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1

Introduction

The battle for the dominant standard in the web browser industry is a fascinating example of a standards competition. Several studies (Bresnahan and Yin, 2007; Sebenius, 2002; Yoffie and Cusumano, 1999) have been dedicated to the Internet browser war between Microsoft Internet Explorer (IE) versus Netscape (Communicator) in the 1990s, leaving Microsoft's IE as the standard web browser. In 2002, IE controlled an estimated 95% of the browser market (Onestat.com, 2002¹), a seemingly impregnable position.

However, a new struggle in the web browser industry has emerged: surprisingly, Mozilla's open source web browser Firefox has started to make inroads into the market at a rapid pace since 2004, at IE's expense. By September 2007, IE's market share had decreased to 74%, Firefox had a 21% market share, and the other browsers together 4% (XiTi, 2007²). Other sources provide different figures but the tendency is clear: Firefox has been squeezing IE's market share to an increasing extent.

This turn of events contradicts current wisdom: in an industry with network effects such as the web browser industry, the strong, in this case, IE, should grow stronger (Shapiro and Varian, 1999a, b), and not weaker. In general, models of the diffusion of technological innovations under conditions of increasing returns to adoption, and which are built on path dependence and lock-in (Arthur, 1989; David, 1985), predict that in the long term a single dominant technology will prevail, which, once established, prevents competing technologies from obtaining a foothold in the market (Bonaccorsi et al., 2004).

Although the browser wars have similarities – in both cases a late entrant takes on an established incumbent – there are also profound differences. The first browser war took place in a “pre-open source software (OSS)” setting (Netscape vs Microsoft), while in the second (Microsoft vs Mozilla) the proprietary incumbent is subject to competition from an OSS rival. Therefore the question arises as to whether Firefox’s rise in market share and current coexistence with IE are related to the fact that it is OSS, and whether OSS does influence the manner in which a standard becomes dominant. Standards-setting and competition in the web browser industry in general have received much attention. Most of the studies concern the browser war between IE and Netscape Communicator (e.g., Corts and Freier, 2003; Cusumano and Yoffie, 1998; Jenkins et al., 2004; Windrum, 2004). Except for the study by Wang, Wu and Lin (2005), none of the studies on competition and standards-setting in the browser industry so far take into account the new situation of the OSS browser Firefox gaining market share over IE, although there are studies that touch upon this development of Firefox (Krishnamurthy, 2005a; Mockus et al., 2002) and Firefox’s marketing campaign (Krishnamurthy, 2005b).

Most research on OSS to date has focused on the organization and management issues surrounding OSS (Silverthorne, 2005), for example, its development (Raymond, 1999; Spinellis and Szyperski, 2004), its development coordination (Crowston et al., 2005; Egyedi and Van Wendel de Joode, 2004) and the economic rationale of OSS contributors (Frost, 2005; Lerner and Tirole, 2000). Aside from studies on Linux (Casadesus-Masanell and Ghemawat, 2006), not much research has been conducted into the standards-setting and competition of OSS or into proprietary software in the marketplace.

The origins of OSS can be found in the sixties and seventies, but the rise of Linux has drawn it into the spotlight. Raymond (1998a) defines OSS as software for which the source code is publicly available and which permits changes by users. Frost (2005) refers to open source as two separate, yet related entities, the open source development model, and the open source style of licensing. OSS development can be characterized as a “bazaar” (Raymond, 1999), where software is cooperatively developed by voluntary contributions in an open and participatory environment. Or, as Frost (2005) puts it, OSS development is a process

of developing software based on decentralization, collaboration, and reciprocity. OSS need not necessarily be completely developed from scratch by volunteers. Sometimes, established firms release proprietary code into open source. As Lerner and Tirole (2004) observe, this usually happens when a company is lagging behind the market leaders.

Besides its distinctive approach of development, open source licensing is another unique aspect of OSS. The three key tenets usually embodied in an open source license are: “free redistribution”, “open source code”, and “allowed derived works” (Fink, 2003). Although there is consensus that OSS users should be able to read, use and modify the source code, different views exist on the appropriability and on the blending of OSS with proprietary software (West and Dedrick, 2001). These different views have led to different OSS licenses, of which the Berkeley Software Distribution (BSD) license and the more restrictive GPL license, to be explained later, are the best known.

The alleged pros and cons of OSS have been the subject of a heated debate. Mendys-Kamphorst (2002) has identified the most common advantages of OSS, such as lower price, higher reliability, customization, no vendor lock-in, and availability of support, while the most common disadvantages include lack of agent responsibility, incompleteness and poor integration, low user-friendliness, absence of complements, and lack of compatibility between versions.

OSS’s compatibility deserves special attention, as it has a strong relation to standards-setting. Compatibility is relevant both in the development phase of an OSS product and in the market context. It can be split up in terms of compatibility between different versions of the same product, which Katz and Shapiro (1994) term vertical compatibility, and in terms of compatibility with other products, which Katz and Shapiro (1994) term horizontal compatibility.

Once an OSS program is ready, its promotion can be sponsored, in the sense that Oshri and Weeber (2006: 4) define as sponsoring of the program: “a variety of activities aiming to promote the technology or product in order to establish it as a market standard.” Three strategic options by which a firm or OSS sponsor can compete in the market have been identified by Hax and Wilde (1999): “Best Product”, “System Lock-in”, and “Total-customer Solutions”.

Standard, in the context of this study, refers to a complete virtual product (i.e., the web browser). A standard achieves dominance in the case that its market share is over 50%.

Oshri and Weeber (2006) define three main standards-setting attributes they believe influence the manner a standard emerges: “effort to standardize”, “mode of standard selection”, and “access to standard”, framed along the cooperation–competition continuum.

Standards can be distinguished between open and closed proprietary. A proprietary standard’s access is owned and controlled by one party, whereas, in the case of an open standard, access to the standard is open to all (Grant, 2002). Standards are not easily classified into “open” or “closed”, as they encompass varying degrees of openness. Openness can also be measured in different manners. West (2004) identifies three key metrics for openness, while Krechmer (2006) identifies ten different measures of openness. Shapiro and Varian (1999a, b) also address the rationale of an open standard and further elaborate on the consequences and trade-offs of standard openness.

Standardization mechanisms, the theoretical mechanisms that underlie standards’ acceptance in the market, have received wide attention in the literature (Farrel and Saloner, 1985; Katz and Shapiro, 1985, 1992; Shapiro and Varian, 1999a, b). Classical concepts in this respect are network effects, positive feedback, and lock-in. Network effects refer to a situation where the value of a product for an individual user increases when the number of people who use the product increase (Grant, 2002). Positive feedback is the phenomenon of a self-reinforcing circle of success (Shapiro and Varian, 1999b). In the case of lock-in, users are not willing to abandon the standard they have adopted because the cost of switching to a new standard is too significant.

Different standards may compete for acceptance. Shapiro and Varian (1999a) have identified two tactics for participants that often occur in such standards wars: preemption and expectation management. They further identify seven key assets needed to win a standards war, for example, control over installed user base, and reputation and brand name (Shapiro and Varian, 1999a).

Book structure

This book is structured as follows. Chapters 2 and 3 provide overviews of the literature on OSS and standards-setting respectively. Chapter 4

offers a framework to examine standardization battles. We will use this frame when examining the Mozilla and Microsoft case. Chapter 5 provides a description of the industry, from the PC industry at large to the more specific web browser industry. The second part of this chapter introduces the web browser industry's main players, Microsoft and Mozilla, their history and certain issues relating to the context of the study. Chapter 6 describes Browser War I (IE vs Netscape), while Chapter 7 outlines Browser War II (Firefox vs IE). We examine these two standardization battles through the lens of our framework. We analyze the manner the standardization battles are carried out in OSS in Chapter 8 and draw conclusions concerning the impact that OSS has had on these battles. Finally, we discuss implications for practice and research in Chapter 9.

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