Exclusion and coordination in collaborative innovation and patent law

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Abstract: Intellectual property law has been criticised for over-arching scope of protection and at the same time, for insufficient protection. This seeming contradiction may stem from the discrepancies between the actual innovation practice and process and the models adopted in law. This paper illustrates this contradiction in the patent laws’ treatment of collaborative innovators. Particularly, this study examines how the participation of multiple innovators at the initial stage of the innovation is regulated under the patent laws in the US, Japan and, to an extent, in Europe. A single entity perspective and a concurrent closed invention model implied in law create legal uncertainties for collaborative innovators. This brings forward the organisational capability that provides inter- and intra-firm governance structure over the innovative process and the uses of innovation in managing the uncertainties before, during and after collaboration. This capability is in a central role in addressing the seeming contradiction.

Keywords: collaborative innovation; joint inventors; patent law; exclusion; governance; organisational capabilities.


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1 Introduction

Intellectual creation and innovation is significant for economic growth. Thus, ensuring the efficiency of intellectual property (IP) law, the very purpose of which is to promote this growth, has become increasingly vital. In the past few years, technological advances have dramatically increased the types and amount of intellectual creations and useful commercial innovations. As a result, IP laws in major industrialised countries now protect subject matters broadly, ranging from cartoon characters, haiku, typeface,
companies’ slogans, computer programs, business methods and to human genome information (Lee, 2005).

These expansionist changes in law have raised concerns. This is because they have potentially negative impacts on the science and research communities that have traditionally adopted an open and collaborative approach and, consequently, on the structure of competition and innovation (Lee, 2006). In certain industries where the research is accumulative and the development is incremental, pervasive IP is believed to cause fragmentation that leads to inefficient use of intellectual works (Heller and Eisenberg, 1998). At the same time, in other industries, even a broad protection of IP may not provide sufficient protection and incentives for innovation. Commonly, the uncertainties and complexities related to legal changes create extra costs for firms and private actors, e.g., in the form of the need to defend their business models against the undue claims of IP infringement. In sum, IP law seems to simultaneously give too much protection in some and too little incentives in other industries1.

One reason for this seeming contradiction maybe the discrepancy in the practice of innovation (i.e., how innovation is actually produced and used) and the model which IP laws implicitly adopt. Innovation is, by definition, a heterogeneous and multi-faceted process. As a continuous process, innovation is dynamic and the relationships generated by this process are fluid, flexible and often complex. In contrast, intellectual property rights (IPRs) are modelled on the idea that one inventive idea or one creation correlates to one right over one product. By making the ownership right over the tangibles and the IPRs analogical, IP law provides and concentrates the right over the abstract object to a single entity. As a corollary, the use, transfer and enforcement also adopt a ‘single entity perspective’. However, the fundamental nature of intangible ideas differs from the tangibles because, in the absence of regulative and legal intervention, the use of one innovative idea does not reduce or block the use of the same ideas by the others. In this sense, simultaneous uses of an innovative idea by multiple entities are prevalent as a matter of practice.

Further confusion arises as both the incentives of an exclusive right and an efficient coordination of the resources are required to promote innovation. A single entity perspective used in the IP law may provide incentives with exclusive appropriation mechanism, but it may disregard or downplay the importance of having an efficient governance structure that coordinates the uses of resources throughout the process of innovation.

Consequently, a substantive gap seems to exist between the innovation practice and the model that IP law uses. The gap is manifested most in areas where multiple entities are involved in the creation and the use of IP and where the coordination is most required. Collective rights management (Merges, 1996) and the related struggle over multiple IPR claims over a single essential technological standard, provides one typical example after the rights are acquired (Lee, 2006). Another more problematic example is a situation where multiple parties engage in collaborative innovation before the relevant rights are appropriated. This paper discusses the latter. Particular attention is paid to the initial stage of the collaborative inventive process as approached in the patent laws in the US, Japan and, to a certain extent in Europe (as harmonised by the WTO-TRIPs agreement2). This paper argues that the uncertainty created by the gap between law and collaborative innovation practices highlights the importance of inter- and intra-firm governance structures, either by means of contracts or by utilising organisational capabilities.
2 Patent law’s regulation of collaboration

Innovation is becoming more cumulative, sequential and even iterative. It tends to be based on collaboration and joint efforts of many, rather than on the effort of one single individual [Scotchmer (1991), see also Benker (2003) for the account of a social production]. Depending on the industry, this joint effort may take the form of a simple informal exchange or a highly sophisticated formal exchange. Sometimes, it is confined within the boundary of a firm, or sometimes it goes beyond the boundaries (Ketchen et al., 2008). In other cases, firms formally form an alliance (Lerner and Merges, 1998) or acquire or outsource to other firms as a specialised capability to drive the innovation (Arora and Merges, 2004).

Informal sharing and communication of innovative ideas often precede the formal commencement of a project. As the model in Figure 1 below shows, a general flow of innovation often begins long before any IPRs are acquired or any action toward appropriation of the IP, such as patent filing begins. However, IP protection often neglects this fuzzy initial phase of innovation and collaboration.

While the legal protection and the conception of invention may not necessarily commence at the same time, patent laws regulate collaboration to an extent in three different phases during the life cycle of an invention – before the filing of a patent, pre-grant patent prosecution stage and post grant enforcement stage. In each phase, collaboration raises the question of multiple inventors/right holders, multiple uses of the invention and multiple facets of the innovative technology itself [see for example, the question of multiple actors in the enforcement of a patent by Lee (2008)]. In most cases, these questions are regulated interdependently.

In order to discuss the model that the patent law adopts, it is necessary to make a distinction between the model of competitive concurrent invention and collaborative innovation. A concurrent invention deals with the question of two or more separate entities working on the different paths toward the same innovative technology, competing with each other. The process of concurrent invention is a simultaneous but a closed one. For example, if two competing inventors are working on the same technological problem, the path of innovation would be concurrent but closed. While the concurrent inventive process has a certain interaction through the signals generated by the patent filing (Long,
2002), each invention follows a discrete path. The entities following concurrent inventive paths do not necessarily know of each other’s presence or may only learn about it as a warning to avoid a certain solution. At an extreme, if all paths lead to related but separate inventions, a concurrent fragmentation is resulted, leading to problems of governance such as anti-commons (Heller and Eisenberg, 1998) or patent thickets (Shapiro, 2001).

In contrast, a collaborative innovation process follows a path that may be pursued jointly and simultaneously by multiple innovators. In both concurrent invention and collaborative innovation, multiple innovators seek one innovative technology, through various paths. However, a deliberate and planned sharing and exchange of knowledge may occur mostly in the collaborative innovation, because concurrent invention model assumes each innovator to unconnectedly engage in separate processes. A deliberate sharing and exchange allows pro-active arrangement and thus, collaborative innovation enables ex ante arrangement for coordination over the use of shared knowledge. In other words, a collaborative innovative process provides opportunities for the related parties to enter into contractual arrangement or other forms of private ordering even before the property rights over the outcome of the collaboration are materialised, contrary to a concurrent inventive process that would only allow an ex post arrangement.

2.1 Collaborative innovators – joint inventorship

Most patents laws require formalities such as patent examination and registration as a condition for protection (TRIPS, Art. 27 and Art. 29). These pre-filing activities may be carried out by multiple actors either collaboratively or concurrently. However, as almost all the patent laws grant the right based on the first connection thesis (Drahos, 1996; Lee, 2005), the right will be granted only to the entity that acts first. This is regardless whether a country adopts a first to invent system as in the patent law of the US4, or a first to file system in most other countries. The first connection thesis in the patent law sees the innovation process as closed and it thus, implies that a concurrent competition is the behavioural model of innovation in patent law.

At a glance, a collaborative innovation is acknowledged in the patent law’s joint inventorship, i.e., an entitlement for a patent grant and joint proprietorship over the granted patent right. The right related to an invention can be theoretically divided into different categories, before the patent filing and after the grant (see Figure 2). The bundle of rights after the grant collectively forms a patent right that has the traits of a private property right in most countries (Lee, 2006). Before the grant, the right of an ‘inventor’ consists mainly of a right to file for patent and to be named as an inventor in the patent and a right to withdraw patent application. Through joint inventorship, patent laws acknowledge collaborative inventive processes5. A variant of this is regulation on a corporate person inventorship (see for example, EPC, Art. 58) and employee inventorship. These concern the questions whether a legal entity may act as an assignee of the right to file for patent on behalf of a group of researchers, depending on whether they are under the employment condition or under other specialised contracts.
National laws on this regard are not harmonised. During the patent prosecution, some national laws may actively provide for a right to an inventor consisting of the bundle of rights discussed in the above. In other countries, the rights may be regulated simply in the part of the patent law that provides the grounds to demand a change in the application or a new application, or to ultimately refuse the patent application.

Once the right has been granted, multiple innovators are regulated in two different strands; the right of a joint inventor and the right of other innovators who are not named as inventors. The rights of the joint inventors who are acknowledged as inventors in the patent certificate concern their rights as the initial proprietors of the patent, as well as the rights to use, licence, assign, or otherwise dispose of their share of the patent right and their right to defend, enforce and maintain the patent right.

Those who are not named as inventors may demand corrections to this after the grant to an extent if an error in patent filing process is indicated. Furthermore, if wrongfulness is indicated, patent law’s regulation on invalidation based on wrongful patent application or correction may apply. However, after the rights have been granted, the innovators who participated in the process but have not joined in the application process may be treated in the same manner as the third parties if the innovators cannot meet these conditions or if there is no contractual arrangement or clear evidence to the contrary.

2.2 Collaborator’s uses

During the patent prosecution, sharing and use by each multiple innovator before the filing of the patent becomes important in terms of the patentability of the invention, especially the requirement of novelty. Patent laws may regulate sharing or collaboration by one of the many patent applicants before the filing to be novelty destroying disclosure. Often joint inventive or innovative activities may start long before the patent filing. In some occasions, collaborators do not consider patenting as an option due to various reasons such as uncertainty of the patentability, cost of application and maintaining the right. Most notably, consideration of multiple parties during patent prosecution would be

Figure 2 Rights related to an invention and sharing of rights
targeted to the impact of pre-filing inventive or innovative activity on the patentability – novelty and non-obviousness/inventive step and utility/industrial applicability (TRIPs Agreement Art. 27).

In this sense, the grace period for novelty (for non-prejudicial disclosure) is the relevant aspect of patent law that deals with inventions based on collaboration. Patent laws of Japan and US provide the grace period during which the novelty is preserved despite the disclosure of the invention. The grace period allows inventors to make certain types of disclosures that are defined in law without destroying the novelty. Different conditions are attached to this rule. For example, in Japan, the rule provides for six months and limits it to those disclosures made by the persons who have the right to file a patent as an academic communication of the testing, or against their will, or in a designated international exhibition. In contrast, current US patent law provides a general grace period of one year without limiting it to the persons who have the right to file for patent. In Europe, European Patent Convention (EPC) is often viewed to have no grace period as it contains a most strict rule on a novelty saving period only to situations where evident abuse is indicates, or to display at a designated exhibition by the applicants or their successors (EPC Art. 55).

Thus, the disclosure by a joint innovator, who is not named as the inventor, may destroy the novelty under EPC, but not in the US. In Japan, it would depend on whether a joint innovator had the right to file for patent. Grace period rule has a strong policy implication on collaboration. In the sense that it allows the innovators to freely exchange and collaborate their innovation, a general grace period works toward a collaborative innovation. On the other hand, it creates uncertainty and may incite opportunism among the innovators (e.g., EPO – Galama, 2000; EPO – Straus, 2000).

After the grant of the patent, collaboration is regulated through the rules on allowable defences against the claims of infringement. An example is the applicability of the prior-user defence to the use of the joint innovator who is not named as the inventor. Prior user defence is found in both Japan and in the US. Non-exclusive license for the prior user of an independent invention is found in Japanese patent law, as a right. Prior user defence is found to an extent under the US law, limited as a defence against the infringement claims of a business method patent (35 USC §273(b)).

The treatment of collaborator’s use in patent laws examined in the above implies taking an approach of concurrent inventive process rather than collaborative innovation. A collaborating innovator would, by definition, be aware of the invention, unless patent application is deliberately concealed from him or her. Thus, the prior user as a right or a defence would be of less use to the collaborative parties who choose not to be named as an inventor in the patent application. In other words, if a collaborator who chose not to be named as an inventor uses, or continues to use the contribution he or she made at the initial stage, there is likelihood that he/she would be found infringing the patent directly or indirectly.

In sum, the patent law’s treatment of the collaborator’s uses shows that without any contractual arrangement, a patent application and the subsequent patent grant may lead to discontinuity in collaboration, unless all of the collaborators are named or could be named as inventors. Complexity caused by subsequent patent appropriation the importance of having a clear set of rules or an agreement before the project starts. In some cases, clearly understood and enforceable norms may regulate the collaborators behaviour even without contractual arrangement (Fauchart and von Hippel, 2006). In the
absence of such norms, contractual arrangement may be necessary to guarantee the continuation in the collaboration.

2.3 Multiple components and complex systems innovation

The nature of technological development itself may also manifest the gap between innovation practices and the patent law. If a patent right covers a single discrete product and functions as a single input to the final product, the use and the right would match. However, in practice, a patent right may cover a technology that may be used for various purposes. As the controversy surrounding the patentability of the second medical indication shows (EPC Art. 54(5)), a tangible product implementing the physical composition of the innovation may be used for purposes other than claimed by patent.

At the same time, a mirror of this description is also true. The invention covered by patent may only cover a part of the innovative technology. In this case, the role of IP as input into multi-component products or intermediate products has to be considered. Most of today’s products are so-called complex systems products, in the sense that a product often consists of various parts and modules that are independent products and at the same time, generate commercial value as a system. Some of these modules are made by standardised interfaces so as to provide hard wired modularity in production. In this case, the technology itself is not covered by few related patents, but rather a huge stack of patents.

In other instances, firms may manage the production modularly – by disintegrating some of its facilities in a modular way in order to gain efficiency and outsource the production. In other words, innovation may occur partially, not over the entire systems products. At the same time, innovation may occur in combination of one part of the product with that of the others.

This incremental innovative process may also mean that the IP relationship over one product and the rights related to the product could be highly fragmented. Fragmentation of rights emphasises the need for coordination. One combined effect of product complexities and expansionist change in IP law is that the right holders and users proactively enter into various contractual and institutional arrangements to minimise risks related to innovative process and to avoid expensive or cumbersome infringement related litigations and liabilities. This capability to manage innovation is a part of firms’ organisational capabilities.

3 Sharing of the outcome of the collaboration

Collaboration unavoidably involves sharing of both the technology and the rights over the result. At the same time, the costs of innovative process, appropriation of rights and commercialisation leads to the question of sharing the costs as well as the profits. In this context, sharing of the outcome of collaboration may mean any sharing at three different levels – sharing of technology, rights or costs/profits, or a combination of these.

Sharing of technology may mean sharing the invention or the creation itself. A non-exclusive licensing for a fee is, in essence, a promise given by the licensor to licensee that he/she will not sue the licensee for infringement. This is also a type of contractual arrangement where the innovation resulting from the collaboration is shared. As sharing of technology is dealt with partially in the above section in terms of continuity
in use by a collaborator, this section discusses the sharing of rights in contrast to sharing of profits.

Sharing of rights raises a complex legal issue, as it involves the question of joint proprietorship of the rights surrounding a particular IP. The question is not only involves the question of IP law, but involves how general property law governs the property interests of multiple parties. As the above Figure 2 showed, rights surrounding a patented invention include a various range of rights from the right to apply for a patent to the right to enforce the patent. Sharing of the rights may mean sharing of all of these rights, as in the case of joint inventorship, sharing most of these rights, as in the case of assignment, or sharing few rights, as in the case of licensing.

A profit sharing arrangement is a compromise. A profit sharing arrangement could be a contractual arrangement between the inventor and a financing organisation that may not use the patented technology, or may not license the rights either. The sole interest in the financing firm would be then to recoup the cost of investment that the firm has used in advance, before the patent is granted, or before a technology becomes fully completed or commercialised.

3.1 Sharing of rights and technology – joint ownership

The fundamental structure of IP law is such that a natural person is envisioned as an inventor or an author. National patent laws often require a natural person to be an inventor and the firms as legal persons may acquire the right after the right is granted. In this sense, the right originally gets attributed to the inventor unless there is an assignment.

Thus, a joint ownership arrangement has to be made during the R&D phase, before the filing of the patent\textsuperscript{12}. At the same time, when the product is not materialised yet, firms may use contracts to control the ownership interests on the outcome of their collaboration. However, some aspects of mandatory attribution of the entitlement in the laws may not be overridden. Joint ownership of a patent is regulated differently and not harmonised (AIPPI Summary Report, 2007). However, a joint application of patent seems to be one starting point for the joint ownership of the right and a contractual arrangement over the ownership seems possible after the grant of right\textsuperscript{13}.

Ideally, a joint ownership represents a cooperative relationship between the parties involved. On the other hand, in a worst case scenario, a joint ownership increases the competition risks. At a glance, a joint ownership provides an assurance that the rights holder may control the use of the outcomes from the R&D project. In a cooperative relationship, this may mean that the collaborating firms pool their resources together to gain much needed technology for themselves and a tool to effectively generate revenues.

However, if each joint owner of a patent holds a right to unilaterally licence the patent to another party without the consent from other joint owners, they may be under no obligation to share or otherwise account for any use-related profits\textsuperscript{14}. Furthermore, in a jointly owned patent, a single joint owner may have a possibility to block an infringement suit and thus, essentially take the right to enforce the patent from other owners simply by refusing to voluntarily join in an infringement suit. In addition, a joint owner may licence the technology to a competitor without informing the other owners. In the worst case, the joint owner may assign the right to a competitor.
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#### 3.2 Sharing profits – IPR trust or holding company

An IPR trust or a holding company is a means to involve a neutral firm to coordinate the IP assets, thus, allow resolution of the ownership questions without having to assign the rights to each other. In the sense that it is a third party who would take care of the rights, such an organisation provides security that any opportunist behavior by any of the parties involved can be avoided. On the other hand, forming a trust company or a holding company involves costs and the costs should be justified by the profits generated by the IPR assets held in trust.

A trust company is used commonly in Anglo-American jurisdictions. One notable risk involving IPR trust is related to the legal context. Using a trust company would require that the business law does not restrict the formation of a trust company consisting solely of IP assets. Countries often restrict the assets that are subject to trust agreement to the tangibles. In particular, in civil law countries, the Anglo-American concept of trust companies where the ownership may be divided (in statutes and in equity) may be difficult apply. On the other hand, civil law countries may have a similar concept that may be utilised as a similar management concept; consider, e.g., foundations, where the assets are held and managed on behalf of the donator. If the law requires the assets to be transferred by donation from the right holder, it significantly differs from the concept of trust where the ownership only partially gets transferred to the trustee. However, if the law does not have any explicit restriction on the type of property to be pooled into the foundation, patents can be included as part of the foundation like in IPR holding companies. Another question is valuation. For holding companies, valuation is a very significant factor for various regulatory purposes. A company that consists solely of IP assets may face this valuation problem. Especially in the case where the trust is established to explore the possibility of licensing the pooled intellectual asset, the licensee fee may not be an actual value, but only estimated revenue based on expectation. This expectation may not be realised at all.

### 4 From exclusion to coordination – a capability perspective

Influenced by the different factors of invention, firms arrive to various business decisions and contractual arrangements regarding the processes of collaborative innovation. As most of the innovative outcome is oriented toward commercialisation, the operational capabilities of a firm need to be considered. In this sense, a more practice oriented approach would be needed to deal with the means and organisational process for the exclusion and governance of innovative process that may exist independently of the exclusive rights provided by the laws.

#### 4.1 Strategic elements of sharing and patenting

Patents and patented invention often serve two different purposes in creating a stream of revenues to the right holders. One is that the invention covered by the patent could create a source of income for the right holder as a cost-effective technological solution. Another purpose would be present in the case where there is large unrealised market potential in the area where the right holder does not practice. This would be the case when the
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patented invention is unrelated or only marginally related to the core business area of the developer and when the use of invention in itself is not an interesting option.

Thus, as a preliminary issue, a firm investing in an invention or an R&D project leading inevitably to IP needs to resolve whether it is in the interest of the firm to share the rights with the inventor/creator, or to share the technology or the profits, before the IPRs become materialised. This foresight would be a component of contracting strategy. For firms facing this decision, there may be conflicting strategies at play. On the one hand, there may be a strong need to control the invention and innovation, or to sufficiently recoup the investment. On the other hand, firms may even give the inventions away to create a business model for another market.

4.2 Coordination – towards a perspective of contracting capability

Questions surrounding ownership arrangements surface in the context of joint research and development effort, or joint inventive activities, before, during and after the collaboration. If patents are to be applied based on the outcome of the collaboration, ownership arrangements of the patents have to be made and relevant processes to allow the appropriation during the collaboration have to be undertaken. However, if patent protection is unavailable or uncertain for the outcome of the collaboration or strategically undesirable, firms are likely to utilise other means to govern and control the path of innovation and commercialisation (Hurmelinna-Laukkanen, 2005). For example, if firms or collaborators decide to use an open business model, an organisational process may be required not only to prevent future liability concerns arising from claims of patent infringement, but also to provide a governance structure for the patterns of interactions. Organisational processes may also regulate and coordinate the concern for competition both from the collaborators and from the concurrent competitors.

This organisational process oriented view complements the exclusion centric approach of IPR management. Capabilities perspective found in the strategy-based literatures or organisation research underlines these process elements. Initially begun as a study of an organisation, the capabilities perspective observes that firms possess various and unique capabilities that provide a source of competitive advantage to the firm (Williamson, 1999; Teece et al., 1997). Thus, a firm is an organisation of capabilities that combine resources, routines and contracts (Penrose, 1959; Schumpeter, 1942) and not just a production function or a mode of governance that substitutes the market (Williamson, 1999; Coase, 1937). A firm exists to efficiently manage complexities in exchange and to coordinate collective learning processes by utilising organisational routines and processes. An organisational capability is part of the firm’s inimitable resources (Penrose, 1959) and at the same time, a source for competitive advantage that can be measured in comparison to the activities of the other firms.

The capabilities perspective seems to have a broad application and as it deals with the organisation’s capabilities to manage information, it has been applied to the study of the process of knowledge and information management (Gold et al., 2001). In addition, in a more recent literature, the capabilities perspective seems most visible in the discussion of firms’ strategies in response to changes in the market and technologies (Teece et al., 1997). A dynamic capability perspective, for example, argues that firms possess an inimitable capacity to shape, reshape, configure and reconfigure their assets and resource bases to respond to changing technologies and markets (Augier and Teece, 2007).
The implication of the capabilities perspective to collaborative innovation is that the capability of the firm used in the management of the routines and process related to innovation may explain the differences in the firm’s performance. In particular, an organisational capability based process of exclusion may protect innovation instead of appropriation mechanisms provided by law. Further, a firm may promote the exchanges by putting a process of coordination and governance structure over the use of innovation rather than relying on a specific right based exchanges.

In terms of exchange, it has been noted that the ‘ability to transact is itself a capability’ (Winter, 1988). Using this ability to transact, firms proactively arrange the exchanges related to innovation, even in situations where the IP protection may be weak or uncertain. In terms of appropriability, a ‘process-oriented insight’ from strategy and organisation research commonly highlights the blurred boundaries of the appropriation (i.e., IP and ownership) and governance and exchange (i.e., contract) (Langlois and Foss, 1999). As such, the capacity perspective implicitly questions the claims of normative priority of the efficiency enhancing aspect of property rights in the protection and governance of the innovation. This is because it emphasises routines and the process rather than the actual static transfer of formal title. It has been further suggested that the weakness of property rights for knowledge influences the contracting decision and that the difference in the performance of the firms in the transaction is explained by the difference in the institutional capabilities of the firms to protect the knowledge (Liebeskind, 1996). This suggests that there is a certain trade-off between the organisational processes and property protection.

It is therefore crucial to identify the components of the organisational process that makes the difference. To be considered as an organisational capability, a process has to reside uniquely with the firm (i.e., be ‘inimitable’) and at the same time, it has to be ‘replicable’ within the firm (Rumelt, 1984; see also Teece et al., 1997). Inimitability is fundamentally about how firms can exclude the rival firms from the use of the organisational knowledge. The path dependency, ambiguity and the property rights are all devices of preventing the competitors from imitating the innovation. When the path of the process and the performance is relatively independent and/or when the process and the performance has clear causal link, this would facilitate the imitation of the competitor. On the other hand, even when these are rather clear, a strong property right protection over the process itself would prevent the imitation to the extent that is legally allowed. In this sense, the opposite may also be true – that when there is a weak or no property right protection, but the process is highly path dependent (i.e., asset specificity) and the causality is uncertain, the organisational process would be inimitable.

Intuitively, there seems to be an inverse-relation between the strength of the organisational capabilities and the strength of the property right. A firm with a strong property right (i.e., certainty of the scope, length and enforceability of the right) may still need to rely on the other means of managing the innovation by making the use of the innovation path dependent, or the making the causality uncertain. One manifestation of these other tools is by utilising contractual arrangements over these modalities of exchange and thus one may extrapolate from this an inverse-relation between importance of contracting and the strength of the property right. This hypothesis seems to complement an earlier work that focuses on a particular aspect of relational capability in the area of biotechnology (Arora and Merges, 2004) and the finding on the relationship between IPRs and the transaction (Merges, 2005).
In sum, the capabilities literature seems to suggest that when the IPR protection is incomplete, firms may need a specialised capability to substitute or complement the uncertainty in the rules. In such situation, contracting may allow firms to transfer those innovation that otherwise may not be transferred or remained unutilised. This assumption may be valid in countries where the legal rules for the IP enforcement are uncertain but the contract enforcement is less difficult. This may also be true in the cases where the life cycle of innovation is so short that the market niche may close during the right appropriation process such as patent prosecution.

5 Concluding remarks

Paths and means of protection and exchange of the commercially valuable knowledge are multiple. A most formalised form of protection and transaction of innovative knowledge is the IP and it’s licensing. IP protection is highly visible means of incentivising production and formalising the contractual relationship surrounding the diffusion of commercially valuable knowledge. However, firms have long been protecting and trading commercially valuable knowledge and innovations even in cases where they are not subject to IP protection using various governance mechanisms.

Innovation requires both incentives from exclusion and efficient coordination. In this context, this paper identified collaborative innovation as the area where the governance over the sharing of results of collaboration and its use as well as the exclusion becomes crucially important. The gap in practice and the law highlights the significance of organisational capability of the firms in utilising a non-property centric solution. Using the example on collaborative benefit sharing and joint ownership of patent, this paper argued that where the IP based protection is weak, uncertain and incomplete, capabilities of a firm to coordinate the exclusion and exchange surrounding innovation may make the differences in the firms’ performances.

The protection of IP not only needs to take into account the existence of alternative incentives but also the governance mechanisms over the uses of the intangible innovations. The studies on governance as a private ordering have so far focused more on IP pools, where the fragmented rights are pooled into a usable package, after the rights are granted. However, internal governance structure or a coordination process that is used instead of or in complement of IP protection has largely been ignored in the policy considerations. Furthermore, how an individual firm would utilise the knowledge and organisational learning that it has generated from its past collaborative experiences into sustainable organisational capability governing the intangible innovation process has also been under-researched aspect of private ordering. If firms transact or continuously invest in collaborative relationships for innovation, innovation may be transferred or shared even without any formalistic licensing agreements, as long as there are business processes that are in place to generate and enforce certain norms or behaviours. Thus, transfer of innovation can become more relational than transactional.

The presence of this type of organisational capability may be the reason why over protection or under protection resulting from the changes in law influence firms differently. As a result, this seems to support the claims that dispute the uniformly efficient IP institution (Lee, 2007). Needless to say, the ideas presented in this paper would benefit from empirical evidences.
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References


Notes

1 Some authors argue that the IP law has different impacts on different industries [see Lemley and Burk (2003) calling for a more industry specific implementation of patent law].


3 Thus, it is distinguished from a concurrent innovation as a product development and organising principle, reflecting the learning of concurrent computing or engineering that focuses on the open and concurrent co-creation [see for the discussion of concurrent innovation that combines the insight of concurrent engineering and management science by Santoro and Bifulco (2006)].

4 At the time of writing this, a reform of the first to invent system of the US is still being debated as the Patent Reform Act of 2007 (H.R. 1908, S. 1145).


6 For example, see Art. 49.7 of the Japanese Patent Law, in Europe, EPC Art. 61. In the US, 35 USC §§ 102(f), 116 and 256.

7 See for example, Japanese Patent Law Art. 123(1),6, for the cause for invalidation trials and see also EPC Article 61.


9 Japanese Patent Law Art. 30 (1), (2) and (3).

10 35 USC §102(b), however, this rule may change, if the Patent Reform Act of 2007, passes. See Thomas and Schacht (2007).


13 See also conditions in most countries in general, AIPPI Summary Report (2007).

14 Compare Japan, Art. 33(3) and 73 of the Japanese Patent Law, which prohibits joint owners to assign his share or to grant exclusive license of the entire patent right without the consent of the other joint owners, and 35 USC §262, which allows this.