

Managing Intellectual Property in Global Outsourcing for Innovation Generation

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The globalization of markets and business operations is a trend that will continue strongly in the coming decades. One inescapable aspect of globalization has been the trend toward global outsourcing, especially that of knowledge-based services. Due to firms' compulsion to reduce costs in the developed world, the issue is not if a particular firm will outsource or offshore work but when it will outsource it and how effectively it will leverage outsourcing to achieve superior competitive advantage. An important implication of the outsourcing of knowledge-based services is the management of intellectual property (IP). Managers and researchers alike are interested in understanding the effects of global outsourcing of knowledge-based services on the management of IP. The challenge of accessing, exploiting, and defending IP in global outsourcing relationships is first examined in this paper. IP can be managed by balancing the trust and control and verification in the outsourcing relationship. Given that defending IP is a major concern for outsourcing firms, the moderating roles of multitier suppliers, supplier country legal regimes, and global supplier communities of practice on defending IP is examined in detail through moderating effect propositions. Finally, the paper examines the effect of accessing, defending, and exploiting IP in global outsourcing relationships on the generation of incremental and radical innovation for the outsourcing firm. This research tries to extend current academic research on global outsourcing in three ways. First, it offers a framework to understand the management of the buyer–seller relationship in the global outsourcing of knowledge-based services and its relationship to the management of IP and innovation generation. Second, the framework takes a broader perspective of outsourcing and innovation generation, including globalization, tiered suppliers, supplier country legal regimes, and global supplier communities of practice on defending IP. Third the research examines the effect of accessing, exploitation, and defense of IP on generation of incremental and radical innovation for the outsourcing firm. Managerial implications of this research and future research directions are also discussed.

Introduction

One inescapable aspect of globalization has been the trend toward global outsourcing, especially the outsourcing of knowledge-based services (Apte, 1990; Behara, Gundersen, and Capozzoli, 1995; Piachaud, 2002). Outsourced activities include a wide variety of services, such as accounting, financial services, taxation, customer service, information technology, human resources, research and development, data processing, sales, and customer service (Rao and Young, 1994; Rothstein, 1998; Thibodeau, 2003). At the core of these fundamental global changes is the global approach to marketing and management and the possibilities unleashed with the development and adoption of computers and the Internet in business operations. Indeed, any work that does not require face-to-face

contact is a candidate for either outsourcing or offshoring to less expensive locations. Because outsourcing occurs for tasks that are high on the value chain, the question of managing intellectual property (IP) of the outsourcer becomes critical. The management of IP is a challenging task made formidable by complex networks of service providers. In the global economy, IP must be managed for the outsourcer, the provider, and their relationship in the context of different IP protection regimes, legal infrastructures, differences in employment contracts, and knowledge flows. This paper examines IP management in global outsourcing for innovation generation for the outsourcing or focal firm.

In the heat of the highly charged debate over the consequences of outsourcing, the question of how outsourcing firms should manage IP has rarely been addressed in the media or by academic researchers, despite the rapid growth in the global outsourcing of knowledge-based services. The current research aims to fill this important gap in the global outsourcing

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literature in the domain of innovation generation. Given the large amount of existing theory in the fields of economics, international business, and strategy on the rationale for outsourcing, and given the inexorable march of organizations toward outsourcing, this paper tackles a vital aspect of firms' strategy—that is, managing IP for innovation generation. In doing so, this research follows an interdisciplinary approach by synthesizing knowledge and methodologies from areas such as marketing, management, information systems, and strategy.

Prior literature has focused only on certain aspects of the three domains of this paper: relationship factors, intellectual property, and innovation generation. Much of this literature has developed in a north–south world (Krugman, 1979) that involved the flow of knowledge through technology transfer from developed to developing countries. In a “flat world” (Friedman, 2005), knowledge transfer and innovation (where IP is central) can occur at buyer firms, supplier firms, or in their relationship, and in an increasingly global setting.

For example, the link between business relationship factors and innovation generation has been stud-

ied in the literature (e.g., Gulati, 1995; Roy, Sivakumar, and Wilkinson, 2004; Shan, Walker, and Kogut, 1994). Similarly, the close association between intellectual property management and new product development strategies has been identified in the literature (e.g., Malewicki and Sivakumar, 2004; Teece, Pisano, and Shuen, 1997) where themes like IP “rights” (e.g., Glass and Saggi, 2002) make an implicit assumption that those that violate the focal firm's rights are not connected or related to the firm although they might be competitors to the firm (e.g., Maskus and Penubarti, 1995). Given a changed world where firm alliances and partnerships are becoming necessary (Hagedoorn, 2002) at the global level, this paper goes beyond the existing literature by specifically exploring management of the three dimensions of intellectual property for generation of radical and incremental innovation. This research does so by offering a comprehensive model to manage IP for innovation generation with globally outsourced knowledge-based services.

The rest of the paper is organized as follows. First, the conceptual framework of managing IP is presented; second, propositions from the conceptual framework are developed; third, a discussion and table of definitions and measures for the variables in the model are presented; and finally, managerial and research implications are delineated.

Conceptual Framework

Figure 1 presents the overall conceptual underpinnings of this research approach. The framework considers the management of buyer–seller relationships a central activity of a firm that can be leveraged to effectively manage IP for innovation generation. The framework is a two-stage model. In the first stage the paper examines the nature of IP in global outsourcing relationships and how each IP action may be managed. In the second stage, this research examines how each component of IP management impacts innovation generation for the outsourcing or focal firm.

In the first stage of the model, management of IP involves three distinct but interrelated activities: accessing IP, exploiting IP, and defending IP (Contractor, 2000; Kogut and Zander, 1996; Zander and Kogut, 1995). Several factors related to the globalization of outsourcing moderate the direct linkage between relationship factors and IP management, including the existence of multiple tiering in outsourc-

BIOGRAPHICAL SKETCHES

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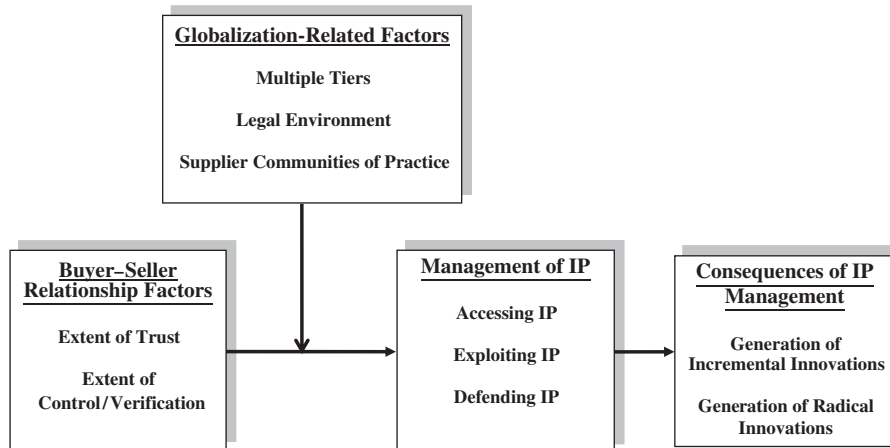


Figure 1. A Model for Managing IP in the Global Outsourcing for Innovation Generation

ing relationships, the prevailing legal environment in the host country, and the existence of supplier communities of practice. Although this research recognizes the moderating role of globalization on all the three aspects of IP management, given the increasing importance of defending IP and in the interest of parsimony when discussing the moderating role of globalization factors, this paper limits the discussion to defending IP. The three IP activities of accessing IP, exploiting IP, and defending IP have different impacts on innovation generation for the outsourcing firm and are discussed in the propositions for the second stage of the model.

Dependent Variables

Intellectual Property. Following Contractor (2000), this research considers registered IP assets, including trademarks, copyrights, patents, and trade secrets of the company and its value network as the first element of IP. The second element includes unregistered but codified IP assets in the value network, including customized software, databases, formulas, recipes, and trade secrets (Hannah, 2005, 2006). These might arise out of dealings with suppliers, particularly knowledge-based suppliers. The third element of IP occurs in the relational interactions between buyers and sellers (Roy et al., 2004).

Management of IP from the perspective of the outsourcer involves three distinct but interrelated activities: (1) accessing IP; (2) exploiting IP; and (3) defending IP (Contractor, 2000; Grant and Baden-Fuller, 2004; Kogut and Zander, 1996; Zander and Kogut, 1995). Accessing IP describes the process by

which an organization receives IP without necessarily wanting to learn about or control the IP of the provider. Accessing IP is analogous to the strategy conception of value capture (Lepak, Smith, and Taylor, 2007) in the sense that the outsourcer–provider relationship should allow for the rapid accessing of IP from the provider with a view to capturing the value of the IP but not the IP itself. Examples include accessing the provider’s expertise and underlying IP to give “on-tap,” rapid turnaround and high accuracy in high-knowledge content work, such as engineering design. Exploitation of IP would provide increasing innovation generation and value creation in the buyer–seller relationship (March, 1991). Exploiting IP is the process by which an organization develops and commercializes the provider’s IP, its own IP, and any new IP that both the buyer and the seller create for marketing purposes or licensing the IP. Defending IP is the process by which a firm fights both overt infringements of IP, such as piracy, and covert IP losses, such as “leakages” (Brown and Duguid, 2001; Hannah, 2005, 2006).

Innovation Generation. This research defines “innovation generation” as the impact on the new product development (NPD) process for the outsourcer (e.g., Kamath and Liker, 1994; Roy et al., 2004) in which providers deliver knowledge-based services. The paper assumes a typical Stage-Gate[®] NPD process that consists of idea generation, idea screening, concept testing, product development, test marketing, and launch (Cooper, 1998).

This research views innovation generation as a series of “S” curves, in which one rises above the other (Christensen, 1997; Foster, 1986; Sood and Tellis,

2005). The S curves are conceptualized as rising to enhance cost reduction or efficiency improvement along the curve. Jumping from one curve to another curve is considered radical innovation in this formulation (see Roy, 2010, Figure 2, p. 17). Movements up an S curve can be called “incremental innovations,” as they occur on a similar technology platform as a result of process improvements. Thus, reduction of manufacturing waste through total quality management processes, such as *kanban*, just in time, waste reduction, and lean practices of the supplier, can be classified as incremental innovations (White and Prybutok, 2001). However, jumping across an S curve is considered a radical change in architecture or technology platform and would be classified as a radical innovation that reconfigures the customer benefit landscape (Chandy and Tellis, 1998, 2000). Examples include enhanced high-capacity disk drives (versus floppy drives) (Bower and Christensen, 1995) and the Apple iPod (versus the Discman or Walkman).

Independent Variables

As indicated in the conceptual model, the management of buyer–seller relationships in the global outsourcing of knowledge-based services involves two important aspects: trust and verification. The selection of these two variables is based on several of the most influential and relevant theories that currently exist. The variable “trust” comes from relationship and transaction cost theories (Coase, 1937; Dwyer, Schurr, and Oh, 1987; Morgan and Hunt, 1994; Williamson, 1975, 1985), whereas the variable “verification” (or control) comes from agency theory (e.g., Eisenhardt, 1989).

Trust. Buyer–seller interactions help increase trust. It is important to distinguish interactions from communications (Hakansson, 1982; Morgan and Hunt, 1994). Whereas communications carry a message, interactions are more informal and unstructured and aid in building both knowledge and trust in a business relationship. There are several dimensions of interaction, including quantity, scope, and mode (Roy et al., 2004). Trust itself has components such as “competence” trust, or the provider’s competence to actually perform the task, and “goodwill trust,” which refers to the goodwill actions of both parties to safeguard their mutual interests (Sako, 1992).

Verification. Verification can take two forms in buyer–seller relationships. The first is formal control, external audit, or verification that involves the formal reporting of the elements of the outsourced activity for oversight purposes. Formal control can take several forms, such as control of inputs (e.g., how many assays are conducted in the context of clinical trials), processes (e.g., how exactly the assays are done), and outcomes (e.g., whether all side effects are identified). The more established the control system, the more a firm can focus on its own activities rather than the uncertainties associated with the service provider’s behavior. Agency theory (e.g., Eisenhardt, 1989) posits that outcome-based control is desirable, but this may not be the case for knowledge-based services, which, in general, are unstructured or at best only partially structured at the outsourcer’s premises.

The second control dimension, “self-verification,” norms-based control, or “internal audit,” develops as relationship norms are established between the outsourcer and the provider (Lusch and Brown, 1996). Compared with formal control, which involves the management and information systems control in which system procedures and reports are generated, normative control involves setting up expectations for later performance in terms of flexibility, information exchange, and solidarity (Jap and Ganesan, 2000; Lusch and Brown).

Moderating Variables

Multiple Tiering. The automobile industry is well known for its system of tiered suppliers, in which Tier 1 suppliers provide the automaker with a finished assembly and Tier 2 suppliers furnish component parts to Tier 1 suppliers (Womack, Jones, and Roos, 1990). In a similar vein, software development (Gopal et al., 2003) can be onshore for systems analysis and subsequent testing, whereas the actual code writing may take place at overseas companies. In yet another example, a pharmaceutical service provider might subcontract part of the work to a Tier 2 supplier, a move that would have implications for IP management.

Legal Environment. This research uses the term *legal environment* to refer to both the laws of a provider’s country and the vigor of enforcement (Levine, 1998). Thus, the legal environment includes not only whether the country has adopted multilateral trade law agreements but also whether authorities

vigorously enforce local laws. Intellectual property is addressed in a component of the 1994 Uruguay Round of the General Agreement of Trade and Tariff (GATT) known as TRIPS, or Trade Related Aspects of Intellectual Property Rights.

Supplier Communities of Practice. The community of practice is an informal group, such as a mailing list of academics in different functional areas (e.g., ELMAR for marketing) that fosters recognition, fellowship, and camaraderie. In a community of practice, loyalty to the professional group might frequently rise above organizational loyalty. Here, the phrase *communities of practice* includes every type of professional involved at the provider end of service supply (Brown and Duguid, 2001; Lave and Wenger, 1991). For example, a community of service technicians (Orr, 1990) might span the provider's industry, or providers in the pharmaceutical industry might find community in a trade meeting or on a mailing list.

Development of Propositions

IP Management and Outsourcing Relationships

The first stage of the model (P1 to P6b) examines how IP needs to be managed in buyer–seller relationships based on the objective of the focal firm to access, exploit, or defend IP. This extends prior literature that has primarily focused on defending IP rights (e.g., Glass and Saggi, 2002). The model accounts for the increasing growth and importance of alliances (Gulati and Kletter, 2005), particularly the growth of vertical knowledge-based outsourcing alliances (Rindfleisch, 2000).

Accessing IP

Accessing IP refers to the ability of the outsourcing firm to access specialized IP-based services from the supplier without necessarily wanting to learn details about the IP (Grant and Baden-Fuller, 2004; Nakamura, Shaver, and Yeung, 1996). An example is the supplier's ability to synthesize a particular chemical compound for further development by a focal pharmaceutical company.

Relationship theory posits that business relationships based on trust and commitment are imbued with sufficient knowledge of mutual capability to enable the outsourcer to know what the provider knows

(Sako, 1994; Womack et al., 1990). Indeed, highly service-oriented providers could be expected themselves to volunteer advice and information. Business-to-business services research suggests that a service provider that has a deep knowledge of a customer's business enjoys greater trust and adds more value to the customer's business than one that does not. Enhanced interaction helps the outsourcer access the provider's IP (Grant and Baden-Fuller, 2004). Thus, the following is proposed:

P1: The greater the extent of trust in buyer–seller relationships, the greater is the outsourcer's ability to access the provider's IP.

Formal controls or verification (Dahlstrom, McNeilly, and Speh, 1996) involve written documentation (e.g., the use of computer software for generating reports) that begins at the contract stage and continues during the performance stage. Formal controls are most effective in controlling registered IP, less effective in controlling unregistered IP, and almost ineffective in controlling intellectual capital (following Eisenhardt, 1989).

Accessing IP involves not only the willingness of the provider to share information but also its sense of solidarity, flexibility, and information exchange with the outsourcer (Dahlstrom et al., 1996; Lusch and Brown, 1996). These characteristics call for the development of relational norms. According to Jap and Ganesan (2000), norm development takes place in the early stages of a relationship. As such, it is important to set up norms of expectation between the outsourcer and the provider to ensure that the outsourcer can access IP. Accessing IP may not be a project-based enterprise or the sole initiative of the outsourcer or provider. The sense of solidarity and teamwork should be high enough to warrant automatic access to IP when necessary; this state is possible only when high expectations and norms have developed.

P2a: The greater the formal verification, the weaker is the outsourcer's ability to access the provider's IP.

P2b: The greater the self-verification, the greater is the outsourcer's ability to access the provider's IP.

Exploiting IP

In the global marketplace, the exploitation of IP might take several forms (March, 1991). It could

entail the innovation and development of patented new products or the sale of unused patents (Rivette and Kline, 2000); it could also entail exploiting unregistered IP and intellectual capital.

Brown and Eisenhardt (1995) identified three streams of product development: rational plan, communication web, and disciplined problem solving. In all three streams, supplier involvement and interactions with suppliers are viewed as integral in reducing cycle time and speed to market. The knowledge-based view suggests that interaction would help the outsourcer firm access external IP and make a focused effort to exploit IP inside the firm (Mowery, Oxley, and Silverman, 1996).

P3: The greater the trust in a relationship, the greater is the outsourcer's ability to exploit IP.

Coupled with normative control or self-verification, formal control helps exploit in-house IP. The relationship between provider and outsourcer should be such that the provider understands exactly how the service fits into the overall business of the outsourcer. Such an understanding, according to the knowledge-based view (Grant and Baden-Fuller, 2004; Tsai and Ghoshal, 1998), enables the provider to contribute to the long-term business goals of the outsourcer.

This combination of formal and informal control in the information systems outsourcing space has been called “moments of governance” in which either trust or contract operates (Miranda and Kavan, 2005). According to Miranda and Kavan, an outsourcer–provider relationship might vary from moment to moment according to whether buyer–seller trust is being invoked or the contract is being invoked. For the purposes of managing IP, formal controls in the shape of data-based reporting are beneficial for all kinds of behaviors that can be codified and reported and that might have a bearing on IP. For example, the provider might be asked to report employee attrition on a monthly basis (Gopal et al., 2003).

However, if the provider's employees are discouraged by systems of control, one would expect these employees to be less spontaneous in responding to requests for data or other knowledge they may have, which would result in less exploitation of IP.

P4a: The greater the formal verification, the weaker is the outsourcer's ability to exploit the provider's IP.

P4b: The greater the self-verification, the greater is the outsourcer's ability to exploit the provider's IP.

Defending IP

Defending IP involves the protection of registered IP, unregistered IP, and intellectual capital that the outsourcer has or that the provider acquires through association with the outsourcer. Defending IP is considered a risk-management issue (Chopra and Sodhi, 2004; Coffin, 2004; Kunzler and Payne, 2004). The risk-management perspective advocates keeping interactions with the supplier to a minimum, according to the principle that if one does not communicate, one cannot lose IP.

Interactions in buyer–seller relationships should take place in an environment of trust and commitment (Hakansson, 1987; Jap and Ganesan, 2000; Lusch and Brown, 1996). Indeed, the early stages of a relationship call for added interactions to build trust and convey idiosyncratic commitment. In contrast, a risk-management perspective views defending IP as a stance that calls for caution when interacting, preferably a minimum number of interactions with as much of the contract stated up front as possible. To avoid “leakage” of knowledge (Brown and Duguid, 2001), it would be necessary to keep the service provider at arm's length and to reduce interactions. Fewer interactions would hinder the accessing and exploitation of IP but would help in the defense of IP.

P5: The lesser the trust, the greater is the outsourcer's ability to defend its IP.

Control systems, such as computer-generated reports and other structured information, lie at the heart of the risk-management perspective (Chopra and Sodhi, 2004; Coffin, 2004; Kunzler and Payne, 2004). Outsourcers using the control approach would be able to identify any infringement of registered IP, including patents and trademarks, and thus would be able to facilitate corrective action. However, firms using management control would have greater difficulty protecting unregistered IP and the growing intellectual capital in the interorganizational space.

However, according to relationship theory in the distribution context (Jap and Ganesan, 2000; Lusch and Brown, 1996), norms that are developed in the early stages of an outsourcer–provider relationship assist in defending unregistered IP and intellectual capital. Intellectual workers in the knowledge age need to learn, think, and be motivated for the good of the organization and for the benefit of the buyer–seller dyad. Because unregistered IP and intellectual capital reside in the minds of individuals and members

of small groups, these employees must feel a sense of identification with their organization so as not to give away the “family jewels” (Kline, 2003).

P6a: The greater the formal control and verification, the greater is the outsourcer’s ability to defend its registered IP.

P6b: The greater the norms-based control or self-verification, the greater is the outsourcer’s ability to defend its unregistered IP and intellectual capital.

The Moderating Role of Globalization in Defending IP

The discussion of defending IP rights in the existing literature has largely assumed market expansion type of interfirm relationships (Glass and Saggi, 2002) rather than global sourcing relationships where knowledge must first leave the focal firm before it comes back augmented by research (Quinn, 2000). Such an exit and return of knowledge in a global setting is a recent phenomenon, and this research explores the moderating implications of globalization on defending IP in propositions P7 to P12. This research illustrates the impact of globalization on only one of the three dimensions of IP management—defending IP—given its importance in outsourcing. To the best of the authors’ knowledge, this moderating link has never been examined in the prior literature and thus represents a unique contribution of this research.

Multitiered Versus Single-Tiered Supply Chains. Multitiered supply chains have been studied extensively in the automobile industry (Sako, 1992; Womack et al., 1990) and now are being studied in the context of the Internet and global sourcing. In the case of the auto industry, in which products have a design and IP is easier to define and control, a Tier 2 supplier can be monitored for quality. However, when tiering is involved in the supply of a service, the buyer needs to know about and address the tiering issue. For example, consider a customer service outsourcer based in the United States (e.g., Convergys.com) that accepts an assignment from a U.S. client but eventually services part of the job or even the entire job overseas.

Agency theory (Eisenhardt, 1989) suggests that a Tier 2 supplier will need to be monitored by results alone because IP leaks (Brown and Duguid, 2001) are

difficult to assess. Thus, interaction would be less likely between a buyer and an overseas Tier 2 service provider, specifically because the commercial relationship would be between the Tier 1 and the Tier 2 suppliers. With more tiers, there would be less interaction and a weaker defense of IP for the buyer.

P7: Multitier outsourcing moderates the link between trust and the defense of IP: as the number of tiers between the buyer and the seller increases, the association between trust and the defense of IP becomes weaker.

Control becomes difficult as the number of tiers increases, unless all tiers are integrated electronically. This integration is a difficult endeavor given the ongoing problems with enterprise resource planning (ERP) implementation within a given company and its own global operations (Kumar, Maheshwari, and Kumar, 2004). Indeed, integrating a firm’s value chain electronically is so difficult and strategic that, for example, Dell has secured 42 patents for its “continuous flow” process for integrating customer requirements into supply-chain fulfillment (Rivette and Kline, 2000). These patents serve to deter competitors in the personal computer market from copying Dell’s online business model too closely. However, the system fails to track Tier 2 suppliers that supply subassemblies or components to the Tier 1 supplier.

The situation becomes even more complicated for services because the order taker may not be the service provider and the service provider could be several steps removed from the outsourced task. Service activities, such as tax returns and medical diagnostics, may be outsourced to U.S. suppliers, which may have Tier 2 suppliers upstream.

As Graziadio and Zilbovicius (2003) point out in the case of the automotive sector, training lower-tier suppliers is difficult. Not only is it difficult to train lower-tier suppliers to accept more complex modular work, but it is also difficult to verify their actions in terms of services. That is, the more tiers there are, the more difficult it is to verify a particular tiered supplier’s actions with respect to the IP that is flowing from the outsourcer to the Tier 1 supplier with which the outsourcer has contracted.

P8: Multitier outsourcing moderates the link between verification and the defense of IP: as the number of tiers between the buyer and the seller increases, the association between verification and the defense of IP becomes weaker.

Country Legal Regimes. Country legal regimes for IP protection have been critical to firms' internationalization efforts (Johanson and Vahlne, 1977). For example, Oxley (1999) maintains that greater vertical integration is required when legal regimes are weak. For example, the mere fact that a country signs the TRIPS agreement does not guarantee that it will respect the registered IP on the ground.

In the realm of knowledge-based services, a major concern is that a service provider's employees may leave the firm and join a competing service provider, taking the outsourcer's IP with them (Chopra and Sodhi, 2004). Leakage of IP (Brown and Duguid, 2001) can happen in distant countries and can seriously affect long-term competitiveness. Relationship theory posits that it is possible to curb such opportunistic behavior through interaction and trust (Kale, Singh, and Perlmutter, 2000). Stronger supplier country legal regimes can facilitate such interactions.

P9: Supplier country legal regime moderates the link between trust and the defense of IP: the stronger the supplier country legal regime, the stronger is the association between trust and the ability to defend IP.

In a similar vein, supportive legal regimes, including the presence of laws and their vigorous enforcement (Levine, 1998), facilitate control. The economics–legal literature (Oxley, 1999) indicates that in countries in which the legal environment is weak, whether in laws or their enforcement, vertical-hierarchy forms of governance, such as majority joint ventures or wholly owned subsidiaries, are desirable.

As Walden and Wetherbe (2005) point out, if firms outsource software development rather than focus on controlling the developed application they might find it more profitable to give up marketing rights of the application to firms in larger markets, which would result in better upgrades and lower costs. This is true in global outsourcing in which different countries might have different legal regimes that provide varying levels of IP protection (Simmonds, 2004; Walden and Wetherbe). Therefore, in different legal regimes, it might be easier to enforce norms- and trust-based controls.

Formal control mechanisms can help defend registered IP, but norm development in the early phases of the relationship is a better means of defending unregistered IP and intellectual capital in the relationship. Strong country legal regimes should support both types of control.

P10: Supplier country legal regime moderates the link between verification and the defense of IP: the stronger the supplier country's legal regime, the stronger is the association between verification and the ability to defend IP.

Global Supplier Communities of Practice. Intellectual property seems to be both “sticky” and “leaky” (Brown and Duguid, 2001). “Sticky knowledge” (von Hippel, 1994) remains fixed at a particular site. Despite the fact that the Internet and telecommunications facilitate IP transfer, Silicon Valley remains a locus of technological innovation (Brown and Duguid, 2002). When employees are disgruntled, they tend to leak knowledge and IP to competitors, especially when they know their competitors' employees through a community of practice. The situation becomes more complicated if the outsourcer is dealing with a foreign provider with its own communities of practice.

Interactions and trust that build relational or social capital (Uslaner, 2000) are the only safeguards against IP leaks in communities of practice. Communities of practice are strong and self-sustaining and can be formal or informal. When banned, a community of practice could go underground and leak even more IP (Brown and Duguid, 2001). The only recourse might be to build stronger communities of practice and relational capital with provider employees so that interaction enhances defense of IP.

P11: The presence of global supplier communities of practice moderates the link between trust and the defense of IP: as global supplier communities of practice become stronger, the association between trust and the ability to defend IP becomes stronger.

Given the growth of social and professional networking websites (Allee and Taug, 2006; Waxell and Malmberg, 2007) and the increasing ability and willingness of professionals to collaborate, for free, in knowledge creation on the Internet, communities of practice will increasingly play a dominant role globally. For example, the online encyclopedia Wikipedia is written entirely by volunteers who are experts in a particular domain or entry and who regulate themselves. Surprisingly, Wikipedia is generally considered reliable even with this volunteer group of writers. By definition, communities of practice are informal, trust-based, and competence-based groupings of

specialized professionals. As such, industrial-style control of “knowledge workers” is difficult to achieve (Brown and Duguid, 2001), even when these knowledge workers are direct subordinate employees. Thus, controlling a knowledge worker with an overseas supplier becomes even more difficult. Indeed, communities of practice would not affect the relationship between control and the defense of IP.

Conversely, the development of normative control or self-verification in the early stages of the outsourcer–provider relationship (Jap and Ganesan, 2000; Lusch and Brown, 1996) would help establish expectations and norms from the provider’s communities of practice. Cost is the primary reason firms outsource knowledge services; however, this should not result in exploitative human resource practices from the provider organization. Knowledge workers in other countries must remain just as motivated (Brown and Duguid, 2001) as employees in the home country to protect IP in their communities of practice. The outsourcer should make good knowledge-worker management practices an early norm of the buyer–seller relationship. If a provider is perceived as a good employer, the brightest and best employees from the community of practice will be attracted, and the outsourcer will benefit.

P12: The presence of global supplier communities of practice moderates the link between verification and the defense of IP: as the global supplier communities become stronger, the association between control and the ability to defend IP becomes weaker.

IP and Innovation Generation

The implicit assumption in the literature between IP management and innovation generation is that the innovator firm or individual creates IP and is motivated by the legal regimes that allow extraction of rent from the IP (Helpman, 1993; Teece, 1998). The literature takes a firm-centric view of IP, as marketing and outward flow of IP is considered and its defense is naturally paramount (Glass and Saggi, 2002). However, the prospects of innovation in the global movement of IP have just started being explored (Quinn, 2000), and this research extends the discussion in P13 to P15. The direct link between the three aspects of IP management and the generation of radical and incremental innovations has not been examined in the literature and is a contribution of this research.

Accessing IP and Innovation Generation

Accessing IP involves the ability to deploy the providers’ IP to facilitate the radical or incremental innovation under way at the focal or outsourcing firm. The outsourcing firm would find accessing IP and expertise most advantageous when the particular innovation task is modular (Schilling, 2000) and the IP required can be simply added on to the innovation activity.

The provider need not know what the focal firm is actually working on, and the IP embodied task would be very clear to articulate for purposes of contracting and delivery.

Accessing IP for innovation generation is therefore particularly useful for black-box types of intellectual property (Rosenberg, 1994) that is clearly articulated by the supplier and is understood and recognized by the focal firm. Such accessing of intellectual property might involve incremental innovations like a computer manufacturer buying a new generation computer chip from a manufacturer like Intel (e.g., Chesbrough, 2003) or might involve a pharmaceutical firm buying a particular intermediary compound from a chemical ingredient manufacturer for developing a blockbuster drug (Schmid and Smith, 2002) resulting in radical innovation.

P13: Accessing IP from outsourcing providers will facilitate incremental innovation and radical innovation.

Exploiting IP and Innovation Generation

Exploiting intellectual property is traversing up a particular S curve or platform to bring either increased efficiency or lower cost to the product or service in question. Such improvements result in incremental innovation, such as a thinner material to make a product like plastic packaging more environmentally friendly. However, these activities require cross-functional teamwork between the focal firm and the supplier. In other words, the supplier must be willing to be part of the team and be able to work on the leading edge of IP possessed by the supplier to find new ways of helping the focal firm innovate.

The notion of exploiting IP extends the concept of dynamic capabilities of the firm (Eisenhardt and Martin, 2000; Teece et al., 1997). Here, the working team within the buying firm collaborates actively with the supplier firm and creates innovations that have a base

in the IP of the supplier and the buyer but is extended in the context of the buyer's application.

The internal dynamic capabilities of the buying and selling firms involve internal routines of absorbing and dealing with knowledge (March, 1991). It is difficult for a firm to change its routines to undertake a radical innovation (Atuahene-Gima, 2005). The supplier firm is able to take up its part of the task and go back to its organization and deal with a modification in a manner that merely fits into the processes of the focal firm. Since these processes correspond to a technology platform, only incremental innovation results."

P14: Exploiting intellectual property from outsourcing providers will facilitate incremental innovation but will hinder radical innovation.

Defending IP and Innovation Generation

Intellectual property is at the core of the competence of the firm (Hall, 1992; Teece and Pisano, 1994) and the very basis with which it competes. It is therefore important to defend IP of the firm in every way it can. To do so, firms routinely ask both employees and suppliers to sign nondisclosure agreements and generally sell goods and services to customers downstream with terms of sale that have IP defense clauses clearly mentioned (Besen and Raskind, 1991). In fact, IP defense is a rationale for keeping activities in house and having no contractors involved (Hart and Moore, 1990).

Defending IP can be structured as a transactional relationship, where the supplier does not come into contact with any actual user of the product or service supplied (following Contractor and Lorange, 2002). Thus, in the pharmaceutical industry, scientists define the compound they want and are not supposed to talk, meet, or discuss with any supplier and the relationship with the supplier is handled entirely by a different person or department. This physical separation prevents inadvertent sharing of IP by the scientists with the scientists of the supplier.

However, exploiting IP involves teamwork with supplier and incremental innovation for the focal firm. Here, an overemphasis on IP defense and constant verification as to whether IP is leaking away may be detrimental to trust and teamwork (Abell, 1999) and thereby may make IP exploitation unproductive from an innovation standpoint.

P15: Defending IP from outsourcing providers will hinder incremental innovation but will promote radical innovation.

Discussion and Conclusion

For numerous outsourcing companies and providers, the nature and extent of outsourcing is a new challenge that can bring about drastic organizational changes. These changes have far-reaching implications for the management of IP for innovation generation. This research makes several unique and important contributions from academic, managerial, and public policy perspectives. First, unlike existing research on outsourcing, which has focused primarily on manufactured goods or activities that are less knowledge intensive, the current research makes a new, comprehensive contribution that encompasses a wide range of outsourcing activities. Second, it concentrates on the critical aspect of the link between the buyer–seller relationship and the management of IP. Although practitioners have acknowledged this link as important, it has not been researched from an academic perspective. Finally, by focusing on the outsourcing firm and its innovation generation, this research takes a strategic perspective to help firms manage IP. The variables of interaction and control are particularly relevant after the events of September 11, 2001.

Managerial Implications

One inescapable implication of this research is that decisions regarding the global outsourcing of knowledge-based services should not be made purely from short-term operational considerations but rather from the overall context of organizational performance, including the vital aspects of accessing, exploiting, and defending IP for innovation generation. This is especially crucial in industries that are undergoing rapid change and require fast innovation because such industries have the most to lose by not appropriately managing IP for innovation generation.

The second implication is that some outsourcing contracts (with their respective elements of interactions and control) may have contradictory implications for different aspects of IP management. For example, increased interactions may benefit knowledge access but, at the same time, make a firm vulnerable to defending its position in the marketplace.

Table 1. Managing IP in the Global Outsourcing of Knowledge-Based Services: Variables, Definitions, and Illustrative Measures

Variable	Conceptual Definition	Exemplars of Operational Measure Items	Relevant References
<i>IP</i>	Includes organizational and interorganizational IP in the form of (1) registered IP, (2) unregistered IP, and (3) intellectual capital.	(1) Registered IP includes patents, trademarks, copyright, and trade secrets (e.g., how many patents of outsourcer, of provider, and jointly by both). (2) Unregistered IP includes customized software, databases, formulae, and recipes (e.g., customer database). (3) Intellectual capital includes human resources, company reputation, and goodwill (e.g., the ability of a Hong Kong contractor to quickly design toys where registered IP goes to the outsourcer).	Contractor (2000); Hannah (2005, 2006); Kogut and Zander (1992); Zander and Kogut (1995)
<i>Accessing IP</i>	To access or obtain IP inputs from provider on an “as-needed” basis as part of outsourcing contract. Accessing is to help exploit complementary IP with no intent of learning or “pirating.”	Early supplier involvement (ESI) in new product development projects; information sharing (e.g., how does the outsourcer provide assurance that the provider’s IP will not be misused by it or other providers in their network? Toyota provides such assurance; see Dyer and Nobeoka, 2000)	Bidault, Despres, and Butler (1998); Cannon and Homburg (2001); Dyer and Nobeoka (2000)
<i>Exploiting IP</i>	Exploiting IP involves using IP (e.g., registered IP, unregistered IP, intellectual capital) for innovation and new product development, enhancing market share and customer satisfaction, and sale or licensing of registered IP.	How many new products developed? Is early supplier involvement (ESI for service providers) in place? How effective is ESI in new product development? How many adaptations does the supplier do for the buyer? How many incremental innovations are generated? How many radical innovations? How does the firm rate in its industry in terms of intellectual capital, including customer capital performance metrics, compared with others in the industry?	Bontis (1998); Chandy and Tellis (1998, 2000); Roy et al. (2004)
<i>Defending IP</i>	Defending IP involves defense of registered IP, unregistered IP, and intellectual capital of the outsourcer, and as it resides in the interorganizational relationship with the provider.	How many IP infringement notices/lawsuits filed? How vigorously pursued? Are there information and IP security mechanisms in place (e.g., secure intranet to protect unregistered IP)? What are the mechanisms of keeping employees happy and committed at the provider organization to avoid IP “leaks”? Is there a mechanism to prevent the provider’s employees from joining a different provider that supplies a competitor?	Chopra and Sodhi (2004); Kunzler and Payne (2004)
<i>Trust in Buyer–Seller Relationships</i>	Quantity, scope, and mode of communication between buyer and seller build trust. “Competence” trust is the confidence in the provider’s ability to deliver the job. “Goodwill trust” is the confidence that both parties will look after each other’s interest without resorting to opportunism.	Number of messages exchanged between buyers and sellers during a given time (quantity); total time spent communicating during a given time (quantity); different levels of employees involved in information exchanges (scope); different divisions involved in information exchange (scope); nature of focus (narrow vs. broad) of the topic of communication (scope); formal versus informal nature of information exchanges (mode); information exchanges classified according to media such as e-mail, telephone, face-to-face, mail, and so on (mode). Survey questions: “We feel we can trust this customer completely”; “We have full confidence in the information provided to us from this customer”; and “We are convinced that this customer can handle confidential information from us.”	Hakansson and IMP Project Group (1982); Hakansson (1987); Laage-Hellman (1997); Leonard-Barton (1993); Roy et al. (2004); Saxenian (1991); Shaw (1985)

Table 1. (Contd)

Variable	Conceptual Definition	Exemplars of Operational Measure Items	Relevant References
<i>Verification in Buyer–Seller Relationships</i>	Management control refers to both formal reports that the provider provides and the informal norms that are developed in the early part of the relationship.	Examples for customer service call center: Average wait time? Call record entry and resolution analysis? “Listening” to customer. Customer feedback for product development relayed from provider to outsourcer? Product usage problems relayed from customer calls to outsourcer? Integrating data from CRM, SCM, and ERP systems with offshore call center reports? Review meetings between outsourcer and provider? Incorporation of new metrics with added experience? Norm development includes how, in the early part of the relationship, the parties share information and look after each other’s long-term business interests.	<i>Formal Control</i> : Bonner, Ruckert, and Walker (2002); Gould (2000); Marabotti (2003); McFarlan and Nolan (1995); Prahinski and Benton (2004). <i>Informal Control/Norms</i> : Jap and Ganesan (2000); Lusch and Brown (1996)
<i>Multiple Tiering</i>	Multiple tiering of suppliers refers to subcontractors to the main provider. A Tier 3 supplier supplies to Tier 2, which supplies to Tier 1, which supplies to the outsourcer.	Does the provider subcontract work to a Tier 2? Does the Tier 2 subcontract to Tier 3?	Bernstein and Decroix (2004); Van Hoek and Weken (1998)
<i>Strength of Legal Regime</i>	Strength of country legal regime involves both the existence of enacted laws for the protection of IP and a law enforcement and judicial system that offers swift enforcement and justice.	Has the country signed the TRIPS agreement? Are there internal laws? How good is the country patent attorney profession? How vigorous is the anti-piracy law enforcement? How difficult is it to prosecute in terms of time for judgments and duration to achieve justice?	Chopra and Sodhi (2004); Levine (1998); Oxley (1999)
<i>Supplier Communities of Practice</i>	Communities of practice are informal associations of professionals cutting across firms both horizontally and vertically. Recognition, a sense of identity, and loyalty to the profession are important.	What are the various professions involved in delivering this service from the provider? Are there formal associations for these particular professions (e.g., accountants’ association)? How active are these communities? Do they have monthly or annual events? Is there a mailing list?	Lave and Wenger (1990); Brown and Duguid (1991)
<i>Innovation Generation</i>	Innovation generation (moving up an S curve is incremental; moving across S curves is radical) in any outsourcer–provider relationship.	Cost or time reduction to achieve product adaptations/improvements (incremental); number of product adaptations/improvements during a given time period (incremental); managerial judgment on the nature of innovative activity (minor–incremental; major–radical); presence of drastic or architectural change in technology platform or production processes (radical); speed of introduction of new technology (radical); and changes in cycle time for major and minor changes in products/services.	Bower and Christensen (1995); Chandrashekar et al. (1999); Henderson and Clark (1990); Roy (2010, Figure 2, p. 17); Sood and Tellis (2005); von Hippel (1988)

These kinds of conflicting situations are not easy to handle. What is suggested by one of the firm’s desires may be offset by another aspect of the firm’s objectives. Such situations call for a judicious assessment of the total effect on the overall organizational activities. In the process, the issue is not one of maximizing or minimizing interactions or control but of optimizing to achieve superior overall results. The optimal level

will clearly depend on the relative importance of the components of IP management. One particular formulation may not fit all firms in an industry.

The third implication is that decisions regarding the outsourcing of knowledge-based services must be taken in the global milieu of, for example, legal regimes and laws for movement of information and people across companies and industries. Although

outsourcing decisions within the boundaries of the United States have always assumed the U.S. legal environment, crossing borders brings its own challenges regardless of the technical merits of the case. The situation becomes further complicated in countries and regions with carefully crafted legal safeguards and IP regimes that are never implemented meaningfully. Thus, what is conceptually available may be less important than what is actually and meaningfully implemented.

Future Research Directions

This paper attempted to provide a conceptual framework that links buyer–seller relationship factors to the management of IP; thus, several exciting future research possibilities exist in this important domain. The first suggested direction is a comprehensive empirical testing of the framework. In that process, measures should be developed or purified, and the specific context of outsourcing should be clarified. Table 1 provides a list of variables in the model, their conceptual definitions, and operational measures for the same as identified in the literature. In the interest of space, this paper does not present a detailed discussion of the variables and data collection for empirical validation of the research.

A second suggested research direction would be an examination of the present study's conceptual model in different types of knowledge-based industries. For example, when a company employs a consultant such as Accenture, the IP issues are very different from when a U.S. pharmaceutical company employs a company in a developing country to conduct clinical trials. Understanding such nuanced differences between industries would be useful for individual companies as well as for industry associations that develop policies and procedures.

A third avenue for future research is to examine the link between interfirm relationship and IP management in the firm's stock market performance. Companies are susceptible to stock market pressures. How IP affects stock performance would be an exciting area for study.

Finally, a better understanding of the way IP is diffused among clients of a large service provider (e.g., Accenture) would be important. Given the movement of people across organizations (albeit with some time restrictions on competitive employment), even if safeguards can be designed to prevent loss of explicit

knowledge, how can firms guard against the loss of tacit knowledge? This issue may be less a legal one than one of industry culture.

In conclusion, this research is among the first to examine the conceptual linkage among buyer–seller relationship factors, the management of IP, and the link to innovation generation in the context of global outsourcing of knowledge-based services. This research makes several unique and important contributions from academic, managerial, and public policy perspectives. We hope that managers and researchers will find our work to be a useful starting point in a more thoughtful decision-making process.

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