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## The emergence of openness: How and why firms adopt selective revealing in open innovation

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### ABSTRACT

Open innovation is often facilitated by strong intellectual property rights (IPRs), but it may also function, and even be boosted, when firms deliberately waive some of their IPRs. Extant literature has pointed out the potential benefits of such behavior, but falls short of explaining what triggers firms to practice it in the first place and to maintain or extend it. Since the waiving of IPRs runs counter to common views on strategy and competition and to engrained practices, this is a non-trivial question. To address it, we conduct an empirical study in a segment of the computer component industry which traditionally has taken a rather proprietary stance. With the advent of the open source operating system Linux, firms increasingly waived their IPRs on software drivers. We trace and analyze this process using both qualitative and quantitative methods. Our results indicate that component makers went through a learning process, which led some to realize how selectively waiving IPRs may be beneficial for their business. We uncover customer demand pull as the initial trigger and observe how a positive feedback loop sets in subsequently, leading to a further increase in the use of selective revealing. Overall, we find that openness develops into a new dimension of competition. We discuss the implication of our findings for research on open innovation and highlight how they impact managers in practice.

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### 1. Introduction

In essence, innovators have two means of maintaining exclusivity to innovation-related knowledge: secrecy and legal exclusion rights. When practicing outbound or the “coupled” type of open innovation, the latter characterized by combining inflows and outflows of knowledge (Enkel et al., 2009), the innovator by definition gives up secrecy on the outbound knowledge. Yet, legal exclusion rights may remain and, it has been argued, these are often beneficial or even necessary for successful open innovation (Arora et al., 2001; Chesbrough, 2003, 2006).

But open innovation may also function without exclusion rights, in situations where legal protection is either ineffective or voluntarily waived by the innovator. The latter case, termed “selective revealing” by Henkel (2006), is most interesting from a strategic perspective. Contrary to received wisdom, various studies have shown that firms may benefit from voluntarily waiving some of their intellectual property rights (IPRs) in an open innovation process (e.g., Chesbrough and Appleyard, 2007; Pisano, 2006; West,

2003). In doing so, they may, among other things, increase the efficiency and effectiveness of their R&D efforts by enticing other actors to join in co-creation of value or increasing their chances at standard setting.

Yet, for firms steeped in the paradigm of closed innovation, the transition to open innovation is challenging—and in particular the adoption and implementation of selective revealing (Alexy et al., 2013b). Waiving legal exclusion rights entails obvious risks, while the benefits are uncertain and need to be proven. Indeed, it has been observed that while we have tremendously increased our understanding of open innovation and selective revealing, we still do not fully comprehend how closed firms move to open innovation in general, and to selective revealing in particular (Alexy and Dahlander, 2013; Christensen et al., 2005). We thus ask *how and why do firms try out selective revealing in open innovation, and what determines if they subsequently maintain or even extend this engagement?* This question is important since, first, selective revealing has a large potential—and also considerable risks—for improving innovation efficiency and effectiveness, and second, most industries are still characterized by tight protection of IP and might be ripe for such a learning process.

Since our research question is best described as “intermediate theory research,” we use a multi-method design linking qualitative with quantitative methods (Edmondson and McManus, 2007). Our

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empirical setting is the embedded component industry, which has historically taken a rather strict proprietary stance on IP and now seems to be opening up. Taking a process perspective, we analyze the emergent strategies of embedded component manufacturers (ECMs) with respect to the revealing of driver source code for the Linux operating system. As Linux drivers may be kept proprietary with their source code secret, they are perfectly suited for studying strategic decisions about openness.<sup>1</sup> Furthermore, a driver is strictly complementary to the corresponding component, such that the bundle of both has to be seen as one product. The case we study is thus markedly different from the logic of giving away a program as open source software (OSS) in order to increase demand for (non-strictly) complementary offerings (e.g., Raymond, 1999). Rather, revealing a driver amounts to disclosing the blueprint of a part of the focal product. We began by conducting 16 in-depth interviews and document analysis, followed by a survey addressing the entire population of ECMs in three sectors: processors, single-board computers, and data acquisition cards.

Our main findings provide a first picture of the emergence of openness in an industry. For ECMs, the growing importance of Linux triggered a change in the revealed preferences of customers, who hitherto had taken closedness of drivers for granted. Because Linux is OSS, customers now expected the driver source code to be publicly available. It was this *demand pull* that led ECMs to rethink the established practice of keeping drivers closed. The interplay of increasingly articulated customer need for openness and ECMs' experiences with openness over time initiated a *positive feedback loop* increasing average levels of selective revealing. Eventually, this process facilitated the emergence of openness not only as a phenomenon, but as a *new dimension of competition*. In elaborating on these three mechanisms (demand pull, feedback loop, new competitive dimension), we extend our understanding of open innovation, and the emergence and implications of selective revealing in this context.

2. Background

A broad and growing literature addresses potential advantages of open innovation over closed innovation (Dahlander and Gann, 2010; West and Bogers, 2013). In particular, questions about organizations purposefully sharing knowledge with external actors have received increasing attention in the literature (e.g., Clarkson and Toh, 2010; Polidoro and Toh, 2011). Sharing knowledge across firm boundaries does not imply that the originator of this knowledge relinquishes ownership. Quite the contrary—it has been argued that strong IPRs are often beneficial and potentially even necessary for open innovation (Chesbrough, 2003, 2006; Hagedoorn and Ridder, 2012; West, 2006). Examples include R&D alliances between biotech and pharmaceutical companies (Chesbrough, 2003), contributions to open standards such as UMTS in the ICT industries (Simcoe, 2006), commercial engagement in OSS (Fosfuri et al., 2008), or transactions on markets for technologies (Arora et al., 2001) such as those offered by open innovation intermediaries (Jeppesen and Lakhani, 2010).

In other instances, though, innovators may benefit by sharing their knowledge (and thus giving up secrecy) and waiving, or not establishing in the first place, legal exclusion rights to it. Harhoff

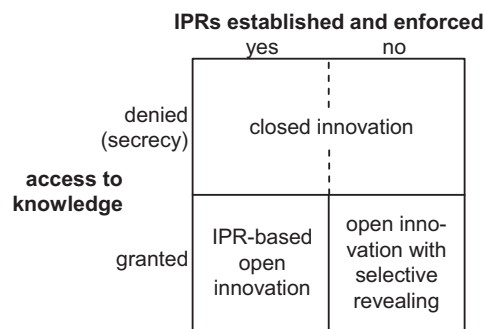


Fig. 1. Combinations of secrecy and legal exclusion rights.

et al. (2003) have termed this behavior “free revealing.” However, this notion is sometimes understood to describe altruistic and intrinsically motivated information sharing. In order to emphasize that we study profit-oriented behavior we use the term “selective revealing” (Henkel, 2006), which implies that the focal actor does not reveal out of principle but rather as a result of weighing the commercial pros and cons.

The matrix in Fig. 1 illustrates the innovator’s choices. The vertical axis describes if innovators deny or grant third parties de-facto access to their innovation-related knowledge (in other words, if they maintain secrecy or not); the horizontal axis, if innovators establish and enforce legal exclusion rights. The figure thus captures the two most important dimensions of the appropriability regime (Teece, 1986), IPRs and secrecy, and innovators’ choices regarding their use or waiving of these mechanisms.<sup>2</sup> In this context, we are concerned with situations in which IPR protection and secrecy are possible but deliberately waived—selective revealing.

Several anticipated benefits will drive if and to what degree firms will engage in selective revealing. Here, marketing and technological benefits feature particularly prominently in the literature (for recent reviews, please see, e.g., Afuah and Tucci, 2012; Alexy et al., 2013a; Baldwin and von Hippel, 2011; Henkel, 2006; Henkel and Baldwin, 2011). With regards to marketing-related benefits, this literature highlights positive effects on reputation, word-of-mouth-advertising, and increased opportunities to sell the produce due to price reductions and increased customizability that are the results of selective revealing. Regarding technical aspects, benefits such as reduced production cost, increased reliability, the use of standard components, and access to new markets may allow firms to identify and successfully engage in new opportunities to create and capture value. This is particularly the case given that selective revealing mitigates transaction cost (since no costly bilateral contracting happens) and decreases hold-up (since revealing is a credible and usually irreversible commitment). At the same time, it is clear that selective revealing is not without risk. Beyond the obvious concern about imitation and loss of competitive advantage,<sup>3</sup> also issues of reduced compatibility, reliability, safety and security, and an increase in maintenance cost may arise.

Thus, firms need to determine on a case-by-case basis if the net benefit of selective revealing is positive. This is precisely the condition captured in “selective” revealing or in the notion of

<sup>1</sup> ECMs distribute their (compiled) drivers as part of the components they sell. If the drivers were to be considered “derivative work” of Linux in the sense of the GPL, then such distribution would require making the source code available to the receiver of the compiled code. Drivers are commonly not considered derivative work, though (unless of course they contain code under the GPL). While there is some controversy, it is accepted practice to provide Linux drivers in compiled form only (for a discussion, see Henderson, 2006).

<sup>2</sup> Fig. 1 simplifies in at least two respects. First, the choice at either axis is not a binary and not even a uni-dimensional one. Second, the first line (“access denied, secrecy”) and the first column (“IPRs established and enforced”) both need the qualifier *to the extent possible*, which depends on the prevailing appropriability regime. Note that waiving either IPRs, or secrecy, or both means of protection is different from what Pisano (2006) refers to as an “endogenous appropriability regime.”

<sup>3</sup> However, as noted by several authors (e.g., Clarkson and Toh, 2010; Polidoro and Toh, 2011), firms may also strategically benefit from others imitating selectively revealed knowledge.

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