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No. 844

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DISTRIBUTION OF INTELLECTUAL PROPERTY RIGHTS AND THE DEVELOPMENT OF TECHNOLOGY SUPPLIERS*

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ABSTRACT: The importance of customer relationships as a source of suppliers' innovative activity and competence accumulation has been widely recognised. The more a relationship involves collaboration and creative, non-standardised customer solutions, the more there is potential for the development of the supplier's competencies – but also for a conflict of interests pertaining to the intellectual property rights (IPRs) to the output. IPRs provide the right to economically exploit and further develop an intellectual asset.

The impact of a contract allocating IPRs, and thereby partly conditioning the *ex post* utilisation of relationship-related knowledge, has been commonly ignored in business economics literature. The increased knowledge-intensity of products has, however, increased technology firms' concern with protecting their intellectual assets that often underlies competitive advantage and company value.

This paper provides a theoretical analysis of the determinants likely to affect allocation of IPRs in buyer-supplier relationships. It also concerns consequent implications for the development of the suppliers' competitive advantage and diversification as a means to decrease possible dependence of the main customer. Contracting on asset ownership in vertical relationships inherently involves bargaining power and incentives to make relationship-specific investments.

These issues have relevance in knowledge-intensive industries, such as electronics and biotechnology, in which firms feed on cross-boundary knowledge transfers, and in which successful development of small innovative firms often depends on relationships with resource-abundant established firms.

KEY WORDS: buyer-supplier relationships, intellectual property rights, IPRs, contracts, customisation, resource-based view, resource dependence, bargaining power.

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TIIVISTELMÄ: Asiakassuhteiden on usein todettu edistävän toimittajien innovatiivisuutta sekä uuden tiedon karttumista. Asiakasyhteistyö ja tuotteiden räätälöinti lisäävät toimittajan kehittymisen – mutta toisaalta myös immateriaalioikeuksiin liittyvien intressiritiriitojen todennäköisyyttä. Immateriaalioikeudet mahdollistavat tuotteen taloudellisen hyödyntämisen ja jatkokehittämisen.

Sopimus, joka määrittelee immateriaalioikeuksien jaon ja näin ollen ehdollistaa toimitussuhteeseen liittyvän tiedon myöhemmän hyödyntämisen, on yleisesti sivuutettu liiketaloustieteellisessä kirjallisuudessa. Tuotteiden tietointensiivisyyden lisääntyessä teknologiayritykset ovat kuitenkin tulleet yhä tietoisemmiksi immateriaalioikeuksien merkityksestä kilpailuedun ja yrityksen arvon perustana.

Artikkelissa analysoidaan teoreettiseen kirjallisuuteen pohjautuen niitä tekijöitä, jotka vaikuttavat immateriaalioikeuksien jakoon teknologian toimitussuhteissa. Siinä myös arvioidaan immateriaalioikeuksien jaon vaikutuksia toimittajan kilpailuedun kehittymiseen. Lisäksi immateriaalioikeuksia tarkastellaan välineenä vähentää mahdollista riippuvuutta merkittävimmästä asiakkaasta. Osapuolten suhteellinen neuvotteluvoima sekä innovaation tuottamisen kannustimet liittyvät oleellisesti vertikaaliseen yhteistyöhön.

Artikkelin teoreettinen malli on sovellettavissa tietointensiivisille aloille, kuten elektroniikka- ja biotekniikkateollisuuteen, joissa yritysten välinen yhteistyö on kriittistä tiedon ja osaamisen nopealle omaksumiselle ja joissa pienten innovatiivisten yritysten menestyksenkäs kehittyminen riippuu usein suurista vakiintuneista toimijoista.

AVAINSANAT: asiakas-toimittajasuhteet, immateriaalioikeudet, sopimukset, tuotteiden räätälöinti, voimavarapohjainen yrityksen teoria, resurssiriippuvuus, neuvotteluvoima.

1 Introduction

The increasing pace of technical development together with global competition has compelled firms to specialise in their core competencies and, consequently, to engage in relationships with firms with complementary skills and products. Access to external resources through exchange relationships provides not only a means to dispose of non-core activities and related investment requirements, but also a means to accumulate the stock of knowledge and capabilities through learning. In industries in which firms' innovativeness and technological distinctiveness are primary determinants of competitive advantage, specialised resources and capabilities may be regarded as their most valuable assets.

When product development takes place in a buyer-supplier relationship with an objective to produce a non-standard output for the buyer, it generally involves some degree of the supplier's creative effort and utilisation of his specialised resources. With such non-standard components the buyer generally seeks improved competitive position.

In many cases of this kind, the design of a contract stipulating the terms of supplier output control, i.e., the distribution of intellectual property rights (IPRs) is not trivial since it should have the objective of securing the future development and competitive advantage of both parties. Issues such as, who gains the right to further develop and economically exploit the output, and to what extent the use of the know-how accumulated in the relationship should be restricted in other business contexts need to be addressed in contract negotiations. For a supplier, assignment of IPRs implicates that knowledge created in the course of the relationship remains relationship-specific and does not increase the firm's competitive advantage in the market. The buyer, in turn, is concerned for protecting its head-start offered by the customised component. Too a restrictive contract may therefore cancel out the benefits from access to external knowledge resources to competence development for either party.

In many high-tech, or "innovation-driven" industries, such as electronics, pharmaceutical and biotechnology industries, in which vertical relationships between large, established and small, innovative firms are frequently observed, IPRs are an important contractual issue between collaborative firms.

This paper concerns the development of a technology supplier's competitive advantage subject to a contract allocating IPRs. The contract is also considered as a determinant of a supplier's ability to manage dependencies by diversifying into new products and customer industries. The supplier's perspective in this paper is chosen to shed light on the

preconditions under which a supplier of customised technology may benefit from a relationship with a customer.

The paper is structured as follows: Chapter 2 outlines the objective and scope of the paper. Chapter 3 provides a review on related theoretical literature, while chapter 4 outlines a model to assess the impact of a technology supplier's internal and external resources on IPR allocation, and the subsequent development of the firm's competitive advantage and scope of diversification. Chapter 5 discusses some dynamic implications of contractual relationships in the context of the model. Chapter 6 concludes and discusses the managerial implications of IPR allocation in vertical relationships.

2 The objective and scope of the paper

The main research question set forth in this paper is, how suppliers of customised knowledge-intensive products develop in a contractual relationship subject to allocation of IPRs. Intellectual property includes items such as: copyright, patents, utility models, trademarks, trade names, industrial design, layout design of an integrated circuit, and trade secrets and confidential information. As the research interest is focused on knowledge-intensive supplier products, the IPRs to a product under contract correspond largely – yet not exclusively – the control over the knowledge created in a customer relationship. By yielding the IPRs to a customer, a supplier simultaneously gives up the right to exploit a vital part of the knowledge created in the relationship and, thus, risks further development of his competitive advantage. Furthermore, application of relationship-specific knowledge in different products and / or different customer industries also serves in managing potential dependence on one customer or industry.

In this paper, I outline a tentative model to investigate 1) to what extent the relative stocks of resources of exchange parties determine the terms of contract regarding the distribution of IPRs; 2) how the IPR allocation affects the subsequent development of the supplier's competitive advantage as well as the supplier's ability to diversify to decrease dependency on the focal customer. More specifically, the model sets out antecedents of bargaining power, which determine the terms of contract-based transactions (here, allocation of IPRs). The terms, in turn, influence relationship outcomes, which subsequently change the antecedents for the next round of negotiations.

The proposed model builds upon extant literatures on:

- *the resource-based approach*, which attributes differences in firms' economic performance to resources they control
- *the resource-dependence approach*, which relates unequal resource endowments to organisational power and asymmetric bargaining positions, and
- *the property rights theory*, which rationalises firms contracting on the residual rights of property and suggests an IPR allocation rule for joint ventures.

By explicitly considering contracts on IPRs in the context of organisational relationships, which are primarily motivated by an access to external knowledge resources, I wish to contribute to the discussion of relationship outcomes as perceived from the so-called resource-based perspective. Indeed, there is a general tendency in the resource-based strategic management literature to highlight the beneficial effects of inter-firm collaboration to knowledge transfer, innovation, and market performance. However, the terms of use of relationship-related knowledge has raised little recognition among scholars in this field resulting in an apparent ignorance of the possibility that an access to other firms' resources does not necessarily guarantee improvement in the initial position of a firm.

My research interest in exchange contracts is in the division of IPRs, i.e., the right to commercially exploit an invention through reproduction, modification, and sale. Other contractible aspects, such as other control rights (cf. Lerner & Merges, 1998) or price, are not included in the analysis. Furthermore, the level of analysis is *the supplier* rather than the relationship. This one-sided approach enhances the probability of a more parsimonious model for later empirical testing, although it ignores many important aspects of relationships.¹ It is acknowledged that the empirical results are likely to be affected by the chosen perspective, and therefore, it leaves the researcher with an aspiration to return someday to the topic from the buyer's perspective.

3 Literature review

Firms as bundles of unique resources: The resource-based perspective

The resource-based perspective to the theory of the firm regards the firm as a "bundle of linked and idiosyncratic resources and resource conversion activities" (Rumelt, 1984, p.561). The main generalisation of the approach is that sustained differences in firms'

¹ One-dimensional perspective on dyadic relationships in empirical work was also adopted by Frazier, (1983), Leiponen (2001), Provan & Gassenheimer (1994), Skinner et al. (1987), and Yli-Renko (1999).

performances are accounted for by heterogeneity of resources and capabilities they control (Penrose, 1959). It is further assumed that the overall objective of firms is to build or otherwise acquire resources that increase competitive advantage (Foss, 1997a).

The explanation of competitive advantage, and changes therein, is thus linked to the characteristics of resources. Production factors that are rare and valuable may give rise to Ricardian rents, which are above-normal profits that do not induce further entry (Montgomery & Wernerfelt, 1988; Peteraf, 1993). There are some “isolating mechanisms” that limit the *ex post* normalisation of such rents among firms. These mechanisms include such elements as specialised assets, unique resources, IPRs, learning, team-embodied skills, goodwill, legal restrictions on entry, switching and search cost, and causal ambiguity (Rumelt, 1984). The last-mentioned mechanism, causal ambiguity, refers to uncertainty that may be involved in specifying the elements required in accumulating certain input factors. This is because context-relatedness and tacitness of some – typically knowledge-based – resources and capabilities makes their imitation difficult or prohibitively costly. For the same reason, these kinds of “strategic factors” are imperfectly tradeable and substitutable (Dierickx & Cool, 1989).

Indeed, the efficiency of various isolating mechanisms in guarding against dissipation of above-normal rents is related to the degree of inherent imitability of resources. Teece (2000, p. 19) considers appropriability of knowledge assets as a function of the *ease of replication* and the *legal intellectual property system*. Appropriability is strong when a technology is difficult to imitate (has an important tacit dimension) and the intellectual property system provides tight legal protection. Weak appropriability, in turn, pertains to a technology that is easily imitable (codified knowledge) and intellectual property protection is unavailable or ineffectual.²

The managerial challenge implied by the resource-based perspective is to identify the resources of the firm with an ability to generate sustainable rents, and to add costly-to-copy characteristics in them (Conner, 1991; Porter, 1980), as well as to create, acquire, combine, and employ resources so as to make the firm’s products either attractively distinctive to buyers or positioned in cost-terms more favourably than competitors’ similar products (e.g., Conner, 1991; Dierickx & Cool, 1989; Prahalad & Hamel, 1990).

Despite the fact that “the resource-based approach focuses on the characteristics of resources” (Oliver, 1993, p. 697) the extant literature is notably ambiguous in defining of what these “strategic assets” consist. In fact, as noted in Foss (1997b), contributors to

² Conditions for moderate appropriability follow from the combination of tight IPRs and easy imitability, and loose IPRs and hard imitability.

the literature often use concepts such as “resources”, “assets”, “capabilities”, and “competences” interchangeably.

For the purposes of this paper, it is useful to reclassify a firm’s resource profile into tangible and intangible assets, since it makes explicit the resources and capabilities in which a firm’s competitive advantage is likely to reside. While tangible assets consist of financial (e.g., cash flow, debt capacity, new equity availability) and physical (e.g., plant and equipment, inventories) resources, intangible assets include human capital (e.g., technological and managerial skills and capabilities), structural capital (e.g., organisational structure, corporate culture, processes, methods, intellectual property, software, documents, and other knowledge artefacts, as well as relationships) (Edvinsson & Malone, 1997; see also Hofer & Schendel, 1978; Stewart, 2001). For later reference, it is important to note that a firm’s “resource profile” the above classification of a firm’s resources implies that they consist of both internally and externally controlled factors. Indeed, existing or potential *access* to externally controlled resources is an important means of extending a firm’s internal asset base.

Penrose, as noted by Mahoney & Pandian (1992), makes an important distinction between *resources* (“the physical things” at a firm’s disposal and “the people hired” Penrose, 1959, p. 25) and *capabilities* (services of resources). Mahoney & Pandian (ibid, endnote 6) interpret the Penrosian classification as to suggest that resources are stocks and capabilities (services) are flows. Or, in Penrose’s own words (1959, p. 25), “a resource, then, can be viewed as a bundle of possible services”.

There seems to be a somewhat congruent opinion among scholars that *strategic assets* are those of the firm’s input factors that are nonsubstitutable, nonimitable, and non-tradeable (Dierickx & Cool, 1989; Nelson & Winter, 1982; Rumelt, 1984) and on which long-term competitive advantage critically depends. Hence, one might think strategic assets to consist of resources and capabilities.

Core competences, in turn, are viewed as “the pool of experience, knowledge and systems, etc. that can be deployed to reduce the cost or time required in creating or expanding the stock of strategic assets” (Markides & Williamson, 1994), or simply, “what the company can do particularly well” (Andrews, 1980). Core competences can be viewed as “catalysts in the production function of strategic assets” (Markides & Williamson, 1994).

The resource-based approach incorporates a knowledge-based perspective, which attributes differences between firms to asymmetries in knowledge, rather than to resources in general. Stewart (2001) reckons that “intellectual assets have become more

important than any other because only by means of knowledge can companies differentiate their work from their competitors'. [...] The specific asset – the differentiating asset – is not the machinery. It's the software and the wetware – the stuff between your ears" (ibid., p. 18).

Resource-based perspective on the firm has been later extended to co-operative firm relationships, which provide a firm with an access to external resources and a means to enhance the performance (e.g., Arora & Gambardella, 1990; Conner & Prahalad, 1996; Hamel, 1991; Hamel, Doz, & Prahalad, 1989; Lorenzoni & Baden-Fuller, 1995; 1998; Powell, Koput, & Smith-Doerr, 1996; Ring & Van de Ven, 1992; Teece, 1992). Acquisition of external knowledge is considered essential for a firm's innovative activity and learning, i.e., accumulation of internal knowledge resources (e.g., Cassiman & Veugelers, 2002; Hagedoorn & Schakenraad, 1994; Hamel, 1991; Hamel et al., 1989; Teece, 1992).

Teece (1986; 2000) argues that other firms' resources are *complementary* to those possessed by a focal firm, and generally required to embed the firm's knowledge into value-producing products. Conner & Prahalad (1996) suggest that transactions involve *knowledge-substitution*, which refers to one party applying the knowledge of the other. However, in order to take advantage of external knowledge, a firm will have to possess "absorptive capacity" (Cohen & Levinthal, 1990)³, i.e., ability to internalise new knowledge through understanding. A less knowledgeable firm, for example a supplier, who anticipates knowledge-absorption difficulties in a relationship, may choose to allow the buyer's judgement to dominate the corresponding elements of his own. Letting the more knowledgeable firm to "orchestrate" business activities provides the less conversant a significant solution to cognitive limitations allowing economising on them. Knowledge-substitution increases the supplier's productive capability without requiring simultaneous knowledge absorption by him.⁴

Heterogeneous resources as a determinant of bargaining power: The resource dependence approach

The resource dependence approach on the organisational theory (Pfeffer & Salancik, 1978) emphasises the importance of access to external resources as the main driver of exchange relationships, since "[t]he key to organizational survival is the ability to ac-

³ "[A]n ability to recognise the value of new information, assimilate it, and apply it to commercial ends" is based on prior related knowledge. These abilities collectively are referred to by Cohen & Levinthal (1990, p. 128) as a firm's absorptive capacity.

⁴ The price of this kind of "apprenticeship" is, however, likely to be reduced autonomy. Conner & Prahalad (1996) mention that a precondition for knowledge-substitution is the supplier's belief that the buyer's knowledge is valuable. The authors conjecture that the buyer's reputation may be one attribute helping in assessing the quality of his knowledge.

quire and maintain resources” (p. 2). All organisations, even the seemingly self-contained, depend on external resources and, ultimately, on those who have control over the required resources.

Interdependencies between exchanging firms are rarely perfectly symmetric. Indeed, asymmetry in interdependence is the major source of power reflecting differences in critical resource assets and the fact that the exchange relationship is not equally important to both parties (Emerson, 1962; Gaski, 1984; Jacobs, 1974; Pfeffer & Salancik, 1978; Provan, Beyer, & Kruytbosch, 1980; Skinner et al., 1987). A natural precondition for the existence of bilateral power is interdependence and willingness to achieve agreement on an exchange (Macneil, 1980). The terms of the exchange will depend upon relative balances of dependence, i.e., bargaining power.

Organisational power stems from (Pfeffer & Salancik, 1978): 1) *resource importance* i.e., magnitude of exchange and criticality of the resource in achieving strategic objectives; 2) *discretion over resource allocation* through possession (e.g., knowledge), property rights (e.g., intellectual property)⁵, or access to resources controlled by others; and 3) *concentration of resource control*. Resource dependence relates to input acquisition (supplier relationships) as well as to output disposal (customer relationships) (Jacobs, 1974).⁶

There are rarely “free lunches” in interdependent relationships. Organisations are likely to demand certain actions in return for continuing to provide the required resources. Indeed, for a firm to survive, responsiveness to the demands of the relevant external “resource controllers” is necessary. Hence, the environment exercises external control of and creates constraints on organisational behaviour and objective achievement. (Pfeffer & Salancik, 1978)

Dependence is the measure of the extent to which other organisations must be taken into account in a firm’s decision making (ibid.), while power, the reverse side of the coin, is “the ability of one party to get other[s] to do what they want [and] also [...] that party’s ability to *resist* [emphasis in original] doing what others want them to do”

⁵ While possession provides a direct and absolute discretion of a resource, property rights provide only an indirect discretion requiring the support of the legal system (Pfeffer & Salancik, 1978).

⁶ Relationship-specific investments in assets increase their value to the actual user while render them less useable (i.e., valuable) to other users (Williamson, 1985). The owner of such assets may attempt to appropriate some of the “quasi-rents”, i.e., the difference of the assets’ value in their first best (present) and second best (potential other) uses (Klein, Crawford, & Alchian, 1978). Therefore, in contractual relationships such asset specificity involves the potential for opportunistic behaviour (Williamson, 1985). In this paper, the Williamsonian approach to asset specificity as a source of bargaining power is ignored to increase theoretical parsimony, but it is conceptually closely related with “nontradeable” or “imperfectly mobile” context-specific assets of the resource-based perspective (which, actually, draws from Williamson’s work), and with the “discretion over resource allocation” as a source of power of the resource dependence approach.

(Ramsay, 1996, p. 130). In a contractual context, to be sure, the relative power-dependence balance determines bargaining power.

Pfeffer & Salancik (1978, p. 94) remark that compliance with external demands, although important for maintaining an immediately critical relationship, may not be in the long-term interests of the firm and may place it in a situation in which its future survival may be threaten. Compliance can be regarded as a loss of discretion and a constraint for obtaining organisational objectives. The authors suggest that an organisation is likely to become subject to recurring influence attempts once it allows itself to be influenced by an external actor. Consequently, organisational autonomy may be lost progressively as behaviours and decisions build upon past events.

Consideration of demands from various interest groups is an important managerial challenge. Pfeffer & Salancik (1978) suggest that a firm may attend to one interest group's requests at one time, and shift attention over to some other's demands at other time. For example, a new firm may choose to build up customer relationships at the expense of the owner's short-term profits. Once the relationships have been established, the firm may start to decrease compliance with customers' demands to the benefit of the shareholders. More generally, the need for compliance changes over time as the amount of interdependence changes as a function of relative resource development.

Property rights theory and trade in intellectual property

“In essence, economics is the study of property rights over scarce resources. [...] [T]he question of economics, or of how prices should be determined, is the question of how property rights should be defined and exchanged, and on what terms.” (Alchian, 1976, pp. 2-3 cited in Furubotn & Pejovich, 1972) Property rights to an asset consist of the power to control its residual rights, i.e., “all aspects of the asset that have not been explicitly given away by contract” (Grossman & Hart, 1986, p.695). More precisely, property rights to an asset have three aspects: 1) the right to use the asset, 2) the right to appropriate returns from the asset, and 3) the right to change the form and substance of an asset (Furubotn & Pejovich, 1972).

The distinction between specific and residual rights relate to the incomplete contracting theory, according to which it is too costly to specify all the particular rights firms have on each other's assets.⁷ Grossman & Hart (1986) propose that firms contract on two types of rights: specific rights and residual rights. Residual rights are those that remain with a firm after it has signed away some specific rights to the firm's assets. Ownership

⁷ Design of complete contracts is limited by two behavioural features, i.e., bounded rationality (human inability to account for all future contingencies) and opportunism [“self-interest seeking with guile”; Williamson, 1985 #119, p.47].

of a firm – defined as being composed of the assets that it owns (ibid., p.692) – consists of the power to control its residual rights, i.e., “all the aspects of the asset that have not been explicitly given away by contract” (ibid., 695).

In the world of costly contracting the low-cost alternative, argue Grossman & Hart (1986, p.695), is to purchase all rights except those specifically specified in the contract. Residual rights provide an implicit or explicit default that allows some party to choose the relevant components of production *ex post*.

To the extent an asset is of intellectual kind its ownership involves some special concerns. A characteristic differentiating tangible and knowledge assets (as one class of intangible assets; see p. 6) is the so-called “public good” aspect of knowledge, i.e., consumption thereof does not reduce its quantity. However, the *economic* value of knowledge assets may well decline with use by several economic actors. (Teece, 2000) Easy replicability of information, a central ingredient of knowledge assets, has important implications for its production cost structure: Information has high fixed cost, but close-to-zero marginal cost. Moreover, fixed cost is largely nonrecoverable in case of a failure (Shapiro & Varian, 1999). Therefore, the support of the legal system in protecting intellectual property is crucial in encouraging economic innovation activity in knowledge-intensive production.

Furthermore, Teece (2000, p. 12) notes that “the march of technologies such as integrated circuits is transforming the linkage between intellectual property and products. Technological innovation is requiring the unbundling of the two [...]. For example, trade in intangible products (e.g., packaged software) involves, as a premiss, a transfer of right of use (a license), while the proprietary right remains with the seller, since, from the legal perspective, the item of sale is a *copy* of the original intangible product – which, in turn, from the economic perspective is an *asset*. The right of use of an intangible product cannot be transferred to a third party nor can it be altered without the consent of the seller (licensor). No such limitations apply to tangible goods. (Takki, 1999)

An inherent characteristic of intellectual property, i.e., the “fuzziness” of property boundaries, and the consequent vagueness of the legislation protecting intellectual property hamper trade thereof. For example, loose and limited IPRs result in fear of involuntary spill-overs and prevent firms from fully disclosing their “intellectual product offering”, thereby precluding potentially advantageous trades. (Teece, 2000)

In industrial relationships, the more customised an intangible supplier good is, the more relevant becomes the issue of property rights transfer. To be sure, there is no reason for a supplier of e.g., off-the-shelf software to consider handing out property rights to one

of the customers. The case is not as clear-cut for a supplier of a commissioned component, which may have an anticipated property of increasing the customer's competitive advantage. Granted, the more innovative elements the supplier's output embodies, the more it is likely to distinguish the customer's product in the end market. But, in the same vein, the more it will probably have value in adding to the stock of the supplier's strategic assets, which would then produce incrementally enhanced output in future exchanges. But it may be exactly the reason for the customer to try to limit the supplier's employment of the new intellectual asset in dealings with third parties. Takki (1999) proposes that the central question pertains to the *degree* to which the rights are transferred. Ultimately, an optimal contract depends on the needs and objectives of the trading partners.

With an application to the software industry, Takki (1999, p. 65) lists four concerns making the possession of IPRs interesting firms:

- *Protecting competitive advantage.* IPRs are a means to prevent distribution of a new idea to others, particularly competitors.
- *Commercialisation of the work.* IPRs enable reproduction and sale of the work.
- *Making use of the work in other contexts.* IPRs enable the use of the work in various usage environments.
- *Independence in maintenance and further development of the work.* IPRs make possible altering and development of the work by the proprietor or an entitled partner.

What do these concerns signify for the supplier and the customer, respectively? For the supplier, retaining IPRs is necessary to be able to capitalise on his creative work by reproduction and sales to other customers, and to be able to alter and develop the work by e.g., integrating other proprietary elements to it without fearing that rights thereof unintentionally transfer to the customer. For the customer, it is important to be able to reserve the right to use the product in all beneficial functions that might open up in the future, not only in the one for which it was initially created. The customer will neither want to be prevented from choosing partners for developing new products taking use of the supplier input, nor limit the number of copies made for his own use, nor hold back the application of product-related knowledge or documentation in other circumstances. Furthermore, a customer who pays for the creation of a non-standard product wants to ensure that he will benefit from the competitive advantage it affords. (Takki, 1999)

4 A model of the effects of IPR allocation on supplier development in contractual relationships

The resource-based strategic management literature, while emphasising accumulation of knowledge assets as a driver of competitive advantage, is founded on the assumption that access to external resources through relationships enhances firms' performance (e.g., Hamel, 1991; Hamel et al., 1989; Hines, 1994; Jorde & Teece, 1989; Lorenzoni & Baden-Fuller, 1995; Porter, 1990; Powell, 1998; Teece, 1986, 1992). Factors that stand on the way of interfirm knowledge transfers and consequent performance improvement centre mainly on two concepts: Firms' *absorptive capacity*, i.e., ability to convert new information into new knowledge through understanding, and *appropriability problems*, i.e., inability of firms to check unintentional knowledge spill-overs, which may prevent firms from engaging in inter-firm activities.

The resource-based approach commonly ignores the *conditions* of access to external resources, i.e., the contract, and its implications for firms' resource accumulation. Some authors (Conner, 1991; 1996; Kogut & Zander, 1992), as noted by Foss (1996a; 1996b), reject altogether the interpretation of firms as contractual entities with "selfish motives" (Kogut & Zander, 1992, p.364). In their view firms exist to provide "a social community of voluntaristic action" (ibid.) clear of opportunism. Nevertheless, also the less extremist conversation in the resource-based literature more or less implicitly assume that once a firm has got access to another firm's resources it starts to acquire new knowledge, which it absorbs, subject to its capacity and translates into new organisational assets. It is rarely questioned, whether these relationship-mediated assets are fully exploitable by the firm, since the contract stipulating allocation of property rights is treated as a black box or assumed away.

Once we consider the contractual conditions under which a firm gets access to external resources, the firm's resource accumulation "apparatus" can get various forms. It is not only the absorptive capacity of the firm that determines the extent to which he can benefit from a relationship. The benefits are ultimately defined by the extent to which the firm *retains control* over the knowledge he has absorbed or created in the relationship. Allocation of IPRs is a critical, but widely neglected aspect of inter-firm relationships in the resource-based literature. It has also direct bearing to the development of resource-dependence / bargaining power of a firm. The contract can therefore be seen as a potential moderator of relationship outcomes.

In what follows, I present a set of hypothesis, which bases on the selected theories (see figure on page 21). By combining the two approaches emphasising the importance of

resources in the achievement of firms' strategic objectives with explicit consideration of contractual allocation of IPRs I wish to provide a different view on a supplier's customer relationships. To emphasise, the model adopts the supplier's perspective, and other aspects of contracts are excluded.

Supplier's internal resources and bargaining power

Looking at the determinants of a contract allocating IPRs to a supplier-produced output one surely needs to assess the relative bargaining powers of the contracting parties. As discussed above, resource endowments involve power. Therefore, a firm with relative dominance in resources may use its power to obtain a favourable contract. The size of the firm, in terms of, e.g., financial and physical assets, number of employees, or market share, is the most common measure of relational power.

But sheer volume is not the only attribute of resources to endow the holder with bargaining power: Criticality and rareness matter as well, as suggested by both the resource-based and resource dependence literatures.⁸ Accumulation of distinctive resources (in terms of hard imitability, substitutability, or transferability) may provide a small firm with some monopoly power vis-à-vis other firms with abundant resources. Simply put, the more a firm is differentiated in terms of resources the less it has competitors, and the less a buyer has alternative sources of a product at issue. It is important to keep in mind, however, that some resources of more generic nature, such as financial assets, are critical for firms' survival. Therefore, endowments thereof provide a firm with independence in pursuing its strategic goals (see e.g., Lerner & Merges, 1998).

Correspondingly, the less a firm controls resources internally, the more dependent it is on external resources, and the less it can bargain over the conditions with which it can gain access to them. Therefore, new and/or small firms are likely to be more resource-dependent and enjoy less bargaining power than their more established and larger counterparts (e.g., Lerner & Merges, 1998; Pfeffer & Salancik, 1978; Provan & Gassenheimer, 1994; Skinner et al., 1987; Yli-Renko, Autio, Sapienza, & Hay, 1999).

Supplier's internal resources could be thus seen a general measure of his "weight" as a bargaining partner.

⁸ Referring to the earlier theoretical discussion, in the terminology of the resource dependence approach resources should be understood to *contain* capabilities, i.e., the Penrosian services of resources (see p. 6). As an attempt to integrate the terminologies of the underlying theories, I consider hereafter *resources* as a general term, which covers both strategic assets (resources and capabilities that are rare owing to imperfect imitability, substitutability, and tradeability) and critical assets (which may be of generic kind, e.g., financial assets) of a firm.

Hypothesis 1: The greater the stock of distinctive and/or critical resources a supplier holds, the stronger bargaining power he has in negotiating for the IPRs to the product supplied, and the more likely he will retain control thereof.

Supplier's product-specific resource investments and bargaining power

Transactions vary according to the degree of adaptations made to their accomplishment. In discrete market exchanges suppliers sell standardised products with no adjustments to the specific demands of a buyer, while in relational contracts (relationships) firms make relationship-specific investments and enjoy consequential efficiency gains from non-market, i.e., customised products. (Williamson, 1985)⁹

A supplier of a standardised “off-the-shelf” product holds the IPRs thereof since the product embodies the supplier’s independent resource investments (access to third-party resources is ignored for simplicity). In the case of customised products IPR allocation is not as clear-cut, since successful development of customised products requires some investments by the buyer as well, including typically provision of private information and/or know-how.

In theoretical research, the *relative investment criticality* of exchange parties in increasing the probability a strategically valuable output (innovation) has, indeed, been considered to be a central factor in the distribution of asset property rights (Aghion & Tirole, 1994; Grossman & Hart, 1986). Literature on property rights suggests that ownership of an anticipated innovation will be assigned to the party whose investment is more critical for the success of the project. In other words, the firm with relative advantage in knowledge resources related to the technology at issue would receive control over the impending asset. Or, put differently, the stage of product development at the time of signing a contract would affect allocation of IPRs (Lerner & Merges, 1998). The *stage* indicates then both the share and substance of the *ex ante* investments made by each participant. In their work Lerner & Merges (1998) found, however, contradictory empirical evidence to the theory.¹⁰

Despite the lack of robust grounds for hypothesising on IPR allocation subject to the degree of product customisation I put forward two hypotheses on the relationship between product-specific investments and IPR allocation.

⁹ Relationship-specific investments of a supplier, who is in our focus here, may materialise in customer-specific physical, human, site-related, or otherwise dedicated assets (Williamson, 1983). In principal, any “special attention” paid to a buyer shifts the relationship away from standardised products, i.e., market exchanges. In what follows, I will limit the analysis of relationship-specific investments to product customisation.

¹⁰ Lerner & Merges (1998) found that financial resources outweighed prior track record in innovation-related know-how in contracts allocating IPRs to innovations in the biotechnology industry.

On the one hand, a standardised product indicates that the supplier has completed the product development stage without the buyer's contribution, while product customisation increases the probability of the buyer's investments. The degree of product standardisation indicates the importance of *ex ante* investments of the supplier.

Hypothesis 2: The more standardised a supplier's product is, the more likely the supplier will retain control over its IPRs.

We may, on the other hand, imagine cases in which a supplier's product is fully customised for a buyer's purposes, but the share of volume or strategic import of the buyer's investments may be unimportant. Equivalently, a fully customised product may be completely specified and financed by the buyer, while the supplier merely executes its implementation. Decisions on the relative shares of project-specific investments thus relate to *ex post* investments. We want therefore, in the tradition of extant theories, to account for the relative investments made by the exchange parties.

Hypothesis 3: The more important, in terms of share and substance, the supplier's resource investment is in the product supplied, the more likely he will retain control over the product's IPRs.

Compared to a supplier's internal resources as a measure of "general" bargaining power, the level of a supplier's product-specific resource investments is a measure of a supplier's bargaining position pertaining to a specific project.

Customer-controlled resources and bargaining power

For a supplier, considering exchanges from the resource-based perspective, buyer relationships involves not only output disposal and but also input acquisition.¹¹ To the extent that external knowledge is critical to organisational learning, knowledge transfers from a buyer can be regarded as input to a supplier's productive activity. Empirical research has found partnerships with large firms to serve small firms as an instrument for new knowledge and competence accumulation (e.g., Powell, 1998; Rothwell & Dodgson, 1991; Shan, Walker, & Kogut, 1994; Yli-Renko, 1999).

The further we move from market relations towards co-operative relational contracts, the more specialised knowledge and relationship-specific investments there are involved in transactions to support customisation and to enhance the probability of an innovation (see Hines, 1994 for an example of the Japanese auto industry). This kind of an environment provides ground for new knowledge absorption and substitution. Buyer-supplier interaction spurs transfer of knowledge not only in the technology at is-

¹¹ To be precise, output disposal comes down to input, i.e., cash acquisition.

sue, but also in business management (Hodgson, 1998). For example, for a small or new firm with limited managerial skills, adjusting to a more knowledgeable customer's managerial and productive structures – i.e., allowing for knowledge substitution – serves as a short cut to organisational development.

A relationship with a buyer may provide a supplier with an access to yet other resources with economic value, e.g., access to non-public information about the market (through e.g., the buyer's memberships in industry associations and other forums); access to the customer's customers (higher demand volumes) and other relationships. Pfeffer & Salancik (1978) denote "gatekeeping", i.e., regulation of access to those who make final decisions on allocation and use of critical resources, as a source of power.

Hypothesis 4: The greater the stock of distinctive resources a buyer controls that are accessible for a supplier through a contract, the weaker bargaining power the supplier has in negotiating for the IPRs to the product supplied, and therefore, the less likely he will retain command thereof.

Perhaps the most intuitive and widely used indicator of the value of a customer relationship is the share of the customer's sales of total sales (e.g., Frazier, 1983; Ramsay, 1996; Yli-Renko, 1999). The measure indicates the relative importance of the buyer in the supplier's output disposal, one of the fundamental dependencies of a firm (Jacobs, 1974). However, sales proceeds, as opposed to a customer's distinctive resources, are a resource of generic nature, which has implications for substitutability – the subject of the next section – and bears therefore a different substance for bargaining power.

Hypothesis 5: The higher a buyer's share in a supplier's total exchange volume, the less bargaining power a supplier has in negotiating for the IPRs to the product supplied, and therefore, the less likely he will retain command thereof.

Supplier's alternative resources and bargaining power

Other customers' resources to which a supplier has gained or will potentially gain access also improve his bargaining position. There is vast empirical support, reported in Skinner et al. (1987), for the moderating effect of external linkages of a firm on the power exercised by a focal partner. First, alternative sources provide substitutes for some resources controlled by the focal customer, e.g., sales proceeds. The significance of other customers as sources of substitutable, and thereby somewhat generic resources, can be measured indirectly from the share the focal customer accounts for in the supplier's resource acquisition (cf. Hypothesis 5).

In the same vein, the more options a buyer has for an exchange, the less he needs to compromise on the terms of a contract with a supplier. As discussed earlier, the more unique a supplier's resources are, the fewer competitors it has. Therefore Hypothesis 1, relating a supplier's distinctive assets positively to his bargaining power, measures indirectly the number of alternatives for the buyer.

To note, however, in considering the "weight" of alternatives as a source of countervailing power, Jacobs (1974) stresses that the degree to which they *effectively* substitute for the primary resource as well as the time span required to adjust to substitutes need to be evaluated.

Secondly, relationships with other customers increase the accumulation of a supplier's firm-specific knowledge resources along the same logic as with the focal customer. Knowledge transfers from *extra*-relational assets thereby improve the supplier's attractiveness for the customer as an importer of new knowledge to the focal relationship. For resource-scarce firms, to note, external relationships are often used to increase legitimacy in the eyes of critical resource controllers (Venkataraman, Van de Ven, Buckeye, & Hudson, 1990). Extra-relational assets accessible to the supplier thereby complement his indigenous resources as a source of bargaining power.

Hypothesis 6: Access to extra-relational resources complements the stock of a supplier's internal resources, and thereby improves the likelihood of retaining IPRs to the product supplied.

IPRs and the development of competitive advantage

IPRs to an intangible asset – providing the right of use, modification, and economic exploitation – have direct influence on the supplier's ability to compete with its competitors in terms of costs and product differentiation, the core elements of competitive advantage. In the earlier discussion it was emphasised that assets that are nonsubstitutable, nonimitable, and nontradeable typically lie behind *sustained* advantage. Organisational assets embedding tacit and socially complex knowledge need not (and often in practice cannot) be legally protected, but they are typically sheltered by "isolating mechanisms". The importance of legally protected property rights grows with weak inherent appropriability (Teece, 2000). From this perspective, IPRs provide only imperfect protection of competitive advantage: patents expire, copyrights may be circumvented, and trade secrets may break.

Dierickx & Cool (1989, p. 1506) argue that a firm's strategic assets are "the cumulative result of adhering to a set of consistent policies over time. Put differently, strategic asset *stocks* are *accumulated* by choosing appropriate time paths of *flows* over time [empha-

sis in original]”. The authors exemplify such policies by e.g., adoption of quality control systems to build reputation for quality, honest dealings to build goodwill among customers and dealers, and R&D investments to build R&D capability.

In my view, a firm’s decisions on the allocation of proprietary rights in customer relationships represent one such policy that has important implications for the accumulation of asset stocks, since “it takes a consistent pattern of resource flows to accumulate a desired change in strategic asset stocks”(ibid). IPRs often constitute a technological core or “platform” on which further product development builds. Therefore, despite the imperfect protection of IPRs on competitive advantage, they typically provide a base for incremental accumulation and replenishment of “genuinely” strategic assets. Consequently, IPRs represent an important economic concern that calls for contractual attention and effort, and thus serves an analysis as a basis of competitive advantage.

The particular cost characteristics of knowledge-intensive products, discussed in section 1.4, have direct bearing to the profitability of their suppliers. Those supplying standardised products are able to capitalise on the high-cost investment incurred by the first copy while enjoying close-to-zero reproduction cost. For suppliers of customised products, in turn, there are opportunities for scale economies only in case the product is, firstly, reproducible or modifiable for the market, and secondly, the resale of a copy of the product is not contractually restricted. Furthermore, the right to change the form and substance of the original product provides an opportunity to alter and further develop the original specifications to produce new versions of the product, and thereby capitalise on the initial development investment.

Hypothesis 7: The more IPRs a supplier retains, the more profitable he will be.

A supplier’s specialised resources, leveraged by customer-mediated resources, increase the distinctiveness of the supplier and materialise in the degree of differentiation of the supplier’s products. However, the shift in technological distinctiveness is subject to a contract *not* restricting the supplier from appropriating and applying the new knowledge. If the supplier has no control rights to reproduce a product or modified versions of it, or there are important restrictions as to the market segments where, or time period when the product can be sold, this knowledge remains relationship-specific and does not enhance, other things equal, the supplier’s status as a supplier for other customers.

Takki (1999) has observed that it is common for software suppliers to sign away exclusive rights to customer products. The observation supports Grossman & Hart (1986) proposing that since it is prohibitively costly to contractually specify “each dimension of each asset in each particular future contingency” (p. 716), the low-cost alternative is

to purchase all rights. However, for the *seller* it may turn out to be, I contend, an expensive alternative since he simultaneously signs away future revenue from new products building on the intellectual property.

Hypothesis 8: The more IPRs a supplier retains, the more differentiated his products are from competing products.

IPRs and diversification

The resource-based perspective and the resource-dependence approach underline different motives behind firms' diversification. The resource-based perspective regards diversification as a growth option stemming from excess capacity that is put in use in the "closest entry opportunity" available for the firm (Montgomery & Wernerfelt, 1988) to increase profitability. The resource-dependence approach, in turn, looking upon resources as a source of power regards diversification as a means of reducing dependence. In the present context, the latter explanation on firms' activity expansion is assumed. Consequently, we will be interested in the *range* of new markets (determined by products, geographic areas, and customer industries) in which a firm operates, and less in the *competencies* it employs in different productive activities.

Pfeffer & Salancik (1978) note that a firm's capacity to accept substitutable inputs or create new outputs to reduce dependence on one source is subject to its *current state of knowledge* and the flexibility of its technology (ibid.). This is in line with the resource-based perspective that maintains that firms diversify by deploying their core competences [(Markides & Williamson, 1994; Prahalad & Hamel, 1990).

To the extent that a firm's knowledge resources include proprietary knowledge, I argue that a supplier's ability to diversify is also conditioned by the *control rights* to his current knowledge assets. By applying and reprocessing pieces of knowledge assets firms can produce new versions of a product to the primary market, or serve new customer industries or geographic areas¹² with the original product.

Hypothesis 9: The more IPRs a supplier retains, the wider is the range of markets he supplies.

Figure 1 depicts the model, which plots a supplier's internal and external resources, potentially accessible through customer relationships, as the antecedents to contract negotiation, in which the allocation of IPRs to supplier output is stipulated. Also the product under contract, i.e., its level of customisation and the supplier's related investments are included as determinants of contract outcome. The content of the IPR contract, in turn,

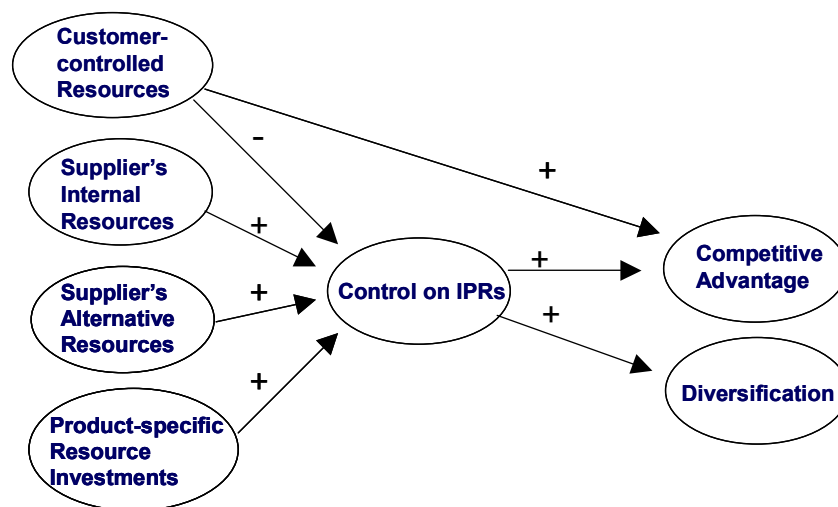
¹² To the extent that competition in the customer industry is global, geographic diversification disappears as an option.

influence the subsequent development of the supplier's competitive advantage and degree of diversification.

The model suggests a dual role for a customer. The customer's resources are simultaneously potential sources of negative and positive effects on a supplier's development. While demands on IPRs may hamper the development of the supplier's competitive advantage and diversification, interaction with the customer potentially improves the supplier's performance through new knowledge acquisition.

The model provides thus a tool to analyse the *net* outcome of a customer relationship. To assess the magnitude of the shift in a supplier's competitive advantage generated by a customer relationship one needs to weigh the potential increase in competitive advantage induced by customer-mediated resources against possible decrease caused by assignment of IPRs. In other words, an exclusive contract may moderate or, at the extreme, cancel out the enhancement effect of partnerships.

Implications of bargaining power and IPR allocation on the development of a supplier's performance



5 The dynamic effects of IPR allocation on a supplier's development

The model outlined above is a static illustration of a contractual relationship, or alternatively, it depicts a discrete (market) transaction. As Macneil (1980) points out, it is the time dimension that distinguishes bilateral power in discrete and relational contracts. In discrete transactions the balance of dependence is a static fact, while in relations it is

dynamic, or in Macneil's words, "in significant measure *a product of the relations themselves*" (p. 34, emphasis added) and always "in a state of flux" (p. 35). Macneil suggests that in the absence of relative advantages on one side, "the dynamics of exchange tend toward equal division of the exchange-surplus" (p.64), yet he argues that "the powerful [...] do have advantages [...] of information, of ability to hold out, of social control of many kinds" (ibid.). Pfeffer & Salancik (1978), in turn, argue that history matters in exchange relationships in that successful use of power enlarges the relative asymmetry in the relation and increases the probability of further demands of compliance.

The existence of an ongoing contractual relation gives rise to expectations of future exchanges; preservation of the relation is, indeed, one of the central relational norms emphasised by Macaulay (1963) and Macneil (1980). Therefore, compromises on today's contract terms may be justified in anticipation of compensations in later stages of the relationship.

Considering the time dimension within the framework outlined above, changes in the relationship outcomes, i.e., the supplier's competitive advantage and diversification, have direct feedback effects on the *ex ante* determinants of relational power, thereby changing the bargaining position of the supplier in the next round of contract negotiation.

Consider first competitive advantage, indicated by profitability and differentiated products. Changes therein affect the status of the supplier's internal resources through altered financial position and attractiveness of his product offering and indirectly, the number of direct competitors. The supplier's competitive advantage, particularly through technologically distinctive products, also affects its products' demand among other customers, i.e., the supplier's accessibility to alternative resources.

Second, as we consider IPRs as a means for the supplier to manage dependency through diversification, we note that the range of markets he supplies has implications for the same power determinants as competitive advantage. Diversification within a particular technology indicates an ability to apply and economically appropriate some specific core competence (Prahalad & Hamel, 1990), and is likely to reinforce further accumulation of related knowledge through the improvement of absorptive capacity (Cohen & Levinthal, 1990). Diversification also expands the array of alternative resources, i.e., other customers (which is its primary objective), as well as makes the supplier less vulnerable to competition in one single market.

Finally, the supplier's product-specific investments measuring the supplier's *ex ante* and *ex post* investments in a project are not expected to have comparable feedback loops from changes in competitive advantage and diversification.

6 Conclusions and further research questions

Consideration of IPR allocation in vertical relationships from resource-dependence and competence development perspectives gives rise to interesting managerial issues for both a supplier and a buyer.

The most straightforward managerial issues relate to customer relationship strategies of a supplier. When assessing the overall outcome of a key customer relationship, one needs to evaluate its short-run benefits and sacrifices against those realising in the longer-run. The scarcer a supplier's internal resources are, the more critical it is for him to gain access to resources in external control. Therefore, responsiveness to the demands of critical resource owners is not always avoidable. Particularly in small firms, managerial concerns for short run survival are likely to exceed other, longer-term strategic objectives, such as development of sustainable competitive advantage.

As Pfeffer & Salancik (1978) point out, dependency on outside resources prevent firms from pursuing their primary objectives. Resource-poor firms are likely to end up making compromises in anticipation of "less dependent times". In the present context, this could mean securing a critical exchange relationship at the expense of competence development (through assignment of intellectual assets). However, Pfeffer & Salancik remark that organisational autonomy may be lost gradually as behaviours and decisions build upon the history of a relationship.

Recurrent assessment of the short-term and long-term effects of a buyer relationship is important for a technology supplier whose objective is to build long-term competencies. A firm needs to identify, accumulate, and develop assets that are scarce in supply to increase resource distinctiveness and, hence, to improve the terms of contracts. Should there be conflicting interests with a customer as to the allocation of property rights to an asset that contributes to the accumulation of the supplier's strategic assets, the supplier needs to be aware of the full effects of compliance on the future development of his competence and bargaining position.

What managerial implications are there in IPR allocation for the buyer? Let us consider collaborative vertical relationships, or partnerships, established to produce non-standard output. By tapping external specialised resources through collaboration both parties

seek – surely, with self-interested motives – improved performance. The more specialised and valuable the partner’s resources are and the more they develop, the more there is to gain through collaboration. Thus, the idea of partnerships bases on “win-win” philosophy. Another characteristic of partnerships, i.e., continuity, provides insurance of sustained access to these resources. From a buyer’s perspective, then, the development of a supplier’s core competencies and financial stability is likely to serve the long-term interests of the buyer as well. The design of contracts should accordingly safeguard the development potential of both parties.

Finally, asset ownership is closely related to yet another managerial issue, which has not (yet) been incorporated in the theoretical analysis of this paper, but which is a natural extension of the research topic. Namely, under a contract, which does not fully pre-define the characteristics of the final product, *incentives* matter for efficiency. As proposed by the property rights literature (e.g., Grossman & Hart, 1986; Hart, 1995; Hart & Moore, 1990), ownership of an anticipated innovation bears an incentive for *ex ante* investments to increase its value, or the probability of its emergence.

Grossman & Hart (ibid.) emphasise the symmetry of control. Namely, when residual rights are gained by one party they are lost by a second party. This “inevitably creates distortions” by shifting incentives for opportunistic and distorted behaviour (p.716). In the present context this would indicate that a supplier, when with no control rights to the output, would lose incentive to exceed the minimum level of contract performance. A buyer, in turn, when without control to the subcontracted innovation, would provide the supplier with minimum information enabling the product development, thereby compromising on the value of its innovative content. Ultimately in case the innovation development would require some private information of the buyer the transaction would be thwarted altogether.

The standard conclusion of the theory is that the parties to a transaction (e.g., an R&D partnership) allocate property rights so as to induce the level of relationship-specific investments that maximises joint value of an anticipated innovation (Grossman & Hart, 1986). Nevertheless, Aghion & Tirole (1994) propose that efficient contracting on the property rights to an *ex ante* noncontractible innovation centres on two aspects: *relative investment criticality* of the parties in obtaining the innovation and *bargaining powers*. The authors suggest that when assuming a *cash constraint* supplier and a buyer with superior bargaining position, inefficient property rights allocation occurs: Because the buyer obtains the property rights, the supplier minimises his critical investment (innovation capabilities). Thus, the suboptimal outcome stems from the fact that the cash constrained supplier is unable to compensate the buyer for a transfer of the property rights,

and therefore, the buyer realises “a bigger piece of a smaller pie” i.e., exclusive ownership of a suboptimal innovation. Indeed, the empirical work of Lerner & Merges (1998) established that relative financial resources of contracting parties at the time of signing an agreement had clear implications on the allocation of a series of control rights in the biotechnology industry.

Thus, a buyer of customised technology is faced with a trade-off between supplier value-added and residual rights to an asset. Moreover, the more critical the buyer’s investment (e.g., disclosure of technical information or know-how) is in producing an innovative output, the more complex the decision problem becomes for the buyer, since leakage of such investments to competitors may have severe consequences for the buyer’s competitive position.

To conclude, when negotiating IPRs to an output developed in partnerships, a buyer wishing to gain sustainable advantage from a supplier relationship needs to evaluate the risks of *not* demanding exclusive rights to a customised output (loss of competitive advantage), but also the risks of demanding them (reduced supplier incentives and competence development). A broad analysis of alternative contractual techniques by which the interests of both parties could be protected might yield a contract with valuable nuances in the IPR allocation rule.

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