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## Full Length Article

# From fewer blockbusters by more superstars to more blockbusters by fewer superstars: How technological innovation has impacted convergence on the music chart☆

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## ABSTRACT

The pace of change in recorded music technology has accelerated faster than ever during the past two decades with the shift from analog to digital. Digital recordings provide consumers the unimpeded ability to access, sample, learn about, acquire, store, and share vast amounts of music as never before. Supporters of *winner-take-all* theory believe lower search and transaction costs brought about by digitization have led to greater convergence with fewer extraordinarily popular songs (*blockbusters*) and a smaller number of artists who perform them (*superstars*). Supporters of *long-tail* theory believe the same factors have led to less convergence and a greater number of songs and artists becoming blockbusters and superstars. This work pits these opposing predictions against each other empirically. More specifically, we examine how the number of songs and artists appearing annually on *Billboard's* Hot 100 singles chart has changed between 1974 and 2013 in relation to three major turning points in technology associated with digitization. These turning points mark consumers' shift: (1) from analog records and cassettes to digital audio with the advent of CDs, (2) from CDs to compressed digital audio MP3s, and (3) from P2P networks and illegal file sharing to legitimate online distributors of digital downloads. In general, we observe a growing winner-take-all effect for songs until the advent of MP3s in 1998, when this trend abated. This result appears largely due to greater convergence in the Top 10. The trend reverses itself as the number of songs making the chart increases steadily after the launch of legitimate online music sellers such as iTunes. The exact opposite pattern is observed for artists. Initially, an increasing number of artists made the chart, and this trend continued unabated until 2003. After the emergence of legitimate online resellers, the trend reversed as fewer and fewer artists made it onto the chart. The overall pattern is summarized as a transition from fewer blockbusters by more superstars to more blockbusters by fewer superstars.

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## 1. Introduction

The development of audio recording and reproduction is arguably the most significant event to have affected the role music plays in people's daily lives. Only during the past century has recorded music allowed consumers to repeat a gratifying musical experience by hearing a song performed exactly the same way over and over again. Recorded music for home use was born with the phonograph. Phonograph records stopped being seen as a novelty in the 1920s, and by the 1930s, the "popularity" of music came to be measured by

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record sales (Frith, 1988). Yet the commercial market for recorded music didn't really take off until the late 1940s when the 33–1/3 long-playing record (LP) and 45-rpm were introduced (Salvaggio & Bryant, 1989). Vinyl records dominated the market until the late 1960s and early 70s, when affordable high-quality cassette decks hit the market. Better sound quality, a larger variety of offerings, and better artwork allowed records to coexist with cassettes until digital audio came along.

The pace of change in recording technology has accelerated faster than ever during the past two decades as the medium transitioned from analog to digital. The digitization of content, including music, film, TV shows, video games, and books has radically changed consumer behavior in the entertainment arena. Converting information into binary code has ultimately made it easier to store, access, and transmit large amounts of content faster and further than ever on a wider variety of media. During music's digital transformation, recording technology encountered three significant turning points. The first was the shift from analog to digital that led consumers to convert their music collections from records and cassettes to CDs. The second shift was from static to mobile music collections as consumers moved away from CDs (typically large .wav files) to compressed audio formats such as MP3s, files easily exchanged online. The third shift occurred as many consumers began moving away from peer-to-peer (P2P) networks and illegal file sharing to learning about and acquiring music from legitimate online distributors such as iTunes. A legitimized marketplace resulted in proprietary formats that came with digital rights management (DRM) protection. The most popular was Apple's AAC audio with FairPlay, but others including Rhapsody's AAC+ and WMA files with Helix DRM emerged as well.

Compressed digital files, the internet, P2P file sharing networks, and legitimate online sellers' extensive music catalogs each advanced consumers' ability to learn about, sample, acquire, save, and share vast amounts of music. A hyper-efficient digital market for music is believed by many to have intensified what is referred to as a *winner-take-all* effect, whereby a few winners (songs) capture a disproportionately large share of the market and go on to become *blockbusters*. This is because near-zero marginal costs, combined with effortless search and instantaneous delivery enable almost any consumer worldwide to identify and acquire what is presumed to be a small set of the very best products in terms of quality (Frank & Cook, 1995). The same efficiencies are believed to exert a similar effect on artists. *Superstar theory* refers to the idea that exposure to a greater number of artists results in fewer individuals coming to "dominate the fields in which they engage" (Rosen, 1983, p. 449).<sup>1</sup>

In contrast, proponents of what is known as the *long-tail* effect argue that the transition to digitized content has moved audiences away from a relatively small number of blockbusters toward a larger number of niche goods and away from a small cadre of superstars toward a larger stable of lesser-known artists (Anderson, 2006; Brynjolfsson, Hu, & Simester, 2011).

This research pits the predictions derived from these two conflicting viewpoints against each other and does so empirically. We rely on *Billboard's* Hot 100 popular music chart to determine which songs are deemed blockbusters and which artists are deemed superstars. The Hot 100 is one of the industry's pre-eminent indicators of success in the music industry, and a song's ranking on the chart is considered the "best benchmark we have to measure the bigness of hits" (Molanphy, 2013). Proponents of winner-take-all effects and superstar theory predict any advances in market efficiency resulting from digitization would by and large lead to greater convergence, the end result being a greater concentration or smaller set of both songs and artists making it onto the Hot 100. Proponents of long-tail theory predict the opposite; advances in market efficiency result in less convergence resulting in less concentration and an expanded set of both songs and artists making it onto the Hot 100. Consequently, these two theories provide predictions that are diametrically opposed to each other with respect to how changes in market efficiency should impact the popular music charts.

### 1.1. Objectives of this research

At its broadest level, this research examines the impact of evolving technology on convergence in the entertainment market. More specifically, we examine how the concentration of songs and artists appearing annually on *Billboard's* Hot 100 singles chart has changed over the course of the past 40 years (1974–2013) in response to shifts in recorded music technology. The technology shifts under investigation here have resulted in the recorded music market alternately becoming more and less efficient over time. Generally speaking, *more efficient* markets imply more convergence based on winner-take-all/superstar (long-tail) theory and should be reflected by a decrease in the number of songs and artists making the Hot 100. In contrast, *less efficient* markets imply the opposite. If inefficient markets make coalescing around a small set of winners and superstars more difficult, there should be relatively less convergence according to winner-take-all and superstar theory. If an inefficient market means consumers have difficulty identifying those idiosyncratic alternatives that would suit them better, there should be relatively more convergence according to long-tail theory.

### 1.2. Contribution

This research contributes to the extant literature on technological innovation and entertainment goods in several ways. First, we document the changing trends over time with respect to convergence in the music industry corresponding to major turning points in recording technology. Beginning with 1974, we observe convergence increasing annually, on average (i.e., fewer songs making the chart and thus becoming blockbusters), a trend that was halted by the advent and adoption of the MP3 format in 1998–99. Following the emergence of legitimate online music sellers in 2003–4, the trend reverses itself completely, and we observe greater divergence as more songs began making it onto the chart each year. Interestingly, almost the exact opposite pattern exists for artists. Beginning with

<sup>1</sup> In past work, concentration rates for products per se have frequently been described in terms of testing the "superstar" phenomenon. In this research, the term *blockbuster* is used exclusively with products such as songs and reflects a winner-take-all effect while the term *superstar* is used exclusively with people (i.e., performers) and reflects superstardom.

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