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Full Length Article

# The effects of installed base innovativeness and recency on content sales in a platform-mediated market

John Healey <sup>a,\*</sup>, Wendy W. Moe <sup>b,1</sup><sup>a</sup> A.B. Freeman School of Business, Tulane University, New Orleans, LA, United States<sup>b</sup> Robert H. Smith School of Business, University of Maryland, College Park, MD 20742, United States

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## ABSTRACT

Buying behavior in the video game market can be conceptualized as a two-stage process where users first purchase a console and then purchase content for that console. As a result, the sales of consoles and content in this market are interdependent and together form a platform-mediated market. Established research on platform-mediated markets has highlighted the effects of installed base size (or the number of consumer who have adopted the platform) on content sales. In other words, how does the number of console users impact sales of content designed for that platform? Here, we extend the research on installed base effects on content sales by examining two characteristics of installed bases: installed base innovativeness and recency. Installed base innovativeness is defined by the proportion of the installed base that adopted the platform early in the platform product's lifecycle. Installed base recency is defined as the proportion of the installed base that adopted the platform in recent weeks. We find that installed bases with higher innovativeness or higher recency purchase more content than less innovative or lower recency installed bases. We also find that installed base recency has a larger positive effect on content sales when an installed base is less innovative. These results suggest that content sales depend on more than just installed base size. In fact, there may be opportunities to increase content sales by releasing new content not just when the installed base is at its largest, but also when the installed base is considered more innovative and recent.

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## 1. Introduction

The video game market is one of the fastest growing and largest entertainment markets, with an estimated \$93 billion in worldwide sales in 2013 (Gartner, Inc., 2013). According to recent estimates, 59% of all Americans play video games, with 51% of US households owning at least one dedicated game console (Entertainment Software Association, 2015). This market has grown at an annualized rate of approximately 6% since 2000 and is projected to grow at over 12% per year from 2012–2015. The growth of this entertainment market has led game developers to allocate greater resources to the development of games, often matching the development budgets of blockbuster movies. For example, Grand Theft Auto Five cost Rockstar Games \$266 million to develop (Kamenetz, 2013). As games become more expensive, the risk of a poorly selling game increases substantially for the game developer. As such, it is important to better understand how end consumers purchase games.

\* Corresponding author. Tel.: +1 352 278 1916.

E-mail addresses: [jhealey@tulane.edu](mailto:jhealey@tulane.edu) (J. Healey), [wmoe@rhsmith.umd.edu](mailto:wmoe@rhsmith.umd.edu) (W.W. Moe).<sup>1</sup> Tel.: +1 301 405 9187.

In the video game market, consumer buying behavior is defined by a two-stage process. In the first stage, consumers need to purchase a console, which is a durable electronic product that serves to allow end users to play games. After console purchase, in order to generate utility, consumers then purchase content (games) for the console. This structure is defined as a platform-mediated market, in which a platform product (e.g., the gaming console) provides content developers access to their installed base of customers. Platform-mediated markets are traditional in some entertainment industries (i.e. video games and home video) and are expanding into other markets due to technological innovation (i.e. smartphones, digital music players, and e-readers). As such, it is critical to develop a more thorough understanding of how the characteristics of the platform's installed base of users affect content sales.

Prior research related to platform-mediated markets has focused on the relationship between installed base size, which is the total number of prior platform product adopters, and content sales. This research has found that a larger installed base, which indicates a larger potential market for content, leads to an increase in content sales (Gallaughner & Wang, 2002; Schilling, 2002). This relationship is especially crucial in entertainment content markets, such as the market for video games, because product sales in these markets are characterized by rapid early sales immediately after content release followed by an exponential decline in sales as the content ages (Calantone, Yenyurt, Townsend, & Schmidt, 2010; Moe & Fader, 2001; Sawhney & Eliashberg, 1996). Therefore, it is crucial for entertainment content, such as games, to be released with a relatively large existing installed base. However, in this type of market, the availability of content is also a crucial determinant of the installed base's size, since consumers generate utility based on the availability of content (Anderson, Parker, & Tan, 2014; Binken & Stremersch, 2009; Lee, 2013), which will only be developed if content sales are anticipated.

This cyclical relationship between the development of an installed base and content sales poses a dilemma for content developers. Certain content developers, especially platform firms, which are major content developers in the video game industry (Marchand & Hennig-Thurau, 2013), are dependent on the development of a particular installed base. As such, if the content developer only considers the effect of the size of the installed base, these firms need to tradeoff higher content sales and the development of a larger installed base when releasing content.

We explore the possibility that installed base size fails to entirely capture the content purchasing potential of an installed base. Indeed, prior literature has shown that the consumers that compose an installed base can change over time (Batislam, Denizel, & Filiztekin, 2007). These systematic changes in the installed base over time could potentially change the nature of the relationship between the installed base and content sales.

Therefore, in this paper, we study how an installed base evolves over time in its content purchasing behavior. Building on prior research from the broader marketing literature, we identify two potential sources of installed base dynamics: (1) the innovativeness and (2) the recency of the installed base. It is important to note that both of these constructs can be measured using aggregate level data.

We develop the concept of installed base innovativeness by drawing from the extant product lifecycle literature (Cox, 1967; Golder and Tellis 2004; Rogers, 1962). Building on these theoretical frameworks, we define installed base innovativeness as the relative proportion of the installed base that adopted early in the platform product's lifecycle.

Innovativeness and early adoption have been previously linked with a variety of characteristics and behaviors, such as higher product involvement, lower risk aversion, and increased willingness to try new things (Gandal, Greenstein, & Salant, 1999; Ram & Jung, 1994; Rogers, 1962; Steenkamp, ter Hofstede, & Wedel, 1999). As such, at an aggregate level, we propose that an installed base that is high in innovativeness will purchase more content than a less innovative installed base.

Second, we develop a measure of installed base recency. This construct captures the proportion of an installed base that adopted the platform product in recent weeks. Building on extant theory that provides insights into how console usage might evolve after adoption (Binken & Stremersch, 2009; Hauser & Urban, 1986; Kahn & Lehmann, 1991; McAlister, 1982), we propose that a more recent installed base will purchase more content per user than a less recent installed base.

We also test the potential that innovativeness and recency may interact, suggesting that the effects of installed base recency might change depending on the innovativeness of an installed base. Based on prior individual level research, which has shown that later adopters use products more rapidly after adoption compared with earlier adopters (Prins, Verhoef, & Franses, 2009), we theorize that the effect of installed base recency on content sales will be stronger for less innovative installed bases.

In order to study the effects of the innovativeness and recency of a platform's installed base on content sales, we analyze sales from the video gaming market. Specifically, we collect weekly sales data from the seventh technological generation of the video game market from November 20, 2005 to April 10, 2011. This data is used to characterize the innovativeness and recency of installed bases. We examine how content sales are affected by these characteristics of the associated installed base. We conduct two separate but related analyses. First, we examine how the aggregated weekly content sales for all games, often associated with a specific console, are affected by the console's installed base innovativeness and recency. This analysis provides insights into the installed base's content purchasing behavior in the market as a whole. We complement this analysis with a second analysis that is conducted using title specific sales data for content titles that are offered only across all platforms. This allows us to control for content differences across games but provides only a partial picture of content purchasing behavior, as not all games are available on all consoles. In other words, the two analyses complement each other and provide a robustness check of our results.

The remainder of this paper is organized as follows: first, we establish a deeper theoretical development and our formal hypotheses. Then, we describe our dataset for the empirical analysis. Third, we provide an overview of our analyses and our empirical results. Finally, we outline some managerial insights provided by our results and conclude.

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