

# Profiting from innovation and the intellectual property revolution

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## Abstract

This paper reviews the contribution of Teece's article [Teece, D., 1986. Profiting from technological innovation: implications for integration, collaboration, licensing and public policy. *Research Policy* 15, 285–305.]. It then re-examines the core concept of appropriability in the light of recent developments in the business environment. Whereas twenty years ago the appropriability regime of an industry was exogenous and *given*, today they are often the product of conscious strategies of firms. And as open source software and other industries show, advantageous appropriability regimes are not always “tight” or characterized by strong intellectual property protections. The strategies adopted by firms that have successfully profited from their innovative activities cast into new light old questions about the impact of intellectual property protection on the rate and direction of innovation.

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## 1. Introduction

Twenty years ago, David Teece published his highly influential article entitled “Profiting from Innovation.” Since that time, this paper has drawn extensive attention in the literature. It is one of the most cited papers in the field of innovation, and it has been the most cited paper in “Research Policy” over this time period. The attention and praise aimed at this article is well deserved. “Profiting from Innovation” (PFI) has had a profound influence on the field of innovation and strategy. In short, this paper initiated a process of convergence between two fields that had essentially (and surprisingly) lived apart: innovation and strategic management. Many of the ideas presented in PFI continue to shape the way scholars, and increasingly practitioners, think about the role of intellectual property in strategy.

In this essay, I have two objectives. First, I want to summarize what I see as the main contributions of PFI to the fields of strategy and innovation and how these ideas have shaped the intellectual dialogue on the topic. Second, I want to re-examine some of the core concepts presented in PFI – particularly the concept of “appropriability regimes” – in light of recent changes in the nature of intellectual property. In PFI, the appropriability regime was exogenous. The challenge of strategy was to develop appropriate vertical integration and complementary asset positions *given* the extant appropriability regime. Increasingly, appropriability regimes are not givens but are the product of conscious strategies of firms. And, surprisingly, an advantageous appropriability regime is not always “tight” or characterized by strong intellectual property protections. Phenomena such as open source software and forms of deliberate intellectual property sharing are increasingly being utilized by for-profit enterprises as a rent seeking strategy. Such strategies cast into new light old questions about the impact of intellectual property protection on the rate and direction of innovation.

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## 2. PFI and the fields of innovation and strategy

Like most good theory, PFI addressed a puzzle that had not been well explained in the previous literature, namely: why is it that innovators often fail to capture the economic returns on their innovations? At the time PFI was written, there were many such examples, and the paper cites these (e.g. EMI in CAT scanners, Bowmar in calculators). Perhaps more impressively, during the ensuing twenty years after PFI was published, we can see many more examples of such failures. The phenomenon endures. The first generation PC manufacturers all but disappeared from the scene (and even IBM, while not a first-mover in PCs, recently exited the business by selling its PC business to a Chinese company, Lenovo). Apple invented the graphical user interface, but Microsoft Windows dominates the PC market. Apple invented the PDA (the bricklike Newton) but Palm became the dominant player. Netscape invented the browsers, but Microsoft captured the market. Merck was a pioneer in cholesterol lowering drugs (Zocor), but Pfizer, a late entrant, grabbed the dominant market position (Lipitor). Excite and Lycos were the first real web search engines, but they lost out to Yahoo. And Yahoo then lost out to Google.

At first glance, it is tempting to say that these examples simply reflect the normal rough and tumble of typically Schumpeterian competition. Winners do not stay on top for long; in highly dynamic settings, new entrants are always ready with disruptive innovations.<sup>1</sup> I will return later to the “why established firms fail” literature and its relation to PFI. However, it is worth noting that there is ample variance in the phenomenon. There are many cases where first or early movers captured and sustained significant competitive advantage over time. Genentech was a pioneer in using biotechnology to discover and develop drugs, and 30 years later is the second largest biotechnology firm (and, the most productive from an R&D point). It is second only to Amgen, another early entrant. Intel invented the microprocessor and continues to dominate that market more than 30 years later. Dell pioneered a new distribution system for personal computers and, despite numerous attempts to imitate its highly successful business model, remains the dominant “supplier” of computers (and increasingly a wide range of electronics).

The contributions of PFI can be viewed at various levels. At a very specific level, PFI offered a theoretic

cal framework for explaining and predicting why (and when) innovators would generate sustained profits from their innovation and when they were vulnerable to displacement by later entrants. I will not bother to recite the details of the argument here, as they are clearly explained in the original PFI. In essence, the ability of an innovator to profit from its innovation over time was a function of its “complementary asset” position and the “appropriability regime” in which it found itself. In “weak” appropriability regimes – where imitation was relatively easy from both a technical and legal standpoint – protecting rent streams from innovation required privileged access to what Teece called complementary-specialized assets (or “co-specialized assets”). In strong regimes, in contrast, firms could rely on licensing and other contractual arrangements to extract rents from their innovation without access to such assets. In short, strategy is contingent on the appropriability regime.

This is an extraordinarily powerful insight, and this leads to the broader, perhaps even more enduring, contribution of the paper. Previous to PFI, the field of strategy was disconnected from the field of innovation, at least academically (practitioners had always had to deal with these issues!). The field of innovation was focused on understanding such (important) issues as the rate and direction of technical progress (at both industry and national levels), the sources of innovation (e.g. von Hippel, 1978), and a host of questions about the organization and management of R&D. In the mid-1980s, the strategy field was being transformed by Michael Porter’s seminal work on the competitive forces (Porter, 1980). Strategy was focused on understanding the implications of industry structure on competitive choices and positioning. Innovation was not really a central actor.

Industrial organization economics came closest to providing a link. Theoretical and empirical work exploring the link between R&D, innovation, and market structure was the main focus of industrial organization economics at that time. That work itself could be classified into two broad categories: traditional neo-classical microeconomics work (including game theoretic exploration of “patent races”) and evolutionary models of Nelson and Winter (1982). The more traditional economic work was not really concerned with strategy; strategy involves choices, and in traditional economics of the mid-1980s, choice was about optimizing. The idea that similar firms (facing similar prices) might make different choices was something most of economic theory did not really want to think about. In addition, game theoretic approaches that might have led to insights about strate-

<sup>1</sup> There is a long literature on the role of new entrants in dislodging established firms. See for instance, Anderson and Tushman (1990), Clark (1985), Henderson and Clark (1990), Christensen (1997), etc.

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