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# Technological adoption and use after mass market displacement: The case of the LP record

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## ABSTRACT

This paper investigates the reasons why some technologies, defying general expectations and the established models of technological change, may not disappear from the market after having been displaced from their once-dominant status. Our point of departure is that the established models of technological change are not suitable to explain this as they predominantly focus on technological dominance, giving attention to the technologies that display highest performance levels and gain greatest market share. And yet, technological landscapes are rife with technological designs that do not fulfil these conditions. Using the LP record as an empirical case, we propose that the central mechanism at play in the continuing market presence of once-dominant technologies is the recasting of their technological features from the functional-utilitarian to the aesthetic realm, with an additional element concerning communal interaction among users. The findings that emerge from our quantitative textual analysis of over 200,000 posts on a prominent online LP-related discussion forum (between 2002 and 2010) also suggest that the post-dominance technology adopters and users appear to share many key characteristics with the earliest adopters of new technologies, rather than with late-stage adopters which precede them.

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## 1. Introduction

It is not uncommon that technologies which fall victim to displacement during a technological discontinuity continue to enjoy patronage from some customers despite the availability of a newer and 'better' dominant design. Indeed, there is a vibrant retrocomputing community embracing long ago obsolete computer systems, and within it a growing retrogaming sub-community playing equally obsolete computer and arcade games (e.g. Galloway, 2011). Similarly, the Polaroid-type instant film technology has recently made a comeback into consumer photography (e.g. Schneiderman, 2010) and enjoys a dedicated group of users. Moreover, not only is the vinyl long-play record (LP) – long ago superseded first by the compact audiotape cassette (the 'C cassette') and later the compact disc (CD) – still available, but actually has been the fastest-growing music format in the US from 2010 to date (RIAA, 2013).

Even though such 'retro' phenomena may not constitute markets comparable in size to corresponding 'mainstream' markets, such phenomena are culturally increasingly resonant, as witnessed by, for example, relatively recent feature articles about the 'LP revival' in the

Financial Times (Cookson, 2013), the Wall Street Journal (Felten, 2012; The Economist, 2011). In fact, the LP revival has already gained momentum to a degree that Amazon.com has opened an online "Vinyl Store" dedicated to the format. More generally, peoples' increasing resonance with 'retro' phenomena has translated into a 'retro branding' movement in marketing and new product design (e.g. Brown et al., 2003).

Notwithstanding, technology life cycle models premised on the bases of industry competition (e.g. Christensen, 1997; Pyka, 2000) or the diffusion of technological innovations (e.g. Rogers, 2003; Da Silveira, 2001) do not extend beyond the end of the life cycle at which point the technology in question is replaced by another and is therefore of no longer interest to scholars. Furthermore, the dominant models of technological development and change established within the scholarly community and widely used in the industry are mainly concerned with the notion of dominant design (Abernathy and Utterback, 1978; Murmann and Frenken, 2006; Suárez and Utterback, 1995; Tushman and Murmann, 1998) and especially with the dynamics that lead to the establishment of a new one (Anderson and Tushman, 1990; Ehrnberg, 1995; Tushman and Anderson, 1986). Thus, what happens to technologies *after* they become displaced from a dominant status is not of particular concern in the established models. There is, however, some signs of emerging interest in this phenomenon in the scholarly community, particularly in the works of Adner and Snow (2010a, 2010b)

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who have investigated firms' survival strategies, based on embracing the incumbent or 'old' technology (labelled as "bold retreat"), when its displacement is imminent or has just occurred. Nonetheless, while their contribution does enhance our understanding of the competitive dynamics of technological rivalry, their focus does not extend appreciably long after the displacement, focusing on the undertakings of a firm 'under attack' rather than offering a general theory that temporally extends the existing models of technological change. For these reasons we believe that it is worthwhile – both from scholarly and practical points of view – to look more closely into the post-dominance era in the life cycle of a technology in order to understand why this life cycle may extend beyond – and sometimes appreciably long beyond – the moment of mass market displacement.

To reach this understanding, we feel it necessary to begin with a focus on demand related factors, in other words, the sentiments of the technology adopting and using community, which enable the persistence of that technology beyond its displacement by a new dominant design. In this study we concentrate on the case of the LP by conducting a quantitative textual analysis of discussion on a prominent online LP-related discussion forum between the years 2002 and 2010. By scouring a very large set of textual data acquired from this forum, we aim to draw the profile of contemporary LP enthusiasts with respect to 11 dimensions that describe motivations to adopt and use technology. In this manner, our intent is to find out what animates people still – and in increasing numbers – to embrace the LP nearly three decades after its displacement in the consumer music market. This approach contrasts and simultaneously complements prior works that have attempted to reach this understanding through qualitative methods such as interviews with LP users, and at the same time represents a unique means of employing discourse analysis in the technology adoption context that is often concerned with rich and nuanced analysis of quite limited amounts of text. Compared to prior scholarly accounts of the re-emergence of the LP, our results offer a somewhat different explanation which emphasizes the peculiar and intricate nature of the technology *vis-à-vis* its current and potential patrons and their preferences.

After this introductory section, the paper is organized as follows. First, we will briefly review the established general models of technological development and change in order to establish that 'obsolete' technologies by and large fall outside their scope. After this we provide a short historical description of the focal technology, the LP, demonstrate its comeback in the light of selected market statistics, and review prior scholarly explanations for the phenomenon. From there we proceed to describe our empirical setting – methods and data – followed by the description of our results. Finally, we present our key conclusions from the study and provide a closing discussion.

## 2. Established general models of technological development and change

As commonly perceived, technology evolves through breakthroughs that emerge at a given point in time, thereby providing a discontinuity in an otherwise continuously progressing technological trajectory (Anderson and Tushman, 1990; Ehrnberg, 1995; Tushman and Anderson, 1986). A discontinuity may represent the emergence of a new artefact, such as the appearance of the automobile in the late 19th century, a period that was dominated by horse-based technology. However, discontinuities do not establish a single technological design that will satisfy needs straight away. Rather, the discontinuity initiates a period of variation with respect to the forms of technological products that compete for dominance, often referred to as the era of ferment (Anderson and

Tushman, 1990). For example, the emergence of the automobile in the late 19th century began an era of ferment that underlined the struggle for dominance between three major automobile designs – steam, electric, and gasoline engine vehicles (Cowan and Hultén, 1996) – as well as the existing transportation technology based on the horse. The era of ferment comes to an end when a particular technological design or a synthesis of different, proven designs becomes selected as a dominant design (Abernathy and Utterback, 1978; Ehrnberg, 1995). The dominant design influences the character of subsequent technological advances that are to follow, therefore establishing the path of future technological development. After a few decades of competition among automobile technologies, for example, the gasoline engine vehicle emerged as a dominant design in the early 20th century. After the selection of a dominant design, the cycle enters the era of incremental change, throughout which the accepted design is elaborated as a result of gradual development under a technological paradigm (Dosi, 1982). The incremental phase comes to an end with the appearance of a new discontinuity, which at the same time marks the commencement of a new cycle of technological change.

The locus of interest in the literature studying technological evolution has traditionally been the supplanting of incumbent technological performance levels by new, higher performance levels as the technology progresses through the cycle described above. There are important reasons for the focus of existing research. First, it is generally assumed that for organizations to remain competitive in the industry they are required to keep up with the successively higher levels of technological performance introduced by the industry over time (Christensen, 1992; Kim, 2003). Hence, the resulting S-curve of technological (performance) evolution (Foster, 1986; McGrath, 1998) is deemed to be an important indicator of industry dynamics which organizations should monitor as well as forecast to remain competitive. And second, the advent of creative destruction and the substitution of the old technology by the new (Fisher and Pry, 1971) is heralded by the diminishing performance increases in the S-curve of technological evolution. Subsequently, the emergence of an alternative technological paradigm creates a discontinuity in technological evolution, which is assumed to be vital for organizations to identify ahead of time in order to ride the wave of change (Anderson et al., 2008; Tushman and Anderson, 1986).

By focusing on the changes in the highest levels of performance, the traditional models of technological evolution have generally neglected the continuation of supplanted performance levels within the technological ecosystem. Although the resurgence of an established dominant design, termed the 'sailing ship effect' (Ward, 1967), has been analysed under the displacement threat posed by a new technological design, the fate of the former has not been studied once it has eventually been dethroned. And yet, technological landscapes are marked by technological designs that were once dominant but which continue to survive in specific market niches beyond the point of displacement by newer designs. This we believe is a limitation of existing models of technological change which deserves due attention.

A deficiency with similar underlying causes is also observed in the technology diffusion model, which studies the growing adoption of a given technology among users over time (Easingwood and Harrington, 2002; Moore, 1999; Rogers, 2003). According to this well established life cycle framework, the diffusion of a technology is characterized by several categories of adopters – innovators, early adopters, early majority, late majority, and laggards – which acquire the technology over time. These adopter categories are primarily delineated by the relative innovativeness of individuals belonging to these groups, in other words, the degree to which the individual is earlier in adopting new ideas than other members of a particular population.

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