallev and Lidköping districts, which are available digitally from the Regional Archives in Härmösand, HLA, according to present municipal affiliation and with real estate register numbers as reference). The information from these sources has been combined with information from interviews and local historical literature. Among the ten biggest firms in the district in 2007, economic capital seems to have been transferred from the agrarian to the industrial sector during the start-up phase in at least 8 cases. It was of significant importance in 5 cases.

23 The probate inventory of Johan Alfred Johansson (*Häradsrätten* in Åse, Viste Barne and Laske district, document no HT 1940:157, GLA); document regarding the partition of Johan Alfred Johansson's inheritance, July 14, 1945 (*lagfartsakter* regarding Tråvad Frälsegården 13:20, Vara municipality, act no 351, HLA); Informant no 10; article regarding the family in *Göteborgs-posten* december 30, 2002.

24 *Inskrivningshandlingar* regarding Kvänum Tornum 9:38, Kvänum Vägestorp 1:4 and Öttum Fårtoorp 3:26, all in Vara Municipality: bill of sales, *köpebrev*, April 6, 1955 (act no 154, HLA); Ove Allansson, 'PM-luft', in *Kvånumsbygden*, 57-70; informant no 3 (by telephone October 20, 2009). During the start up of the firm the farm had also been mortgaged (*inskrivningshandlingar*, acts of mortgages no 1952:779 and 1955:522). Johansson's partner in the firm, Nils Åkerstedt, also received an inheritance from a family farm in 1955, although not as large (*Häradsrätten* of Åse, Viste, Barne and Laske, probate inventory of Sven Niklas Andersson, document no 1955:303, GLA; *Inskrivningshandlingar* regarding Tråvad Algutstorp 1:30, Vara Municipality: *köpebrev*, December 31, 1955, document no 1956:89, HLA).

ers respectively. Without initial access to 'landed capital', it is doubtful whether this development would have been possible.

Finally, behind all of the above, a *cultural* freeholder capital can also be discerned— a deeply rooted endeavour 'to remain one's own boss'. As stressed in many of the interviews, growing up on a family farm also meant socialisation into the way of life of a family business which valued virtues such as hard work and independence. These merits were probably decisive factors behind this form of industrialisation.

2.6 Kvänum as a case of agrarian industrialisation

As a municipality of its own from 1950–1967, Kvänum had a coat of arms: A large spike of wheat was pictured in the background and, in the foreground, a cogwheel. This way the on-going forces of development within the area were effectively visualized. As farming was rationalized, there was a growing demand for agricultural machinery. This opened up new market opportunities for local village smithies, enabling them to grow into factories. The machinery produced rationalized farms, liberating farmers and their sons from the land. This way industry received its share of labour, but, in addition, both entrepreneurship and knowledge from the agrarian sector were transferred to the industry as a consequence of farm rationalisation.

As a historical example, the case of Kvänum can be understood as part of a wider post-war wave of rural industrialisation. At the European level, the most well-known parallels can be found in the industrial district in Third Italy that to a great extent emerged from a similar social setting of family farming and small-scale handicraft. In Denmark, Hull Kristiansen has depicted an analogous development on the Jutland peninsula; in Finland industrialisation in part of Ostrabothnia shows many parallels²⁵ Swedish examples include the metalworking district of Gnosjö; the island of Orust, specializing in expensive yachts (a production which emerged in connection to fishing and shipping); or Ljungby, specializing in heavy forklifts for timber and container handling (a production which emerged in

25 Peer Hull Kristensen, 'Industrial districts in West Jutland, Denmark', in: F. Pyke and W. Sengenberger (eds.), *Industrial districts and local economic regeneration* (Geneva 1992); Riita Mäkinen, *It's not impossible after all. The true stories of the entrepreneurship in on Ostrobothnian municipality* (Kauhajoki 2004).

relation to forestry).²⁶ Widening the historical perspective, this post-war development can be understood as a link in a more lengthy chain of rural processes of industrialisation, starting with the rise of 'proto-industrial' districts in the early modern period – a development that, as discussed earlier can also be connected to an agrarian structure based on a free class of family farmers.

What makes Kvänum special in this context is the level of strength in the agricultural connection. While both proto-industrialisation and twentieth-century rural industrialisation mainly occurred in areas with a predominance of small holdings or weak agricultural conditions, Kvänum was situated right in the heartland of one of the richest arable regions of the country. This pronounced agrarian character enabled a much deeper interaction between industry and agriculture, where both agrarian market connections and specific agricultural knowledge were employed in industrialisation. As farmland was more valuable here than in other rural regions the district was also better endowed with landed capital. This type of industrialisation process was probably only possible during a brief historical time slot, when the traditional structure of family farming started to break up due to modernisation and structural rationalisation.

To conclude the first section of the paper, it can be noted how Kvänums course of industrialisation in many respects closely resembles Del Piores' and Sabel's model of 'flexible specialisation' which stresses the prevailing importance of handicraft-based know-how, small scale entrepreneurship, and external benefits found within industrial districts.²⁷ With its starting point in the small village shop, the ability to meet specific customer needs and to rapidly adjust to constantly changing markets was, so to say, embedded in the history of the district. These characteristics were later developed into an industrial flexibility, with the ability to rapidly supply demand within the new markets that opened up during the course of farm

26 Orust: Nyström, *En industrialisering*; Ljungby: Carl Johan Roubert, *Smäländsk världsindustri: en studie om entreprenörer och kluster 1950-2002* (Ljungby 2009); Lars Nyström, 'Book review: Carl Johan Roubert, *Smäländsk Världsindustri. En studie om entreprenörer och kluster 1950-2002*', *Scandinavian Economic History Review*, 58 (2010); Gnosjö: Lundmark and Malmberg, 'Changes': Bengt Johannisson, 'Swedish evidence for the potential of local entrepreneurship in regional development', *European Small Business Journal* 1:2 (1983) 11–24; Bengt Johannisson, 'Industrial districts in Scandinavia', in: Giacomo Becattini, Marco Bellandi and Lisa De Propriis (eds.), *A Handbook of Industrial Districts*. (London 2009); Bengt Johannisson and Carolina Wigren, 'The dynamics of community identity making – the spirit of Gnosjö revisited', in: C. Steyaert C and D. Hjorth D (eds.), *Entrepreneurship as social change* (Cheltenham 2006); Caroline Wigren, *The spirit of Gnosjö. The grand narrative and beyond* (Jönköping 2003).

27 Piore and Sabel, *The second industrial*.

mechanisation. In this context cluster dynamics should also be mentioned: the way in which firms in Kvänum benefitted from being located next to each other within the same industrial district. This will be the theme of the following sections of the paper.

3 Cluster dynamics and networks: the supporting structures

One source of inspiration for the increasing amount of research on industrial districts was the rediscovery of a brief section in the writings of Alfred Marshall where, a number of potential external benefits stemming from the geographical clustering of firms are identified: the spread of knowledge and innovation; the existence subcontractors offering specialized knowledge and services to local firms; a labour force with the qualifications demanded within the local industry; how investment in machines too expensive for an individual firm can be financed with the district as a market; and how clients are attracted by the agglomeration of specialized firms.

In his analysis, Marshall mainly discusses industrial clusters in terms of market mechanisms. In some passages, however, the social or cultural aspects of the industrial district are also briefly touched upon, such as the existence of a certain place-bound industrial atmosphere where 'the mysteries of trade become no mystery, but as if it were in the air'.²⁸

In the renewed cluster-discussion from the 1980s and onwards, these social dimensions of the industrial districts come increasingly to the fore. The writings of Becattini are highly influential in this context.²⁹ In his works, the industrial district is understood as 'both a community of people and a population of firms', two components that 'tend to merge'.³⁰ From this perspective, it becomes natural to study the interaction between firms in their relation to other actors and institutions within the local community. Another inspiration in this respect has been Michael Porter and his 'diamond model'.³¹ Although somewhat closer to Marshall's neoclassical

28 Alfred Marshall, *Principle of economics. An introductory volume* (London 1920) 271.

29 Giacomo Becattini, *Industrial districts. A New approach to industrial change* (Cheltenham & Northampton 2004).

30 Giacomo Becattini, 'The Marshallian industrial district as a socio-economic notion', in F. Pyke, G. Becattini and W. Sengenberger (eds.), *Industrial Districts and Inter-firm Co-operation in Italy* (Geneva 1990) 38.

31 Michael E. Porter, *The competitive advantage of nations* (Basingstoke 1990).

understanding, Porter's model also focuses on the relation to the surrounding society which is identified at central components in the emergence of successful industrial clusters, especially strong home markets, complementary industries, and governments.

In the case of Kvänum, these supporting structures included local authorities and agricultural knowledge organisations, especially the *Regional Husbandry Foundation* (Hushållningssällskapet). This organisation arranged fairs that proved strategic as local firms took the step from local to national markets. It also offered formal knowledge, complementing the local tacit know-how rooted in handicraft and farming. One strategic example of the unification of these competences can be identified in 1967 when a former Husbandry Foundation engineer was employed by one of the local firms, later to become its owner. This laid the foundation of the Runstenen group (including Akron and Rekordverken) the most important manufacturing group of farm machinery in the district today.³² Nonetheless, the role of this organisation should not be overstated. Its primal concern was in fact to support farmers, not producers of farm machinery. Over time, its importance was confined by the gradual shift towards other fields of industrial production, outside of agriculture.

Regarding *local authorities*, the year 1950 was an important turning point. This year a municipal reform took place in the region, in which the old parish-based municipalities were united into larger units. In the area of Kvänum, this new unit corresponded well geographically with the core land of the emerging industrial district. This reorganisation took place the same time as the period of most intensive agricultural rationalisation, a development that rapidly reduced employment on farms and consequently also threatened to evaporate the municipality's tax base. In this situation, the emergent industry was, to an increasing extent, seen as the hope and future of the community. In this way, the formation of a new municipality also meant the creation of a new identity, based on the confluence of industry and agriculture – as clearly expressed in the coats of arms discussed above.

By 1967 this process was, however, abruptly interrupted by a second municipal reform. Kvänum now became a part of an even bigger municipality centred in the community of Vara outside of the district. At least according to local entrepreneurs, the loss of a local municipal administration centred in the district also meant a significant loss in municipal inter-

32 Informants no 30 and 12 (at the Akron factory, October 15, 2008, by telephone on several subsequent occasions).

est in the development of the district.³³ Instead, the development of the community of Vara became the main concern.

From this perspective, it is clear that the most important supporting structure of the district was overwhelmingly that which was already discussed in the first section of the paper, namely the surrounding agrarian setting. Together with the plains of Scania and Östergötland, this region constituted the most pronounced arable area of Sweden. In connection to Porter's diamond model, this agricultural dominance can be seen as an important demand condition, enabling local firms to develop a comparative advantage, as the sophisticated home market pressured them to create better and more innovative products. In this context, the social network within the agrarian community also played a significant role. In my interviews there are several accounts of how new machinery was developed through a process of a trial and error together with friends, neighbours, and family members on their farms.

4 The relationship between firms: the role of cooperation and trust

After this overview, it is now time to move in to the core of the district: its firms. What were their mutual relations? What were the patterns of competition? How did knowledge and innovation spread within local community? Which values, virtues and cultural practices were favoured within its local environment?

In research on industrial districts, there is in general a clear answer to these questions. It is based on a strong belief in the dynamic role of social networks of firms.³⁴ These networks are supposed to create a situation

33 Informants no 8, 11, 21, 25 and 7 (in Kvänum August 29, 2005, the issue has also been discussed at several subsequent occasions). The relations between industry and municipality after the municipality reform is also discussed in: Lars Göran Asp & Dan Lundblad, *Juvelen i Kronan. En fallstudie av Kvänums industrier*. Unpublished bachelor thesis from the department of Cultural Geography, Gothenburg University 1996.

34 See for example: Becattini 'The Marshallian'; Edwards H. Lorenz, 'Trust, community and cooperation. Toward a theory of industrial districts', in: Michael Storper and Allen J. Scott (eds.), *Pathways to industrialization and regional development* (London 1992); Maurizio Mistri and Stefano Solari, 'Behavioural rules in industrial districts: loyalty, trust and reputation', in: Fiorenza Belussi, Giorgio Gottardi and Enzo Rullani (eds.), *The technological evolution of industrial districts* (Boston 2003); T. Martinez-Fernández, Joseph Capó-Vicedo and Teresa Vallet-Bellmunt, 'The present state of research into industrial clusters and districts. Content analysis of material published in 1997-2006', *European Planning Studies* 20:2 (2012) 281-304.

where the border between cooperation and competition is blurred and where the knowledge and contacts of one entrepreneur are the knowledge and contacts of everybody. One key factor in this context is Becattini's identification of the industrial district as not just a number of interrelated firms, but in fact also a local community. In an environment where people meet face-to-face daily, not only in business, but also after the Sunday service or at the pub, a high level of trust and mutual understanding can be achieved. This way transaction costs are lowered, people are able to interact, and knowledge about new technology, markets or competitors is rapidly spread within the local community. Out of this situation, a general sense of belonging to a district is also created, based on common values and even a common endeavour. In Becattini's view, the making of a district is thus to a great extent an *intentional* process based on both formal and informal cooperation.

During the last past few decades, however, this model, has been increasingly subject to debate. According to scholars such as Fabio Nuti and Ivana Panizza, much of the early research was the fruit of an idealisation of the industrial districts, based on an idea of how they *ought* to work rather than unbiased empirical investigation.³⁵ With a more critical eye, only a casual observation could, as Nuti puts it, provide 'just as many (and perhaps more) examples of lack of co-operation among district firms: producers refusing to share their information with their neighbours, or refusing to spread news; firms duplicating their investments in order to gain advantage over their competitors.'³⁶

In my view, Becattini's identification of the district as also being a community (and thus something more than a mere cluster) is one of the main keys to the whole concept. In this type of community, where business and everyday life merge, it is also quite natural for cultural practices to develop. The nature of these practices must, however, first and foremost be an empirical question. If one model of district interaction is used as the starting point for the understanding of the whole concept, it loses much of its dynamics: the conclusion of an investigation would be reached even before it was started. A better approach is to view the social interplay depicted within the school of Becattini for what it is: a theoretical construction or ideal type, trying to seize the inherent logic behind *one* possible way of district interaction. In this context, it would be strategic to look closer at

35 Ivana Panizza, *Industrial districts. Evolution and competitiveness in Italian firms* (Cheltenham 2002); Fabio Nutti, 'Italian industrial districts. Facts and theory', in: Giulio Cainelli and Roberto Zoboli (eds.), *The evolution of industrial districts. Changing governance, innovation and internationalisation of local capitalism in Italy* (Heidelberg 2004) 55-77.

36 Nutti 'Italian industrial districts', 67.

cases where this theory fails to explain industrial development. In this instance, Kvänum can provide an illustrative example.

Thus, far from the ideals of trust and cooperation, the corporate culture during the district's formative period was instead based on fierce, cutting-edge competition. In my interviews Kvänum is often compared to the metal-working district of Gnosjö in Western Småland, nationally famous for its 'industrial spirit' of small-scale entrepreneurship, Lutheran work ethics, and dense social networks among the members of the different protestant congregations.³⁷ In Kvänum, things are supposed to have been quite different, or, as one former entrepreneur expressed it:

In Kvänum, there has never been any 'Spirit of Gnosjö'. The idea of Gnosjö is that if you can't do something by yourself, then you walk over to your neighbour, and maybe you can do it together. The idea of Kvänum is: mind your own business and don't give a shit about the others.³⁸



Illustration 1. Marketing illustration for one of Vamo's straw choppers from the early 1950's. Archive of Kungliga Skogs- och Lantbruksakademien.

Following a similar line of argument a former municipal secretary of industry and trade talks about the strong individualistic culture within the district, supposedly inherited from farming:

³⁷ For a critical discussion on the 'Spirit of Gnosjö', see: Wigren, *The spirit of Gnosjö*.

³⁸ Informant no 3 (by telephone April 8, 2010).

'This is the farmhouse, and this is the barn. This is mine. In this territory, I am the boss. Here, nobody tells me what to do.' This way of thinking is actually quite common among freeholders, and many have also carried this with them later in life when they started their own businesses. I think this is the origin. This is mine, here nobody is coming close.³⁹

When an industrial district grew out of this agrarian setting, one of its main characteristics was that firms competed with each other for the same emerging agrarian markets producing the same types of agricultural machinery. In the mid-1930s, there were four industrial pioneers in the Kvånum area and its vicinities. All four made straw fans; three also made electric farm mills. By 1946, the number of straw fan manufacturers had grown to ten. In the following decades, local firms started instead to manufacture products such as straw choppers (11 producers), screw conveyers (5 producers), barn air shafts (7 producers) hammermills (5 producers), and hot air grain dryers (6 producers).⁴⁰ 'If somebody produced something', explained one former factory overseer that took part in this development, 'the immediate idea of the next person was, "I think that I can do that more cheaply."'

In such a situation, a closer collaboration between district firms was probably almost impossible to achieve. In contrast to Becattini's theories, this lack of social cooperation did not however hinder the district in its development. In fact, a certain amount of unscrupulousness in inter-firm relations seems to have been one of the driving forces of industrial growth. In this instance, the production of straw choppers is an illustrative example.

5 Cluster dynamics at work: the case of straw choppers

In the late 1940s, the combine harvester started its breakthrough in Swedish farming. It revolutionized harvest work, but, adversely, farmers now faced a previously unknown problem: what to do with all the straw that the new machinery left behind. As fodder it was of decreasing value. If left on the field, it was in the way for the plough. One possibility was to burn it. At the same time, however, the straw had a potential value as fertilizer; it needed only be divided into smaller pieces to be later ploughed down into

³⁹ Informant no 3 (by telephone April 8, 2010).

⁴⁰ Informant no 7.

the soil. Soon, the machine industry offered a technical solution: straw choppers that could be mounted on the back of the combined harvester.⁴¹

In Kvänum, production was started in 1948 by Karl Adolfsson in Tråvad who run one of the minor firms of the district. His first model was a close copy of an already existing machine, produced by a manufacturer in another province. This construction was later refined by a number of Adolfsson's own improvements, and, for a short period of time he seems to have been in the lead of technical development. However, once 'the golden vein' was hit, other firms in the vicinity were also attracted by the emerging market.



Illustration 2. The second take-off from the land. The first washing machines produced at Karl-Erik Anderssons factory (at the family farm) in 1950. Karl-Erik Andersson (one of the informant of this investigation) is sitting behind a machine at the rightward.

The second local producer was the Abelson brothers in Järpås, former subcontractors to Karl Adolfsson. Starting this new, competitive production seems to have been all but friendly. In his unpublished memoirs, Adolfsson relates how he and his family returned home late at night after a few days of a combined sales and holiday trip to the province of Östergötland.⁴² He soon realized that something was wrong, and, hidden under one of the finished machines in front of the factory, he found one of the Abelson brothers with a torch in one hand and a yardstick in the other.⁴³ Also

41 The subsequent section is based on the survey of firms and production (see footnote 5). In addition, the articles from the agricultural press for the years 1945-1965 have been used to study the development of technology and markets, especially *Lantmännen*.

42 The memoirs of Karl Adolfsson were written in the early 2000's. These word-documents are in the possession of the family who have kindly provided me with digital copies.

43 The story has been confirmed by Adolfsson's who was present at the occasion (informant no 2).

the Abellsson brothers actually had some temporary success with their choppers; later the firm developed into one of the leading machine producers of the district (Akron), specializing in grain dryers.

The third local producer, Cevor, was founded by a former Karl Adolfsson employee, Carl Evert Johansson. In 1951, he launched a straw chopper with a new type of construction in which the straw was cut between rotating and fixed knives. Compared to previous models, this proved to a superior solution, enabling a finer cut, and a more voluminous flow of straw into the machine. From now on, further technical development was based on this new construction.

During the years 1952-1955 Rekordverken (the Grönberg brothers) in Öttum, Einar Adolfsson (the brother of Karl Adolfsson) in Jung, Bruno Pettersson in Norra Vånga, Karl Larsson in Saleby, Johan Larsson in Gudhem, The Thulins workshop in Nossebro and Skaraverken workshop in Skara took up production of machines that were indeed very similar to those of Carl Evert Johansson, yet also differed in important details. By this time, over half of the Swedish producers of straw choppers were concentrated in the Kvänum area and its vicinity.⁴⁴ Among them Carl Evert Johansson and the Rekordverken Grönberg brothers soon stood out as the main antagonists.

In the local oral tradition, there are many stories about the cutthroat struggle between these two firms. The gist is mostly the same. The Grönberg brothers are supposed to have stolen their basic construction from Carl Evert Johansson. According to one informant, one of the Grönberg brothers had bribed one of Johansson's employees to hand over the blueprints, which he then took by train to Gothenburg where he managed to patent them. Other versions include nightly house break-ins or local farmers used as decoys, buying machines from Carl Evert Johansson which were later disassembled by the Grönberg firm.

The real background behind these stories falls out of the scope of my investigation. What can be established from contemporary Patent Office records is that both firms actually applied for patents on their machines.⁴⁵ Both also tried to stop the other firm from receiving a patent, by means of a complicated tangle of appeals and objections. From this documentation, it

44 Out of the 14 national producers that could be identified by the machine brochures archived at the Royal Academy of Agriculture or by test reports from the National Bureau of Machine Tests, 8 were from Central Västergötland. In addition, a further 3 local producers could be identified in other sources.

45 Patent act documents, National Bureau of Patents, Stockholm. The most important acts are: applications for patent numbers 1623/52, 5156-2/52 (approved as SE 166 835), 10048/52 (approved as SE 173 334), and 540/1954 (approved as SE 158 809).

is quite evident that the Grönberg brothers had made effective use of Carl Evert Johansson's construction, but also that it had made several improvements that probably resulted in a better and more competitive machine.

More surprising is that Carl Evert Johansson was also accused of plagiarism. According to the son of a farmer from the area, Ejnar Karlsson, the original idea of the new construction was actually his. In his objection to entrepreneur Johansson's applications for patent, he explains how he had showed the latter a conceptual model and proposed that they should manufacture it together. But instead, Johansson went behind his back and started to produce it on his own. To some extent, the farmer's son's story is confirmed by some drawings that he sent in to the National Office of Innovation in 1949, over a year before Johansson started production.⁴⁶ Although the basic construction is the same as in Johansson's machine, it is much more simplistic and lacks the refinements that later made it into such a success (for example its integrated security and stopping mechanisms). Actually, it has also clear similarities to older, hand-driven cutters of straw, previously produced by the Herrljunga Factory of Treshers, not far from Kvänum.

In the end, thus, everybody seems to have copied everybody. The interesting point is how this culture of imitation and antagonism actually contributed to the success of the district. The same entrepreneur that in one moment leered at the ideas of a neighbour could, in the next moment, develop new ideas that made it possible to manufacture even better machines. In this way, the whole district functioned as a 'laboratory' in the development of harvest handling machines. It was a model of development based on equal parts of plagiarism and innovation. Using more modern terminology, it could be described as an 'open source' system in which firms made continuous contributions to a common protocol (while at the same time also trying to privatize it!).

In his writings, Alfred Marschall depicts precisely this logic:

If one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas.⁴⁷

A similar perspective is also highly present in the research on the industrial district in 'Third Italy' where questions on cognitive processes have in-

⁴⁶ Documents regarding the applications for patent numbers 1623/52 and 5156-2/52 (National Bureau of Patents). The National Office of Innovation (*Svenska uppfinnarekontoret*), National Archives, Stockholm, documents regarding act number 9444 (archived under *'NUTEKS föregångare'*).

⁴⁷ Marshall, *Principles of economics*, 271.

creasingly come to the forefront. However, what is more seldom problematized are the potential conflicts that are embedded in such a system. To district theoreticians such as Beccatini and Rullani, cooperation and competition stand out as parallel principles, mutually reinforcing the industrial district as a 'creative milieu'.⁴⁸

In this context, Kvänum illustrates a more harsh reality. It was hardly the access to 'social capital' that triggered the development of straw chopping technology in the 1950s. Quite the opposite, the struggle over markets and patents described above must have obstructed the emergence of a network economy based on trust and cooperation. In the absence of such a culture, firms did not have to have second thoughts before copying the products of their clients, employers, or neighbours – enabling the wheel of innovation to spin even faster. Actually, this was also a way of sharing information. External benefits in this process were however in essence accidental and not based on intentional cooperation, as has often been taken for granted. Moreover, without disloyal competition from new firms copying the production concepts of their predecessors (as also happened also with, for example, straw fans, electric farm mills and grain dryers) there would have been no industrial district in the first place. In the case of straw choppers, in fact, the intense rivalry between a number of small rural workshops laid the foundations for what is still today, 65 years later, the basis of global technology.

Ultimately, this kind of competition-driven economy of 'cluster dynamics' comes quite close to Alfred Marshall's original understanding of the phenomenon. It also resembles the writings of Porter in which rivalry, rather the collaboration, is emphasized: 'the more local, the more intense, the more intense, the better'.⁴⁹ A more profound analysis of the relationship between this model for cluster dynamics with a model based on social capital and networks stands out as a strategic area of research.

6 Concluding discussion

In sum: What were the main forces in the making of Kvänum as an industrial district? How did the area manage to 'take off from the land'? This study has identified two key explanations. The first involves a close interaction

48 Beccatini Industrial districts, esp. article no 3; Enzo Rullani, 'The industrial district as a cognitive system', in: Fiorenza Belussi, Giorgio Gottardi and Enzo Rullani (eds.) *The technological evolution of industrial districts* (Boston 2003) 63-87.

49 Michael E. Porter, *On competition* (Boston 1998) 181.

between industry and agriculture, in which the latter provided the former with markets, labour, knowledge, entrepreneurs, and capital. In many aspects, this 'from farms to firms' path of development resembles the findings from the classical case of the industrial districts of 'third Italy', where the former sharecroppers has been identified as the entrepreneurial basis of industrialisation. In Kvänum, the agrarian connection was however much stronger than in any of the districts discussed within the Italian school of research. The fact that firms initially specialized in farm machinery certainly contributed to the profound interaction between the two sectors. Another important factor was most probably the comparably strong position of the Swedish peasantry. In Kvänum, almost all farms were freeholds, and often they were also quite large. This meant that the local population had access to a large number of resources that could be employed during the industrialisation: agrarian landed capital, that could be turned into industrial capital, agrarian know-how (the ability to manage a family firm, skills in the handling of machinery, hands on knowledge) that could be turned into industrial know-how, and agrarian attitudes (a culture of hard work, the ambition to remain 'one's own boss') that could be turned into industrial attitudes.

The second explanation for Kvänum's industrial success involves the emergence of a local economy of cluster dynamics where firms benefitted from being located within a wider industrial milieu which specialized in harvest handling machinery. In contrast to the dominant school of research, this economy of clustering was, however, not based on a culture of cooperation and networking – rather, it was the other way round. The district's culture during the industrial take off was raw and ruthless, based on harsh competition and rivalry. Innovations by other firms were frequently copied in a hostile manner, and if one entrepreneur started successful new productions, others (including former employees and subcontractors) soon followed in his footsteps. A rapid growth in the number of firms resulted as well as an increase in the speed of innovation as firms involuntarily shared information and ideas. From this perspective, it was in fact *the absence of cooperation* that laid the foundations for the district's success.

Thus, one important lesson to be learned from Kvänum is that there is more than one potential cultural path for industrial districts to follow in order for them to prosper. This case makes a strong contrast to the predominant theories of industrial districts, but also to evidence from the most famous industrial district of Sweden, namely the one in Gnosjö, well-known for its spirit of networking and cooperation. Why was the culture here so different from that in Kvänum? Religion might be one explanation. Even if both areas have strong Lutheran traditions, they differ in terms of which

congregation they belong. While farmers in Kvänum have stayed within the Swedish state church, dominated by the priesthood, the farmers and industrial entrepreneurs of Gnosjö have joined the movement of religious revival based on free churches. These congregations have to a greater extent been organised 'from below', a fact that might have created better preconditions for a social economy based on networking and cooperation. At the same time, it is also evident that industrial production in Gnosjö expanded into a broader area of specialisation from a much earlier date. This development probably lowered the risk of direct competition between neighbouring firms and heightened the potential benefits of cooperation between local firms of complementary competences.

From this perspective, it is also interesting to follow the development in Kvänum over time, beyond the period discussed in this article. What happened in the district in the 1960s and 1970s was what might be called a 'second take-off from the land', where firms used the knowledge acquired in the production of farm machinery in order to develop a wide range of other products, for markets outside of agriculture. In this way the intense local competition within one narrow field of specialisation, so characteristic to the district during the 1940s and 1950s, was gradually dissolved. As a consequence, the cultural climate has also changed. Once based on distrust and fierce cutting-edge competition, over the last two or three decades, the district has instead started to develop a culture of networking and cooperation; a change stressed by many of my informants. At the same time, subcontracting between firms within the district has expanded. In several ways, Kvänum now comes quite close to Beccatini's ideal model of the industrial district.

About the author

Lars Nyström is a lecturer in history at Gothenburg University. His research deals with several aspects of 18th-20th century Swedish rural history. His latest book, *En industrialisering efter industrialiseringen* [*Industrialization after industrialization*] covers the processes of rural industrialization in post-WWII Western Sweden, combining theories on protoindustrialization and industrial districts. Other subjects of interest include power relations and paternalistic ideologies on 19th century landed estates; interaction between industry and agriculture within the distillery sector; 18-19th centuries Swedish enclosure reforms; and conflicts over land during late twentieth century urban expansion.

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Appendix: Source material

1 Interviews

The total numbers of informants used in the investigation is 66. The subsequent list specifies informants that are quoted in this article or mentioned in the footnotes. Recordings or notes from the interviews are kept in the archive of the author. Some of the dates are given in footnotes.

2. **Adolfsson**, Thord, industrial entrepreneur, son of Karl Sigvard Adolfsson, the first straw chopper manufacturer in the district (Vamo), September 20, 2009 (by telephone); 3. **Andersson**, Bertil, son of a farm hand, welder, foreman and factory overseer, employed at Kjällströms, Venoco and Plåt-Mekano from the late 1940's until the 1990's, several interviews 2008-2011; 7. **Grönberg**, Olof, son of a farmer and building entrepreneur, related to the Kjällström entrepreneurial family at his mother's side, former secretary of Industry and Commerce for the municipality of Vara, several interviews 2005-2011; 8. **Grönberg**, Rune, the brother of Olof Grönberg (no 7), employed at Plåt-Mekano in the early 1950's, founder of Svegma and Tornum (grain dryers), September 19, 2008 (by telephone); 10. **Gustafsson**, Rolf, former manager of the Emtunga Company, son of the founder, Bertil Gustafsson, September 18, 2008 (by telephone); 11. **Gustavsson**, Thord, director of quality and environment at Swegon (formerly Plåt-Mekano), August 29, 2005 (at the Swegon factory in Kvänum); 12. **Hemming**, J.G., agronomist, former consultant of machinery at the Regional Husbandry Foundation, several interviews 2008-2012; 19. **Karlsson**, Joakim, son of a farmer, owner of a mechanical workshop, Nedergatans maskiner located at the family farm, Oktober 20, 2009 (by telephone). 21. **Kjällström**, Bror, industrial engineer, previously active in the family company, Källströms mekaniska, June 19, 2010 (at his home in Kvänum); 25. **Martinsson**, Ann-Britt, Secretary of Industry and Commerce at the Municipality of Vara, October 22, 2005 (at the Lumber and Carle Hotel in Kvänum); 29. **Olsson**, Bengt Åke, part time farmer, previously employed at Frisk Ventilation, father of Johan Olsson who started JO-ventilation, October 22, 2005 (at the family farm/factory); 30. **Persson**, Sven Johan, son of a large-scale farmer from southern Sweden, agronomist, former consultant of machinery at the Re-

gional Husbandry Foundation, owner of the Runstenen Group including the Akron and Rekordverken companies, Oktober 15, 2008 (at the Akron factory); **32. Ronger**, Ingemar, son of a farmer, until 2006 'moonlight farmer', previously employed in several district firms, founder and owner of the Rotage Company, December 7, 2005 (at his farm where he first started the company); **63. Sixtensson**, Lars, farmer and owner of a mechanical workshop, Sixtenssons Mekaniska, located at the family farm, May 10, 2007 (by telephone).

2 Archives

Riksarkivet, National Archives, Stockholm (RA)

Kommerskollegium, Statistiska byrån

H I aah) huvuduppgifter från fabriker (main forms from the factories, 1931-1962)

H I aaa) specialuppgifter från fabriker (special forms from the factories, 1931-1962)

Kommerskollegium. Företagsräkningen (National census of firms) 1931

H a) Inkomna uppgifter från företagen (primary forms from the firms)

Kommerskollegium, Företagsräkningen (National census of firms) 1951

H I a) Primäruppgifter, huvudserien (primary forms from the firms)

Patent och registeringsverket, Bolagsbyrån

E V a) Räkenskapshandlingar insända av aktiebolag (annual reports from limited companies)

Statistiska Centralbyrån, I-byrån, sectionen för industri och bergsstatistik

H I aa) Primärmaterial till industristatistiken (primary material to the statistics of industry, 1963-1989)

NUTEK:s föregångare, Svenska uppfinnarekontoret (National Office of Innovation)

E III) Ärendeakter (files on inquiries regarding patent-related matters)

Statens Maskinprovningar

B II a) Meddelanden (printed reports from the testings of agricultural machinery)

Riksarkivet i Göteborg, Regional Archives, Gothenburg (GLA)

Parich archives

A I; A II; C and F): Civic records

- Häradsskrivarna i Barne, Vara and Skara fögderier (local tax registrars)
 F I and F III a) Mantals- and inkomstlängder (tax records)
 F II b) Fastighetslängder (cadastral registers)
 Häradsrätterna i Valle, Skåning, Skara and Skåning och Valle (local courts)
 F II) Bouppteckningar (probate inventories)
 F IV) Konkursakter (legal documents of bankruptcies)
Riksarkivet i Härnösand, Regional Archives, Härnösand (HLA)
 Inskrivningsdomarna (cadastral judges) in Åse, Viste, Barne och Laske, Skarabygden, Skånings och Valle and Lidköping districts
 D I) Fastighetsböcker (ledgers of real estate)
 G I) Lagfartsakter (title deeds)
 G II) Inteckningsakter (mortgage deeds)

Patent- och registreringsverket, The Swedish Patent and Registration Office, Stockholm (PRV)

- E 1) Akter till beviljade patent (patent files)

Kungliga biblioteket, Royal Library, Stockholm (KB)

The collection of *Vardagstryck: Företagstryck* (*uncatalogued commercial print*)

Company files (organized by company name)

Kungliga Skogs- och Lantbruksakademien, Royal Academy of Agriculture, Stockholm (KSLA)

Maskinbroschyrssamlingarna, the collections of Instruktionsboksamlingen, huvudkatalogsamlingen, Statens maskinprovningar, Jordbrukstekniska institutet, and Winnforska samlingen

Commercial print from producers of agricultural machinery

3 The district firms

Firms engaged in production of agricultural machinery ca 1935-1975 within the main area of research (in italics) and in the surrounding area.

Company name, location	Time period covered	Production (selected products)	Primary sources employed
<i>A. H. Varnborgs plåtslageri, Kvänum</i>	1930s-1960s	EqP, BVS, sub-SM	KB, FR:31,51, IS:35-64, TR
Abelsson & co/Akronmaskiner, Järpås	1930s-1970s	StCh, SC, GD, GB, PF, As, MS	KB, IS:54-79, KSLA, MT, PA, UK
<i>Adolfssons mekaniska verkstad, Jung</i>	1940s-1960s	FG, StCh	KB, TR, MT
<i>Birger Karlsson, Kvänum</i>	1960s-1970s	FF*	TR
Bronäs kvarnfabrik, Vinninga	1930s-1970s	FF, FG	KB, IS:54,60, KSLA, Pa
Bröderna Larsson/ Scandia Elevator, Arentorp	1930s-1970s	FF, FG, BVS, PF, BE, As	KB, FR:51, IS:31,41-75, KSLA
<i>C. Evertz mekaniska verkstad/Cevor, Jung</i>	1950s	StCh, BVS	KB, IS:58, KSLA, LDB:59, MT, TR, Pa, PF, iPF, iUK
<i>Emtunga mekaniska verkstad, Em- tunga</i>	1940s-1970s	FF, BVS, FFT <i>Containers, Modular building systems</i>	KB, FR51, IS54-79, KSLA, TR, P, UK, AR
Främmostads smides & mekaniska verkstad, Främmostad	1950s-1970s	MS	KSLA, MT
<i>Grönbergs kvarn och fläktfabrik/Re- kordverken, Öttum</i>	1930s-1970s	FF, FG, BH, StCh	KB, FR31, FR51, IS:33-79, KSLA, MT, TR, P, PF, iPA, iUK
Gudhems snickeri och mekaniska verkstad	1950s	FF, StCh	IS51, iUK
<i>Hugo Warnborg/Nya Plåtslageriet/ Kvånums plåtslageri/AB Wennerberg/ Venoco, Kvänum</i>	1940s-1950s	FF, EqP, sub-SM	KB, IS41-51, TR
Josve Industrier/J.Johansson & söner mekaniska verkstad, Vedum	1960s-1970s	FLT, H	KB, IS60-75, KSLA
<i>Johansson & Karlsson/Gårdsjötorken, Kvänum</i>	1950s-1960s	EqP, GD	KB, FR:51, KSLA, TR
<i>Jungs mekaniska verkstad, Jung</i> <i>/Tråvads bil- och mekaniska verkstad, Tråvad /Vamo, Tråvad</i>	1940s	FF, StCh	KB, FR:51, LDB:49, AR, MT, TR, UK
Karl Larssons fläktfabrik, Trässberg	1950s-1970s	FF, StCh, SCo, MS	KB, KSLA
Karl Svahn, Källerås	1950s	SCo*	FR:51
Karl Svensson, Vånga	1950s-1960s	Sub-W	FR:51, IS:64
<i>Karl-Erik Andersson/Jungaverken/Cy- linda, Jung</i>	1940s-1970s	FGS*, MP* <i>Washing machines</i>	KB, FR:51, IS:54-79, TR, Pa, AR

Company name, location	Time period covered	Production (selected products)	Primary sources employed
<i>Karlsson & Gustafsson svetsindustri, Emtunga</i>	1950s-1960s	FFT	IS:64, TR
<i>Kjällströms mekaniska verkstad /Kellve, Kvänum</i>	1930s-1970s	FF, FG, BH, FLT Belt conveyors	KB, FR:31,51, IS:33-79, KSLA, TR, Pa
<i>Kvänums fläktfabrik, Kvänum</i>	1930s-1970s	FF, FG, SCo, BVS, DF, PF	KB, FR51, IS:41-75, KSLA, MT, TR
<i>Kvänums plåtindustri, Kvänum</i>	1960s-1970s	BVS, GD, GB, BE	KB, IS:64-75, KSLA, TR
<i>Ladugårdsinrede, Jung</i>	1960s-1970s	CI*	TR
<i>Nyholms industrier, Öttum</i>	1970s	MP	KB, IS:75
<i>Mera system, Kvänum</i>	1970s	SBR*	IS:75
<i>Petterssons mekaniska verkstad, Norra Vånga/Vara</i>	1950s-1970s	FG, StCh, DF, MS	KB, IS60-75, KSLA. MT,
<i>Plåt-mekano, Kvänum</i>	1950s-1970s	EqP, SCo, BVS, GD, PF, As Comfort ventilation	KB, IS:54-79, KSLA, TR, Pa, AR
<i>Ranagårdens svets och smide/Rana- verken, Tråvad</i>	1960-1970s	FFT, MS, GB	KB; IS:75, KSLA, TR
<i>Skallström & Höglund, Kvänum</i>	1940s-1970s	Sub-El*	TR
<i>Skaraverken, Skara</i>	1950s-1970s	FF, StCh	KSLA
<i>Svenska gårdsmaskiner/Svegma, Kvänum</i>	1960s-1970s	GD, GB	KB, IS:75, Pa
<i>Thulins mekaniska verkstad, Nosse- bro</i>	1950s-1960s	StCh	MT, iUK
<i>Tråvads fläkt- och smidesverkstad, Tråvad</i>	1940s	FF	TR, KB
<i>Vamo, Larv</i>	1960s-1970s	FG, H	KB, IS:75, KSLA
<i>Vara Tunnbinderi/Varaverken, Vara</i>	1940s-1970s	GD, GB, PF, BE, As	KB, FR:51, IS:41-75, KSLA
<i>Vara gjuteri och mekaniska verkstad/ Varator, Vara</i>	1940s-1950s	FF	KB, FR:51, IS:41-51, MT
<i>Öhm & Österplan, Vinköl</i>	1960s	EqP, BVS	KB, IS:60
<i>Önums svets, Önum</i>	1970s	FFT	KB
<i>Önums snickeri, Önum</i>	1940s-1950s	Sub-W*	TR
<i>Öttums snickerifabrik, Öttum</i>	1950s	Sub-W	FR:51, TR

Production codes: As: aspirators; BE: bucket elevators; BH: Barn hoist elevators; BVS: Barn ventilation shafts; CI: Cowshed interiors; DF: diet feeders; EqP: Equipment for poultry farms; FF: Hay, grain or straw fans; FFT: Farm fuel tanks; FG: farm grinders; FGS: Farm grindstones; FLT: Front loaders (for tractors); GB: Grain bins; GD: Grain dryers; H: Harrows; MP: Machine parts; MS: Manure spreaders; PF: Propeller fans (for barn drying); SBR: Storage boxes for root vegetables; SCo: screw conveyors; StCh: Straw choppers; Sub-El: Subcontractor of electrical components and installations; Sub-

SM: Subcontractor of sheet metal parts; Sub-W: Subcontractor of wooden parts.

Primary source material codes: AR: Annual reports from Idts; FR (years): National census of firms; IS (year-year): Industrial statistics (not all intermediate years are always covered); KB: company print, Royal library; KSLA: company print, Royal Academy of Agriculture; LDB (year): Legal document of bankrupts; MT: Reports from tests of agricultural machinery, Statens maskinprovning; Pa: patents (digital archive at <http://was.prv.se/spd/search?lang=sv&tab=1>); PF, Patent files, Patent och registreringsverket; iPF, information in patent files of other companies; TR: Tax records; UK, file in the archive of the National Office of Innovation, Svenska uppfinnarekontoret, iUK, information in file of other company in the archive of Svenska uppfinnarekontoret.

* The production cannot be verified from contemporary documents. The information is based on interviews and/or literature. For more details, see: Nyström, 2012.