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## Winner does not take all: Selective attention and local bias in platform-based markets

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## ABSTRACT

We model how macro-level dynamics of platform competition emerge from micro-level interactions among consumers. We problematize the prevailing winner-take-all hypothesis and argue that instead of assuming that consumers value the general connectivity of an entire network, they are selectively attentive and locally biased. We contrast several alternative agent-based models with differing sets of assumptions regarding consumer agents' behavior and compare their predictions with empirical data from the competition between Sony's PlayStation 3 and Microsoft's Xbox 360. The results show that only when consumers are assumed to be selectively attentive and locally biased is it possible to explain real-life market sharing between the given platforms. In effect, it is shown how a late-entrant platform can get adopted by most consumers in the market, despite the fact that an early entrant has greater initial installed base, greater pool of complementary products, and lower initial price.

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### 1. Introduction

Organizational fields are increasingly organized as platform ecosystems, where the platform refers to “a set of shared core technologies and technology standards [that] supports value co-creation through specialization and complementary offerings” (Thomas, Autio, & Gann, 2014, p. 201). Apart from the provision of a shared core, the platform mediates interactions among different users, such as consumers and providers of complementary products. In addition, platforms and their ecosystems compete against each other in platform-based markets. Previous literature on platform competition has explained the competitive outcomes in platform-based markets from a variety of perspectives. Grounded in the literature on industrial economics and two-sided markets (Evans & Schmalensee, 2007), both global and local network effects have been noted to have an impact on the market penetration of platforms. Building upon the notion of network effects, strategic management literature has focused mainly on the strategies platform owners can utilize to leverage network effects to their advantage (Cennamo & Santalo, 2013; Lee, Lee & Lee, 2006). In addition to these factors, the decisions of users of the platform, both the providers

of complementary products as well as consumers, have been under scrutiny. For example Kang and Downing (2015) explored supplier networks' impact on competition between WiMAX and 3G/LTE whereas Venkatraman and Lee (2004) studied the product launch decisions of complementary game providers, and Zhu and Iansiti (2012) examined the expectations of the consumers (i.e., the players) in the same video game console market.

Platform-based markets as two-sided markets are characterized by indirect network effects (Katz & Shapiro, 1986), where the demand for the platform on one side of the market will subsequently affect the demand for the platform on the other side of the market (Clements & Ohashi, 2005; Rochet & Tirole, 2006). Thus, a platform with greatest pool of complementary products should attract most of the new end users which then stimulates further support by complementors, eventually resulting in self-reinforcing demand dynamics. This logic suggests that tipping—all players and video game developers select the same platform—is an equilibrium in these markets (Hossain et al., 2011). Hence, two-sided markets, including platform-based markets such as the video game console markets, are often called winner-take-all markets (see e.g., Schilling, 2002; Eisenmann et al., 2006; Lee et al., 2006).

Due to the prevalence of network effects, literature suggests (conditionally) that a platform provider should expand its installed base of users rapidly in order to attract more complementary product providers to the platform. Such a get-big-fast strategy is likely to result in self-reinforcing loop and hence, in winner-take-all outcome (i.e., one

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platform takes over the entire market) even with inferior quality to competing platforms (Lee, Lee & Lee 2006; McIntyre & Subramaniam, 2009; Zhu & Iansiti, 2012; Cennamo & Santalo, 2013). In other words, it would be expected that an early entrant<sup>1</sup> platform with a greater initial installed base, greater pool of complementary products and lower initial price would be adopted by most adopters. Yet, we have an exciting empirical example on the competition between two video game consoles, namely PlayStation 3 and Xbox 360, where the most consumers adopted the late entrant (i.e., PlayStation 3) despite the fact that Xbox 360 had all the aforementioned potential advantages. In this study, we aim to explain this “winner does not take all” market outcome since we believe that such an attempt can open up new important insights on the dynamics of competition in platform-based markets.

In this study, we challenge the assumption on the causality between the size of the installed base and winner-take-all outcome. First, we incorporate a field-level assumption of selective attention (Assumption 1) into our study. Consumers are not perfectly rational utility maximizers and, as research on consumer behavior and psychology in general has consistently shown, consumers have limited attentional capability when making decisions (Kahneman, 1973). We acknowledge that the assumption that humans are selectively attentive is a widely accepted one; however, to the best of our knowledge, our study is the first to incorporate demand-side dynamics at the micro-level and take into account the selective attention of consumers in the research on platform-based markets. Specifically, we assume that the consumers' attention toward complementary products and thus their perceived qualities are affected by the introduction of new complementary product quality to the market, which then affects the utility of platforms and hence their adoption. In the spirit of problematization (Alvesson & Sandberg, 2011), we challenge a domain specific assumption, namely the assumption related to the size of the installed base and introduce a field-level assumption of selective attention to this domain.

In addition, extending the work of Lee, Lee, and Lee (2006) and Afuah (2013), we develop an alternative assumption ground for the theory on platform competition by stating that consumers derive utility from their local network, that is, from other consumers who interact with them. Recently, the assumptions underlying the current literature on platform competition have been criticized for the overly simplistic view on network effects, behavior of the consumers, and the overemphasis of the size of the installed base (Afuah, 2013; Lee, Lee, & Lee, 2006). The global network effects—that is, the size of the network—is not all that matters and the value of network effects is more likely to arise from a specific structure of the network and its behavior (Afuah, 2013). Social networks influence individuals (Goel & Goldstein, 2013). In particular peer-effect can lead to local bias (Assumption 2), a situation where acquaintances in the same social network adopt a lagging technology with a smaller installed base than the leading technology (Lee, Lee, & Lee, 2006).

We contrast several alternative agent-based models with differing sets of theoretical assumptions regarding consumer agents' behavior and compare their predictions with empirical data from the competition between Sony's PlayStation 3 and Microsoft's Xbox 360. Our results show that the developed assumptions (i.e., selective attention and local bias) are crucial to explaining why PlayStation 3 eventually obtained most adopters, and that the other sets of theoretical assumptions cannot explain the market outcome. In effect, we show that the competitive advantage that a late-entrant has in terms of complementarities (i.e., the perceived quality of complementary products) can compensate for its disadvantage in terms of local direct network effects, thereby allowing it to penetrate the market and be adopted by most consumers.

Our study offers the following contributions. We contribute to the theory of competition in platform-based markets by introducing a field-level assumption of selective attention to this domain. Further,

we extend the work of Lee, Lee, and Lee (2006) and Afuah (2013) by empirically showing that consumers derive value from their local network, that is, that they are locally biased. Only recently, the specific structure of the network where network effects arise has been listed as an important avenue for future research (Lee, Lee & Lee, 2006; Rahmandad & Sterman, 2008; Afuah, 2013). With empirical data, we test different sets of theoretical assumptions and show that the market outcomes are not counterintuitive when we examine the competition in light of the developed assumptions. All in all, by focusing on demand-side dynamics we show that the division of the market between platforms is shaped by the sequential decisions of the adopters, who are selectively attentive and influenced by the local bias in their social network. Finally, we claim that while relying on established procedures, the applied approach is a practically useful example on empirical validation of agent-based simulation models that continues to be a nontrivial task (Windrum, Fagiolo & Moneta, 2007; Rand & Rust, 2011).

## 2. Theoretical background

### 2.1. Competition in platform-based markets

A multitude of industries are organized around platforms that provide a technological core to connect and facilitate transactions among several parties (Eisenmann, Parker, & Van Alstyne, 2006; Zhu & Iansiti, 2012). Such settings are called platform-based markets (Eisenmann, Parker, & Van Alstyne, 2006; Zhu & Iansiti, 2012), and the structure of the platform-based market is two or multi-sided when an intermediary (i.e., platform) must succeed in bringing both sides of the market (i.e., customers and suppliers) together. Numerous examples exist, including credit cards, which bring together credit card holders and merchants; shopping malls that bring together buyers and sellers; PC operating systems that bring together software providers and customers; and smartphones that bring together application providers and customers (for more illustrative examples, see Evans, 2003; Rochet & Tirole, 2003; Eisenmann, Parker & Van Alstyne, 2006; Afuah, 2013). Another example is the video game console market, where platform providers, such as Sony and Microsoft each produce game consoles, are associated with their own developer and player communities (for a more detailed description of the video game console market, see Daim, Justice, Hogaboam, Mäkinen & Dedehayir, 2014).

Platforms offer little value to the end-user without complementary products. For example, the usefulness of a computer to a consumer depends largely on the complementarities, the software. Thus, the quality of the platform is partially dependent on the quality of the complementary products. In platform-based markets, consumers adopt the platform and in addition the complementary products; in the video game console markets consumer adopt both video game consoles and video games. The relationship between the platform and complementary products is a complex one as different actors typically provide the hardware and software. Traditionally, the adoption in markets with indirect network effects has been modeled with contingent diffusion models where complementary products create demand contingencies (Gupta, Jain, & Sawhney, 1999). In essence, consumers derive value from the availability of complementary goods (indirect network effects) (Schilling, 2003; McIntyre & Subramaniam, 2009).

Competition between platforms in platform-based markets has been explained with a multitude of factors. First, there exist explanations that explicate performance outcomes (e.g., market penetration) with platform-exogenous characteristics such as network effects (McIntyre & Subramaniam, 2009). When one user joins and expands the network, the value of membership to another user increases (Arthur, 1989; Katz & Shapiro, 1986). Thus, network effects are typically portrayed as a function of the installed base, cumulative number of consumers at any given time, and marginal impact of a unit increase in network size of demand—the network strength (McIntyre & Subramaniam, 2009). These direct network effects can be either global or local. When global

<sup>1</sup> As Xbox 360 was the first 7th generation video game console launched, we will refer to it as early entrant. The later launched PlayStation 3 will be referred to as late entrant.

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