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Can contractual theories of the firm explain the existence of knowledge-intensive firms?

Volker Mahnke

Department of Industrial Economics and Strategy
Copenhagen Business School
Nansensgade 19,6
DK-1366 Copenhagen K, Denmark
+45 3815 2566 (phone)
+45 3815 2540 (fax)
volker@cbs.dk

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Abstract

This paper argues that the existence of *knowledge-intensive firms* pose puzzlements for the *contractual theories of the firm*. For example, in knowledge-intensive firms physical assets are widely absent, the nature of employment relations and asset-ownership are much less clear compared to industrial firms. Although knowledge-intensive firms account for a growing share in wealth-creation and employment, they have hitherto made relatively little impact on contributions to the contractual theories of the firm (e.g. the work associated with Coase, 1937; Williamson, 1971 1975, 1985; Alchian and Demsetz, 1972; Meckling and Jensen, 1976, Grossman and Hart, 1986, Hart, 1995). Here, I identify puzzlement for the contractual theories of the firm related to the existence of knowledge-intensive firms.

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Introduction

Following Coase (1937), the contractual approaches to the firm begin their take-off period at the beginning of the 1970s - a time where knowledge-intensive business was less important and the industrial firm (Chandler, 1962) dominated public and scholars' interest. Interestingly, Chandler (1962) has described the *industrial enterprise* as a *large, capital-intensive, and diversified* business firm engaged in the *handling of physical goods* in some or all of the successive *industrial processes* from the procurement of raw material to the sale to the ultimate customer. It is this type of company that has attracted the attention of many of the contributors to the contractual theories of the firm¹.

Here in contrast, I am interested in knowledge-intensive firms - firm which are usually small compared to industrial firms. Production involves ideas, concepts, and knowledge rather than physical goods, and products exhibit a low degree of standardization. These firms are also capital intensive, but their capital is of an intellectual rather than a financial nature. Unlike in industrial firms, the main asset of these companies is knowledge of highly skilled people carried literally in the employees' heads. Knowledge is brought to production through personal relations. Both knowledge and personal relations are intangible assets and resist direct control, fiat, and monitoring. Given that principality is linked to asset ownership (Grossmann and Hart, 1986), it is less clear who is the agent and who is the principal in knowledge intensive firms, since in knowledge-intensive firms associated professionals (main input) are usually less dependent on the firm than the firm is dependent on them (Akerberg, 1993). Furthermore, what is the meaning of ownership of intangible assets like knowledge, personal relations and reputation in contrast to physical assets in industrial firms? Which governance form efficiently organizes the main asset in knowledge intensive

¹ It is worth noting that Oliver Williamson's (1975) *Markets and Hierarchies* carries the subtitle *Analysis and Antitrust Implications*, which hints on his concern with large industrial companies to the justification of which he has clearly contributed.

business? Here I suggest that to the extent that contractual theories of the firm build their explanatory apparatus on ownership of physical assets (Hart, 1995), specialization in monitoring (Alchian and Demsetz, 1972), fiat, and direction (Williamson, 1975) in traditional employment relations (Coase, 1937), knowledge-intensive service firms pose puzzlement for contractual theories of the firm.

The remainder of this paper is organized as follows: First, I clarify the notion of knowledge-intensive firm and outline differences to the industrial firm. Secondly, I discuss the pillars on which all contractual theories of the firm build their propositions. Thirdly, I elaborate on puzzlements posed by knowledge-intensive business for the contractual theories of the firm. Finally, I conclude with implications for further research.

Knowledge-Intensive-Firms

Chandler's (1990) seminal work has extensively described the rise of the modern capitalist enterprise, the paradigm case of which he takes to be the large, diversified, capital intensive manufacturing firm. His *Scale and Scope: The Dynamics of Industrial Capitalism* (1990) covers the period starting from the 1870s through the 1960s and makes some reference to more recent development until the 1980s. Yet, since then economies have seen the rise of knowledge-intensive companies (e.g. management consultants, technology consultants, law firms, marketing and PR services, advertising agencies) which play an increasingly important role in employment and wealth generation (Aharoni, 1993).

In advanced forms of capitalism, for example in Japan, the US, and Europe we observe a shift towards work in the realm of information, knowledge, and ideas (Drucker, 1992: 95; Barley, 1994). For example, Barley (1994) estimated the share of physical labor to shrink by half from 1990 to the turn of the year 2000, while he predicts knowledge work (e.g. professional service, management-consultancy, etc.) to grow strongly during the same time. Relatedly, statistics (OECD, 1995) indicate that the sector business survives

has grown steadily and account for nearly as much employment as the manufacturing sector.

While knowledge-intensive companies seem to be of growing importance for growth creation and employment, their fundamental differences to industrial manufacturing firms has until now not made significant impact on the contractual theories of the firm. Knowledge-intensive firms differ from industrial manufacturing firms in at least the following aspects.

- ***Input characteristics.*** Unlike industrial manufacturing firms knowledge intensive firms are less dependent on financial capital, land, technology, and physical labor. They are rather dependent on the professional expertise of knowledge-workers associated with the firm, as well as their constant attraction (Starbuck, 1992; Akerberg, 1993). It should be noted that a part of their knowledge is tacit (Polanyi, 1958).
- ***Employment relation.*** Association of knowledge-workers with the firm are often different from traditional employment relationships in industrial manufacturing firms (Akerberg, 1993). Partnerships, freelance work, and temporary employment are common features. The dependency of knowledge-workers on employers seems to be the reverse of the relation between industrial manufacturing firm and manual workers (Drucker, 1992). While manual workers need access to the firm's physical production facilities more than the firm needs them,. knowledge-intensive firms seem to depend more on the knowledge-workers than knowledge workers depends on them.
- ***Ownership.*** As knowledge workers cannot be owned by the firm, and physical assets (machinery, office space) are of less importance in knowledge-intensive business, physical asset ownership may have only limited impact on the propensity to invest and as a basis for power relations within the firm. Although reputation is important to knowledge intensive firm, reputation may (1) equally depend on the individual knowledge workers, and (2) reputation may be best signified as rented from clients and employees rather than owned the firm.

- **Production and Output characteristics.** In contrast to industrial manufacturing firms, where production is capital intensive and involves repeated processing of physical goods which make routines and standardization of processes possible, production in knowledge intensive firms relies on intangibles (Shotack, 1984), whereby the production involves low standardization (Maister, 1993), highly interactive product definition and customization (Lovelock, 1983), as well as a high degree of non-routine problem definition and solving (Alvesson, 1995). Furthermore, the coordination mechanisms employed are contingent on the type of production (Thompson, 1967). If production is standardized like in industrial manufacturing firms and signified by sequential interdependence, coordination might be most economically achieved through planning. If by contrast production is signified by reciprocal interdependence, coordination in knowledge-intensive firms might require mutual adjustment.

These characteristics suggest that:

- When assignments are idiosyncratic and non-standardized, monitoring knowledge-workers' performance and work conduct becomes difficult if not impossible during production because establishing monitoring criteria ex ante seem hardly possible.
- Because professionals by definition are experts in fulfilling their tasks, professional work resists direct control. For the same reason, providing direction enforced by fiat seems neither necessary nor feasible - not least because nobody in the organization knows better how to perform the task at hand than the knowledge-workers themselves.
- While there is only self ownership of human assets, and association between knowledge workers and knowledge-intensive firms takes often forms that differ from the traditional employment contract, potential exclusion from physical production facilities are unlikely to yield ex post bargaining power to the owners of physical assets. Thus, the threat of exclusion from physical

assets for bargaining purposes seems less effective compared to industrial manufacturing firms.

These features of knowledge-intensive companies pose puzzlement for the contractual theories of the firm to the extent that they build their explanations of the firm's existence on concepts such as (1) ownership of physical assets (Hart, 1995), (2) specialization in monitoring (Alchian and Demsetz, 1972), (3) fiat as governance mechanism (Williamson, 1975) and (4) traditional employment relations (Coase, 1937).

Contractual Theories of the Firm

By contractual approaches to the firm I mean the work associated with the contributions to *Transaction Cost Theory* (e.g. Coase, 1937, Williamson, 1975, 1985; Klein, Crawford and Alchian, 1978), *Property Rights/Team-production Approach* (Alchian and Demsetz, 1972); *Agency Theory* (Meckling and Jensen, 1976); and finally the *Incomplete Contract Approach* (Grossman and Hart, 1986; Hart and Moore, 1990, Hart, 1995).²

What unifies these approaches, different in focus they may be, is that they all see the firm as efficient contractual entity (Foss, 1996). For example, Alchian and Demsetz (1972: 794) argue: “The essence of the classical firm is identified here as a contractual structure with: (1) joint input production; (2) several input owners; (3) one party is common to all the contracts of the joint input owners; (5) who holds the residual claim; and (6) who has the right to sell his central contractual residual status.” Likewise, but independently of team-production Meckling and Jensen (1976) see the firm as ‘nexus of contracts’, whereby contractual relations are the essence of the firm, not only with employees but with suppliers, customers, creditors, etc. (p. 215). More specifically, Williamson (1975, 1985) linked governance forms (markets, hybrids, hierarchy) to different forms of contract law (classical, neoclassical, relational). Finally, Hart (1995), explicitly builds on the notion of incomplete contract and the allocation of property rights.

Besides the focus on contracts, contractual theories of the firm share two additional features: opportunism and imperfect information. It is the latter which provides the *raison d’être* for the contractual theories of the firm. If there were

² These approaches have focused on at least one of the classical questions of a theory of the firm (Holmström and Tirole, 1989), namely (1) the existence of the firm (e.g. Coase, 1937; Williamson, 1975, 1985, Alchian and Demsetz, 1972), (2) the boundaries of the firm (e.g. Coase, 1937; Williamson, 1975, 1985; Hart, 1995), and (3) the internal organization (e.g. Jensen and Meckling, 1976; Alchian and Demsetz, 1972). Here I am interested in explanations of the existence of knowledge-intensive firms.

perfect information opportunism were plainly irrelevant, while if there were no opportunism imperfect information would still matter as impediment to efficiency. It is thus not surprising that all contractual theories of the firm have addressed imperfect information which renders contractual exchange costly and invites opportunism. Both, in turn make the alignment of incentives necessary.

Imperfect Information and Inefficiency

In contrast to neoclassical economics where perfect information is assumed, the contractual theories' struggle is with real world problems where information is imperfect and sometimes asymmetric, where prices may not capture all dimensions of a given good, and where the future is uncertain. If perfect information were real, competition free from artificial restriction, prices were sufficient statistics, and contractual market clearing costless, Pareto-optimal allocation could be achieved through markets. That is, given an equilibrium exists, no one could be made better off without making someone else worse off (Arrow, 1951; Debreu, 1959). Put differently: Pareto-efficiency is the ideal benchmark with which to compare other economic outcomes. When this benchmark is maintained, every market outcome that deviates from this standard is inefficient.

As ideals are unreal and contractual theories of the firm make claims to reality, they assume less than perfect information. Through this they distinguish themselves from the unreal assumptions of the neoclassical theory, but nevertheless remain truthful to either or both its method (methodological individualism, marginal analysis) and the overall efficiency benchmark (Pareto optimality). If information is imperfect, a deviation from this benchmark follows, and thus by definition all market outcomes reached under imperfect information regimes are inefficient. Put differently: they are market failures. Market failure due to imperfect information is also the *raison d'être* for the contractual theories of the firm.

It is worth distinguishing between reasons for imperfect information and its implication. The former might be due to 'bounded rationality', which means that

the decisions makers cognitive capacity is limited so that not all relevant information for contractual exchange can be processed. That is, it is the cognitive capacity, rather than rationality per se which is bounded (Langlois, 1990). Another reason is unobservable information, that is information might be not accessible to a person or a group because it is hidden by another group or person (asymmetric information). Alternatively, information might be simply worthless detached from its context, or its value may be underdetermined (i.e. tacit knowledge). A final reason for imperfect information is subjective perception that leads to different information related to the same observed phenomena. While there are many reasons leading to imperfect information, its implications are information costs and potential market failure.

Introducing imperfect information in economic models gives insight into why market fail (e.g. transaction costs, imperfect contracting) and possible non-market corrections (e.g. in firms) occur. Markets fail among other reasons because contracts that could make one or both parties better off do not come into existence or come into existence but lead to inefficient outcomes. Contracts may not come into existence because prices are absent for a given class of goods (Arrow, 1972). Additionally, prices may be insufficient statistics for market clearing to happen (Akerlof, 1972). Asymmetric information may constitute an at least temporary monopoly of unobservable information which prevents efficient contracting to be completed. That is, one of the partners to a contract is in possession of unobservable information before a contractual agreement (adverse selection) or during its complementation (moral hazard) while the other is not (Ibid.). While there are several implications of imperfect information, there are also several non-market cures suggested in the contractual theories of the firm.

Intrafirm Remedies

The proposition of the contractual theories of the firm is to alleviate contractual problems related to imperfect information through a combination of (1) specialization in efficiency enhancing intrafirm activities, and (2) property rights allocation which provide (3) incentives to enhance efficiency.

Furthermore, it is important to consider which cost category a theory considers, for enhancing efficiency means in the context of the contractual theories of the firm cost reduction and the prevention of productivity losses. The following table illustrates different contractual theories of the firm sorted by specialization, property rights, relevant costs and contract type, and the theories' focus on the classical questions of the theory of the firm.

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Before the discussion of these theories in relation to knowledge-intensive business and associated puzzlements can proceed some clarifications of the following questions are in order. (1) Which role does specialization on efficiency enhancing activities play in different contractual theories of the firm? (2) What categories of information costs can be distinguished? (3) What is the role of property rights in contractual theories of the firm?

(1) Specialization. The firm in transaction cost economics and team production / agency theory can be clustered as two responses to market failure³ due to imperfect information. Each employs different forms of specialization on efficiency enhancing intrafirm activities. While the former suggest fiat and direction as activities targeting at qualitative intrafirm coordination when market

³ Oliver Hart has summarized and formalized much of the insights of other contributions to the contractual theory of the firm..

contracting is prohibitively costly or impossible (e.g. Coase, 1937; Williamson, 1975, 1985), the latter focuses on monitoring and the provision of incentives as efficiency enhancing activities in the face of asymmetric information (e.g. Alchian and Demsetz, 1972; Meckling and Jensen, 1976).

(2) Information costs are efficiency losses incurred due to the implications of imperfect information (Dallmann, 1979: 148). If related to contracts in the theory of the firm, information costs are efficiency losses that occur while preparing, writing and executing contracts. It is worth noting that contractual theories of the firm have specified these losses, i.e. monitoring-, bonding-, search-, negotiation-, or management costs by focusing on certain efficiency enhancing activities. Transaction costs - a subcategory of information costs⁴ - are by far the most widely considered information costs mentioned in the literature of the contractual theory of the firm. A transaction can be defined as the exchange of property rights (Commons, 1931), and with Dahlmann (1979: 147-148) we can distinguish accordingly transaction costs as follows:

“In order for an exchange between two parties to be set up it is necessary that the two search each other out, which is costly in terms of time and resources. If the search is successful and the parties make contact they must inform each other of the exchange opportunity that may be present, and the conveying of such information will again require resources. If there are several economic agents on either side of the potential bargain to be struck, some costs of decision making will be incurred before the terms of trade can be decided on. Often such agreeable terms can only be determined after costly bargaining between the parties involved. After the trade has been decided on, there will be the costs of policing and monitoring the other party to see that his obligations are carried out as

⁴ Notice that while transaction costs capture most of the relevant information costs used in the contractual theory of the firm, transaction costs are not identical to information costs. While transaction costs require per definition the exchange of property rights, information costs do not.

determined by the terms of the contract, and of enforcing the agreement reached.”

This description suggests that one can distinguish ex ante and ex post information costs, that is before or after concluding a contract. Different theories of the firm have focused on either or both. For example, Coase (1937) has focused on ex ante information costs when he asserts that firms exist because the usage of the market system is costly, while Williamson (1975, 1985) adds to this story that the anticipation of ex post transaction costs is brought to bear on the decision to invest in transaction specific assets. Others are concerned with ex-post information costs (e.g. monitoring) that can be avoided through ex-ante alignment of diverging interest (Jensen and Meckling, 1976) or efficient allocation of residual income rights in team production (Alchian and Demsetz, 1972). Likewise, Hart (1995) deals with ex post information costs that can be avoided if property rights are allocated in a manner that prevents postcontractual hazards.

(3) Property rights. Specialization in, for example, monitoring or fiat in conjunction with the allocation of property rights provides the incentive structure that governs behavior in organization. Ownership is the most widely accepted property right and it is useful to distinguish different rights associated with ownership. According to Furubotn & Pejovitch (1972) it is possible to distinguish ownership into the (1) the right to use the asset (*ius usus*), (2) the right to appropriate the returns from this asset (*ius usus fructus*), (3) the right to change its form and substance (*ius abusus*), and (4) the right to transfer each of the three previous mentioned rights to another party (*ius successionis*). While Hart (1995) considers all rights as a basis of power relation in contractual exchange, Alchian and Demsetz (1972) are mainly concerned with the first 2 rights when they argue that the allocation of the residual income rights (*ius usus fructus*) to a monitor as residual claimant prevents productivity losses in team production. Finally, Coase can be interpreted to be concerned with situations where transaction costs prevent the usage of property rights or occur due to their misspecification.

Property rights matter in the contractual theory of the firm because their allocation and specification influences individual behavior. If a property right is not assigned to an individual, then all costs and rewards associated with its use do not accrue to him or her personally. By implication the direct link between individual behavior and its consequences will be diluted. Thus, if for example income rights (*ius usus fructus*) are assigned to a group rather than to one person, and if individual behavior is not easy observable, then the inclination to hold back efforts may be the rational response which decreases income attainable were property rights clearly assigned (Alchian and Demsetz, 1972). The assignment of property rights is especially salient when contracts are incomplete (Hart, 1995). In a world of incomplete contracts and information costs not all property rights can be specifically assigned. Thus, residual right concern contractual unspecified issues, the responsibility of which needs to be assigned if efficiency losses are to be prevented. Furthermore, not only the specification and assignment of property rights matters, but the ability to enforce property rights too is of crucial importance (Furbotn and Pejovich, 1972). The usage of property rights in turn depends on information costs, which if prohibitively high prevent exchange or alternatively, the toleration of post contractual harmful behavior (p.1139).

Puzzlements: The existence of knowledge-intensive firms

This section discusses contractual theories of the firm in relation to knowledge-intensive business. It concerns mainly the question if the contractual theories of the firm can explain the firm's existence in this business. To the extent that the pillars (property rights, specialization on fiat and monitoring, employment contracts) of the contractual theories of the firm seems weak on footing when applied to knowledge intensive firms, puzzlements occur that constitute a within-paradigm critique.

Transaction Cost Theory

The existence of the firm is a natural starting point in the contractual theories of the firm. Coase's (1937) was arguably the first who introduced questions

of why firms exist and the firm's nature into economic analysis with hitherto left "obscure the role of business management and the employer-employee relation" (Coase in Winter and Williamson, 1993: 38)⁵. The firm's existence is explained by noticing that the use of market coordination via price is often costly due to ex-ante transaction costs (e.g. search and bargaining), which in Coase's (1937: 390) rendering are simply the "costs of using the price mechanism."

If price coordination is costly and coordination of input owners can be achieved by hierarchical control, that is by "supersession of the price mechanism" (Coase in Winter and Williamson, 1993: 56), coordination will be organized so as to economize on transaction costs. Put differently: firms exist when hierarchical coordination is less costly at the margin compared to market coordination.

Interestingly, in Coase's story "the employer-employee contract has been made the archetype of the firm" (ibid., 64), whereby one contract is substituted for many service contracts and employees agree enforced by hierarchy and fiat "to obey [within limits] the directions of an entrepreneur" (p. 56). Specifying the mechanism of hierarchy and fiat, Coase (1993: 56) quotes Butt on the *Law of Master and Servant*:

"It is the right of control or inference, of being entitled to tell the servant when to work (within the hours of service) and when not to work, and what work to do and how to do it (within the terms of this service) which is the dominant characteristic in this relation and marks off the servant from an independent contractor"

Puzzlements for Coase's story arise, where coordination in knowledge-intensive firms cannot rely on fiat based on traditional employment relation. To the extent that knowledge-work concerns the identification of unknown

⁵ To be sure, his thrust was not to substitute but to supplement neoclassic economic analysis which has been preoccupied with the functioning of markets and price theory.

problems, unknown solutions, and untried means-end relations (Reich, 1991: 182), rights to control or inference, of being entitled to tell a knowledge worker what work to do and, especially how to do it are most likely to be rather empty. While in industrial manufacturing firms, physical work can be specified by process and content, in knowledge-intensive firms this is hardly the case. If thus the basis of fiat which makes coordination in hierarchies efficient compared to market exchange is undermined, transaction cost explanations of why firms exist are weak on footing. This is true, however, only to the extent that comparative advantages of hierarchical coordination supported by fiat firmly rest on traditional employment contracts.

Williamson (1975, 1985) like Coase explains the existence of firms in terms of comparative cost advantages. Likewise, hierarchy and fiat make firm organization a suitable alternative to market coordination. Unlike Coase, Williamson (1985) considers in addition to ex-ante transaction costs, also costs that emerge from postcontractual hazards. Anticipating ex-post contractual hazards is especially salient in situations where transactions are signified by 'asset specificity'. That is, in situations where transaction specific investments lose significant value in others than agreed upon uses.

Investments in specific assets need safeguarding if opportunism aimed at the ex-post appropriation of income streams which are generated by the underlying specialized assets is feasible. In principle, safeguarding against contractual hazards could be achieved by comprehensive contracting. To the extent, however, that contractors are 'boundedly rational' (Simon, 1952, 1984) and foresight is limited, contracts are likely to be incomplete. Even if contracts were complete, in situations where transactions are accompanied by investment in specialized assets, post-contractual enforcement may be prevented by prohibitively high transaction costs. In sum, hierarchy might be the cheaper solution.

Williamson (1985) explicitly mentions human asset specificity which occurs when at least one partner in a transaction invests in learning that if used for

the contractual purpose yields higher value compared to any other transaction. Implications for the knowledge-worker-firm relation can be easily imagined. For example a consultant may learn features of a firm's specific information system and ways of conducting consultant work, he may learn about clients and their problems that are firmly bound to the consultancy and unlikely to switch established relations.

To forestall opportunism by the firm, the consultant might only choose to engage in this learning, when the firm offers compensations of marginal efforts plus a compensation for increase in the consultant's market value that he could have obtained would he have directed his attention and time to more general, and more widely applicable knowledge domains. While this story is perfectly consistent with Williamsons notion of human asset specificity, it cannot explain why a firm should exist for organizing consultancy work.

A firm would only have comparative advantages relative to market contracting if the total value of the specific transaction it offers would yield not only the compensation required by the consultant, but also create more value compared to all other possible specific learning / transaction combinations available to the consultant. Furthermore, why should value generated beyond the consultant's opportunity costs accrue to the firm. Put differently: What efficiency enhancing specialization does Williamson offer to make this a likely case?

Here like Coase, Williamson (1991) suggests the coordination advantages of fiat, the underlying rationale of which besides employment contracts he sees in private ordering. He argues that:

“One explanation is that fiat has its origins in the employment contract. Although there is a good deal to be said for that explanation, I propose a separate and complementary explanation: The implicit contract law of internal organization is that of forbearance. Thus, whereas courts routinely grant standing to firms should there be disputes over prices, the

damages to be ascribed to delays, failures of quality, and the like, courts will refuse to hear disputes between one internal division and another over identical technical issues. Access to the courts being denied, the parties must resolve their differences internally. Accordingly, hierarchy is its own court of ultimate appeal.” (Williamson, 1991: 274)

More precisely, the logic of forbearance is what sets in Williamsons account hierarchical coordination apart from market contracting:

“The underlying rationale for forbearance law is twofold: (1) parties to an internal dispute have deep knowledge both about the circumstances surrounding a dispute as well as the efficiency properties of alternative solutions -- that can be communicated to the court only at great cost, and (2) permitting internal disputes to be appealed to the court would undermine the efficacy and integrity of hierarchy. If fiat were merely advisory, in that internal disputes over net recipes could be pursued in the courts, the firm would be little more than an 'inside contracting' system.” (Williamson, 1991: 276)

Thus fiat, as Williamson maintains, rests on private ordering advantages that occur when deep knowledge cannot cheaply be communicated to a court. While this argument claims that hierarchies may have advantages in the internal dissolution of conflict, it does not satisfactorily explain why communication costs that arise through knowledge gaps between conflicting parties and an external judge can be lowered by substituting external ordering with internal ordering. Furthermore, in Williamson’s account the question why knowledge-intensive firms should exist in the first place, i.e. why knowledge workers should enter in employment contracts instead of relying on market contracting is not so clear either. Instead, internal and external contracting might be not so different as far as fiat and power is concerned in the organization of knowledge work.

Team Production

This is exactly what Alchian and Demsetz (1972) propose when they deny that from a contractual point of view the firm is any different from markets with regard to power between contractual parties. Contrary to the transaction cost view, firms “are not characterized by the power to settle issues by fiat, by authority, or by disciplinary action superior to that available in the conventional market” (p. 777). Further they argue that making fiat the efficiency enhancing specialization in firms is misleading. As the authors clearly note:

“This is delusion. The firm does not own all its inputs. It has no power of fiat, no authority, no disciplinary action any different in the slightest degree from ordinary market contracting ... To speak of managing, directing, or assigning workers to various tasks is a deceptive way of noting that the employer continually is involved in renegotiation of contracts on terms that must be acceptable to both parties. Telling an employee to type this letter rather than to file that document is like my telling a grocer to sell me this brand of tuna rather than that brand of bread. I have no contract to continue to purchase from the grocer and neither the employer nor the employee is bound by any contractual obligations to continue their relationship. Long-term contracts between employer and employee are not the essence of the organization we call a firm.” (Alchian and Demsetz, 1972: 777)

The firm’s rationale in the authors rendering then becomes a special contractual arrangement, which through the efficient allocation of residual property rights and specialization on monitoring solves productivity problems in the presence of team-production.

When production involves technological indivisibilities, gauging marginal productivity of team members is difficult (metering problem). To the extent that individual contributions cannot be gauged, team-members have an incentive to shirk, i.e. to withhold contributions. If they do so, team

productivity shrinks. To alleviate the metering problem while maintaining the productivity advantages of team production, Alchian and Demsetz (1972) suggest that team-members appoint by contract a monitor who specializes on monitoring team production.

Team productivity will increase through monitoring to the extent that other team members can be induced to withhold less contributions. If further productivity gains more than off set the costs of the monitoring, efficiency gains accrue to the team members. Cheung (1983) illustrates this point:

“My own favorite example is riverboat pulling in china before the communist regime, when a large group of workers marched along the shore towing a good sized boat. The unique interest of the example is that the collaborators actually agreed to the hiring of a monitor to whip them” (Cheung, 1983: 8).

But what prevents the monitor from shirking? After he is appointed as a monitor he simply could withhold his monitoring efforts while receiving the agreed upon compensation. To circumvent this problem, Alchian and Demsetz (1972) suggest to make the monitor the residual claimant. Residual rights involve (1) residual income from team production, (2) the right to alter team membership, and (3) the right to transfer his residual rights. If the monitor is made the residual claimant, team production takes place under an optimal level of monitoring.

Puzzlement's for the Demsetz and Alchian story arise if (1) process monitoring is unlikely to be effective, or (2) monitoring can be achieved effectively without the reallocation of residual rights. This may be the case when unlike the Chinese boat pullers, knowledge workers engage in non-standardized, non-repetitive work, which makes monitoring criteria hard to establish ex ante. In such a setting no one, but the professional itself can challenge his judgement during work conduct due to its superior local knowledge of time and place.

To be sure, monitoring is possible in knowledge-intensive companies, such as small consultancies. But it takes forms that deviate from the picture of the monitor in Alchian and Demsetz story. Process monitoring can be achieved through peer control and group pressure in consultancy project without making a team member the residual claimant. In peer control, it is not so much the threat of punishment by an external monitor as it is the self-interested maintenance of individual reputation among a group of peers that drives contributions to team production. By contrast, process monitoring by externally appointed team members seems rather impossible, if local knowledge needed to make process control effective is missing.

Output monitoring and associated rewards and punishment may lie more in career opportunities such as project appointment (or non appointment) through other team members and partners. Alternatively after a certain time period has expired non requested team members might be sorted out just like a grocer is sorted out by clients if there is no demand for the fruits he offers.

Furthermore, senior consultants and partners might be seen as the generators of tasks to be sold to their knowledge workers rather than as monitors with residual claimant status. Their role might be better described as traders of tasks to be bought by knowledge workers, whereby it is up to the trader to whom to sell the task at the highest price. Thus in total, Alchian and Demsetz' story that the firm is like a market with regard to power might be validated. Puzzlements occur in relation to monitoring, the monitor and its residual claimant status. This however, is less than trivial for their story - not least because both concepts are Demsetz and Alchian's main rationale for the firm.

Incomplete Contract Approach

While transaction costs theory and team production approaches to the firm build on fiat and monitoring respectively to explain the existence of the firm, the incomplete contract literature bemoans that both miss a sound foundations of the power relation they assume to establish their propositions. Thus, Oliver Hart and his co - authors (Grossmann and Hart, 1986; Hart and Moore, 1990, Hart, 1989, 1995) advance the argument by identifying the firm with the physical assets it possesses whereby “ownership confers residual rights of control over the firm’s assets” (Hart and Moore, 1990: 1120). Further, they argue that control over non-human assets leads to control over human assets.

Through this argument they are able to explain the power relation that makes not only fiat a credible option, but additionally sets intrafirm contracting apart from market contracting. Furthermore, to define the firm by the physical assets it owns allows them to define the boundaries of the firm in a clear and unambiguous manner. But why does ownership or more precisely residual control rights of physical assets matter?

Here, the incomplete contract literature suggests that when contracts between agents are incomplete (e.g. they cannot account for all possible future contingencies) and contracting is costly (e.g. transaction cost), residual control rights which accompany the ownership of physical assets correct disincentive to invest. Thus, asset ownership combined with the anticipation of ex post surplus to be generated by asset use, places strong incentives to put assets to its highest value use. In the Hart’s words:

“In a world of transaction costs and incomplete contracts, ex post residual rights of control will be important because, through their influence on asset usage, they will affect ex post bargaining power and the division of ex post surplus in a relationship “ (Hart, 1995:12).

Put differently: the question who owns a piece of private property (1) decides on the question who chooses contractually unspecified uses, (2) decides how ex post surplus is divided, (3) owns a credible threat to exclude others from the asset use, and (4) thus establishes a power relations that can provide the basis of fiat.

Thus, an implication of the incomplete contract literature is that it matters who owns a piece of property. Briefly stated: residual rights should be allocated to the party which is potentially best equipped to increase the asset's usage-value. To illustrate, suppose a situation where two firms (A and B) could acquire each other, but A is better equipped to make investments in the underlying assets of both. Consider, if the boundaries of the firm are extended through integrating an asset and related transactions -, the benefits and costs of asset acquisition accrue to the party holding ownership, whereby "...the benefit of integration is that the acquiring firm's incentive to make relationship-specific investments increases since, given that it has ...residual control rights, it will receive a greater fraction of the ex-post surplus" (Hart, 1995: 33). If B would acquire A, the incentives of A would decrease while the incentives of B would increase. The reverse holds would A acquire B. The allocation of property rights would thus be optimal if the party would make investments who is best equipped to do so.

The edifice of the incomplete contract model is harmfully undermined if physical assets are absent or unimportant - as is the case in many knowledge-intensive firms. Since human assets in the absence of slavery cannot be bought or sold, management and workers own their human capital and the residual control thereof. (Hart, 1995). Furthermore, if human assets were the only assets which could only be rented, the knowledge-intensive firm in Hart's world is not identifiable. Hart and Moore (1990) seems to recognize this weakness when they explain:

It should be emphasized that the approach taken in this paper...distinguishes between ownership in the sense of possession of

residual control rights over assets and ownership in the sense of entitlement to an asset's profit stream. In practice, these rights will often go together, but they do not have to.”

(Hart and Moore, 1990: 1121, n. 3)

To the extent that human assets in knowledge-intensive firms are concerned, residual income rights and residual control rights do not go together. This may, but need not, undermine the value of the incomplete contract model for knowledge intensive firms. These firms may possess for example databases, trademarks, brandnames from the use of which knowledge workers could be excluded. These assets are not physical, but nevertheless tangible and could thus establish the basis for fiat by the threat of exclusion. One can thus ask if the presence of these assets may rescue the application of Hart et. al.'s model to knowledge-intensive firms.

The answer far from being straightforward, however, depends on how one judges the knowledge workers' dependence on these assets. If dependence is a function of alienability of knowledge measured by the costs of knowledge transfer than the distinction between specific and general knowledge (Jensen and Meckling, 1995; Hayek, 1933) becomes important. The cheaper the transfer of knowledge, the more likely is the knowledge transferred general knowledge. The more expensive the transfer (if possible), the more likely we deal with specific knowledge. If the reduction or avoidance of information costs, i.e. caused through transferring knowledge while conducting transaction are of any importance for the incomplete contract approach, it should favor the transfer of general rather than specific knowledge. To the extent that databases, trademarks and the like can be easier transferred than the individual's expertise, much speaks for a situation where the firm depends more on the knowledge worker than the knowledge worker depends on the assets of the firm. We may thus add to Harts insight, that not only ownership matters but the ease with which knowledge is transferred matters too for the allocation of residual control rights of physical assets (Brynjolfsson, 1994).

Another way to rescue the incomplete contract model of the firm is to argue that one of the key assets in knowledge-intensive firms is reputation. This is exactly what Kreps (1990) suggests when he sees the firm as a repository of reputation. However, one can ask with Hart (in Williamson and Winter, 1993: 153) “what it means for reputation to be embodied in an organization as opposed to individuals.” Additionally, the question has to be addressed why individuals cannot build reputational capital through market contracting and how the reputational capital is being sustained. In the absence of a satisfactory answer, one can equally hold that reputation is indeed rented from customers and the firms knowledge workers. To use Harts (1993) own words:

“In conclusion, while Krep’s view is an interesting one, it leaves some questions unanswerd. In particular, the issue of what it means for reputation to be embodied in an organization as opposed to an individual- and the extent to which an organization can be said to be characterized by its reputation-has still to be resolved”. (Ibid.:153)

Summary

To summarize the previous arguments, the rationale for the existence of the knowledge-intensive firm is unlikely to be found in the contractual theories of the firm. It has been shown that some pillars (specialization on fiat and monitoring, employment contracts, private ordering) of the contractual theories of the firm are indeed weak on footing when applied to knowledge intensive firms. I have proposed so far that neither the specialization on fiat nor monitoring can be invoked as arguments for the superiority of firm coordination as opposed to market coordination as far as the organization of knowledge-work is concerned.

In the absence of a sound power-basis (e.g. employment contract, private ordering, asset ownership) fiat is unlikely to achieve coordination any better than a market solution could. Equally, monitoring seems ineffective due to lack

of local knowledge which prevents process monitoring by an external monitor. Alternatively, group pressure and peer control seems possible, but both do not require the appointment of an external monitor as residual claimant. Further, it has been argued that output monitoring might be better understood as market process. In sum, it is not obvious how asymmetric information (as a cause of contractual imperfection) can be reduced through monitoring or fiat in knowledge-intensive firms as opposed to monitoring between independent contractors. Finally, it has been shown that a knowledge-intensive firm without physical assets are simply not identifiable in the incomplete contract framework.

Thus, as far as the existence of the knowledge-intensive firm is concerned, we are led to conclude for all contractual theories what Milgrom and Roberts (1988) have concluded for transaction cost theory.

"The incentive based [contractual theories have] been made to carry too much of the weight of explanation on the theory of organization. We expect competing and complementary theories to emerge." (Milgrom & Roberts, 1988:450)

All these arguments are not meant to suggest that the reasoning of the contractual theories and especially the need to align incentives between contracting parties are entirely irrelevant for the organization of knowledge-intensive business. In the contrary, if human capital services are the main inputs to production, and if this input is especially hard to measure and monitor, problems of moral hazard and adverse selection are most likely. Furthermore, the arguments made here are broadly consistent with Alchian and Demsetz' (1972) finding that intellectual team production will be more likely be organized in partnerships including market organized team activity and non-employer status. Furthermore, organizing knowledge-intensive business might be less firm-like, and may require less concentration of residual rights of control and income. However, agreeing with the problem analysis of specific contractual theories of the firm is one thing. Stating puzzlement in their application to the question of the existence

of knowledge-intensive firms is quite another. These puzzlements are so severe that for knowledge-intensive firms neither a sufficient nor necessary rationale for their existence can be identified within the framework of the contractual theories of the firm.

Conclusion and Opening Up

This paper has analyzed the existence of knowledge-intensive firms from the perspective of the contractual theories of the firm. The broader question clearly is how competitive advantage can be achieved through the organization of the key assets (e.g. knowledge, human assets, intellectual capital) in knowledge intensive firms. I have treated the question of the existence of the firm as a question of the comparative advantages of firm organizations relative to market organization. The analysis has shown that the contractual theories of the firm have next to nothing to say about the existence of knowledge-intensive firms. Thus, we are confronted with the following set of research options:

1. Turn to and further develop other theories that see the firm as a repository of routines (e.g. Nelson and Winter, 1982); cognitive entity (e.g. Dosi and Marengo, 1994); a response to structural uncertainty (e.g. Loasby, 1976, 1994); resource and competence bundle (e.g. Conner and Prahalad, 1996), and knowledge creating entity (e.g. Nonaka and Takeuchi, 1995). Simplifying, this literature can be summarized as the knowledge/capability approach of the firm, whereby greater stress is put on learning, time, dynamics etc. The problem, however, is that these theories are at best imperfect alternatives (Foss, 1997) to an impossible solution (contractual theories of the firm), when we seek to address the question of the firms existence.
2. Another option may be to assume that knowledge-intensive firms are like markets, whereby more firm like-coordination is signified by relational

specialization, continuity of association, and the reliance on direction (e.g. Demsetz, 1988), whether or not this relational structure is supported by a contractual framework, whether or not this relational coordination-structure relies on the allocation of specified property rights.

3. Consistent with the findings of the contractual theories of the firm we may also assume that key assets in knowledge-intensive firms are organized in a market like manner and consequently analyze competitive advantage and performance differences of knowledge-intensive firms with market concepts (e.g. entrepreneurship, intermediation, high powered incentives etc.).
4. Try to draw on contractual and capability approaches (e.g. Langlois, 1992; Teece, 1982, Foss, 1997) to establish a sound rationale for the existence of the knowledge-intensive firm.

Each line of inquiry seems promising and would deal with the questions of how and when comparative advantages can be gained through the coordination and organization of the key assets in knowledge-intensive firms. There are interesting times to come for both, traditional economic theories of the firm and recent developments in the field of strategic management.

Appendix:

Theory	Specialization	Property Right	Cost / Contract	Focus
<p>(1) Transaction Costs Theory</p> <p>Coase (1937)</p> <p>Williamson (1975, 1985)</p>	<p>Hierarchical coordination:</p> <p>Fiat / Direction</p>	<p>Fructus</p> <p>Successionis</p>	<p>IC* (ex ante)</p> <p>IC* (ex post)</p> <p>Incomplete contract</p>	<p>Existence</p> <p>Boundaries</p>
<p>(2) Teamproduction</p> <p>Alchian & Demsetz (1972)</p>	<p>Hierarchical coordination:</p> <p>Monitoring</p>	<p>Fructus</p> <p>Abusus</p> <p>Successionis</p>	<p>IC* (ex post)</p> <p>Productivity loss</p> <p>Complete contract</p>	<p>Existence</p> <p>Internal organisation</p>
<p>(3) Agency Theory</p> <p>Jensen and Meckling (1976)</p>	<p>Hierarchical coordination:</p> <p>Monitoring</p> <p>Incentives</p>	<p>Fructus</p> <p>Successionis</p>	<p>IC* (ex ante)</p> <p>Risk costs</p> <p>Complete contracts</p>	<p>Internal organisation</p>
<p>(4) Incomplete Contracts</p> <p>Hart (1989, 1993; 1995), Grossmann & Hart (1986); Hart & Moore, (1990)</p> <p>* Information Costs</p>	<p>Hierarchical coordination:</p> <p>Fiat</p> <p>Incentives</p>	<p>Usus</p> <p>Fructus</p> <p>Abusus</p> <p>Successionis</p>	<p>IC* (ex post)</p> <p>incomplete contract</p>	<p>boundaries</p>

Table 1: Contractual theories of the firm

Bibliography

- Aharoni, Y. 1993. *Coalitions and competition: The globalization of professional services*, London: Routledge.
- Åkerberg, A. 1995. "Relationships between individuals and their organization in knowledge-intensive firms: What do we know," Working Paper: 303, Swedish School of Economics and Business Administration.
- Akerlof, 1972. "The Markets for Lemons," *Quarterly Journal of Economics*: 488-500.
- Alchian, A. A. and H. Demsetz. 1972. "Production, Information Costs, and Economic Organization," *American Economic Review*, 62, 5: 772-795.
- Alvesson M. 1995. *Management of knowledge-intensive firms*, New York: Walter de Gruyter.
- Arrow, K. J. 1951. An extension of the basic theorem of welfare economics. In: *Proceedings of the Second Berkeley Symposium on Mathematical Statistics and Probability*, Berkeley: University of California Press.
- Arrow, K. J. 1974. *The limits of organization*, New York: Norton.
- Barley, S. 1994. Presentation Script. Stanford University.
- Brynjolfsson E. 1994. "Information Assets, Technology, and Organization," *Management Science*, 40, 12: 1645 - 1662.
- Chandler, A. D. 1962. *Strategy and structure*, Cambridge: MIT Press.
- Chandler, A. D. 1990. *Scale and scope: The dynamics of industrial capitalism*, Cambridge: MIT Press.
- Cheung, S. N. S. 1983. "The Contractual Nature of the Firm," *Journal of Law and Economics*, 26, 1-22.
- Coase, R. H. 1993. "The Nature of the Firm: Influence," in O. E. Williamson and S. G. Winter (Eds.), *The Nature of the Firm*, Oxford: Oxford University Press, 1993.
- Coase, R. H. 1937. "The Nature of the Firm," *Economica*, 4: 386-40.
- Commons, J. R. 1934. *Institutional economics*. Madison: University of Wisconsin Press.
- Conner, K. and C.K. Prahalad 1996. "A Resource-Based Theory of the Firm: Knowledge versus Opportunism," *Organization Science*, 7: 477-501.
- Dahlmann C.J. 1979. "The Problem of Externalities," *Journal of Law and Economics*, 22, 141-162.
- Debreu, G. 1959. *Theory of value*, New York: John Wiley & Sons.
- Demsetz, H. 1988. "The Theory of the Firm Revisited," *Journal of Law, Economics, and Organization*, 4, 141-161.
- Dosi, G. and L. Marengo. 1994. "Some Elements of an Evolutionary Theory of Organizational Competences," in Richard W. Englander. *Evolutionary*

- Concepts in contemporary economics*. Ann Arbor: University of Michigan Press.
- Drucker P. 1992. "The New Society of Organizations," *Harvard Business Review*: 95-104.
- Foss, N.J. 1997. "On the Foundations of a Strategic Theory of the Firm," *Working Paper*, 97-8, Copenhagen Business School (IVS)
- Foss, N. J. 1996. "Knowledge-Based Approaches to the Theory of the Firm: Some Critical Comments". *Organization Science* 7: 470-476.
- Furbotn, E.G. and S. Pejovic. 1972. "Property Rights and Economic Theory: A Survey of recent Literature", *Journal of Economic Literature*, 10: 1137-1162.
- Grossman, S. and O. Hart. 1986. "The Costs and Benefits of Ownership: A Theory of Vertical Integration," *Journal of Political Economy* 94: 691-719.
- Hart O. D. and J. Moore. 1990. "Property Rights and the Nature of the Firm," *Journal of Political Economy*, 98, 4 , 1119-1158.
- Hart, O. D. 1989. "An Economist's Perspective on the Theory of the Firm," *Columbia Law Review* 89(7): 1757-1774.
- Hart, O. D. 1995. *Firms, Contracts, and Financial Structure*. Oxford: The Clarendon Press.
- Hayek F.A. 1933. "The Trend of Economic Thinking," *Economica*, 1, 2: 121-137.
- Holmström, B., and J. Tirole 1989. "The Theory of the Firm," in Richard Schmalensee and Robert D. Willig 1989. *Handbook of Industrial Organization, Vol. 1*. Amsterdam: North-Holland.
- Jensen, M. C. and W. H. Mekling. 1976. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics*, 3, 305-360.
- Klein, B., R. A. Crawford, and A. A. Alchian. 1978. "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," *Journal of Law and Economics*, 21, 297-326.
- Kreps, D. M. 1990. "Corporate Culture and Economic Theory", in James E. Alt and Kenneth Shepsle, eds. 1990. *Perspectives on positive political economy*, Cambridge: Cambridge University Press.
- Langlois, R. N. 1990. "Bounded Rationality and Behaviouralism: A Clarification and Critique," *Journal of Institutional and Behavioural Economics* 16: 691-695.
- Langlois, R. N. 1992. "Transaction-Cost Economics in Real Time," *Industrial and Corporate Change* 1, 1: 99-127.

- Loasby, B. J. 1976. *Choice, complexity, and ignorance*. Cambridge: Cambridge University Press.
- Loasby, B. J. 1989. *The mind and method of the economist*. Aldershot: Edward Elgar.
- Loasby, B. J. 1992. "Market Co-ordination," in Bruce Caldwell and Stephan Boehm, eds., 1992. *Austrian economics: Tensions and new directions*, Boston: Kluwer.
- Loasby, B. J. 1994. "Understanding Markets," *unpublished manuscript*.
- Lovelock, C.H. 1983. "Classifying services to gain strategic marketing insight," *Journal of Marketing*, 47: 9-20.
- Maister, D.H. 1993. *Managing the professional service firm*. New York: Free Press.
- Milgrom, P. and J.D. Roberts. 1988. "Economic Theories of the Firm: Past, Present, and Future," *Canadian Journal of Economics*, 21, 444-458.
- Milgrom, P., and J. D. Roberts. 1992. *Economics, organization, and management*. New York: Prentice Hall.
- Nelson, R. R., and S. G. Winter. 1982. *An evolutionary theory of economic change*. Cambridge: Harvard University Press.
- Nonaka, I. and H. Takeuchi. 1995. *The knowledge creating company*. Oxford: Oxford University Press.
- Polanyi, M. 1958. *Personal knowledge*. Chicago: University of Chicago Press
- Reich, R. 1991. *The Work of nations: Preparing ourselves for the 21th century capitalism*. London: Simon and Schuster.
- Simon H. 1952. "A Formal Theory of the Employment Relationship," *Econometrica*, 28, 293-305.
- Simon, H. A. 1984. "On the Behavioral and Rational Foundations of Economic Dynamics," *Journal of Economic Behavior and Organization*, 5, 35-55.
- Starbuck, W. H. 1992. "Learning by Knowledge-Intensive Firms," *Journal of Management Studies*, 29, 713-740.
- Teece, D. J. 1982. "Towards an Economic Theory of the Multiproduct Firm," *Journal of Economic Behavior and Organization*, 3, 39-63.
- Williamson, O. E. 1975. *Markets and hierarchies: Analysis and antitrust implications*. New York: The Free Press.
- Williamson, O. E. 1985. *The economic institutions of capitalism*. New York: The Free Press.

Williamson, O. E. 1991. "Comparative Economic Organizations: The Analysis of Discrete Structural Alternatives," *Academy of Science Quarterly*, 36: 269-296.

Williamson, O.E. and S. G. Winter (Eds.). 1993. *The Nature of the Firm*, Oxford: Oxford University Press.