



Using P2P sharing activity to improve business decision making: proof of concept for estimating product life-cycle

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Abstract

Estimating the life-cycle or duration of a product can be an important input into a firm's decision-making related to production and marketing. In the music industry, online Peer-to-Peer (P2P) networks have attracted millions of potential music consumers and have had substantial impact on the music business. In this paper, we investigate the possible use of P2P information in estimating product "shelf-life," in particular the duration of a music album on the Billboard 100 chart. We identify and track the music albums that appear on the Top 100 of the Billboard Charts, spanning a period of six months. We show that P2P sharing activity can be used to help predict the subsequent market performance of a music album.

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1. Introduction

Estimating the life-cycle or duration of a product can be an important input into a firm's decision-making related to production and marketing. This is of special significance for entertainment firms that deal with multiple products

with short life-cycles, such as music and movies. In standard analysis of such issues, researchers have had little difficulty structuring the objective functions – businesses are profit maximizing and can manage their interaction with consumers. And then along came free peer-to-peer (P2P) networks that provided distinctly "non-commercial" means of exchange. In fact, recent studies have observed high level of free-riding among users in these networks [10,14]. A recent article in *Fortune* highlighted the non-business approach of KaZaA

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and its originators, Janus Friis and Niklas Zennstrom, that has so greatly impacted entertainment companies. The KaZaA developers apparently proceeded without a business plan, taking a “just go and do it approach” with subsequent failed attempts to work out licensing deals with major entertainment companies. KaZaA, despite being a virtual non-business, has become the “top search term on Yahoo” [Fortune, 2004] and, together with its P2P counterparts such as WinMx and Grokster, continues to vex the entertainment industry. But we suggest that businesses might actually leverage P2P networks as information sources to make better production and marketing decisions. In the material that follows, we present our initial investigations into the gathering and potential industry use of P2P activity information.

P2P application software such as KaZaA and WinMX are extremely popular and commonplace among potential music purchasers. As explained later, we developed a custom software application that directly observes and takes “snapshots” of P2P music file-sharing activity. Using this data, we are able to directly address whether measures of such sharing activity might be useful in business decision making. In the work presented here, we focus on estimating product “shelf-life,” in particular the duration of a music album that appears on the Billboard 100 chart. Could entertainment firms utilize information on P2P file sharing to better determine the success (measured in chart duration) of music albums?

Before discussing data collection or data analysis, we think it prudent to consider characteristics of the P2P “data venue.” In the P2P music sharing setting, incentives are rather different than the normal business/consumer market. Without a profit-maximizing (or similar) objective, what incentive is there for support or customer service tools such as enhanced search tools? In fact, as one would expect, the search options allowed on P2P networks are quite limited. In such environments, searches for digital goods such as music are primarily directed searches. That is, a consumer gathers information from offline as well as online sources about music items (album and artist names) and then searches for a particular item to sample. Certainly, some searches may be broader (e.g., based on mu-

sic genres), but information overload is likely to quickly occur since there is no support for search aids such as “ranked list of relevant results” in these networks since there are no incentive to provide such services. This deters a “browsing based” search behavior on a particular genre or artist, for example, since a random presentation of search results quickly increase the search cost for a consumer. Hence, the directed nature of the search implies that consumers are more likely to sample those music items for which “information availability” is high (from offline and online sources). This indicates a generally higher sampling and sharing activity for well-known albums that also likely have higher sales based on consumers’ information awareness.

With these two factors (most searches are likely to be directed searches and heavily influenced by information availability), we begin our discussion of data collection followed by presentation of initial P2P data analysis. It has been observed that while radio airplay measures the advertising effort for given music albums [11], airplay does not closely predict consumer interest in such albums [5,12]. In fact, anecdotal evidence points to misjudgment of consumer interest and related promotional activities of new artists and albums by record companies (see, for example [16,18]). Given the increasing interest in research on products such as music [2,3,6–9,13], we posit that sharing information on P2P networks may be used to predict consumer interest and subsequent sales for music albums. Our proof of concept approach to investigating the possible value of P2P information in business decision begins with consideration of the following three research questions related to albums that appear on the Billboard charts:

- (i) Can sharing information on online networks during initial weeks on chart be a valid predictor for survival duration on the charts?
- (ii) Does such early sharing information offer predictive ability beyond such factors as debut rank on the charts?
- (iii) Finally, is there any relationship between the predictive ability of early sharing information and album visibility or “album information availability”?

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