Factors for winning format battles: A comparative case study

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ABSTRACT

The outcome of battles between competing interface formats shapes technology fields and implies success or failure for the companies involved. Recently, this journal published a paper, which proposes a new framework of factors that impact the outcome of such battles. We apply this framework to three format battles: for wired connectivity in home applications, for wireless connectivity in home applications, and for multi-channel sound. The framework appears to be more complete than earlier frameworks, and therefore provides a better understanding of interface format battles. Firms can use this framework to make more accurate forecasts about the winner, if any, of a format battle, and can adjust their strategies by exploiting certain factors to enhance their chances of success.

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1. Introduction

Why did QWERTY become the dominant keyboard layout format instead of DVORAK? Why did VHS win the video format war and why did Blu-ray defeat HD-DVD? Which fourth generation mobile communication format will we use in the future? Battles between formats emerge time and time again. For every party involved it is important to understand the likelihood of a specific format achieving dominance, since betting on the format that turns out to be unsuccessful can result in high losses [1].

Several studies [2–4] have analyzed these battles in depth and have proposed factors that explain their outcome [5–7], but most focus on a subgroup of the set of possible factors for format dominance [8]. Moreover, most of this literature lacks empirical evidence for the factors that contribute to format dominance, and a small number of empirical studies focus on only a few factors. In this study, we take a more comprehensive approach by building on a study by Van de Kaa et al. [9] which was recently published in this journal. They conducted an extensive literature study resulting in a framework for format dominance consisting of a large number of factors. They claim that it is the most complete framework and that it can be used to analyze any format battle. The objective of this study is to explore the completeness of the framework and the relevance of the factors in this framework by confronting it with empirical data. In this paper, we study three cases in depth [10,11]. This may confirm the framework or result in new factors that have not previously been mentioned in the literature. This research aims to add to the growing body of literature focusing on interface formats, dominant designs and standardization, and builds on the findings of Suarez [5] and Schilling [6,8].

Interface formats are codified specifications defining the interrelations between entities in order to enable them to function together [9]. These can be called dominant when they achieve the largest market share among new products sold (in which one or more of the competing formats are implemented[1]) in a certain product category for a certain amount of time [9]. We concentrate on the period beginning

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[1] If two competing formats are implemented in one product, the market share of both formats increases so that the sum of the market shares of the two formats may be more than 100%. The format with the largest market share is the dominant one.

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with the first format being released until one of the formats becomes dominant, i.e., the 'era of ferment' [12].

The paper proceeds as follows. We begin by exploring several theoretical perspectives on format dominance in Section 2. Section 3 provides our methodology. We present the results from three case studies in Section 4 and discuss our findings in Section 5. In Section 6, we present our conclusions.

2. Theory

Many industries are characterized by forces, which lead to a single format attaining dominance. In these industries, positive direct network externalities apply where technology becomes more valuable for an individual user when more people use it [13,14]. Most markets in which these effects exist are 'two sided' in that they consist of complementary goods for which the technology defines communication [15]. Examples include the markets for VCRs [3] and video game consoles [16,17]. An increase in the availability of complementary goods has a positive effect on the installed base of the technology [8]. If we take the case of Blu-ray vs. HD-DVD, if more popular movies are available on Blu-ray compared to HD-DVD, the demand for Blu-ray players and disks will be high [18]. These markets are often path dependent, meaning that random historical events can determine which technology rises to dominance [2,19]. Evolutionary economists place technology selection in the context of natural selection [20]. Technological artefacts advance over time whereby incremental changes occur until a major breakthrough appears in the market. Due to these 'technological discontinuities' market uncertainty increases and the industry may be changed significantly [21]. Consequently, a new 'technological paradigm' arises. Therein, various technological paths can develop, resulting in technological designs competing for format dominance [22]. The technology that eventually achieves dominance is often referred to as the 'dominant design' [23,24].

Various researchers have analyzed how actors compete in these so called 'network markets' [25,26] and use the term 'format war', 'platform war' or 'standards battle' to refer to a situation in which two or more interface formats battle for dominance [1]. Because the firm that establishes dominance with its technology can profit from a 'winner-take-all' situation and can accrue monopoly rents with its technology [27], it is important for firms to understand which factors affect the outcome of format wars. Building on the resource-based view of the firm [28,29], scholars in the area of strategic management have emphasized firm capabilities that are needed to successfully commercialize a technology. Teece [30] uses the label 'complementary assets' to describe factors such as reputation, production capacity and distribution channels which can be exploited to reach a dominant format [5]. Furthermore, firms need to invest in knowledge acquisition, otherwise they run the risk of being locked out of the market [6,8]. Scholars have also focused on strategies that can be applied in network industries and that impact the expansion of an early installed base [26]. Various authors seem to agree on the significance of marketing communications to positively influence customer expectations regarding the format [16,31–33]. Others focus on the price of the product in which

the format is implemented [31,33], the availability of complementary goods [34,35], appropriability strategies [36,37], and the timing of market entry [6,8]. Standardization scholars emphasize technical characteristics such as a format's quality in terms of e.g., bandwidth capacity and the compatibility that it enables [38]. They also focus on the importance of other stakeholders such as standard development organizations. Government involvement in standardization may provide the format with a certain degree of authority or legitimacy and is beneficial for its diffusion [39]. Governmental agencies may also use their power to prescribe a format [40]. For example, the (US) Federal Communications Commission (FCC) used its power in the battle for a color television format [27] and in the battle for an HDTV format [41]. Van de Kaa et al. [9] conducted an extensive literature review with the objective of reaching a framework of factors for format dominance. Table 1 presents and defines the twenty-nine factors.

3. Methodology

We studied three historical cases of format wars to explore the completeness of the framework presented in Table 1 and the relevance of the factors for format dominance. The unit of analysis was the format that was vying for dominance. We created a list of cases and chose three cases by following two selection criteria. First, the formats vying for dominance should be comparable in terms of the interoperability that these formats enable [42]. Second, one format should have achieved dominance (i.e., we made sure that the case studies were truly historical). We selected the battle between FireWire and USB for peripheral interconnectivity to the PC, the battle between DECTPRS, Wi-Fi, and HomeRF for wireless connectivity in the home, and the battle between MPEG-2 Audio and AC-3 for a multi-channel sound format. These battles were fought in diverse industries including Information Technology (IT), Telecommunications (TE) and Consumer Electronics (CE).

We first gathered secondary data for each format war by analyzing the press releases of the companies involved and by examining several online news archives including Factiva and Lexis-Nexis. Primary data was collected through face-to-face semi-structured interviews with key figures in the format war. We interviewed two kinds of experts for each format: those who were involved in the development and/or promotion of that format, and an expert who was not involved but who had studied the format war closely (i.e., an 'outsider' in the battle). The majority of the interviews were conducted face-to-face. We asked all interviewees to provide secondary sources in the form of reports, presentations, news articles, etc., which were analyzed and resulted in a reconstruction of the three cases.

We interviewed four respondents about the battle for peripheral interconnectivity to the PC, six respondents about the battle for a wireless format for the home, and five about the battle for a multi-channel sound format. For privacy reasons, we do not provide their names.

We began each interview with an open question and asked the respondents to describe the most important events in the format war in chronological order. In their description, respondents mentioned several factors, explicitly or implicitly. In subsequent questions, we asked the interviewees