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Information cost, learning, and trust
Lessons from co-operation and higher-order capabilities amongst geographically proximate firms

by
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Abstract
In this short paper, I put forward an argument about trust based upon an information cost perspective. I argue that, in different contexts, different origins of trust come to dominate. This is so, because different possible origins of trust have a different information cost, and different contexts have different information availability. Agents learn about this, and place their trust accordingly. I provide an empirical example, and list some traits of information availability between geographically proximate firms. The information cost argument explains why a particular way of trusting is prevalent in some proximate 'communities' of agents.

Keywords
Trust; governance; information cost; organisational learning; industrial districts

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Introduction

Trust is a most interesting economic notion, but, due to the traditional differences of method and ontology between economists with methodological individualist and collectivist points of departure, theorists have largely failed to come to a fruitful understanding of trust, and, thereby, to bring organisational economics a significant step forward. In this short paper, I put forward an argument about trust based upon an information cost perspective. I hope thereby to contribute to a notion of trust encompassing insights from different theoretical fields, enabling us to grasp the different origins of trust.

First, I argue that if we limit the definition of trust to a *state* of an agent (the expectancy of honesty), we may probe into the different possible *origins* of trust. Such origins combine or follow each other in a sequence resulting in trust. In various contexts, different origins of trust come to dominate. Then, resting my argument upon an empirical case study, I propose that this can be understood in an information cost perspective: The *availability* and *type* of information in a context give rise to a particular way of trusting, learned by the single agents. Even if this is an evolutionary argument, it is not overly functionalist: Trust does not always arise when needed. I end the paper by briefly discussing the information cost of the various origins of trust, and why geographical proximity may propagate information of importance for one of these origins, resulting in 'ascriptive' trust.

1. Co-operation and information cost

Co-operation as an asset

With a growing dominance on many markets of strategies of continuos specialisation; flexible co-ordination (Piore & Sabel, 1984; Best, 1990; Sayer & Walker, 1992; Schoenberger, 1988; 1997) and inter-firm technological learning[1] (Lundvall, 1985; 1992), co-operation between firms is - seen in the "resource-based" perspective (e.g. Wernerfelt, 1984; Winter, 1988; Chandler, 1992; Langlois, 1998) crucial for achievement of capabilities[2]. For groups of firms, realising external economies (Marshall, 1891, Krugman, 1995); co-operation gives rise to "higher-order" capabilities (Foss, 1996).

Co-operation as a theoretical problem

Co-operation, however common in real life, is not as easily grasped within organisational economic theory as one should expect, because of the predominating assumption of agents' maximising behaviour. Information about market contingencies and technological possibilities will, in most cases, be asymmetrically distributed between business firms (managers); and they will, before they initiate co-operation, know little about each others' incentives and goals (I shall touch upon determinants of the degree of such information imperfection in section 6). The danger of the partner acting *opportunistically*[3] (that is, shirking; holding-up; terminating the co-operation before time; stealing business ideas; etc.) withstanding, why would agents at all choose to enter into co-operation and risk their investments (or even their existence)?

[1] Here, inter-firm "technological learning" is much similar to "innovation". At a later stage, I shall make an argument about 'institutional' or 'social' learning (Johnson, 1992).
[2] I choose not to go into a detailed discussion about the differences between "resources" and "capabilities". See Foss (1996).
[3] In much work within modern economics of organisation (e.g. transaction cost economics), agents' inclination towards opportunistic behaviour has also become an assumption as Friedman likes them: Widely applied; reasonably fruitful - and, in most cases, utterly unrealistic. But already Malmgren (1961) suggested that a theory of the firm does not have to rest upon this assumption.

Even if one proposes that agents have no incentives towards acting opportunistically when they expect future pay-offs (Roscher, 1989; Casson, 1991), one cannot explain how co-operation is initiated if one maintains the assumptions of imperfect information and maximising behaviour: Why should agents at all dare to initiate a co-operation; given the risk that their partner might escape with the entire profit?

2. Trust

Trust as an asset

If managers *trust* each other not to act opportunistically, economic action (co-operation) is “lubricated” (Arrow, 1974). Such trust is of economic value, because it allows agents to initiate and maintain co-operation - without making costly safeguards. If trust is common or “social” amongst a whole group of agents (Coleman, 1984), widespread, flexible co-operation (i.e. with possibilities to shift between partners or combine different co-operations) is a real option. The importance of trust for economic action and co-operation applies both on principal-agent relationships within firms[4]; relationships between firms and customers[5]; and between managers of independent business firms (both in vertical and horizontal firm relations). Because trust is both valuable; non-ubiquitous; and specific, it can be seen as a capability or higher-order capability[6].

[4] The significance of “corporate culture” for co-operation between management and labour (Kreps, 1990) is an illustration.

[5] The importance of “reputations” or “brands” illustrates this.

[6] Trust can be seen as a *higher-order* capability, because it per definition exists *between* agents (it is a social relation, a ‘dyad’, or in the case of social trust, a relationship between many agents); and it is non-imitable by others (a third manager will find a trust-based relationship between two others causally ambiguous - and will in any case hardly be able to enter into it. In the case of social trust in a group of firms, newcomers will find it extremely hard to ‘plug into’ such a coherent system). One may debate whether trust can be regarded as a capability, because it is of little economic value in itself - it is the *co-operation* it gives rise to which is of economic value.

Trust as a theoretical problem

In standard economic theory, trustful expectations of firm managers is not taken into account. Within newer theory, much of the debate on trust is flawed, partly because it threatens the perspective of transaction costs as an overriding determinant of organisation forms (Williamson, 1975; 1985). The rise of new institutional economics has been followed by a large critique, mostly based upon trust arguments (e.g. Granovetter, 1985; Lorenz, 1988; Craswell 1993; Ghoshal & Moran, 1996), and surely, if we accept that the fear of opportunism is overstated by economic theorists and that co-operation may be achieved without costly contracts (not only within hierarchies but also, in many cases, on the market)(Macaulay, 1963), the whole transaction cost argument is on the verge of collapse. This is probably why to Williamson (1993), trust is a 'sociologic' notion, not for economists to explain.

Trust is a problematical notion, because it relates so closely to the classic - and somewhat fruitless - economics/sociology distinction. Some economists from within the more orthodox camp (e.g. Maskell, 1990) maintain that when managers *seem* to act trustfully, it is nothing but a 'behavioural symptom' of real, underlying economic causes (i.e. agents do not really trust, they just maximise, and if it is most rational to act *as if* one trusted each other, so be it).

However, within economic organisation theory, it has now become a central issue to somehow incorporate the empirical fact that, in many cases, managers do seem to trust each other. Some economists even find the origin of trust so important to investigate that they want to broaden their scope and cross some trenches in order to do so. Traditionally, economists who have tried to cross trenches, striving to incorporate institutional perspectives into economics, have but failed to give a theoretical account for institutions, and, in spite of a Nobel prize, got a reputation within the orthodox economist circles as mainly 'historicist' economists[7]. With the growing impact of (and body of work within) 'modern' institutional perspectives[8] within

[7] In much work within this realm are given quite detailed descriptions of the nature of social institutions. Exactly how causal connections should run from such institutions to the single agent is less accounted for. This is a classic problem of methodological collectivism.

[8] The (embryonic) resurrection of 'old' institutionalist perspectives (see e.g. Hodgson, 1988).

economics, there is, however a better chance of coming to grasp with institutions and understand their implications for single agents' behaviour.

A definition of trust

In the following, I shall define trust as a *state* of an agent, namely

> *"an expectation of a manager*[9] *that his (potential) business partner will not act opportunistically - even if he holds no power over him to ensure that he behaves"* (see e.g. Lorenz, 1992).

With this definition, trust is not necessarily a two-way phenomenon: An agent may trust another agent non-reciprocally. Further, trust per se is not correlated to one or few *causes*: Expectations of the agent need not be founded on some security in order to qualify as "trust". It is not whether there *is* risk that matters for the definition: It is the manager's *perception* of risk.

This separation of "trust" from "cause" allows us to investigate the *different possible origins* of trust. Trust is namely not necessarily a stable state, and, depending on its context, may disappear. At the other hand, over time, different origins may give rise to a qualitatively similar expectation: Trust, allowing agents to co-operate. What I propose is thus basically a *dynamic* conception of trust.

3. The different origins of trust

What becomes more and more clear with case studies on trust (Dei Ottari, 1984; Lorenz, 1988; Sako, 1992; Sabel, 1993; Fukuyama, 1995; Maskell et. al., 1998; Storper & Salais,

[9] Naturally, all firms are not controlled by a single manager. But to avoid repeated, lengthy reservations in the following, I shall nevertheless use the simplified term "manager" for the dominant decisionmaker(s) in a firm.

1997;Lorenzen, forthcoming), is that expectations of honesty can have many different institutional origins, spanning from regulation (firm-level contracts and society-level conventions) to cognition (ascription).

Trust-building over time

The most common perspective on trust is that it is something co-operating agents build over time. There are two, qualitatively different, arguments about this.

First, there is a learning perspective: When agents co-operate towards a common goal, exchange information, and get to know each other better, they build trust. In the literature on firm-level "organisational learning" (e.g. Levitt & March, 1988; March, 1991), there are few direct references to trustbuilding. In the Swedish 'network school' (e.g. Håkansson 1989), on the other hand, there are many, empirically founded, insights on trustbuilding as a by-product of co-operation. These insights, however appealing, tell only half the story: They give important evidence about how trust may be enhanced on the road through ongoing information exchange between firms, but they say little about the trust it took to *initiate* the co-operation. In other words, they make up a "functional" explanation (Ullmann-Margalit, 1978; Elster, 1983) of how trust is *maintained* or strengthened and not an "aggregate" explanation of its *origin*[10].

Secondly, there is a sunk cost perspective. When firms place "hostages" (Schelling, 1960; Williamson, 1983), i.e. sink investments into transaction-specific assets which they will lose if they destroy the co-operation (Maskell, 1990), they can trust each other not to act opportunistically. However, this argument does not explain how the co-operation got started at all. Why should firms dare sink investments into the co-operation in the first place? Again, this is an explanation of how trust is maintained, not initiated.

[10]Or rather, trust is perceived both as a 'process' and as an 'outcome'. This makes it hard to *study* what started the cumulative process.

Trust through contract

As mentioned, contract theory gives us little insight into how trust is initiated, because there are so many cases where trust is present independent on contracts - and so many examples of how contracts were not sufficient cause for trust[11]. As I shall come back to later, a main reason for this is that written contracts and working rules suffer from severe information problems. There may be cases, however, where agents base initial trust on formalisation, and the - albeit in some cases hypothetical - security provided by enforcement of contracts and agreements.

Trust through social regulation

It seems difficult for *homines economici* to construct an atmosphere of trust and co-operation by themselves - no matter how many contracts they write up. Luckily, agents are not isolated, but embedded in societies, making economic action possible (Veblen, 1919). Institutionalist economists (e.g. Menger, 1963) point towards the importance of the “institutional environment”, i.e. social (as opposed to firm-specific) institutions (North & Thomas, 1973). Regulative institutions like laws; rules; or conventions backed up by systems of social regulation (ranging from enprisonment to retaliation) can facilitate trust amongst agents. Social regulation practised by a majority of participating agents in a group, tying significant social costs (e.g. social isolation; withdrawal of reciprocity) to breach of social conventions, is an efficient origin of trust in closely knit “communities” (Taylor, 1982). Even if social regulation is not perfectly efficient (e.g. due to the monitoring problems I shall touch upon later), few will act opportunistically, and, more importantly, most agents would *expect* each other to act honestly.

Ascriptive trust

This leads us to another important aspect of institutions: Their *cognitive* function. Because trust

[11] Actually, exactly the *absence* of contracts is taken as an indicator of trust by several researchers (e.g. Lorenz, 1988; Sako, 1992; Barney & Hansen, 1994).

is defined as an *expectancy* of honesty, not a security against opportunism, cognitive institutions like fellow-feeling and other aspects of a common ‘culture’ are grounds enough for trust amongst agents (Casson, 1997). They may interpret each others’ actions and motives, ascribing honesty (or dishonesty) to each other on the basis on some social characteristics. Such ‘ascriptive trust’ (see e.g. Lorenz & Lazaric forthcoming) may be present amongst agents who belong the same family; social community (Taylor, 1982); religion; or political conviction. Further, it may be common to place ascriptive trust in agents who belong to a specific profession, e.g. doctors (Fukuyama, 1995).

Combinations and sequences of origins

The different possible origins of trust must, naturally, not be seen as single-standing. In real life, they are combined, and/or, follow in a sequence. At the societal level (e.g. nations), social regulation, contracts, and social coherence are combined origins of trust and co-operation between agents. For the single firm, trust may be achieved first based on contract and law (most contracts demands enforcement through law; making institutions external to the co-operation itself central), later on sunk costs, later again on friendship (Maskell et. al., 1998). In the first stage, the investments made may be small, and the information available to the agents, albeit imperfect, sufficient for them to make such a small investment. Then, step by step, more investments are made, the scope of the co-operation is broadened, more information is exchanged - and trust is enhanced. It may be hard to imagine following the sequence in ‘reverse order’: Moving from ascriptive trust to a more formalised origin of trust. Theoretically, there is however no reason why this could not take place.

Even if different origins of trust may play together, and the dominant origin of trust may shift, here is no doubt that in different contexts, particular origins of trust have come to *dominate.* There can also be given examples of contexts where there seems to be no origins of trust present - and thus, problems of achieving co-operation.

Sako (1992) has pointed towards national differences in how managers trust. Because of different institutional environments, managers generally place trust on different grounds in UK and Japan. Hence, cross-cultural co-operation may be difficult[12]. Sometimes, the origins of trust may be so specific to a particular community that it is virtually closed to outsiders. Even if the Jewish diamond dealers described by Ben-Porath (1980) enjoy strong trust-based co-operation, its origin lies within a closed community, difficult to 'plug into' for newcomers. Several studies within contexts as different as 1970s Italy (Putnam, 1993) and 1980s Pennsylvania (Sabel, 1993) show that when trust is not founded by some social (i.e. external to the firm) institutions, it can be different, if not impossible, to create, and co-operation hard to achieve.

What is it that determine which origin to trust that comes to dominate in a particular context; and whether trust will shift origin? What determines whether there is a 'sequence' of origins to trust in a context, what determines where agents 'plug into' the sequence, and to which other possible origins they may move?

Game theory illustrates this question very well: "Co-operation games" may have different equilibria, not all being optimal (Axelrod, 1984; Sugden, 1986). Game theory itself - such is its nature - fail to give an account for what determines in which equilibrium single agents may find themselves. In a trust perspective, one may say that it is illustrated that some agents may end up co-operating and enhancing trust (in a step-by-step or sunk cost perspective), but even if there are attempts of treating trust in game theory (e.g. Dupuy & Torre, 1996; Nooteboom, 1996), game theory alone cannot give an account for the reasons that some agents end up in a positive feed-back loop, trusting each other, and some not[13].

Through case studies, I have investigated trust amongst managers of a group of geographically clustered firms (Lorenzen, 1997; 1998; forthcoming). I have tried to give an account for the

[12] This is coherent with Lam's (1998) findings.
[13] In the spirit of e.g. Foss (1998), I would argue that if one wants to use a game-theoretic metaphor, the creation of trust should be seen as a game of co-ordination (basically an issue of information cost) rather than a Prisoner's Dilemma-type game (basically an issue of incentive differences).

origin of this trust, and how this origin have come to dominate amongst a whole group of agents. Below, I shall sketch out some of my results in order to bring our discussion forward.

4. Empirical example

In order to investigate the importance of geographical proximity for trust (and hence co-operation; flexible co-ordination and higher-order capabilities), I have focused upon the Danish industrial district of Salling in West Jutland[14], where I have conducted case studies 1993-1994 and 1997-1998[15].

Co-operation and higher-order capabilities in the Salling district

In Salling, trust is a higher-order capability: The small and medium-sized furniture producers localised in the area make up an industrial system of both producers of finished goods and pure subsuppliers; and they achieve competitiveness on export markets through specialisation and widespread co-operation[16]. Flexible specialisation makes a large number of product varieties possible for many producers, while geographical proximity help to keep lead times short or moderate compared to competitors[17]. In turn, the single firms pass on excess orders to other local firms, keeping production within the district. Inter-firm technological learning - even based on advice and gossip passed on between local firms that do not co-operate directly - lead to continuos product and process innovations. Further, new co-operate relations are initiated

[14] The Danish furniture industry is to a high - and growing - degree agglomerated in West Jutland. The regional agglomeration especially applies to producers of wooden furniture of the basic or knock-down type, localised in the 'emerging' (i.e., hitherto rural) industrial areas of West Jutland. In the peninsular of Salling, over a hounded producers of furniture and related wood products have agglomerated over a century. The agglomeration is accelerating, especially from 1970s, since when numerous entrepreneurs have left the crisis-ridden construction industry to start up furniture firms. The agglomeration in the Salling area is remarkable, because the industrial record of the area compared to other 'fairy tales' of industrialisation in the former rural areas is fairly modest.

[15] The case studies encompass 21 interviews in furniture firms; a local bank; credit association; producer's association (guild); industrial development agency; labour union; and technical school. Further, 4 intensive case studies, encompassing several interviews and time-studies of one week's duration were carried out.

[16] These advantages are expressed in a growth in number of firms and employment (both absolute and relative to the Danish average) during the 1990s.

[17] Today, short lead times are crucial on many furniture markets, e.g. in Germany, to where Salling firms have a high export rate.

directly aiming at innovations: Achieving critical mass or access to other firms' competencies in order to export to new markets; start up production in Eastern Europe; design new types of products or to certify existing products. Both long-term subcontracting; passing-on of orders; experimental co-operations; and passed-on gossip and advice giving is based on trust. The case studies show that managers expect no opportunistic behaviour from their partners.

Ascriptive trust in the Salling district

The case studies show that the producers write no contracts; and make few or no safeguards when co-operating - and this applies even when partners who have not co-operated earlier initiate a new venture. Hence, their trust must be based on either social regulation and/or ascription.

In the area, the relatively coherent social community comprised by the local producers' association (guild) with almost 70 member firms might facilitate social regulation against those who act opportunistically. Several of the interviewed managers claim that if a local firm acts opportunistically, he is ruled out of the community of the guild. None of the interviewed managers can, however, give any examples of others who have acted in this way, nor of anyone who have been punished. In general, the case studies show that local social regulation may actually play a minor role as a basis for trust, and that gossip and warnings against local firms that did not perform well or acted less decently in a co-operation is surprisingly modest (and often, not listened to). The chairman of the guild adds that there is no formal way of punishing any member of the guild for non-collegial behaviour, simply because there has so far never been a need for it.

It seems that the fact that the managers *believe* in the social regulation is more important than it actually being efficient. Further, many of the managers interviewed actually claimed that they felt safe co-operating with other local managers, no matter if social regulation was present or not: Trust was "just there"; something we have always had"; "just the way we do in this area"; "a cultural thing". This "culture" allegedly prescribe that opportunism from a local partner is not likely (although it may be, if you think hard enough, it is not something you spend too much time pondering on, and not something you plan against).

This ascriptive trust is not particularly connected to ties of kinship or personal friendship: Kinship play a limited role, and even if managers get to be good friends in the course of their co-operation, they often initiate co-operations with people who are encompassed by their ascriptive trust, but with whom they are not (yet) friends. The trust which most of the interviewed firms seem to ascribe is not reserved for particular firms, it encompasses whole *group* of firms, including firms that the interviewed managers have not so far co-operated with, maybe not even met yet. This group encompass mainly members of the local guild, and the relevant parameters (apart from, of course, membership of the guild) seems to be craftsmanship (as expressed by firm size; the firm's product quality; and the manager's education and personal participation to the production process) and entrepreneurship (as expressed by economic success[18]; willingness to take risks; personal pride in being manager-owner; and willingness to help others to start up their own businesses). There is also a profound *geographical* dimension to the ascriptive trust: First, the guild has a limited geographical hinterland. Secondly, even within the group of firms within the guild, the ones which are localised closest together allegedly have a closer relationship than the others.

Ascriptive trust and information cost in the Salling district

In general, the interviewed firms seemed to prefer co-operation with local firms. Being "a local" is thus a ground in itself for ascribing trust. An important conclusion from the case studies is that an underlying reason that local firms are more easily trusted is that *it is easier to access information about them.*

Sharing of information between firms takes place through a combination of long-term and short term vertical relations (shorter or longer specialisation subcontracting arrangements) as well as through horizontal relations (between producers of similar products). As mentioned, there is a

[18] Albeit too much success (or too large a firm size) may be an impediment for placement of ascriptive trust.

high degree of subsupplying amongst local firms. Further, even entrepreneurs that are competing on products consider themselves as "colleagues" rather than competitors, and several long-term horizontal co-operate arrangements of sales and complementarities ("networks") witness to this attitude. Actually, it seems that even short-term vertical relations (one firm temporarily taking on the role as capacity subsupplier) frequently are based on longer-term horizontal relations.

Interactions on the personal level happen both within and without of the purely "economic" sphere. The fact that many economic interactions are woven into a network of personal relations, relations between former colleagues, former employees, or even family members, serves to support passing on of information between managers. They willingly give advice to their family, friends or long-term business partners. If asked, they often recommend others for a co-operation. They also participate in the local gossip. As a result, information is available to managers in the Salling district according to which personal networks and co-operate relations they participate in[19]. Because interactions are so frequent - most firms partake in several business networks besides their daily social interaction with other local managers - particular information is easily available to them. In particular, the meetings in the local producer's guild and the private get-togethers of guild members give managers get access to a broad range of information, personal advice, and gossip about other local managers' actions. On these occasions, managers reciprocally exchange not only information of technical solutions, technological opportunities, market developments and new products, but also specific information of the needs of potential users and the capacities and capabilities of potential suppliers.

In interviews, several firms emphasise that even non-locals (non-members of the guild) may be trusted, if the have “the right chemistry”. However, the availability of information about managers who are members of the guild does that it is much easier to assess whether a *local*

[19] Some managers are cut off from this information availability, due to their choice not to participate to social gatherings; and/or their low degree of specialisation and co-operation with other firms. These managers constitute special cases, and are ignored in the generalisations in the following.

firm (member of the guild) is of the right chemistry. Thus, due to information cost, local firms are easier to place ascriptive trust in.

Because information exchange takes place between managers within the guild's catchment area, there is a geographical dimension to the information availability. However, there is also a geographical dimension depending on simple physical proximity. First, co-operations are most frequent between the producers localised closest to each other. The managers themselves list transportation costs (of larger batches) as well as co-ordination costs (of more frequent deliveries of small batches or highly specialised goods) as reasons for this. Secondly, the producers localised in the central Salling (close to the main agglomeration of firms) participate most frequently to the meetings in the producer's guild.

The evolution of a origin of trust in the Salling district

To the history of co-operation and ascriptive trust in the Salling area, there is a dynamic dimension: The system seems to have *evolved* over time.

In the first place, there is a particular local cultural 'heritage', rooted in the agricultural past of the area. Many of today's managers have parents or family in agriculture. This heritage has not always given rise to the same degree of co-operation as the present. On the contrary: The frequent co-operations is mostly a new thing, prominent amongst the new generation of firms started up (or managers that have taken over firms) since the 1970s. This generation of firms seems to - partly due to the greater scope for co-operation provided by new technology and product designs - have higher degree of and co-operation than the earlier generations of managers, and have through the 1980s and 1990s experienced several export booms that allowed them to expand their operations and degree of co-operations. Interviews confirm that ascriptive trust is a "new thing", most prominent amongst the younger generation of managers.

My interpretation of this is that these firms - single managers and the group as a whole - have been through an intensive *learning process*, with two prominent results.

Firstly, the single managers have learned for themselves that is pays to trust. Even if the managers did not know from the start that trusting is something that pays off, their co-operations and the resulting competitiveness has certainly given them the opportunity to learn later that it does. The single managers have thus been through the step-by-step organisational learning process, enhancing their trust.

Secondly, some have learned a way of trusting - and others have followed their example in a *social* or 'institutional' (Johnson, 1992) learning process. If single firms have had repeated positive experiences with ascriptive trust, this origin of trust is possibly seen as the most efficient way towards co-operation. Even if a firm's positive experiences with ascriptive trust stems from his interaction with particular other managers, his way of trusting is 'recycled' and used on still new co-operations. Thus, the local firms *may* have initiated some co-operations on an 'inherited' ascriptive trust based on their relations to the rural past of the area or ties of friendship or kinship. However, their present way of ascribing trust is something they have learned through repeated interactions with other firms, and is not particularly connected to ties of family or kinship.

Each and every firm does not have to go through a trial-and-error process of personal experience with co-operative behaviour. Instead, it can take advantage of local information - shared through both co-operations and gossip[20] - of the experiences of the other firms. Because of frequent passing on of advice - and because most manager have been raised in the area and most new firms have their offspring in existing ones - managers who have not been through the step-by-step organisational learning process can draw upon others' experience and *plug right into the trust sequence placing ascriptive trust* on the basis on the available information[21].

[20] My finding - that gossip may be promoting for trust - may seem somewhat counter-intuitive: Usually, gossip is referred to as negative for trust. But, because gossip constitutes information - and gossiping is an information-structuring process - it may help to build points of reference (see section 6), and thus to form a *possible* basis for ascriptive trust.

[21] Naturally, *placing* trust does not ensure that the trust is reciprocal - thus, trust does not necessarily lead to co-operation.

5. Trust and information cost

The managers in the Salling district - as a group - have learned ascriptive trust and not to base trust on contracts or strong social regulation. We may understand this in a information cost perspective: Today, managers choose to continue to operate on the basis of a well-tried practice, co-operation through ascriptive trust, because information needed to evaluate partners according to this logic is cheap and abundant. This can be understood as expressed by Malmgren (1961: 419): “The information strategies and decision rules adopted over time are partly dependent upon information in previous periods, and are conditioned by it, with the result that the rate and adjustment to new kinds of activities is dependent upon the universality, or lack of it, in the information structure of previous periods”.

Following this logic, information cost may be a sufficient explanation for the fact that different origins of trust come to dominate in different contexts (organisations, and, at a larger level, societies). I shall propose that the different possible origins of trust all have different information cost, and the different availability of different types of information in different contexts is the reason why varying degrees and origins of trust can be traced there.

Below, I briefly investigate the information cost of the different possible origins of trust, starting with contracts, and gradually making the institutional context “thicker” (Amin & Thrift, 1994).

The information cost of contracts

Arrow (1974) has pointed out that in most cases firm-level safeguards such as contracts cannot take all contingencies into account and suffer from severe monitoring problems. Thus, paradoxically, trust founded on contracts demands extreme information to be available to both the participants to the co-operation - and if such information was present, there was no *need* for contracts.

The information cost of social regulation

Information problems also apply for trust founded on societal laws or conventions and enforcement: Hobbes' Leviathan is likely to be surprisingly inefficient in promoting trust between agents due to information problems. The cases where law enforcement or social regulation is sufficiently efficient to ensure trust may be limited to extremely closely knit societies. E.g. in the Italian Mafia (Gambetta, 1988), the bosses impose (or threaten to impose) so severe punishments upon associates who double-cross them that they may trust them not to do so[22]. This enforcement however demands such a significant level of information (surveillance) that, in the cases where the bosses fail to be 'omnipresent', there is little ground for trust. Social regulation functions much better as a basis for trust if it is practised by all the participating agents. Such decentralised social regulation however still demands the agents to know in detail about each others' actions. Hence, even decentralised social regulation is only efficient when both strong social conventions and cheap information on which to decide for social sanctions is available - like in expatriate Chinese societies (Whitley, 1990).

The information cost of ascriptive trust

Ascriptive trust also has a information cost: To ascribe honesty to other agents on the bases of their social characteristics demands (sometimes surprisingly detailed) information of their whereabouts. The important difference of the information cost of ascriptive trust as compared to the types of trust described above is that the information *type* needed is another. Here, the needed information is not necessarily about other future contingencies; costs; capabilities or incentives. Rather, what is important is information about the *actions* of others; paired with a broad range of information on their origin; history; family ties; profession; and so on. To these things, one may ascribe a symbolic meaning and place trust accordingly. At the same time, one may act according to the symbols one wants others to ascribe to oneself (Blumer, 1969; Berger & Luckmann, 1966).

[22] Some would argue that this is not really trust, but terror. It is trust - but it only runs one-way.

6. Information cost and geographical proximity

Above, different origins of trust were described, and their information cost briefly touched upon. For step-by-step building of trust, ex ante information about the business partner's incentives plus ongoing information exchange of information through co-operation was considered crucial. For trust based on contracts, ex ante information about possible contingencies as well as ongoing information achieved through monitoring is central. In the case of social regulation, ongoing monitoring is also central, whereas, in the case of ascriptive trust, a much broader range of information may form the base for trust, e.g. gossip and personal advice.

I shall round up the paper by briefly touching upon what determines information ability. Drawing upon the lesson from my empirical example, I argue that the information necessary for evolution of ascriptive trust is especially abundant in geographically proximate societies. I shall argue that in such contexts, the type of information needed for ascriptive trust is 'social' and easily available (i.e. cheap) for most agents through e.g. gossip and advice giving. This may explain why geographically proximate firms achieve trust easily (Lorenz, 1988; Gertler, 1995; Maskell & Malmberg, forthcoming).

Information channels

At any level of societies or organisations, information availability and information sharing between individuals depends on patters of interaction between agents and institutions (Johnson, 1992) and other agents (Melody, 1988): Information channels (Lundvall, 1985).

First, in formalised search processes or through education, agents may achieve codified information through information channels like public educational institutions or business services; (the information exchanging act encompassing requisition of books, papers, reports; or through communication technology such as fax, phone, EDI, etc.). Although Akerlof (1970); Malmgren (1961); Marschak (1974) and Arrow (1973; 1974) have all devoted their attention to the information problem, I know of little empirical research on the importance of codified information for trust, and the significance of the particular information channels mentioned above[23].

Secondly, when it comes to exchange of less formalised information (complex clusters of information or tacit information), patterns of personal interactions - dense networks of personal relations - constitute important information channels (Lorenzen, forthcoming). One can distinguish between information shared in dyads (Håkansson, 1989) and information shared through third parts, what Granovetter (1973) calls “weak ties”. Because of their large capacity for making information ‘social’ amongst a larger group of agents, weak ties or third-part-relations are important information channels through which agents may construct ascriptive trust.

‘Code keys’

In addition to information channels, common cultural ‘code keys’ are important (Lorenzen, forthcoming). "Culture" is a highly ambiguous notion, but for the purpose its information-structuring abilities may be emphasised. An important ability of culture as a homogenising factor is that it leads people to construe their experiences (reception of information) the same way (Kelly, 1963; Boisot, 1994). Aspects of culture in this respect are language, differences in which can lead to misunderstanding of information, and prominence (Schelling, 1960), as contained in artefacts, symbols, or purely cognitive structures, such as mental models (Nonaka, 1995). Differences in what is conceived as important and sense-making (prominent) may lead to misinterpretation of information. As Arrow (1973: 18) puts it: "No matter how much the technology of information-processing is improved, the ability of human mind and senses to absorb signals will be a permanent limitation". Thus, the ability of firms to share information and to build knowledge from it depends on similarity of routines in the firms, meaning that they have skills, practices, language and culture similar enough (Casson, 1997).

[23] But see Hägerstrand (1968) for a discussion of the role of different information channels for innovation.

The importance of proximity

The importance of information availability and information sharing for institutions is a classic theme in economics and sociology (see e.g. Veblen, 1919; Hayek, 1937; Richardson, 1960; Machlup, 1962). Boisot (1994:12) - drawing on Kroeber & Kluckhohn's (1952) definition - goes as far as calling "structuration and sharing or information between individuals and groups of varying sizes" a most crucial aspect of the "culture" institutionalised in different contexts. When one investigates such contexts for institutionalisation and formation of trust, it seems fruitful to take a geographical perspective on information channels and codes: *Proximity* seems to matter (Malmberg & Maskell, forthcoming) for information availability. As far as code keys are concerned, proximity matters, because cultural distance can be closely related to geographical distance (Lundvall, 1985). Geographical agglomeration of firms, e.g. located in the same region (and thus speaking same language) and being communities of firms sharing a common socio-economic environment (and thus conception of what has prominence) can be beneficial to sharing of tacit information. The cultural coherence of geographically proximate firms is most likely to be a result of the high degree of interaction between them: Proximity matters when information channels are concerned, because the channels, through which much information is shared as "... a body-to-body contact sport, played through physical contact between people" (Sweeney, 1991: 367) are face-to-face contacts. Business meetings of strategic or formal nature can be held at conference centres or fancy hotels, but discussions of practical nature as well as less formal interactions between agents in co-operating firms may more often happen as daily contact within a certain information contact potential related to geographical distance (Sweeney, 1991). Further, many information-propagating institutions (e.g. education and business services) have a local hinterland.

Thus, the cost of transmitting codified information may have diminished with development of communication and transport technology (Lundvall, 1996), but this may not be the case for the cost of communicating tacit information. All in all, geographical proximity may be of crucial importance for information availability. This may explain why the most common origin of trust in some proximate communities is ascription.

Conclusion

In the course of this paper, I have argued that, through both ‘organisational’ (i.e., firm-level) and ‘social’ learning processes, particular ways of trust comes to dominate in given contexts (i.e., trust has different origins in different contexts). What determines which origin will come to dominate - at a given point in time - is the information cost of the different possible origins of trust relative to the information availability in the given context.

This is basically an evolutionary argument: The *cheapest* way of trusting ‘grows’ in a context. If the information cost of an origin of trust - or information availability in a context - shifts, the institutional origin of trust in the context may also shift. This is what has happened in the Salling district: Availability of information about other producers’ actions has risen significantly during the latest years with the rise of subcontracting and the strengthening of the producer’s guild. Correspondingly, ascriptive trust now dominates the co-operation patterns. In Salling, evolution has only a limited ring of *selection*: Firms may survive without trust, or if they place trust on false grounds. The reason that one particular origin of trust came to dominate was *social learning through transmission*: News about the ‘best’ way of trusting spread amongst agents, who then didn’t all have to go through expensive processes of trial-and-error learning. Earlier, trial-and-error may have dominated - as it may do in other contexts than the Salling district.

As may be seen, I have tried not to make my argument overly functionalist. Even if the need for trust is the result of an information problem, I do not propose that trust necessarily arises as the most efficient organisational solution to problems of co-ordination under imperfect information. Similarly, even if I have sketched out some possible reasons why ascriptive trust may be cheap in a geographically proximate area, trust does not necessarily arise in all such contexts.

References

Akerlof, G. (1970): The Market for 'Lemons': Qualitative Uncertainty and the Market Mechanism, *Quarterly Journal of Economics 84: 488-500.*

Amin, A & Thrift, N (eds)(1994): *Globalization, institutions, and regional development in Europe*. Oxford: Oxford University Press.

Arrow, K.J. (1973) Information and Economic Behavior. Federation of Swedish Industries. Stockholm 1973.

Arrow, K.J. (1974): The Limits of Organization. Norton & Co. New York 1974.

Axelrod, R. (1984): The Evolution of Cooperation. Basic Books. New York 1984.

Barney, J. B. & M. H. Hansen (1994): Trustworthiness as a Source of Competitive Advantage, *Strategic Management Journal 15: 175-190.*

Ben-Porath, Y. (1980): The F-Connection: Families, Friends and Firms in the Organization of Exchange, *Population and Development Review 1/6:1-30.*

Berger, P. & Luckmann, T. (1966): The social construction of reality: A treatise in the sociology of knowledge. Penguin Books. Middlesex 1966.

Best, M. (1990): The new competition. Harward UP. Cambridge MA 1990.

Blumer, H. (1969): Symbolic interactionism: Perspective and method. Prentice Hall. Englewood Cliffs 1969.

Boisot, M. (1994): Information and organizations. The manager as an anthropologist. HarperCollins. Glasgow 1994

Casson, M. (1991): The Economics of Business Culture. Game Theory, Transaction Costs and Economic Performance. Clarendon. Oxford 1991.

Casson, M. (1997): Information and organisation. Clarendon. Oxford 1997.

Chandler, A.D. Jr. (1992): Organisational capabilities and the theory of the firm, *Journal of Economic Perspectives 6: 79-100.*

Coleman, J.S. (1984): Introducing Social Structure into Economic Analysis, *American Economic Review 74/2: 84-88.*

Craswell, R. (1993): On the Uses of 'Trust': Comment on Williamson, 'Calculativeness, Trust, and Economic Organization', *Journal of Law & Economics xxxvi: 487-502.*

Dei Ottati, G. (1984): Trust, Interlinking Transactions and Credit in the Industrial Districts, *Cambridge Journal of Economics 18: 529-546.*

Dupuy, C. & Torre, A. (1996): Cooperation and trust in spatially clustered firms. Presented at the workshop on 'Learning, institutions and proximity', Bordeaux, IERSO, November 28-30, 1996.

Elster, J. (1983): Explaining Technical Change. A Case Study in the Philosophy of Science. Cambidge University Press . Cambridge 1983.

Foss, N J (1996): Higher-order industrial capabilities and competitive advantage, *Journal of Industry Studies 3/1*: 1-20.

Foss, N J (1998): Pandoras æske i virksomhedsteorien. Inaugural lecture, April 15, Copenhagen Business School.

Fukuyama, F. (1995): Trust: The Social Virtues and the Creation of Prosperity. Hamish Hamilton. London 1995.

Gambetta, D (ed.)(1988): *Trust: Making and breaking cooperate relations*. Oxford: Basil Blackwell.

Gertler, M.S. (1995): Being there: Proximity, organisation, and culture in the development and adoption of advanced manufacturing technologies, *Economic Geography 71/1: 1-26.*

Ghoshal, S. & Moran, P. (1996): Bad for practice: A critique of transaction cost theory, *Academy of Management Review 21: 13-47.*

Granovetter, M. S (1973): The strength of weak ties, *American Journal of Sociology 78*: 1360-1380.

Granovetter, M. S (1985): Economic action and social structure: The problem of embeddedness, *Americal Journal of Sociology 91: 481-510.*

Hayek, F.A. (1937): Economics and knowledge, *Economica 4: 33-54.*

Håkansson, H. (1989): Corporate technological behavior: Co-operation and networks. Routledge. London 1989.

Hägerstrand, T. (1968): Innovation diffusion as a spatial process. University of Chicago Press. Chicago 1968.

Johnson, B. (1992): Institutional learning, in *Lundvall, B.Å. (ed.)National Systems of Innovation. Pinter Publishers. London 1992.*

Kelly, G.A. (1963): A theory of personality: The psychology of personal constructs. W.W. Norton & Co. New York 1963.

Kreps, D. M. (1990): Corporate Culture and Economic Theory, in *Perspectives on Positive Political Economy. Alt & Shepsle (eds.). Cambridge University Press. New York 1990.*

Kroeber, A. & Kluckhohn, C. (1952): Culture: A critical review of concepts and definitions, *Papers of the Peabody Museums of American Archeology and Ethnology vol. 47. Harward University Press. Cambridge 1952.*

Krugman, P. (1995): Development, geography, and economic theory. MIT Press. Cambridge 1995.

Lam, A. (1998): The social embeddedness of knowledge: problems of knowledge sharing and organisational learning in international high-technology ventures, *DRUID WP.*

Langlois, R.N. (1998): Capabilities and the theory of the firm, in *Foss & Loasby (eds.): Capabilities, coordination, and economic organisation: Essays in honour of George B Richardson. Routledge. London 1998.*

Levitt, B & March, J G (1988): Organizational learning, *Annual Review of Sociology 14: 319-340.*

Lorenz, E. H. (1988): Neither Friends nor Strangers: Informal Networks of Subcontracting in French Industry, in *Trust. Making and Breaking Cooperative Relations.Gambetta (ed.). Basil Blackwell. Oxford 1988.*

Lorenz, E. H. (1992): Trust, community, and cooperation, in *Pathways toindustrialization and regional development. Storper & Scott (eds.). Routledge. London 1992.*

Lorenz, E.H. & Lazaric, N, editors (forthcoming): Trust and economic learning. Edward Elgar.

Lorenzen, M. (1997): Knowledge-guided action: Stability of knowledge and patterns of cooperation amongst furniture producers in the district of Salling, Denmark, *Academy of Entrepreneurship Journal 3/1*: 57-81.

Lorenzen, M. (1998): Localised co-ordination and trust: Tentative findings from in-depth case studies. Position paper presented at the DRUID Winter Conference, Middelfart, January 8-10th, 1998.

Lorenzen, M. (forthcoming): Communicating and learning a basis for trust: Danish furniture producers in the Salling district, in *Lorenzen (ed.): Specialisation, low-tech competitiveness and localised learning: Six studies on the European furniture industry. Copenhagen: CBS Press.*

Lundvall B Å (1985): *Product innovation and user-producer interaction.* Aalborg: Aalborg Univeristy Press.

Lundvall B Å (ed.)(1992): *National systems of innovation: Towards a theory of innovation and interactive learning.* London: Pinter.

Lundvall B Å (1996): The social dimension of the learning economy, *DRUID WP 96-1.*
Macaulay, S. (1963): Non-Contractual Relations in Business: A Preliminary Study, *American Sociological Review 28: 55-67.*

Machlup, F. (1962): The production and distribution of knowledge in the United States. Princeton University Press. Princeton 1962.

Malmgren, H.B. (1961): Information, expectations, and the theory of the firm, *Quarterly Journal of Economics 75: 399-421.*

March, J G (1991): Exploration and exploitation in organizational learning, Organization Science 2: 71-87.

Marshall, A. (1891): Principles of economics. MacMillan. London.

Marschak, J. (1974): Economic information, decision, and prediction. D. Reidel. Dordrecht 1974.

Maskell, P. (1990): Netværksbegrebet i økonomisk Geografi, *Nordisk Samhällsgeografisk Tidskrift 12: 3-12.*

Maskell, P et al (1998): Competitiveness, Localised Learning and Regional Development: Specialization and Prosperity in Small Open Economies. London: Routledge.

Maskell, P. & Malmberg, A. (forthcoming): Localised learning and industrial competitiveness, *Cambridge Journal of Economics.*

Melody, W.H. (1988): Information: An emerging dimension of institutional analysis, in *Evolutionary economics vol. 1. Tool (ed.). M.E. Sharpe, Inc. London 1988.*

Menger, C. (1963): Problems of Economics and Sociology. University of Illinois Press. Urbana 1963.

Nooteboom, B. (1996): Trust, opportunism and governance: A process and control model. WP, University of Groningen.

Nonaka, I. (1995): The knowledge-creating company. Oxford University Press. New York 1995.

North, D. & Thomas, R. P. (1973): The rise of the western world: A new economic history. Cambridge University Press. Cambridge 1973.

Piore, M J & Sabel, C F (1984): *The second industrial divide: Possbilities for prosperity*. New York: Basic Books.

Putnam, R. D. (1993): Making Democracy Work. Civic Traditions in Modern Italy. Princeton University Press. New Jersey 1993.

Richardson, G.B. (1960): Information and investment. Oxford University Press. Oxford 1960.

Roscher, N (1989): Cognitive economy: The economic dimension of the theory of knowledge. University of Pittsburgh Press.

Sabel, C.F. (1993): Studied Trust: Building New Forms of Co-operation in a Volatile Economy, *Human Relations 46/9: 1133-1170.*

Sako, Mari (1992): Prices, Quality and Trust. Inter-Firm Relations in Britain and Japan. Cambridge University Press. New York 1992.

Sayer, A. & Walker, R. (1992): The new social economy: reworking the social division of labour. Blackwell. Oxford 1992.

Schelling, T.C. (1960): The Strategy of Conflict. Harward University Press. Cambridge 1960.

Schoenberger, E (1988): From fordism to flexible accumulation: Technology, competitive strategies and international location, *Environment and Planning D 6 (1988): 245-262.*

Schoenberger, E (1997): The cultural crisis of the firm. Blackwell Publishers. Oxford 1997.

Storper, M & Salais, R (1997): *Worlds of production: The action framework of the economy.* Harward University Press.

Sugden, R. (1986): The economics of rights, cooperation and welfare. Blackwell. Oxford 1986.

Sweeney, G.P. (1991): Technical Culture and the Local Dimension of Entrepreneurial Vitality, *Entrepreneurship & Regional Development 3. 363-378.*

Taylor, M. (1982): Community, Anarchy, and Liberty. Cambridge University Press. Cambridge 1982.

Ullmann-Margalit, E. (1978): Invisible-hand-explanations, *Synthese 39: 263-291.*

Veblen, T. (1919): The place of science in modern civilization. B.W. Huebsch. New York 1919.

Wernerfelt, B. (1984): A ressource-based view of the firm, *Strategic Management Journal 3: 171-180.*

Whitley, R.D. (1990): Eastern Asian enterprise structure and the comparative analysis of forms of business organisation, *Organisation Studies 11(1): 47-54.*

Williamson, O E. (1975): Markets & Hierachies. The Free Press. New York 1975.

Williamson, O E. (1983): Credible Commitments: Using Hostages to Support Exchange, *American Economic Review: 519-540.*

Williamson, O E. (1985): The Economic Institutions of Capitalism. The Free Press. New York 1985.

Williamson, O E. (1993): Calculativeness, Trust, and Economic Organization, *Journal of Law & Economics xxxvi: 453-486.*

Winter, S.G. (1988): On Coase, competence, and the corporation, *Journal of Law, Economics, and Organisation 4/1: 163-180.*

Danish **R**esearch **U**nit for **I**ndustrial **D**ynamics

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The DRUID-research programme is organised in 3 different research themes:

- The firm as a learning organisation

- Competence building and inter-firm dynamics

- The learning economy and the competitiveness of systems of innovation

In each of the three areas there is one strategic theoretical and one central empirical and policy oriented orientation.

Theme A: The firm as a learning organisation

The theoretical perspective confronts and combines the ressource-based view (Penrose, 1959) with recent approaches where the focus is on learning and the dynamic capabilities of the firm (Dosi, Teece and Winter, 1992). The aim of this theoretical work is to develop an analytical understanding of the firm as a learning organisation.

The empirical and policy issues relate to the nexus technology, productivity, organisational change and human ressources. More insight in the dynamic interplay between these factors at the level of the firm is crucial to understand international differences in performance at the macro level in terms of economic growth and employment.

Theme B: Competence building and inter-firm dynamics

The theoretical perspective relates to the dynamics of the inter-firm division of labour and the formation of network relationships between firms. An attempt will be made to develop evolutionary models with Schumpeterian innovations as the motor driving a Marshallian evolution of the division of labour.

The empirical and policy issues relate the formation of knowledge-intensive regional and sectoral networks of firms to competitiveness and structural change. Data on the structure of production will be combined with indicators of knowledge and learning. IO-matrixes which include flows of knowledge and new technologies will be developed and supplemented by data from case-studies and questionnaires.

Theme C: The learning economy and the competitiveness of systems of innovation.

The third theme aims at a stronger conceptual and theoretical base for new concepts such as 'systems of innovation' and 'the learning economy' and to link these concepts to the ecological dimension. The focus is on the interaction between institutional and technical change in a specified geographical space. An attempt will be made to synthesise theories of economic development emphasising the role of science based-sectors with those emphasising learning-by-producing and the growing knowledge-intensity of all economic activities.

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