Releasing the Productive Potential of Intellectual Property: Governance and Value Creation Processes

Birgitte Andersen and Sue Konzelmann*

Abstract

This paper examines the interrelationship between the systems governing the ownership and control of intellectual property (IP) and the processes by which the value of IP is realised and diffused. Focusing on patents and copyrights, we examine the rationale, objectives, operation and performance of alternative systems of IPR governance. By developing a framework for better understanding the role of governance in IPR regimes, its influence on the quality of relationships among stakeholders within the system and its contribution to the processes of value creation, realization, distribution and innovation, we hope to contribute to the design of appropriate policy aimed at improving the effectiveness of these systems and hence the performance of the corporate and sectoral systems of which they are a part.

1. Introduction

Intellectual property (IP) consists of the originality and effort embodied in creative expression and symbolic material and the knowledge and novel ideas embedded in product and process innovations and other intangible assets. It is both generated by and plays a key role in production routines, product and process improvements and organisational learning, which together produce operational and dynamic efficiencies as well as competitive advantages.

In most mature economies, the exploitation of IP is legally protected through the use of intellectual property rights (IPRs) which evolved from property rights on land, capital and labour. IPRs take the form of copyrights, trademarks and design rights (in the case of originality or effort) and patents and trade secrets (in the case of knowledge and novel ideas). Because control over the use of IP requires ownership or a license (in the form of an IPR), the growing importance of knowledge-based assets has been accompanied by recognition that IPRs represent strategic assets for those who own and control them. It is therefore not surprising that in recent years, the pace at which individuals, firms and the public sector are using IPRs to privatize knowledge-based assets has been accelerating. This trend has been enhanced by the view of many in industry, government and international agencies that the privatisation of the intellectual capital and knowledge-based assets of individuals and firms provides competitive advantages; and we have seen increased enforcement of IPR

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systems worldwide. However, IPR policy has been largely based on the ‘vision’ of policy makers rather than the findings of solid empirical research. Within the IPR research community, the social and economic effects of tightening the IPR system are not considered obvious. There has also been growing concern on the part of small and medium sized enterprises¹ and many less developed countries² about the emergence of a new form of competition in which the IPR system sets the ‘rules of the game.’

The problem with the existing social contract and political expediency literature regarding the objectives, operation and performance of IPR systems is that its analysis is based on the theoretical logic of mainstream law and economics theory. This analysis assumes that all inventors, whether individuals or firms, are autonomous, rational, profit-maximizing agents and that the aggregate of their behaviour maximizes both their own and social welfare. Largely ignored are the very real effects of technological inter-dependence, strategic interaction and collaboration in competitive markets, the specific nature of productive knowledge, power-relationships in bargaining situations, and the opportunity costs of using the IPR system as a political instrument. Further, whereas the current law and economics approach to IPRs equates competition with perfect competition and monopoly with pure monopoly, the actual architecture of the IPR system is a hybrid structure with both competitive and monopolistic dimensions (See Andersen 2004 for a critical overview).

What is needed is an alternative analytical framework, based on realistic assumptions about the objectives, operation and performance of alternative forms of IPR governance at various levels of aggregation. Merging three streams of literature from economics (productive systems), corporate governance, and IPRs (patents and copyrights), this paper develops such a framework. We take a productive systems³ perspective that explains the requirements for operational and dynamic efficiencies, and hence, system performance, in terms of the ability to secure effective cooperation. With a focus on the governance of patents and copyrights, our objective is to better understand the productive role of IPR governance, its influence on the quality of relationships among stakeholders within the IPR system, and its contribution to the interrelated processes of value creation, realization, distribution and innovation. We believe that advancing our understanding of these processes will facilitate the design of appropriate policy aimed at improving the effectiveness of IPR systems.

The paper is constructed as follows: Section two lays out the analytical framework for understanding the interrelated processes and dynamics by which IPR governance achieves productive efficiency and performance effectiveness. Section three identifies the sources of value from IPRs and locates them with respect to two dimensions: embeddedness in individual entities (such as firms) or in systems and structures (such as strategic networks or pools); and provision of market or non-market advantages. Section four analyses alternative IPR governance structures at the macro, micro and meso levels. In this section, we examine the processes by which value from IPRs is generated and appropriated. The stakeholders in alternative governance structures are

¹ See, for example, the EU’s hearing on software patents or the debate on fair distribution of revenue in cultural industries such as music.
² See, for example, the debate on access to medicine and patenting of traditional knowledge within agriculture or the debate on copywriting aspects of traditional cultures.
³ See, for example, Wilkinson (1983, 2002) and Birecree, Konzelmann and Wilkinson (1997).
identified as are the conflicts that might occur when jointly created value is distributed among them. This highlights the importance of finding mechanisms for effectively resolving conflicts of interest in order to secure effective system performance. Section five analyses the dynamics by which IPR productive system effectiveness might be achieved in the various systems of IPR governance. Section six draws conclusions from the previous analysis, identifies the contribution of the framework developed in this paper for IPR management and policy, and proposes avenues for further research.

2. IPR Productive Systems

In this section, we lay out the analytical framework for understanding the interrelated processes and dynamics by which IPR productive systems achieve efficiency and performance effectiveness.

‘Productive systems’ are those systems where the forces of production combine in the process of production and can be applied to any association in which individuals or groups come together for the purpose of jointly creating something and distributing the surplus value among themselves (Birecree, Konzelmann and Wilkinson 1997; Wilkinson, 1983, 2002). In an IPR productive system, individuals and firms come together with the objective of exchanging rights to own or control IPRs. The system’s effectiveness is determined by the willingness of participants to satisfactorily perform their productive role; and it is in both the individual and collective interest to fully cooperate. This is because of the mutual dependence inherent in IPR system relationships and the operational and dynamic efficiencies that are generated by cooperation. Cooperation not only ‘facilitates the sharing of knowledge, … [it] also fuels the learning processes by which new information and knowledge are created, incorporated and diffused, and by which new products, processes and organisational forms are developed.’ (Wilkinson 2002: 2). Cooperation is therefore centrally important for effective system performance; and it generates efficiencies that determine the value created by the system which is then available for distribution among the various stakeholder groups. However, the centrality of cooperation in securing effective IPR system performance does not imply that all interests are shared because individuals and groups compete over shares of the value they jointly produce. Because of the potential for distributional conflicts to undermine cooperation, mechanisms for resolving conflicts are important for the system’s long term performance viability.

Within IPR productive systems, relations have both technical and social dimensions. The technical relations of value creation are the functional inter-linkages between the various agents within the system. They encompass the technical elements of contractual relationships between the buyer and seller of an IPR, the licensor and licensee of an IPR, or the participants of a patent pool. They are objective and impersonal associations, shaped by the technicalities of the system. By contrast, the social relations of value creation are the subjective and personal associations among the human agents within the system. They form the social structure within which the objectives of the system are jointly pursued. By directing, co-ordinating and controlling the relations among the system’s participants, the social relations of value creation play a central role in determining the effectiveness of co-operation and hence the operational and dynamic efficiency of the system as a whole. Within IPR systems
this could include business practices and routines, such as routines for setting standards in technological development, for making IPR contracts, for making IPR applications and for negotiating IPR related agreements (including routines for setting price or for joint R&D). In short, the social relations of value creation are important for getting things done efficiently and effectively.

The social relations are therefore centrally important in the effectiveness of the productive system. They have the dual role of securing co-operation in meeting the objectives of the system and agreement over distribution of the outcome from those relations. This is important for performance and efficiency because failure to secure agreement over distribution has the potential to set off a retaliatory withdrawal of co-operation, which serves to reduce both efficiency and the ability to perform effectively over the long term. There are potential conflicts between individual interests in relative shares and the longer-term collective interest in the ‘size of the pie.’ However, system effectiveness can be seen to generate additional resources for distribution that increase the prospects for increased co-operation and operational and dynamic efficiencies over the longer term. System decline risks the opposite, setting off a degenerative cycle of conflict over distribution, withdrawal from co-operation in production and deteriorating economic performance.

There may also be other areas where the individual objectives of participant firms or individuals come into conflict with the interests of the IPR system as a whole. For example, the aim of a participant firm in the IPR system is to secure access to knowledge from the IPR system at a minimum cost; and then to make efficient use of that knowledge such that it generates maximum value for the firm itself. This value then forms the basis for what can be distributed among, or subsequently assigned to in new deals, the firm’s stakeholders, importantly influencing the willingness to continue to fully participate in respective productive roles. In these cases, the effectiveness of the IPR system will importantly depend on the resolution of these conflicts to the mutual satisfaction of the stakeholders involved. A key function of IPR system governance, therefore, is the effective resolution of legitimate conflicts of interest both among constituent firms and within the IPR system as a whole.

At all levels within IPR systems and IPR regimes, relationships are also characterized by differences in relative power and the potential for those with advantage to use it to the disadvantage of others within the system. However, while certain individuals or firms may be relatively weaker than others, mutual dependence means that they have bargaining power and effective system performance requires that differences in relative power are not exploited in such a way as to precipitate a retaliatory withdrawal of cooperation on the part of the weaker party to the relationship. As a result, whilst individual short term benefits may be secured by relative power advantages, they are at the expense of collective long term interests in performance effectiveness. The issue is essentially that of short term gain but long term system decline.

Figure 1 provides an overview of the discussion above.
Figure 1. Productive system framework

<table>
<thead>
<tr>
<th>Productive system stakeholders</th>
<th>System relations contributing to operational and dynamic efficiencies.</th>
<th>Sources of conflicts of interest among stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firms and individuals</td>
<td>Technical relations</td>
<td>• Individual interests in relative shares versus collective interests in ‘size of the pie’</td>
</tr>
<tr>
<td></td>
<td>• Contractual</td>
<td>• Short versus long term objectives</td>
</tr>
<tr>
<td></td>
<td>• Division of roles or functions</td>
<td>• Divergent interests</td>
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<td></td>
<td>Social relations</td>
<td>• Power asymmetries</td>
</tr>
<tr>
<td></td>
<td>• Modes of coordination and routines</td>
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</tr>
<tr>
<td></td>
<td>• Social capital embedded in strategic networks</td>
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<td></td>
<td>• Social capital embedded in rules norms, values and trust sourcing social communities</td>
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</table>

In neither the short or long term, is IPR system performance exclusively determined within the IPR productive system. Each system is subject to continuous pressures from the environment within which it operates. These largely unavoidable pressures derive from changes in market conditions, regulations, production and information technologies and must be resolved within the IPR productive system. Similarly, processes within IPR systems, both independent of and in response to external pressures, initiate changes that also help mould its environment.

As discussed above, productive system relationships are characterised by inherently mutual and conflicting interests and differences in relative power. How these are managed and with what outcomes are shaped by strategies pursued within participant firms of the IPR productive system, as well as within the IPR productive system itself; they are also dependent on institutions outside the system which embody economic, social and political power. The institutional structure within which the IPR system is embedded therefore plays a central role in how effectively its resources are utilised and how fully individual and collective creativity are exploited. Success in this respect depends upon the ability to manage the conflicting interests of individuals and groups and to accommodate and redress power differences. Institutions are therefore an important determinant of how the IPR system performs and how it evolves.

The IPR system’s governance framework (external and internal), with its particular set of rules (implicit and explicit) and norms plays an important role in shaping the approaches that individuals and groups are incentivised and able to take. In general, IPR governance can be characterised by layers of governance, from the level of the firms participating in the IPR system to the norms and rules that operate at a national or trans-national level. At the most micro levels are the systems of corporate governance and IPR system governance. Moving outward are the governance layers that form the external environment, including the IPR Regime, the national legal and economic framework and the trans-national legal and economic framework. (See Figure 2). It is important to note that the levels are not necessarily hierarchical, but embedded within each other; and there are interactions among them such that they may co-shape each other. This is particularly the case when relations among the more macro levels of governance are considered.
3. The Economic Value of IPRs

The institutional structures by which IPR systems are governed (described below in section 5) are to an important degree based upon potentially competing incentives associated with value creation processes and stakeholder interests. It is therefore important to examine the potential sources of value created by IPRs. In this section, we argue that IPRs are a productive resource that can be converted into economic functioning that has value. Using the framework developed by Andersen and Striukova (2004), we suggest that this value can be realized in terms of two dimensions: (i) the degree to which it is embedded in individual entities or in systems and structures (i.e., the IPR is held by an individual entity or by a larger group); and (ii) the degree to which it provides market or non-market advantages. (See Figure 3).
As illustrated in Figure 3, the value from IPRs can be organized into four categories, based on the nature of the holder(s) and of the competitive advantages generated:

**IPR assets embedded in individual entities providing market advantages**
The value of the IPR for the single firm holder can be related to the market advantages it provides with respect to market creation, market protection, and the ability to raise venture capital.

**IPR assets embedded in systems & structures providing market advantages**
IPR assets held by combinations of firms, as in the case of patent pools and cross-licensing arrangements can contribute to market advantages (i.e., market creation, market protection, and the ability to raise venture capital); they also permit firms to participate in network relationships thereby gaining access to IP required for final products.

**IPR assets embedded in individual entities providing non-market advantages**
The value of the IPR for the single firm holder can be related to the non-market advantages associated with use of the IPR to generate operational and dynamic efficiencies, organizational learning and learning by doing.

**IPR assets embedded in systems & structures and providing non-market advantages**
IPR assets held by combinations of firms, as in the case of patent pools and cross-licensing arrangements, can contribute to non-market advantages by permitting firms to participate in network relationships, thereby gaining access to IP that facilitates improvements in operational and dynamic efficiencies and organizational learning processes.
From the taxonomy described above, we now develop a typology of IPR valuation factors (See Figure 4).

**Market advantages offered by IPR ownership and control**

The value of IPRs to the firm seeking to control them is to an important degree related to the advantages they offer in terms of market relationships. As such, IPRs can be used to create a market for the protected idea or knowledge, to prevent competitors from entering the market or to help raise venture capital.

**Market creation**

Ideas in the form of scientific and technological knowledge, creative expression and symbolic material are intangibles. They are similar to public goods in that they are non-excludable or non-rival by nature; as a result, the inventor has very little or no incentive to share them. However, by means of patents and copyrights, novel and original ideas can be made excludable and rival by law; and because IPRs make it possible for the creator of an idea to exclude others from using it, there is the opportunity for wider commercial exploitation, giving rise to a market for intangible ideas and knowledge (Arrow 1962).

IPR markets were first considered in relation to the buying and selling of IPRs. However, with growing recognition of the strategic importance of IPR licensing, IPR licensing markets have also been created. Because protected ideas generate increasing returns to scale, with the potential for increasing rent or profit as markets expand, licensing markets have become increasingly important for many firms and in most industries (Rivera-Batiz and Romer 1991, David and Olsen 1992). Thus, although new ideas are not a new feature of capitalist production, they assume greater importance when protected by patents and copyrights.

**Market protection**

As discussed above, the owner of an IPR can exclude others both from using their ideas in production processes and from trading products that embody those ideas, creating a ‘monopolistic-like’ market structure. In this, IPRs provide protection against market entry and allow time for firms who possess them to enter and/or develop an industry or market. IPRs also offer ‘breathing room’ for the inventor to invest in development without fear that another firm will steal the idea. By these means, IPRs provide temporary production and trade advantages as well as assistance in covering the fixed costs of inventing and setting up the production of a new product. It has been argued that without IPRs, a sustainable industry would not develop and mature because IPRs provide the essential incentives to invest in inventions and innovations.

However, this interpretation has been criticised by those who agree with the Schumpeterian theory of the ‘innovator’s head-start profit.’ From this perspective,

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4 A taxonomy provides a framework for the identification and location of the value of an IPR. From this, a typology (the empirical application of the taxonomy (Bailey 1994)), can be developed by mapping the IPR value drivers into the taxonomy.

5 This was the proposition of a range of classical economists during the establishment of the IPR regime, including Jeremy Benthin, Adam Smith, Jean-Baptiste Say, John Stuart Mill and John Bathes Clark.
when an inventor is ahead of others, the time interval between invention, catch-up and imitation should be sufficient to secure the necessary profits and rent for the inventor’s contribution. There is thus no need to further compensate or reward inventions. In support of this view, studies have found that in many industries and large established firms, a head start on commercialisation of an idea is sufficient to yield profit from the invention (Scherer 1959; Mansfield 1986; Levin et al 1987; and Cohen et al 2000). In these cases, it is argued that patents are not only unnecessary to induce innovation but they create excessive profits that go beyond the costs of research and development and market commercialisation.

The strategic value of patents with respect to market protection is well documented. Patents can be used to protect market position, create a defense against imitators and thereby secure market share. They can also be used to construct ‘patent walls’ around category-leading products to prevent competitors from entering the market (Rivette and Kline 2000). Competition is further limited by the threat of patent infringement suits or by creating immunity from litigation in order to avoid the high costs of infringement suits. It is therefore not surprising that in lock-step with the increasing importance of intellectual capital, IPR protection has expanded; and the amount of money paid to IPR lawyers is unprecedented.

IPRs can also be used to restrict potential rivals through ‘bracketing.’ As discussed above, competition can be limited by patenting an invention. It can also by restricted by patenting the surrounding application-innovations, and thereby either preventing competitors from developing the market further or making them totally dependent on the other company’s patents.

Another use of IPRs is the reinforcement of lock-in mechanisms. IPRs on a locked-in idea generate profit over time, providing incentives for firms to pursue strategies designed to take advantage of the increasing returns dynamic that generates lock-in situations (Andersen 2003). The increasing returns dynamic of IPR-based sectors (especially in the intangible economy where many products are knowledge-based or networked or bundled), enforced by corporate strategic interaction, has implications for the value of IPRs and thus encourages anti-competitive behaviour. As a result, firms’ intellectual capital or inventive ideas are informally protected even without the formal IPR legal framework (Andersen, 2003). In this context, IPRs serve primarily as a means by which the knowledge embodied in products and processes can be exploited for excessive rent creation.

**Ability to raise venture capital**

During the 1980s, changes in financial regulations permitted unprofitable firms to include a range of intangible assets in their financial statements in order qualify for listing on the Nasdaq and thereby generate venture capital (Coriat and Orsi 202).

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6 However, book-publishing or pre-recorded music, for example, where imitation is easy, would still need to be protected under ‘the theory of innovator’s head-start profit’ principle. The essential issue is the rate by which new ideas spread (i.e. the rate of imitation and catching up): the faster the speed, the more protection is needed to ensure reward, and the slower the speed, the less IPR protection is needed to ensure reward.

7 The situations are those in which the following dynamics play a role: (i) learning effects and increasing returns to adaptation, (ii) network externalities, (iii) technological webs, (iv) informational increasing returns to adaptation, and (v) knowledge-based intangibles underpinning increasing returns to scale.
Using this approach, together with a series of other institutional complementarities, firms were very successful in creating venture capital from IPRs in general and patent portfolios in particular. In this sense, the market asset-value embedded in patents and copyrights extends beyond directly profiting from the IPR protected idea through to either its commercialisation or licensing.

**Non-market advantages offered by IPR ownership and control**

IPRs contribute to non-market advantages for the holder(s) by facilitating improvements in operational and dynamic efficiencies and by accelerating organizational learning and learning by doing processes. They facilitate the development of favourable relationships with other firms, and from a non-market advantage perspective, they also facilitate acquisition of venture capital. As with the market advantages discussed above, IPRs also have strategic value for the firms that own or control them.

**Operational and dynamic efficiencies**

IPRs encapsulate knowledge and creativity resources that function as a resource base for the further advancement of knowledge and creativity within the firm. Such knowledge can be licensed, thereby permitting knowledge spillovers between firms and quickening the pace of diffusion of existing inventions. Just as the knowledge embodied human capital is a non-market asset, so are the ideas embodied in patents and copyrights. Firms use the ideas embodied in their own or others’ patents (or patent portfolios) and in recorded copyrights for the development of new ideas. However, if they decide to commercialise any of their new ideas embodying others’ ideas they are required to pay licensing fees. Using others’ IPR material requires innovation within the firm and must be applied in the right context. It has been argued that the knowledge spill-over gains from such activities are under-rated and that they are a substantial asset for firms that are able to license an invention (David and Olsen 1992). This conclusion is based on the notion that IPR licensing improves economic efficiency by speeding up learning by doing and quickening the diffusion of existing inventions.

**Ability to build favourable relationships with other firms**

Ownership and control of IPRs allows companies to develop favourable partnerships and licensing relationships (Teece 1986). Science and technological innovations typically occur in a social context where complex and multi-component products are being developed. Because in most industries, an individual patent covers a single component or sub-component, companies have become increasingly inter-dependent as their products have come to embody a variety of patented ideas owned by different individuals and firms (Mergers and Nelson 1990). This has given rise to cross-licensing agreements and patent pools in many sectors.

Whereas cross-licensing agreements most often represent a strategic choice by the partners, collaboration in a patent pool is typically organised such that each participant who contributes something to the pool is permitted to make use of the IP contained in the pool on a royalty-free basis. When it comes to the specificities of the

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8 David and Olsen (1992) criticise the fact that the national patent systems require patent holders to pay a significant amount of annual fees, even after they stop directly using their patented idea but keep the IPR for licensing purposes. This reflects the view that patent monopolies are simply imposing a deadweight welfare burden upon the economy.
cross-licensing agreements or the sharing of royalties from external contracts in patent pools, however, bargaining power plays an important role. Because a single firm is not normally powerful enough to set standards on its own, as a means of avoiding the imposition of mandatory standards, cross licensing (based upon a strategic choice of partners) or patent pooling has often been the solution.

*Ability to raise venture capital*

As discussed above, IPRs facilitate the development and transformation of IPR for commercial purposes because it is less risky to finance the implementation of an idea into products for markets if the idea is covered by an IPR. If, for example, a firm can acquire a strong patent, it is in an improved position to bargain a joint venture or licence deal with another firm that has the production and marketing capabilities (Teece 1986). As a result, IPRs facilitate the raising of venture capital.

*Strategic use of IPRs*

Patents and copyrights are assets for firms in many different respects. However, their strategic use differs across firms and is influenced by such things as firm size, the nature of the industry and its technological underpinnings. It will also depend on whether the ownership of the patent or copyright is individual or corporate, public (e.g. university) or private (Mazzoleni and Nelson 1998a and 1998b). The strategic use of appropriating value from IPR assets has also shifted over time from ‘the role of the entrepreneur and invention protection’ towards ‘appropriation from IPRs and the increasing importance of the venture capitalist as well as strategic interaction in the market place for ideas’ (Andersen 2004).

Still, very little, empirically, is known about the bargaining situations and governance structures surrounding patents and copyrights. In situations where the inventors are employed by a manufacturer or are manufactures themselves, they often find themselves in a bargaining situation where they have no option but to sell their patents or copyrights at a price below their value (Machlup and Penrose 1950). These bargaining situations often go against the natural and moral belief that the IPR system ensures that the creators of ideas receive a fair reward. The view of the natural rights and moral rights theorists is that IPRs represent the most appropriate way to protect the inventor. This was put forward by the classical philosophers John Locke and Thomas Hobbes, who argued that

‘if the inventors could not hope to reap the fruits of their work, … another theory could be substituted for the weakened theory of the patent as an incentive to invent: a theory of the patent as an incentive to venture capital for the financing of the development and pioneer exploitation of inventions’ (Machlup and Penrose 1950).

*IPR Valuation factors*

Based on the discussion above, a typology of IPR valuation factors can be developed as follows.
As discussed above in section two, the economic value generated from IPRs is distributed among the various stakeholders in the IPR system in such a way as to compensate them for their contribution and to reward them for any additional value generated by their joint participation. A system of IPR governance serves to structure these relationships, the allocation of ownership rights or control, and the distribution of value and rents from the exploitation of the IPR involved. In making the choice among alternative forms of IPR system governance, the economic value of the IPR to the firm seeking to own or control it is of central importance.

In this section, we examined the potential sources of IPR value in terms of both market and non-market advantages. In the next section, the alternative systems of IPR governance will be analysed with a focus on their role in the interrelated processes of IPR value creation and distribution.

4. IPR stakeholders and alternative forms of IPR governance for value creation and distribution.

In this section we analyze alternative systems of IPR governance and their role in the interrelated processes of value creation and distribution from IPRs. As discussed in section two, IPR system performance is not exclusively determined within the IPR productive system. We therefore begin by examining IPR governance at the level of the IPR regime, where the ‘rules of the game’ for the IPR system and its participants are set.

In order to understand the governance of IPRs at various levels of aggregation, it is necessary to identify the stakeholders and the nature of the relationships among them,
the mechanisms by which stakeholder interests are prioritized and the influence this might have on the ability to fully exploit the productive potential of the protected IP. IPR stakeholders include those individuals and groups that have both an interest in how the IPR is being used and a stake in how the value from the IPR is being distributed; dominant stakeholders are those who hold the rights associated with ownership and control and therefore those with the most direct relationship to these processes. In this section, we speculate on the potential conflicts that may arise; however, a full account on such conflicts will require detailed empirical case study analysis (which is beyond the scope of this paper and the focus of further research).

Stakeholders at the level of the IPR regime: The macro perspective

Perhaps the most obvious stakeholder in an IPR regime is the society in which it is embedded. At the macro-level, a spectrum of IPR system policy goals can be identified, each of which is underpinned by theories or economic rationales explaining the influence of IPRs on economic behaviour and hence the mechanisms by which they contribute to the achievement of societal level welfare goals (Andersen 2004).

Classical theorists have argued that IPRs provide economic incentives to invest in invention and innovation activities. They are said to stimulate competition and market development through the ‘protection of entrepreneurial talent;’ and they play an important part in organising science, technology and creativity which are believed to stimulate knowledge spillovers (reviewed in Andersen 2004). However, the social contract and political expediency rationales are problematic in their assumptions about the economic nature of inventors (individuals or firms) and of the system in which they operate (Andersen 2004). As discussed above, these arguments ignore important factors, such as technological inter-dependence and power asymmetries that may impede the aggregation of individual self-interested behaviour into the general good for each participant in the IPR system and for society as a whole.

Various groups within society experience the effects of the IPR regime in different ways. This is particularly apparent when national and international negotiations with respect to the design of the IPR regime are considered. The EU’s hearing on software patents provides a useful illustration of this dynamic at the level of international IPR agreements. In this case, IPR offices like the EPO (European Patent Office) express an uncompromising and uncritical view with regard to the importance of the IPR regime. Their position is that because patents generate growth and benefit to society, firms and individuals should accept that the IPR regime plays a positive role in promoting general economic welfare.9

However, it could be argued that IPR offices are biased in their view because they have vested interests in the maintenance and growth of the IPR system and are likely to be poorly informed regarding the economics of the system. The more patents the IPR offices grant, the higher their income from patenting and from patent enforcement. Because subsequent court costs associated with cases based upon decisions taken by IPR offices are paid by the IPR holders, the IPR offices do not assume the risk from their granting procedures. Further, because IPR offices are an important part of the machinery granting and enforcing IPRs, they employ an

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enormous number of people whose jobs, salaries and careers depend upon the continued existence of the IPR system. There are thus strong incentives for IPR Offices and their stakeholders to support the granting of patents and to support the existence of the IPR regime.

Critics of the IPR regime argue that it increases the costs of production, and therefore also price, which in turn reduces welfare for consumers. This welfare loss is worsened by the fact that the IPR owner pays a registration and a maintenance fee to the IPR office and the manufacturer pays royalties to the inventor of the product they produce. As a result, the price of the good exceeds the marginal costs, which from an economic perspective is inefficient and damaging to social welfare. However, supporters of the IPR system argue that the additional costs are justified as necessary for having an effective IPR system and for the efficient allocation of resources. The costs incurred are said to be more than offset by the efficiency gains from IPRs including such things as investment in invention and innovation activities, increased competition and market development, and knowledge spillover. However, many critics argue that the social costs of the IPR system often go far beyond the direct costs (reviewed in Andersen 2004).

Summary Overview

Figure 5 provides an overview of the discussion above, identifying the stakeholders in the IPR regime, their main objectives, the role of IPRs in achieving those objectives and the outcomes that are expected. These are necessarily ‘suppositions,’ particularly in the case where the government is the stakeholder with the objective of best serving society’s interests, because the IPR regime may not perform in accordance with the objectives it is designed to achieve.

As discussed above, in our view, the social and economic effects of the IPR system at the macro level do not represent the aggregate of the behaviour of the IPR system at the micro level. Rather, macro-level outcomes are the result of a dynamic process characterized by complicated and interactive micro-level relationships, with interaction and feedback effects across the two levels of analysis. It is therefore important to identify the stakeholders in the micro-level IPR system, the structure and nature of their interactions and the outcomes resulting from these interactions.
**Figure 5. Belief scheme for IPR governance at the macro level**

<table>
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<tr>
<th>Form of governance</th>
<th>Dominant stakeholder</th>
<th>Stakeholder objectives</th>
<th>Role of IPR in strategic approaches</th>
<th>Expected outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPR regime</td>
<td>Government</td>
<td>Investment, invention and innovation activities</td>
<td>IPRs to stimulate economic incentives</td>
<td>Economic growth and social welfare</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased competition and market development</td>
<td>IPRs to ‘protect of entrepreneurial talent’</td>
<td>Economic growth and social welfare</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Knowledge spillover</td>
<td>IPRs to organize science, technology and creativity</td>
<td>Economic growth and social welfare</td>
</tr>
<tr>
<td>IPR offices per se (e.g. EPO)</td>
<td>Processing IPR applications, Granting and maintaining IPRs</td>
<td>IPRs sustain the importance of the IPR office</td>
<td>IPRs generate income</td>
<td></td>
</tr>
<tr>
<td>IPR agents / IPR lawyers working in IPR offices and IPR agencies</td>
<td>Job, salaries and careers</td>
<td>IPRs sustain the importance of the IPR agents / IPR lawyers working in IPR offices and IPR agencies</td>
<td>Maximize personal welfare</td>
<td></td>
</tr>
<tr>
<td>Consumers</td>
<td>Maximize access to, and minimize price on, products and services</td>
<td>Value from IPR regime is negative as it increases a cost on the production system and thereby increases price</td>
<td>Maximize personal welfare</td>
<td></td>
</tr>
</tbody>
</table>

**Stakeholders at the level of individual IPRs: The micro to meso perspective**

The stakeholders in the micro to meso-level IPR system, their relationship and the mechanisms by which their interests are prioritised can be analysed by investigating the variety of forms that the ownership and control of IPRs can assume. These range from simple buying and selling, licensing, holding or sharing the IPR to more complex arrangements such as cross licensing and pooling of IPRs. (See Figure 6).

The stakeholders in different IPR systems include those individuals and groups who are directly participating in them. Their interests and roles vary according to the system in which they participate. Systems are not exclusive; rather, most firms participate in several different systems depending on the IPRs they hold and need and the type of value they hope to generate, such as direct financial gain, market power, access to an improved knowledge base, etc. (See Section three). However, whereas all alternative forms of governance are equally common within patent systems, copyright systems tend to be biased towards the alternative forms 1 and 2 (see Figure 6).
License Out or Sell and License In or Buy
A firm with sole ownership of the IPR can sell it to another firm and thereby relinquish its rights to control the use of the IPR. Or it can license the IPR to another firm, maintaining the right to use the IPR while at the same time receiving licensing revenues from the firm to which the IPR is licensed. Alternatively, a firm can buy the IPR from the firm that owns it, thereby assuming exclusive control over the IPR. Or it can license the IPR and in exchange for a licensing fee, gain control of the IPR.

The direct stakeholders in a seller or buyer relationship are the seller and the buyer who engage in a contractual market relationship. Since the seller is selling, the seller’s interest is in making as much money as possible from the single transaction. The buyer’s objectives may be manifold. For example, the buyer may be interested in some combination of gaining access to ownership of productive knowledge, improving market power, securing venture capital or making money from subsequent licensing agreements. Because seller and buyer interests conflict with respect to negotiating the price of the IPR, bargaining power plays an important role in this type of IPR system.

In simple licensing relationships, the stakeholders are the licensor and licensee, who engage in a longer-term contractual market relationship, in which ownership is not transferred. Rather, the use-right is temporarily transferred. The decision of the IPR owner not to sell could be a reflection of the seller’s desire to maintain control of markets and to maximize income streams from licensing agreements. Hence, the exclusiveness of the licensing agreement is an issue for both the licensor and licensee when licensing contracts are written. The licensee’s objective is likely to be gaining access to a broader knowledge base that is important for production. Because market
advantages will be greatest in the case of exclusive licensing agreements, there is the possibility for conflict when setting the licensing fee or rules for exclusivity. A potential licensee may also be in a situation where they would prefer to buy but are unable to by virtue of the owner’s unwillingness to sell.

**Cross License**

A firm with exclusive ownership of an IPR can choose to cross-license the IPR with another firm that has ownership of a different IPR. In this case, in exchange for the waiving of licensing fees, both firms gain control over the use of the IPR of the other. The cross-licensing stakeholders are the firms engaging in the cross licensing agreement. Because the licensing fees are waived between the cross licensing partners, they benefit from increased access to productive knowledge on a royalty free basis. Furthermore, if the IPRs entering into cross licensing agreements are licensed exclusive, the exclusive cross licensing agreements can also be a means of setting territories and securing market power. While a cross licensing agreement can be beneficial for both partners, not all cross-licensing agreements are mutually beneficial to the parties involved because the particulars of the agreement are determined by relative bargaining power and not all patents carry equal weight.

Cross licensing agreements are very common in the pharmaceutical sector, but other sectors also use such practices. Dell Computers, for example, has a cross-licensing agreement with IBM which frees Dell from paying IBM millions of dollars in royalties, thereby making Dell more price competitive (Rivette and Kline, 2000). In this way, collateral licensing agreements between parties can provide firms with lower cost components making them more competitive. The Dell and IBM agreement serves as a useful illustration of how IPRs allow companies to develop very favourable partnerships and licensing relationships. Another objective of cross licensing is to establish agreement regarding common standards such that all involved parties invent around the same technological trajectory.

**IPR Pool**

A number of different firms, each in possession of one or more IPRs can choose to form an IPR pool, in which royalty free access to the IPRs contained in the pool is gained by contributing IPRs to the pool by some agreed-upon contribution formula. The IPR pool is similar to a cross-licensing agreement in the sense that the objective of the stakeholders is the gaining of access to IPR-protected knowledge on a royalty-free basis. However, the IPR pool differs from a cross-licensing agreement in that it is non-exclusive and anyone able to make a contribution to the pool’s development trajectory can join. This serves to facilitate standard-setting within industries, discouraging the co-evolution of competitive standards. Patent pools have increased in popularity in markets for complex products and technologies that require input from many different specialized contributors; examples include digital television and digital video systems (e.g. MPEC-LA). The value of the patent pool is similar to that of the cross-licensing agreement; however participation in a patent pool is a non-market relationship where parties are not concerned about market power or the setting of individual territories.

However, as in the case of cross-licensing agreements, patent pools do not equally benefit all parties to the relationship. The specific agreement upon which a new contributor is permitted to join the pool is based on individual bargaining power; and
each patent in the pool may not carry the same weight. The effectiveness of the patent pool depends to an important degree upon trust relations among the members. For example, a company can choose to include both ‘bad’ patents and ‘good’ patents in the pool, but not inform the pool’s members which patents are the good ones. A company can also include all of its ‘bad’ patents in the pool in order to appear innovative and thereby to bargain a better deal for itself. In these cases, the pool will under-perform because of the failure of one of its members to effectively cooperate with the others.

*External Firm Licenses from IPR Pool*

Firms outside the pool can obtain access to IPRs in an IPR pool by means of licensing arrangements. In this case, in exchange for a licensing fee, the outside firm gains access to the IPRs. As in the case of general licensing agreements discussed above, the stakeholders in a licensing relationship are the licensor (i.e. the IPR pool in this case) and the licensee who engage in a contractual market relationship, with the interests and objectives described above.

*Hold On*

A firm with ownership of the IPR can choose to hold on to that right, excluding all others from access to the IPR. In this case, the stakeholder is the company that holds on to its IPRs and thereby prevents market entry by others. Most usually, a company that decides to hold on to an idea that it has developed or bought does so in order to prevent other companies from licensing its ideas and thereby increasing competition. In such cases (although not all), the company’s objective is either the exclusive use of its own invention or the prevention of other companies from using it in an effort to set territories in markets. In many respects, this strategy is reminiscent of the Shumpeterian entrepreneur that keeps his idea to himself and gains market share through the application of a new invention.

*Share*

More than one firm can choose to share ownership and access to the IPR. In this case, the stakeholders are the individuals and firms who hold shares in the relationship. Shareholder IPR relationships come about for a variety of reasons. Most often, they result from the co-development of inventions. They can also be the outcome of a court settlement where both parties decide to co-own the invention rather than spending excessive amounts of money on a risky court case; however, it is not uncommon for large companies to approach smaller inventors with insufficient resources to cover the costs of a court case and to ‘bully’ the inventor into the share-holder relationship. Share-holder relationships can also be the result of one firm selling off a share of their IPR to other firms. Share-holder based IPRs can subsequently be entered into other IPR arrangements, as described above.

*Summary Overview*

Figure 7 provides an overview of the discussion above, identifying the stakeholders in the various IPR systems at the micro to meso level, their main objectives, the role of IPRs in achieving those objectives and the individual value they hope to secure from participation in the various IPR systems.
### Figure 7. IPR governance at the micro level

<table>
<thead>
<tr>
<th>Form of governance</th>
<th>Dominant stakeholders</th>
<th>Stakeholder objectives</th>
<th>Role of IPR approaches in achievement of expected IPR outcomes</th>
</tr>
</thead>
</table>
| Sell and buy       | Seller and buyer      | Short term contractual market relationship | • Seller: Maximise on off income  
• Buyer: Access to ownership of productive knowledge, market power, venture capital, income from subsequent licensing agreements, or other |
| Licence out and in | Licensor and licensee | Longer-term contractual market relationship | • Licensor: Control on markets and maximise income from licensing agreements.  
• Licensee: Access to a broader knowledge base |
| Cross licence      | The firms engaging in a cross licensing agreement. All firms can be considered as both licensor and licensee. | Longer-term exclusive contractual non-market relationship | • Increased access to productive knowledge on a royalty free bases.  
• Cost cutting making the engaged firms price competitive.  
• Setting territories (i.e. market power) though exclusive cross-licensing agreements.  
• To enable an agreement or evolution on common standards. |
| IPR Pool           | The firms engaging in an IPR pool. All firms can be considered as both licensor and licensee. | Longer-term non-exclusive contractual non-market relationship | • Increased access to productive knowledge on a royalty free bases.  
• Cost cutting making the engaged firms price competitive.  
• To enable an evolution or evolution of common standards. |
| External Firm Licenses from IPR Pool | Licensor (the IPR pool) and licensee | Longer-term contractual market relationship | • Licensor: Control on markets and maximise income from licensing agreements.  
• Licensee: Access to a broader knowledge base |
| Hold On            | The IPR owner.        | Market prevention.     | • Exclusively use its own invention (setting territories), or prevention of other to use an invention. |
| Share              | The IPR share-holders. | Non-market share holding relationship. | • The IPRs which are shareholder-based can enter all sorts of IPR arrangements for value creation, as identified above. |
| Any of the above IPR systems | Lawyers, directly engaged in the contractual processes | Job, salaries and careers | • IPRs sustain the importance of the IPR lawyers.  
• Maximize personal welfare |
| Any of the above IPR systems | Employees involved with IPR | Job, salaries and careers | • IPRs sustain the importance of employees involved with IPR.  
• Maximize personal welfare |
| Any of the above IPR systems | The individual and firms who have been excluded from above IPR systems | To gain control over the use of IPRs | • No value from various of the IPR systems are recognized. |

For all IPR systems there are other parties that directly benefit and can therefore be viewed as stakeholders in the system. These include lawyers engaged in the contractual processes who benefit financially from the IPR relationships and IPR officers whose jobs, incomes and careers are based on administering, maintaining and enforcing the IPR system. Other stakeholders in the IPR systems include those individuals and firms who have an interest in how the IPR is used and how the value from it is distributed, but who may not have control over the IPR or these processes.
For example, because an IPR is an exclusive right, many firms and individuals are either excluded from access to the knowledge base they protect or cannot afford the licensing fees required to access the knowledge base. As a result, they are unable to access the stream of benefits associated with using the IPR protected inventions.

5. IPR Productive System Performance

As evident in the analysis above, the effectiveness of the IPR productive system depends on its ability to secure full cooperation of its various stakeholder groups in meeting the objectives of the system as a whole. Because of the potential for distributional conflicts to arise when jointly produced value is appropriated, this will depend upon the existence of mechanisms, both formal and informal, for resolving conflicts and preventing the abuse of power. Alternative IPR governance systems solve this problem in different ways because the structure and nature of stakeholder relations and the ability of individuals and groups to influence outcomes varies across the various forms of governance. In some, like buying, selling and simple licensing arrangements, productive roles and relationships are clearly defined through legally binding contractual agreements. In these systems, cooperation is enforced by means of the technical relations of value creation embodied in negotiated contracts and agreements defining the terms and conditions of the ownership and control of the IPR involved.

In other cases, like the IPR pools, relationships are more open-ended and there is greater latitude for individuals and groups to pursue their own interests at the expense of others in ways that have the potential to undermine the long-term performance of the system as a whole. In these cases, the social relations of value creation assume a central role in securing cooperation as well as agreement regarding distributional shares.

Recognising the critical role of the social relations of value creation in the IPR productive system highlights the importance of ‘social capital,’ an asset that is both based on social relationships (c.f. social) and provides economic benefits (c.f. capital). It includes assets embedded in ‘networks’ (Bourdieu 1983) and ‘social communities’ (Putnam 2000, Dasgupta and Serageldin 2000), where networks are the formal or structural relationships, and social communities reflect the quality of those relationships, taking the form of norms, values and shared understanding. Because economics has an under-socialized perception of human action and sociology has an over-socialized perception of human action, Granovetter (1985) argues that actors should be viewed as being ‘embedded’ in networks and social communities. The network and social community perspectives on social capital are essentially complementary. The network view of social capital emphasises the individual benefits associated with the solving of individual problems attached to membership in networks or social structures while the social community view highlights the collective benefits attached to coordinated actions to solve collective problems. Taking a productive systems approach provides insight into both the role of the social relations in IPR systems and the role of networks and social communities in this context.
Considering first the role of networks in IPR productive systems, the social capital embedded in productive and interactive ‘networks’ between people can be considered an asset. The value of this asset is determined by how and how much people communicate and help each other in a productive fashion; as a result, both cooperation and trust are critically important determinants of the collaborative efficiency of the IPR system. Social capital embedded in networks also supports the establishment and efficiency of stable inter-organizational ties or bonds (formal or informal) that structure joint ventures such as patent pools, long-term buyer-supplier partnerships, and other ties.

This perspective has similarities with the strategic management view of networks where the network plays a role in value creation (Dyer and Singh 1998). Strategic networks provide access to and, often, control over information, markets and technologies; they provide opportunities for sharing risk; and they generate economies of scale and scope. An example of a collaborative asset is a financial relationship, which is particularly important for a company seeking ‘room to manoeuvre’ when, for example, taking on new investments or risky projects. There are also research and development collaborations where strategic networks offer the potential to share knowledge (or access to knowledge) and facilitate learning through, for example licensing agreements and IPR pools. In this respect, licensing agreements or patent pooling are important assets because they provide access to knowledge markets, allowing the participant firm to save considerable amounts of money through the avoidance of royalty payments. Licensing agreements are also important for the dynamic capabilities of firms. Other potential advantages from strategic networks include shortened time to market through inter-firm coordination in cases where distribution and production can be networked, leading to enhanced transaction efficiency. The ability to collaborate can therefore be viewed as an asset embedded in a productive system’s social relations.

In cases where firms are unable to collaborate, it has been found that the vast majority are the result of clashing of corporate cultures (Brooking 1996), where corporate cultures can be likened to ‘social communities.’ Social capital embodied in ‘social communities,’ which can be both formal and informal networks, includes norms, values and shared understanding. Here, again, trust is essential as it facilitates the development of common norms and expectations and reciprocity in favourable or helpful behaviour. In this respect, trust creates ‘good’ relationships and provides incentives for collaboration and collectiveness. In the context of IPR agreements, trust also helps to reduce the cost of agreement layers and anti-trust actions. Social communities serve to coordinate behaviour and more efficiently arrive at mutually acceptable solutions. The importance of corporate culture as an asset to firms has also been emphasized in organizational theories where it is argued that a healthy social community brings the employed within the firm, or the members of an IPR system in our case, together around a common set of norms and values; in this way, the social community functions as an asset to accomplish the mission of the firm or IPR system.

10 ‘Neighbourhood watching’ is a good example of the benefits of a ‘social community’, as it reduces the transaction costs for each household to take extra precautions. Also, it brings a community together around a mission. When a person enters a neighbourhood watching area, he or she does not enter an area of a lot of individual houses, but a community enforcing certain norms and standards.
The importance of the social relations of value creation in the IPR productive system can be likened to Nelson and Sampat (2001)’s ‘social technologies’. Nelson and Sampat argue that organizing institutions for value generation should be based not only on a theory of ‘physical technologies’ but also on a recognition that the way relations within the firm are organized and managed has an important influence on the achievement of corporate goals. As a result, it is necessary to have a theory of the firm that incorporates a division of labour and a mode of coordination, the latter being what Nelson and Sampat describe as ‘social technologies.’

In our analysis, the productive systems framework has provided insight into the requirements of alternative IPR productive systems in terms of their ability to perform effectively in both the short and long term. As discussed above, the interrelated key issues will include: the ability to secure ‘cooperativeness’ of all of the participants in the system; the ability to effectively resolve conflicts of interest among the stakeholders; the ability to secure agreement regarding distributional shares; and the ability to prevent the abuse of power when there are asymmetries. The relative importance of each of these requirements will be shaped by the particular structure and nature of the IPR system and the degree to which it provides space for participants to pursue individual as opposed to collective interests.

6. Conclusions

With recognition of the growing contribution of IPR policy to the performance of firms, sectors and nations, the role of IPR governance has become increasingly important. However, little is known about the social and economic performance of alternative IPR systems; the alternative ways in which IPR systems create value and how that value is distributed; and the degree to which the IPR system accomplishes its productive objectives. Little also is known about the most appropriate design of an IPR regime when setting the rules of the game from the macro to ‘meso and micro’ level (i.e., the optimal type and number of exclusive rights conferred; length of protection obtained; type and scope of knowledge protected; laws governing licensing arrangements; costs and procedures associated with obtaining and holding rights; and types and costs of remedies for infringements).

To contribute to this literature, we have in this paper developed an alternative conceptual and analytical framework for critically examining the objectives, operation and performance of alternative systems of IPR governance. The framework brings together three streams of literature, from productive systems, corporate governance and the IPR literature on patents and copyrights.

In section two, we laid out the productive systems framework for analysis and demonstrated its usefulness in explaining the ways by which operational and dynamic efficiencies are generated in IPR productive systems and how these in turn determine of the system’s ability to perform effectively and to respond flexibly to changing circumstances and new opportunities. We showed how the different layers of IPR Governance (from the firm, to the IPR system, IPR regime and beyond) affect performance, in a system where there are interactions among the various layers that have important impacts on the performance of the system as a whole. Hence, dynamic processes at any particular level cannot be meaningfully separated from the others and
the performance of the system as a whole is not merely an aggregation of micro-level behaviour and outcomes as it is assumed to be in the mainstream IPR literature. In section three, we developed a typology to systematically illuminate where the economic value from IPRs resides. In section four, we illustrated the alternative governance mechanisms by which this value can be captured and the importance of understanding IPR stakeholder relationships within the alternative forms of IPR governance. In section five, we analysed the ability of alternative forms of IPR governance to achieve performance effectiveness, highlighting the critical role of the social relations of value creation in this process.

In our view, such an alternative (to the mainstream) framework is critical when designing IPR management and policy. The framework developed in this paper will form the basis for further empirical case-study research as we continue our efforts at better understanding the dynamic processes that shape the performance of IPR regimes and systems. To test and refine the analytical framework here proposed, we believe that further detailed empirical research, examining alternative IPR governance systems in different organisational and industry contexts is essential.

References


