Building Appropriation Advantage: An Introduction to the Special Issue on Intellectual Property Management

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In a Copenhagen pizza shop in 1984, the Finnish engineer Matti Makkonen launched the idea of short message service (SMS) messages. Although Makkonen is still reluctant in claiming sole credit for developing SMS technology, he is widely acknowledged as the father of SMS. Whereas the International Telecommunications Union recently estimated that nearly 200,000 text messages are sent every single second, this “reluctant father of SMS” did not make any money out of his invention. To explain this lack of financial gains, he acknowledged in a recent text-messaging interview with the BBC that “I didn’t think I made a patentable innovation.”

This anecdote clearly illustrates the criticality of Intellectual Property (IP) management to appropriate value from innovation and secure return on investment. Whereas IP management traditionally focused on allowing freedom of operation in R&D and mitigating the risk of imitation by competitors, firms increasingly apply it in combination with business strategy to fence or steer technological paths, to operate on secondary markets for technology, to respond to competitive moves, and to implement alternative business models. As a result, IP decisions often have dramatic consequences for a firm’s business that reach far beyond the legal aspects of an IP-related dispute.

Although IP management has been investigated from a variety of theoretical and disciplinary perspectives, managers, scholars, and educators are still in need of practical examples and cases that illuminate the relevance, successes, and failures of particular IP management practices, strategies, and business models. In addition, companies are in continuous need for new IP management practices that allow them to respond to new opportunities and alternative modes of intra-firm and inter-firm innovation.

The purpose of this special issue is therefore to provide a collection of studies on how companies plan and execute new practices to manage IP assets, implement IP...
strategies, and carry out IP-based business models in a variety of settings. Among approximately 100 initial submissions received and examined, readers will find here a selection of those that, into the opinion of editors and reviewers, offer the most insightful and original perspectives on this topic.

In this special issue, IP management emerges as a key component of what we call “appropriation advantage.” We define appropriation advantage as an actors’ ability to outperform competitors in terms of taking possession of and extracting value from knowledge and technology for productive activities. In his seminal 1986 article, David Teece suggested that companies don’t become profitable just by coming up with new ideas. Rather, they need to think not just about how to deliver value to customers, but also to capture sufficient returns to enable them to accept the risks associated with investing in innovation. He pointed to appropriation regimes, complementary assets, and timing as important conditions that determine the innovators’ ability to appropriate value from new technology. An important anchor of Teece’s “appropriability regime” is intellectual property. Moreover, the amount of intellectual property protection available is not determined by exogenous factors. IP can be managed, and needs to be managed. Further building on these insights, we claim here that the conditions of appropriation advantage, and hence the success and failure of an innovative project, might indeed be determined by firms’ choices related to IP management. As these ideas were taking shape, and as the papers were going through the various rounds of revisions, we approached Professor Teece, and invited him to comment on past IP management research as well as to identify interesting avenues for the future on this particular topic. In the opening article of this special issue of California Management Review, Teece clearly suggests the need for an integrated view on IP and identifies the challenges and opportunities that emerge as industry and academia consider this perspective for their research and practice.

Consistent with Teece’s work and based on the cases illustrated in this issue, we argue that IP cannot be seen as the logical consequence or the footnote of a go-to-market strategy. Instead, we emphasize that an original IP-based strategy can enable companies to differentiate themselves from competitors. As such, IP assets become a fundamental ingredient to achieve appropriation advantage. The articles included in this issue identify three main IP challenges that need to be addressed to build such an appropriation advantage:

- managing tensions between technological integration and IP fragmentation,
- increasing return on IP investment, and
- organizing IP implementation.

Below we explore each challenge and briefly discuss how individual articles within this special issue provide specific solutions to address them.
Managing Tensions between Technological Integration and IP Fragmentation

Nowadays it is unlikely that behind a product you will find one single technology for which one actor owns all the relevant IP. New product development asks for the integration of many different technologies from different domains. This increased need for technological integration generally requires adopting an open innovation model⁴ where firms engage in collaborative transactions with external partners to bring together the necessary technological assets and skills to realize the development of new products. At the same time, the number of patents and patent holders is rapidly increasing in most industries, creating increased fragmentation of the intellectual property rights (IPR) landscape in which patent thickets—i.e., a dense web of overlapping IPRs—are becoming the norm instead of an exception. Moreover, different actors use their IPR for different reasons. Whereas some actors—i.e., practicing entities—actively use their IPR for the commercialization of products and services, other actors—i.e., non-practicing entities—generally acquire IPR with the primary purpose to enforce it through licenses or litigation.

In sum, whereas there is an increasing need to integrate multiple inventions from different technological domains, the IPRs on these inventions are increasingly scattered around different actors with different objectives. In such settings, some actors are likely to face the tragedy of the anticommons where their incentives to use the patented technology become low because licensing the required technologies is simply too challenging or too expensive.⁵ At the same time, this setting provides the opportunity for other actors to differentiate themselves from their competitors by developing alternative IP business models that allow overcoming the challenges at hand. In this special issue, several studies provide different solutions to help managing this tension between the increased need for technological integration on the one hand and increased fragmentation of relevant IP on the other hand.

In their article, den Uijl et al. emphasize the importance and relevance of patent pools—i.e., a consortium of different companies agreeing to cross-license patents relating to a particular technology—to facilitate the commercialization of co-created technologies in a fragmented IP landscape. Providing an in-depth description of the evolution of patent pools within the optical disc industry, the authors also show that, as the complexity of the co-created technology and the number of involved actors increases, the development and management of such patent pools becomes increasingly demanding. The authors point to the “pool-of-pools” concept where prior patent pools are embedded in new patent pools as a viable solution to govern such increasing complexity.

In multi-invention contexts, private and public firms increasingly organize themselves into ecosystems to achieve joint innovative goals while sharing associated costs and risks. In their article, Leten et al. point to the importance of particular IP arrangements for the successful governance of such ecosystems. Providing an in-depth case study of IMEC, a Belgian research institute that orchestrates several innovation ecosystems around specific nano-electronics technologies, they show that...
smart combinations of different IP arrangements (i.e., generic versus exclusive) allow each ecosystem partner to build up a unique IP fingerprint that maximizes their ability to appropriate value from the joint innovation activities. At the same time, this IP model enables the orchestrator to generate the necessary freedom to continuously initiate new innovation ecosystems.

Given the fragmented IP landscape, firms are likely to face a situation in their product development activities where different parts of the system under development have different statuses. For instance, whereas some parts might have the status of “full IP ownership by the focal firm,” other parts might face a status where the IP is (co-)owned by other partners. In their article, Henkel et al. point to the importance of explicitly considering such differences in IP status when designing the technical architecture of products. Launching the concept of IP modularity, they emphasize the need to avoid IP incompatibilities (i.e., the co-existence of conflicting IP statuses) within technical modules of product architectures. Moreover, they illustrate that, in order to achieve such IP modularity, actors sometimes benefit from creating product architecture designs that are suboptimal from a pure technological perspective. For instance, they provide the example of an automotive company that, in order to avoid IP incompatibilities, decided to design the stability control system and the antilock braking system as two separate modules whereas a one-module solution would likely have been technically superior. Based on insights from different industries, Henkel et al. develop a systematic procedure that can help managers in achieving the appropriate levels of IP modularity across different innovation settings.

**Increasing Return on IP Investment**

Investing in IP is important for firms to appropriate value from their inventive efforts. At the same time, the application, maintenance, and enforcement of intellectual property also trigger substantial costs. Whereas many firms still consider intellectual property as “obscure pieces of dust in the corporate office,” others start seeing it at “Rembrandts in the attic, waiting to be exploited for profit and competitive advantage.”

In this special issue, several studies provide frameworks and guidelines that can help managers to increase the return of investment of IP. Focusing on the pharmaceutical industry, the study by Chesbrough and Chen points to the relevance of recovering abandoned compounds to increase firms’ return on IP investment. According to these authors, pharmaceutical firms are likely to possess false negative compounds. These compounds have been abandoned by the company but could have been valuable, had the organization found the right target market and business model to commercialize them. Using the example of Daptomycin, an antibiotic compound that was initially abandoned by Eli Lilly but subsequently was successfully transformed into a blockbuster drug by Cubist, Chesbrough and Chen show how out-licensing of such abandoned compounds to external partners can trigger additional revenue streams that increase the return on IP investment. Based on several interviews with IP experts, they identify several conditions that
might restrict firms’ willingness and ability to out-license abandoned compounds as well as potential solutions to address these hampering factors.

Conley et al. propose an alternative strategy to increase return on IP investment. They develop a value articulation framework that shows how complementary combinations of different IP mechanisms (i.e., patents and trademarks) can maximize firms’ ability to reap commercial profits in existing as well as emerging markets over time. They illustrate the relevance of this value articulation framework with several cases. For instance, they describe how AstraZeneca—through combining patenting, trademark, and branding strategies—was able to generate, maintain, and even extend its blockbuster business in the proton pump inhibitor market despite the entrance of generic competitors.

Whereas Conley et al. emphasize the importance of combining patents and trademarks, Peters et al. point to the relevance of combining patenting and strategic disclosure activities to support and strengthen firms’ market position. Strategic disclosure refers to the act of creating novelty-destroying prior art in order to prevent or impede another agent from being able to obtain IP protection on the same or a similar invention. Relying on several cases in different industries, the authors illustrate how firms can use strategic disclosure to enhance the appropriation benefits of an associated patent (patent-extend strategy). In addition, they show that strategic disclosures can also be used for early revealing of patent applications (patent-reveal strategy) as well as for establishing common prior art for future patent development (reveal-patent strategy).

Organizing IP Implementation

While companies might have a clear picture of their desired IP goals, strategies, and business models, some are better than others at establishing routines to effectively organize them. A first challenge in IP implementation is the bringing together of different business functions (technical, legal, and managerial) in order to be on top of IP-related opportunities or to neutralize potential threats. A second issue is the lack of consolidated guidelines regarding the positioning of IP responsibilities within firms’ corporate structure. In particular, companies struggle to implement organizational designs that increase accountability for IP decisions as well as allow for coordinated action across different organizational members that are responsible for different types of IP activities (application, maintenance, licensing/selling, legal defense, and so on).

Three articles in this special issue clearly address the organizational challenges related to IP. Cesaroni and Piccaluga point our attention to the operational challenges that STMicroelectronics—one of the leaders in the semiconductor industry—faced when it was shifting from a reactive to a more proactive IP management approach. This case describes how, during the different phases of a new product development project, the company experimented with a wide variety of organizational mechanisms to anticipate some key IP decisions. Moreover, they show how these organizational changes ended up steering product design and commercialization activities.
In this special issue, all of the articles point to the importance of intensive collaboration between R&D, legal, and strategic functions for successful IP management. This issue is addressed most explicitly in the article of Fisher and Oberholzer-Gee who provide a very useful overview of different strategic options that companies need to take into account as they seek to create and maintain an integrated view of IP. This contribution offers both a useful introduction to the topic of IP management and a taxonomy of many different ways to deploy or get access to IP. Based on well-known examples, the authors provide a cohesive framework of different strategic alternatives companies have in their role of either IP-holders or non-holders.

IP assets not only need to be acquired and maintained, but it might also happen that firms need to dispose of IP. In their article, Granstrand and Holgersson argue that certain corporate events, such as M&As or corporate spin-outs, not only have profound implications for daily firm activities, but also significantly impact the composition and relevance of an IP portfolio. According to these authors, managers should consider that, when corporate events lead to the emergence of two different independent entities, they might both need to maintain some form of access to the same IP assets. The two scholars refer to this challenge as the IP disassembly problem. Drawing from examples in the automotive industries, they emphasize that, when such corporate events take place, the choice of the optimal contractual IP agreements heavily depends on the relative strategic importance of the transacted business for buyer and sellers.

Appropriation Advantage: Connecting the Dots

In this introduction, we have defined the concept of appropriation advantage and have identified three IP challenges that should be addressed by managers seeking to differentiate their companies from competitors in terms of appropriating value from their innovation investments. At the same time, we acknowledge that this special issue does not provide an exhaustive overview of threats and opportunities managers face in appropriating value from new ideas. We therefore invite scholars and practitioners to continue collecting cases of appropriation success and failure to enlarge our knowledge of this fundamental domain of innovation management.

Although each single article in this special issue emphasizes different aspects and settings of IP management and strategy, the analyses presented converge on one important point: integration is the key word that companies need to follow in order to seek appropriation advantage. Such integration should happen on three different levels: on a strategic level, on an organizational level, and on the level of IP assets.

Strategic Integration

In this special issue, technology, business models, and IP strategies emerge as three intrinsically interrelated dimensions. Any change in one of these three strategic dimensions has implications for the other two. For a long time, both academics and practitioners have emphasized the importance of combining technology development strategies with business model strategies to appropriate value...
form their innovative efforts. We, however, argue that such strong linkages between technology and business development strategy might be a necessary but not a sufficient condition to realize sustainable appropriation advantage. We point to IP strategy as a third pivotal component in this respect. Moreover, based on the insights from this special issue, we emphasize that these three strategic dimensions are inherently interconnected. For instance, we observe that alternative technology development strategies (e.g., shifting from closed to more open innovation development models) ask for the adoption of alternative IP strategies (e.g., creation of patent pools, smart combinations of generic and exclusive IP). At the same time, we observe that the emergence of new IP strategies (such as proactively out-licensing abandoned technologies, or implementing IP modularity) might trigger important opportunities and/or restrictions in terms of technology development. It is therefore fundamental to consider the formulation of an IP strategy side-by-side with strategic R&D and commercialization decisions.

**Organizational Integration**

Successful implementation of IP strategies requires the integration of various functional competences (technical, legal, and managerial). These different functions talk different languages, and they respond to different parts of the organization. As a result, it is complicated to coordinate effective execution of new IP strategies. Ambiguity in terms of governance of IP responsibility within an organization can prove to be a serious threat for the implementation of a business strategy and exposes companies to mismanagement. Finding the right organizational design to integrate IP activities smoothly across different corporate functions can prove to be a powerful differentiator.

**Integration of IP Assets**

IP assets need to be considered from a portfolio perspective. At the project level, this is necessary because the commercialization of a new product or the definition of a business model happens through the integration of different patents, trademarks, copyright, and other intangibles. At the corporate level, the evaluation of intangible assets should consider not only individual elements, but the relevance of IP portfolios for the various contingencies a company faces. At the level of partnerships, the negotiation of technological alliances, licensing, and cross-licensing agreements should keep into account the entire collection of IP assets each partner can bring to the project in order to appreciate its negotiation power and its relative contribution.

We hope that this special issue can stimulate future academic research in IP management and its connections to technology strategy and business development in generating appropriation advantage. At the same time, we hope that the case narratives can inspire managers around the globe to further optimize their existing IP practices and strategies. We are very grateful to the European Patent Office for its generous support, as well as the *California Management Review* editorial team for believing in this project and for assisting throughout the various phases. We had the fortune to be helped by very committed and insightful reviewers, whose advices resulted in greatly improved manuscripts. Finally, it is important to point to our
readers that what they will find in the next pages is primarily the result of the strenuous engagement of the authors, and their passionate work. Our intent, in editing this special issue, was indeed to give scholars an opportunity to present their ideas and examples, to let them reflect on the relevance of emerging practices of IP Management, and to point to all of us to the future direction of study in this very promising area.

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