# OUTGROWING YOUR IDENTITY: THREE EMPIRICAL ESSAYS ON INNOVATION, IDENTITY CONSTRAINTS AND PRODUCT PROLIFERATION IN SPECIALIST ORGANIZATIONS

by

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# ABSTRACT

This dissertation investigates the competitive environment of craft based specialist organizations. These are often characterized as entrepreneurial, craft based firms that leverage a collective identity of authenticity (and include, but are not restricted to: microbreweries and microdistilleries, artisan cheese producers, custom snowboard, surfboard and bicycle manufacturers, farm to table restaurants, and organic food producers). In this context, I investigate how these entrepreneurial firms leverage reputation, identity, and legitimacy to compete with much larger organizations, despite their inability to garner competitive advantages based on scope and scale economies. The findings are consistent with the notion that craft based organizations operate much differently than mainstream markets.

This dissertation is dedicated to my family.

Thank you for your patience and support.

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# CHAPTER 1

## INTRODUCTION

High levels of growth offer organizations a number of competitive benefits including access to scarce resources, competitive advantages through scope and scale economies, financial leverage, and the ability to build strong network ties through partnerships and strategic alliances. However, growth may also signal to the broader market (i.e., consumers, competitors, partners, and critics) that an organization has fundamentally changed, and that they no longer conform to the characteristics and attributes that the organization has come to be known for. As a result, an important question for management scholars is, can an organization outgrow their identity? If so, what are the consequences and competitive implications when this occurs? This is important because it suggests that organizational growth, almost universally perceived as a positive, might actually pose significant challenges for a firm's long-term success and survival.

As a result, this dissertation seeks to study the implications of organizational growth in a number of different contexts. Of particular interest are industries that are home to specialist organizations. Specialist organizations are often characterized as entrepreneurial, craft based firms that leverage a collective identity of authenticity (and include, but are not restricted to: microbreweries and microdistilleries, artisan cheese

producers, custom snowboard, surfboard and bicycle manufacturers, farm to table restaurants, and organic food producers).

In this context, I investigate how these entrepreneurial firms leverage reputation and identity to compete with much larger organizations, despite their inability to garner advantages based on scope and scale economies. For example, I build on prior research showing how microbrewery startups strategically deploy their collective identity against established mass-production breweries. I argue that the ability to leverage a collective identity as a strategic resource is bounded in some instances and enhanced in others. Specifically, I investigate entrepreneurial growth dynamics by considering the implications for microbreweries as they grow, gain notoriety, and potentially violate their collective identity. These processes have significant implications for a number of startup firms and new industries that leverage a craft based identity, which appear to be gaining in number and popularity. In addition, I also study growth dynamics in the in vitro fertilization (IVF) industry. Within this context, I study how being 'stuck in the middle' can drive differential performance and strategies for organizational change and innovation in IVF clinics.

In its broadest sense, the goal of my research project is to understand the evolving competitive dynamics of specialist organizations. Building on the theoretical underpinnings of resource partitioning theory (Carroll, 1985; Carroll et al., 2002) and size-localized competition (Hannan & Freeman, 1984), whereby consolidation and concentration of generalists at the center of a market open resources on the periphery for specialist proliferation, I suggest that new processes are occurring that are reshaping the specialist domain. While these theories posit a bifurcation of the market, work in

organization theory and organizational ecology has focused greater attention on the competitive environment at the center of the market (Dobrev et al., 2001; Dobrev et al., 2002; Reis et al., 2012) relative to the periphery. Indeed, conventional wisdom and the extant literature suggest that specialist organizations are simply held at the mercy of larger generalists. For example, Hannan (2005) notes that 'As long as the relevant audiences retain the notions underlying the oppositional identity, the specialist niche remains safe from invasion from the center of the market.' Moreover, generalists have been shown to create robust identities, which allow them to encroach on specialist resources (Swaminathan, 2001). Drawing on the literature related to categories, category spanning and category emergence (Zuckerman, 1999; Hsu, 2006; Hsu & Hannan, 2009, Negro et al., 2010, Hannan, 2010; Negro & Leung, 2012), I attempt to explicate theoretical insights and predictions of how specialist organizations are becoming increasingly competitive both in their own competitive space, and in the broader market.

In order to accomplish this, the first study investigates a fundamental paradox in craft based specialist organizations. In order to achieve high levels of growth, nascent entrepreneurial organizations often seek to leverage a single signature product that has proven to be successful in the market. However, for craft based specialists this focused strategy often runs counter to a collective social identity built on a sense of authenticity, creativity, and unique or even idiosyncratic product development. How, then, do specialists reconcile these contrasting logics? Turning to the U.S. craft beer industry, this study posits, and finds empirical support for the notion, that as a craft based organization becomes known for a signature product (i.e., gains notoriety in the marketplace), the appeal of that product will fall. I also find that identity-based cues mitigate this penalty.

Specifically, product proliferation decreases the penalty for the notoriety of signature products. Moreover, the cumulative effects of winning certification contests also serve to mitigate this negative relationship. These findings have important implications for our understanding of how collective social identities mature and are invoked over time, and highlights important boundary conditions with our current theoretical understanding of craft based organizations.

The second study continues this logic by investigating specialist organizations at the product level. At their core, markets are exchange structures between producers and consumers and products are a key element that connects them together. Many new markets emerge in direct ideological opposition to incumbent industries. Yet, the ways in which ideology affects products in oppositional markets are not well understood. I propose that when audiences cannot easily differentiate between products based on physical attributes, they rely on ideological discourse about the production process. I argue that product names, by embodying linguistically the narrative of this discourse, shape the appeal of oppositional products to customers. When products have names that are congruent with the collective identity of an oppositional market, they have higher appeal to consumers. This beneficial effect is attenuated (1) when audience expectations about what type of product should have an oppositional name are violated and (2) when a firm develops a strong organizational identity and audiences rely on this identity to make inference about the firm's production process. I find support to this theorizing in the longitudinal analyses of products' appeal in the U.S. craft beer industry, 1996-2012. These findings suggest that in oppositional markets, when a firm chooses a name for a product it should take into consideration not only characteristics of the product and firm

strategy, but also the collective ideology prevalent in the market discourse.

The third study turns to the context of in vitro fertilization clinics, and seeks to understand the interplay between organizational growth and innovation. Specifically, this study predicts the occurrence and outcome of peripheral change which existing research on core change is not a sufficient explanation. I focus on a special case of peripheral change—incremental technology adoption by clinics in the IVF industry, and develop arguments that account both for the internal and the external context of organizations adopting the technology. I employ organizational size as a measure of the internal context and posit that—contrary to intuitions from the literature on core change and radical innovation—midsize firms are more likely to implement and to benefit from peripheral change than large and small firms. I rely on organizational density as a measure of the external context and predict that—again, in contrast to received theory about core change—peripheral change is less likely to occur as competition intensifies although the benefits of peripheral change are amplified by intensified rivalry. Empirical analysis of the growth, failure and technology adoption rates of IVF clinics in the U.S. between 1989 and 2001 confirm my predictions.

# CHAPTER 2

# PRODUCT PROLIFERATION IN CRAFT BASED INDUSTRIES

## Introduction

When should an organization engage in product proliferation, and what is the result of such a strategy? To address this question, management research has widely studied the impact that change in product scope, i.e., niche width, has on market appeal and firm performance. For example, one perspective suggests that nascent or entrepreneurial organizations should employ a focused product portfolio and leverage a signature product, which will allow them to develop core competencies and capture scale economies, ultimately leading to sustained growth and competitive advantage. Indeed, in dynamic market environments organizations must grow quickly and efficiently in order to survive. However, the counterfactual often emerges in craft based specialist industries, whereby success is derived and measured according to identity-based logics of authenticity, creativity, and unique or even idiosyncratic product development. These identity-based logics operate in sharp contrast to the mainstream, or mass-production, market (Carroll & Swaminathan, 2000; Swaminathan, 2002; Zuckerman & Kim, 2003), hindering their ability to exploit these markets, which is home to the majority of a given industry's consumers.

How then do craft based organizations reconcile these pragmatic needs to grow

their business, with identity-based constraints that penalize organizations for gaining notoriety (i.e., brand awareness) and entering, or even thriving in, the mainstream market? In an attempt to resolve these diverging perspectives, this study identifies organizational identity as a key mechanism influencing a craft based organization's decision to expand its product scope as a means of reinforcing their identity, which can be harmed by crossing over into mainstream markets. Building on the notion that 'the very fact that firms differ in scope implies that these organizations vary with respect to the underlying codes, or routines, that govern their behavior' (Sorenson, McEvily, & Ren, 2006: pg. 916), I identify important boundary conditions in the current understanding of how craft based entrepreneurial organizations grow. Indeed, in craft based specialist organizations, whose collective identity is centered on a sense of authenticity, uniqueness and creativity, product proliferation can serve as an important tool to reinforce this identity particularly when growth, commercial success, and notoriety threaten to undermine it.

This paper investigates a fundamental paradox in craft based industries. Specifically, I test the notion that as craft based specialist organizations grow, gain notoriety, and become known for a signature product, the appeal for that product will fall. In order to stem this loss in appeal, and the violation of the underlying logic of their collective identity, specialist craft based organizations will engage in identity-reinforcing behavior seemingly at the expense of this newfound notoriety. In other words, as craft based organizations become known for their signature product, they will feel the need to undermine this focused brand image by engaging in product proliferation, obfuscating this singular identity. Specialists may also turn to external mechanisms to reinforce their

identity as artisanal and craft based as their product identity becomes more focused. For example, specialists who receive awards in certification contests (Rao , 1994), comprised of their peers who share this collective identity, are also penalized less for being known for a singular or focused product identity. This paper utilizes a unique dataset comprised of roughly 1.2 million online beer reviews from 40,000 different beers and 2,000 breweries over a 17 year time period in the U.S. craft beer industry. However, the results have general implications for the evolution of many craft based specialists industries, which are surprisingly understudied beyond the early stages of their emergence.

## Craft based Organizations and Market Crossover

Specialist organizations represent a positional subset of a market population, which has converged around a given niche in the market, made available on the periphery by consolidation and concentration at the center (Carroll, 1985; Dobrev et al., 2001, 2002). Furthermore, two salient attributes related to the emergence of these organizational niches have developed from the extant literature. First, specialist organizations exhibit the propensity to cultivate a collective social identity (Carroll & Swaminathan, 2000; Swaminathan & Wade, 2002) that is often oppositional in nature, reflecting and reinforcing its peripheral position within a given market space. Second, from a competitive perspective, specialist organizations have been perceived to occupy a tenuous position, effectively being held at the mercy of the broader market. This is due to the fact that specialists are thought to proliferate only because the segment of the market they occupy did not show enough potential and was not amenable to capturing economies of scope and scale that the larger firms sought.

Indeed, Hannan (2005) notes that these specialists are likely only able to survive under specific circumstances: 'As long as the relevant audiences retain the notions underlying the oppositional identity, the specialist niche remains safe from invasion from the center of the market' (pg. 66). This sentiment is echoed in research showing that generalist organizations possess the ability to leverage robust identities, encroaching on specialist markets as they become more attractive (Swaminathan, 2001). But, in recent years craft based organizations appear increasingly capable of crossing over into mainstream markets. Indeed, it appears that the challenge facing these organizations is not the competitive pressures from the firms operating in mainstream markets, rather craft based firms face the challenge of achieving growth without violating their craft based identity, and alienating their original customer base.

This paper focuses on a particular set of specialist organizations, specifically those that leverage a craft based identity which highlight the organizational attributes of authenticity, creativity and uniqueness. These organizations include, but are not limited to: microbreweries, artisan cheese producers, microdistilleries, farm to table restaurants, luxury boutique hotels, organic food producers, and custom snowboard, surfboard and bicycle manufacturers etc. I suggest that these craft based organizations are increasingly unique in that their ability to leverage their collective identity as a strategic resource is bounded under certain conditions and enhanced under others.

For example, Verhaal et al. (2013) show that oppositional names in the microbrew industry have traditionally increased the appeal of beers which utilize them. However, as the collective identity of this industry matures, and increasingly enters the mainstream market, the use of oppositional names become less effective. Ultimately, the oppositional

identity underpinning this specialist industry may be evolving, whereby the salient attributes of the broader collective identity is less a function of the oppositional relationship with the incumbent industry, and more a function of the internal maturation of the specialist industry itself. In suggesting the evolution and change of the specialist resource space, I build on the suggestion of previous researchers who have sought to connect long-term changes in the environment to microprocesses occurring over time within the niche (Dobrev, Kim, & Carroll, 2002)

## A Focused Identity for Craft based Organizations

The role of identity has long been a central theme in organization theory, both at the organizational level (Albert & Whetten, 1985) and at the interorganizational or collective level (Carroll & Swaminathan, 2000; Swaminathan & Wade, 2002; Glynn, 2008). At the organizational level, much of this work differentiates identity from an organization's culture or image (Whetten, 2006), as well as details processes of how organizations manage multiple identities (Foreman & Whetten, 2002) and consolidate identities between organizations (King, Clemens, & Fry, 2010). Moreover, a great deal of research has looked at how collective identities emerge (Carroll & Swaminathan, 2000, Kennedy, 2008; Navis & Glynn, 2001). Within this context, two perspectives have sought to explain how collective identities become established and gain legitimacy. In the first, collective identities become legitimated through a density driven process of being counted (Hannan & Freeman, 1989, Kennedy, 2008), whereby proliferation of like-minded organizations leads a sense of taken-for-grantedness of the collective identity. An alternative perspective suggests that collective identities emerge and are legitimated

from the storytelling process of cultural entrepreneurship (Lounsbury & Glynn, 2001), whereby organizations develop a defining 'collective identity story' that highlights the group's core beliefs and practices (Wry, Lounsbury, & Glynn, 2011).

Much less is understood, however, about how these collective identities evolve and mature over time. Once legitimated, collective identities benefit organizations in a myriad of ways and provide security against broader competitive forces in the market. However, as organizations, and the environment that they operate in, change and evolve do collective identities evolve as well? Ostensibly, organizations remain a member within a collective identity as long as the routines and logics that an organization adheres to fits with the broader collective. In the event that an actor's individual identity no longer fits, they may either be pushed out or seek to transfer to a new collective that better aligns with the actor's identity logic (Rao, Monin, & Durand, 2003). For example, Wry et al. (2011: pg. 449-450) suggest that as actors within a collective identity proliferate, 'collective identity members face pressure to differentiate themselves within the group to be competitively distinctive and secure needed resources.' I suggest, however, that for craft based specialist organizations a much different process is occurring. I argue that specialist craft based industries do not distinguish themselves to secure needed resources. Indeed, organizations that are capable of securing these resources are increasingly at risk of violating the underlying logic of their collective craft based identity.

This identity violation leads consumers and other audience members to reevaluate their perceptions of these organizations and should result in a penalty for these organizations. This contrasts with the notion that specialists should project a focused

product identity (Zuckerman et al., 2003). It also creates a competitive disadvantage for these firms, because particularly for nascent and entrepreneurial organizations, success is often driven by the ability to garner recognition for a signature product that fuels rapid growth. This rapid growth is most effectively and efficiently achieved from leveraging a focused brand, both in terms of marketing and production. Indeed, focusing on primarily one product allows specialist organizations to streamline production, and begin to reap the benefits of scale economies. Moreover, leveraging a focused product portfolio allows nascent organizations to avoid the early stage pitfalls of expansion beyond their capabilities. For example, Zahavi and Lavie (2013) show that during the early stages of intra-industry diversification, specialist organizations can be hurt by a process of negative transfer, or an inability to adjust to extraneous factors or context when adding additional products that appear to be similar to existing products. In contrast, once the success of a signature product is well-established, this gives these entrepreneurs the flexibility and resources to expand their product scope and survive these early problems, potentially leading to a halo-effect for these new products which are benefiting from the brand equity that the signature product has created.

However, in craft based specialist organizations as an individual product becomes popular, and the identity of the organization as a whole becomes associated increasingly with that product, consumers may perceive these firms to be increasingly mainstream, or lacking in authenticity. Importantly, these firms may not have actually crossed over into the mainstream market, however, their notoriety creates the perception of market crossover. Part of the appeal of these craft based products is the notion of authenticity and exclusivity. Therefore, as these organizations build up economies of scale and

expand the distribution and reach of their signature product, the exclusivity of the product wanes. It also becomes much more difficult for these organizations to convince consumers that their product was produced using traditional craft based methods. This leads to the following hypothesis related to product focus and consumer appeal:

- H1: *The more a craft based organization becomes known for a signature product, the lower the appeal for that product.*

## Internal Context – Product Scope

How then do these organizations reinforce this identity logic, when faced with the paradoxical challenge of being hurt by growth and notoriety? This paper suggests that craft based organizations, which are harmed by gaining notoriety for a signature product, can engage in identity reinforcing behavior via product proliferation or an increase in their product scope. Diversification, via intra-industry product proliferation, has long been thought to benefit organizations, so at first glance this may not come as a surprise. The primary driver of this benefit is suggested to be the ability to create scope economies. Scope economies have been shown to benefit organizations in two fundamental ways: first, it creates synergies and opportunities for resource sharing across product and business lines (Sorenson, 2000; Stern & Henderson, 2004; Tanriverdi & Lee, 2008); second, scope economies foster multimarket contact (Gimenco & Woo, 1999) and a general reduction in the competitive pressures within an industry.

However, the impact that product scope has on the ability of organizations to manage a collective identity is less understood. Particularly for specialist organizations, the implications for product proliferation are a particularly thorny issue. For example, as understood within the theoretical underpinnings of resource partitioning theory

(Carroll, 1985; Carroll, Dobrev, & Swaminathan, 2002), specialist organizations ought to maintain a focused or narrow niche width lest they open themselves to competition from the center of the market. Moreover, research on the identity-based constraints posed by market categories suggests that specialist organizations face market-based penalties if they span multiple market categories (Hsu, 2006; Negro et al., 2010; Negro & Leung, 2013) or cannot be easily placed or identified within a specific classification set (Zuckerman, 1999). The logic underlying this assertion is that a focused product portfolio signals a coherent identity to audience members, while a diffuse product identity creates confusion as to the organization's purpose (Zuckerman, 2000; Zuckerman et al., 2003).

I suggest that craft based specialists represent a unique set of specialist organizations in that they are able to span market categories or classification sets precisely because their collective identity is built on the notions of creativity, authenticity and a sense of artistic expression and playfulness. Therefore, rather than causing confusion, a broad product scope serves to reinforce the underlying tenets of a collective identity. This in turn should allow craft based specialist organizations to take advantage of the notoriety that accompanies a signature or hallmark product. This results in the following hypothesis related to product scope, diffuse identities, and a appeal for signature products:

- H2a: *The greater the product scope for craft based specialist organizations, the greater the appeal for its signature product.*

With the notion established that product scope has a positive impact on the appeal of a craft based specialist products, I attempt to reconcile this finding with the previous assertion that the greater the notoriety of a specialist's signature product, the lower its

appeal. As noted above, I argue that within craft based organizations, the goal of diversification and product proliferation is neither to create scope or scale economies, nor is it to competitively differentiate oneself from likeminded specialists in order to gain access to scarce resources (Wry et al., 2011). Quite the contrary, I suggest that product proliferation may be a function of two distinct, yet related processes. The first is that product proliferation within craft based organizations occurs as a natural expression of one's underlying codes and routines (Sorenson et al., 2006), which as opposed to competitively differentiating these specialists, actually serves to conform to other likeminded organizations operating under the same protective cloak of the given industry's collective identity.

Second, by invoking this collective identity though product proliferation, craft based specialist organizations may be attempting to counter the paradox described above whereby growth, notoriety, and product awareness leads to identity violation and the reduced appeal of an organization's signature product. Under these conditions, craft based organizations may seek to engage in product proliferation as a means of internal identity reinforcement in order to realign the logics and routines of the organization with the broader identity of the specialist craft based collective.

- H2b: *The greater the product scope for craft based organizations, the lower the appeal penalty for becoming known for a signature product.*

## External Context – Certification Contests

An organization's ability to gain public recognition and approval has been shown to result in a myriad of positive externalities for the organization. The cumulative effect of this recognition, or legitimacy, has often been suggested in the literature to represent

the social construct of reputation. Organizational reputation can be understood as 'an intangible asset based on broad public recognition of the high quality of its capabilities and outputs (Pfarrer, Pollock, & Rindova, 2010). Furthermore, one means of measuring the construct of reputation is through certification contests (Rao, 1994; Wade et al., 2006; Graffin & Ward, 2010). At their core, certification contests represent 'social tests' of organizations and their products (Thompson, 1967; Rao, 1994) which situate organizations within a hierarchy of their peers.

The reputation of an organization is important to those actors that are members of a collective social identity. This is due to the fact that reputation sends signals to the market about an organization's general ability, and potentially reduces uncertainty related to the degree to which an actor adheres to the logic of that collective identity. Furthermore, reputation is particularly important for craft based specialist organizations, because the identity of these actors is premised precisely on the notions of quality and authenticity. While organizations possess internal mechanisms through the ability to adopt symbols that project a sense of cognitive legitimacy (Scott, 1987), craft based specialists can also benefit from external signals that portray them as appropriate or reputable firms. Absent this endorsement from the general public, specialist organizations would likely be forced to compete with actors in the mainstream market, without the protective cover of a collective social identity. Those actors that are able to gain this public endorsement and the recognition of their peers should, ceteris paribus, enjoy greater appeal for their products, including their signature products. This leads to the following hypothesis related to reputation, certification contests and product appeal:

- H3a: *The greater the reputation of a craft based organization, the greater the appeal for its signature product.*

However, can the accumulation of reputation over time compensate for the violation of a craft based specialist's collective identity? As noted above, craft based specialists who achieve notoriety, and are perceived as mainstream, run the risk of violating their collective identity of creativity, uniqueness and authenticity. While this study highlights an internal mechanism for mitigating this penalty, I argue that external signal of reputation, conferred through cumulative awards garnered in certification contests, can also mitigate this penalty for violating a craft based collective identity. Importantly, these awards or signals of reputation must originate from peers or authority figures within the bounds of the collective social identity. Indeed, garnering a reputation beyond the confines of this collective may actually produce the opposite effect, creating notoriety and a lack of authenticity. This type of notoriety may actually be more akin to celebrity (Rindova, et al., 2006), as opposed to reputation, and this study seeks to differentiate along those lines precisely because in craft based specialists industries notoriety or celebrity should run counter to the underlying foundations of the collective identity.

Assuming, then, that signals of reputation are consistent with the underlying tenets of the craft based specialist's collective social identity, I argue that this cumulative reputation effect has the ability to mitigate the penalty incurred by actors that gain notoriety which is fueled by growth derived from the success of a signature product.

- H3b: *The greater the reputation for craft based organizations, the lower the appeal penalty for becoming known for a signature product.*

## Empirical Setting

According the Brewer's Association (BA)[1], an American craft brewer should be small, independent and traditional. This means that a beer producer is classified as a craft brewer if it produces less than 6 million barrels of beer per year, is less than 25% owned by another alcoholic beverage company, and adheres to the recognized industry standards for quality and tradition. The craft brewing industry consists of two market segments: microbreweries and brewpubs that produce less than 15,000 barrels of beer per year and regional breweries that produce between 15,000 and 6 million barrels per year. Breweries that produce more than 6 million barrels per year are considered to be mass production breweries, and cannot be called a craft brewery[2].

The craft brewing market emerged in the 1980s and saw tremendous growth in the ensuing years. This phenomenon is well documented in previous research (e.g., Carroll & Swaminathan, 2000). Furthermore, it represents a clear example of resource partitioning whereby market consolidation of mass producers created a resource space on the periphery for the proliferation of microbreweries and brewpubs (Carroll, 1985; Carroll, Dobrev & Swaminathan, 2002). Another reason for the rise of the craft brewers was the homogenization of beer from mass producers that created a space for product

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[1] The Brewer's Association is considered throughout the brewing industry as the authority on craft brewing and microbrews in the United States. In its role as an advocate for craft breweries it serves a number of functions, for example, a lobbyist, publisher and organizer of the two largest beer festivals in the world (the Great American Beer Festival and the World Beer Cup).

[2] This threshold was recently changed by the Brewer's Association, and had previously been 2 million barrels per year. However, as large regional breweries, such as Boston Beer Company (i.e., Sam Adams), began to reach this production limit, the limit was increased to include them. At the same time, lawmakers from Massachusetts also successfully lobbied Congress to extend current tax breaks for craft breweries to include production up to 6 million barrels per year.

differentiation based on technical product dimensions, such as taste and ingredients.

The emergence of microbreweries and brewpubs gave rise to a social movement that promoted the idea of imperative for tradition and authenticity in beer brewing. The organizational form identity based on tradition and authenticity has largely prevented the large, mass producers from encroaching on the specialist resource space and winning over microbrew consumers. This happened even though over time mass breweries learned to remove the technical impediments (e.g., taste, color, etc.) that at first objectively disadvantaged their products relative to craft beers. It is now seen as an identity constraint – craft beer audiences see mass producers as only making low-quality beer and focusing more on profits than on beer (Carroll & Swaminathan, 2000). The perceived low reputation of mass producers is so strong that in some cases it even spillovers to craft breweries. For example, because American lager is strongly associated with mass producers, when microbreweries make this style of beer by authentic methods beer enthusiasts still perceive it as low quality and inauthentic (Barlow & Verhaal, 2013).

Craft brewers offer a range of different beers within a broad range of categories. Indeed, it is not uncommon for even small microbreweries to offer multiple styles of beer that all require different ingredients and brewing techniques. For example, Epic Brewing Company located in Salt Lake City, Utah is a relatively small microbrewery that has been in business since 2010. In that time they have produced over 40 different beers that span the entire range of beer styles. They include: stouts, American lagers, barleywine, pumpkin ale, Belgian ales, fruit beers, and even organic and gluten-free styles. This sense of diversity, originality and playfulness in the brewing process is a hallmark of the

craft beer movement's social identity.

## Data Sources

In order to test how product proliferation of craft beers and signature beer notoriety impact product appeal to consumers, I use consumers' online ratings of beer. Consumers provide ratings to declare the value they attach to a firm's product (Zeithaml, 1988; Kovács, Carroll & Lehman, 2013). Such value ratings are one manifestation of product appeal (Kovács & Hannan, 2011). They tend to shape consumer product choices (Sweeney & Soutar, 2001) and consequently affect organizational performance (Luca, 2011). With the continued proliferation of the Internet as a means of communication and interaction, consumer value ratings have been increasingly declared in public forums through online reviews posted on review websites. These websites have recently become a popular data source for studies on product and organizational appeal (e.g., Kovács, Carroll & Lehman, 2013; Kovács & Hannan, 2011; Luca, 2011).

The reviews for this study come from the online beer review website *BeerAdvocate* (www.beeradvocate.com). BeerAdvocate has been in existence since 1996 and has data on ratings of 83,000 different beers from all over the world. As of January, 2013, it has totaled 2.7 million reviews. These reviews were written by 25,974 unique users, for which the average number of reviews was 45.6 with a maximum number of reviews of 3,960. In 2013, BeerAdvocate received on average 25 million page views from 2.5 million unique visitors per month.

On BeerAdvocate, any user can create an account and then rate and write a review about a beer listed in the database. Reviewers can rate beers across four specific

dimensions: look, smell, taste, and feel on a 1-to-5 scale (they can also provide an 'overall' score), as well as write additional commentary and critique about each dimension. Once a user gains a certain amount of reviewing experience and legitimacy on the website, s/he can suggest a new beer for review that has not been incorporated into the online database yet. The website uses a developed classification framework and places newly suggested beers into appropriate style categories before making them available for reviewing.

BeerAdvocate is an appropriate data source for testing my hypotheses for several reasons. First, the website is broadly recognized by mass media (e.g., the New York Times, USA Today, Boston Globe) and by Alexa Internet Inc. (a leading company that tracks web traffic data) as one of the two largest online beer review sites and online beer communities in the world. The other largest online website, RateBeer, was founded in 2000. Second, BeerAdvocate provides detailed information about reviews, reviewers, beers, and breweries, such as, for example, beer style, beer review score, date of beer review and so on. It covers a great variety of beers, including very rare ones. Finally, BeerAdvocate is popular among craft beer enthusiasts and beer lovers and, thus, allows us to look at the effect of signature beer notoriety on the audience for which these products are intended.

For the purposes of this study, the data are restricted to the U.S. craft breweries only (i.e., production less that 6 million barrels per year), and represents the entire population of reviews of these organizations and their beers from the website's inception in 1996 through May of 2012. The final dataset consists of 1,151,627 unique reviews of 41,982 different beers produced by 1,954 unique craft breweries. The data are

aggregated at the brewery-year level, and the final dataset consists of 11,145 brewery-year observations (see Figure 2.1).

## Operationalization of Variables

**Dependent variable.** The dependent variable in this study, signature beer appeal, isolates the single beer for a given brewery that has received the greatest number of reviews in a given year (i.e. its signature beer). I then calculate the average rating of all beer reviews for this beer in a given year. Each individual review scores a beer on a scale of 1-5 (in increments of 0.25) based on five dimensions: look, smell, taste, feel and overall. The total mean of these five component scores is taken for each review and then averaged by year to calculate the yearly average signature beer score, resulting in the signature beer's audience appeal. The resulting measure is a continuous variable ranging from 1 to 5.

**Independent variables.** In order to test the main effect of a signature beer's level of notoriety on its appeal, I construct the variable, *signature beer notoriety (H1)*, which is a ratio of the total number or reviews that a brewery receives for its signature beer relative to its total number of reviews for all beers. In other words, this variable captures the degree to which its signature beer is known, discussed and reviewed relative to its other beers. For example, if Brewery 'X' receives 100 total reviews in 2008, and 75 of those are reviews of it signature beer, the resulting value is 0.75.

The main effect of *product scope* is calculated as a count of the total number of beers that a brewery has received at least one review for in a given year. While not a perfect proxy for a brewery's product portfolio, because beer is a perishable good, it is

likely that if a beer was reviewed in a given year it was likely produced not too long before the review was conducted. Furthermore, because of the emphasis of quality in the brewing process, it is unlikely that craft breweries will systematically sell beers that are more than one year old. In order to test Hypothesis 2b, I interact the product scope variable with the notoriety of the signature beer (*scope*notoriety*).

The main effect of *reputation* is calculated as the cumulative count of the total number of medals that a given brewery has won at the Great American Beer Festival. This festival, run by the Brewer's Association, represents the most popular and well known certification contest in the craft brewing industry. During the festival, beers are judged by style using a blind review process and winners are awarded either a gold, silver, or bronze medal. In order to test Hypothesis 3b, I interact the reputation variable with the notoriety of a brewery's signature beer (*reputation*notoriety*).

**Control variables.** Unfortunately, data for both production and founding/failure date are complete for only about 75% of breweries in the dataset. In order to provide a next best approximation for these variables I calculate a dummy variable for size, which represents a 1 if a given brewery was one of the Top 50 producers in the industry in a given year. This list of top 50 craft beer producers is calculated and published each year by the Brewers Association, which is widely considered to be the leading authority on the craft beer industry in the United States. Additionally, to account for organizational age, I calculate a tenure variable which counts the total number of years that a given brewery has appeared in the dataset (i.e., the total number of years that a brewery has received at least one review).

In order to rule out additional alternative explanations to the proposed hypotheses,

I control for a number of different variables at various levels of analysis. The competitive environment of the industry could potentially play a role in the appeal of an organization's product, including its signature product. Therefore, I control for year *brewery density*. Next, I account for the overall popularity of the industry as a whole by calculating the natural log of the total number of industry reviews by year. The degree to which a brewery is generally known may also influence the appeal of its signature product, so I control for the total number of yearly reviews that a brewery receives. Next, prior research (Barlow & Verhaal, 2013) has shown that in the craft beer industry beers in the American lager category are particularly devalued, therefore I control for the total number of Ameican lager reviews a given brewery receives as this may influence overall levels of appeal and/or reputation of the brewery. I also control for the total number of unique reviewers that a brewery receives in a given year. If a particular brewery is reviewed by only a small number of reviewers, this may artificially inflate or deflate the appeal of their beers. Importantly, the model accounts for state fixed effects by including state dummies (however, due to size constraints these dummies are not included in the final tables). This is important because the craft beer industry has traditionally been a very regional industry, where certain areas of the country have much higher levels of participation. As a result, the location of a given brewery may impact its appeal. I also control for year fixed effects.

**Specification**. The empirical model regresses the dependent variable, *signature beer appeal*, in a given year on the main effect predictor variables, interactions, and other observables in the previous year. This eliminates all brewery-year records in the last observation year for each of the breweries in the data. It also completely eliminates

breweries with single-year observations. As a result, from the original 11,145 observations we are left with a final sample with 8,726 brewery-year observations from 1,646 different breweries.

I use population-average techniques to model all hypotheses, specifically the method of generalized estimating equations (GEE) which allows me to model variance both between breweries and across time for each brewery. GEE was first introduced by Liang and Zeger (1986), and Zeger, Liang, and Albert (1988). The data are structured as an unbalanced panel with multiple observations of different length for each brewery. The different brewery-year records for each brewery are likely autocorrelated because of permanent but unobserved brewery characteristics. To control for such serial correlation between the records for each brewery, I use the exchangeable correlation matrix and calculated cluster-robust standard errors based on the Huber-White sandwich estimator (Huber, 1967; White, 1980), as implemented in Stata 12.

## Results

Descriptive statistics for control variables and key explanatory variables are presented in Table 2.1.

Table 2.2 tests for the main effect of the notoriety of a brewery's signature beer. Model 3.1 in Table 2.2 is a baseline model. Controls show common effects in the expected direction. The more intense the competitive environment, the more difficult it is for a brewery's signature beer to gain widespread appeal as there are many alternatives to compare it to. As a result, appeal is lower during periods of higher brewery density. The greater number of overall reviews that a brewery receives, the higher the appeal of its

signature beer. This might suggest that becoming more well know is a positive for breweries. However, further analysis reveals that this effect is non-monotonic and the squared term of cumulative brewery reviews is negative and significant. In this light, the positive linear effect makes sense because even unique breweries must first gain some level of attention and praise before they can be considered mainstream. The number of American lager reviews that a brewery receives also appears to represent a negative halo effect, as an increase in these reviews is associated with lower appeal for a signature beer. Finally, the longer a brewery stays on the market, the lower its appeal for a signature beer. This is consistent with the general argument that craft based specialists who are perceived to be mainstream are penalized because it does not fit with the collective identity of authenticity and uniqueness.

Model 3.2 tests the main effect of a signature beer's notoriety on its appeal. The effect is strongly negative and significant. Therefore, as a brewery's signature beer becomes more well-known relative to its overall product portfolio, the appeal for this product declines. Hypothesis 1 is fully supported.

Model 4.1 in Table 2.3 tests the impact of product proliferation on appeal. The coefficient is positive and significant which suggests that the greater the product scope of a brewery, the higher the appeal of its signature beer. I argue that this is due to the fact that craft based specialist organizations which produce many different types of products are rewarded because they are conforming to their craft based collective identity. Hypothesis 2a is confirmed. However, despite a broad product scope, many organizations become known for a signature or hallmark product. This is problematic for craft based specialists who are penalized for appearing mainstream. Still, can increasing

product scope potentially alleviate some of the negative perceptions for entering the mainstream? Model 4.2 tests the interaction of product scope and the notoriety (Figure 2.2) of a brewery's signature beer (i.e., the degree to which it is known on the market). The interaction is positive and significant suggesting that product proliferation can serve as a mechanism or tool to reduce the penalty that breweries face for being perceived as more mainstream. In other words, holding a signature beer's notoriety constant, increases in product scope will be associated with an increase in a signature beer's appeal. Hypothesis 2b is confirmed.

Turning to the external context, I suggest that higher levels of reputation, conferred by external stakeholders who are still members of an actor's collective identity, will lead to higher levels of appeal for a brewery's signature beer. Model 4.2 tests this using the cumulative number of medals that a brewery has won at the Great American Beer Festival. The coefficient is positive and significant, suggesting that in addition to internal tools (i.e., product scope), there are also external mechanisms such as reputation which serve to increase the appeal of a brewery's appeal for its signature beer. Hypothesis 3a is fully supported. However, can this increased reputation also help alleviate the penalty associated with craft based specialists being considered mainstream? In Model 4.4, the interaction of reputation and the notoriety of a brewery's signature beer is also positive and significant (Figure 2.3). This suggests that actors within a craft based collective identity are willing to overlook to some extent an actor entering the mainstream if they are deemed to possess a high reputation. Hypothesis 3b is fully supported. Finally, Model 4.5 represents a fully specified model and the both interaction effects still hold and are highly significant.

## Robustness Checks

In order to confirm the robustness of these findings and rule out further alternative explanations, I test the results in multiple ways. At very low levels of *signature beer notoriety*, it may be difficult for consumers and the broader market to identify exactly which beer is a brewery's signature beer. For example, a value of .05 for this variable implies that only 5% of a brewery's overall reviews are for its most reviewed beer, suggesting a brewery may have many well know beers rather than one clear signature beer. In order to account for this possibly biasing the results, I excluded all observations where the value of *signature beer notoriety* was less than 0.10 (or 10% of all brewery reviews). After running all models again, all results held as they had previously. This suggests that the measure is indeed capturing the perception of notoriety for a brewery's signature beer. Additionally, at very high levels of *signature beer notoriety*, this variable may not sufficiently be capturing notoriety per se, but rather a brand new brewery that is just beginning to receive reviews. In order to account for these breweries potentially biasing the results, I excluded all observations where *signature beer notoriety* was greater than 0.90, and reran all models. All hypothesized results held excluding these levels of notoriety as well.

In addition, breweries that are relatively new on the market, or not very popular, may not have developed enough notoriety to legitimately have a signature beer. While possible, it is less likely that breweries have achieved notoriety, or are perceived to have a true signature beer, if the brewery has not garnered a significant number of reviews on the Beer Advocate website. In order to account for this, I excluded all observations for breweries that had received fewer than 50 cumulative total reviews on the website, and

rerun all models. The results were largely unchanged and robust to this specification (the main effect for medals won became marginally significant). All other models remain unchanged and fully significant. To take this assumption a step further, I reran all models excluding observations for breweries that had received less than 100 reviews on the website. Results remain robust and unchanged to the specification with 50 cumulative reviews.

In order to account for the possibility that certain breweries are inherently different, and therefore driving the effect of reduced appeal for signature beer notoriety, I run models that control for specific 'types' of breweries. For example, within the craft beer industry, breweries often operate as brewpubs rather than strictly as a brewery. In essence these organizations are combining brewing with operating a restaurant, and therefore their perception by consumers may be different from firms that are strictly breweries. Additionally, some breweries contract out the production of some or all of their beers to other breweries. This is often done when breweries do not have the production capacity to meet demand. Prior research has shown that there is a negative perception of these contract breweries in the market (Carroll & Swaminathan, 2000), because they violate the underlying identity codes of the collective identity. As a result, I rerun all models controlling for these different types of firms utilizing dummy variables for breweries that are either brewpubs or contract some or all of their production to other organizations. Results are unchanged and robust to these alternative specifications. These variables are not included in the original models because I do not have complete data for all breweries, and models were run on a subset of the data. The dummies for brewpub and contract breweries are complete for 1,586 of the 1,954 breweries in the

dataset, or just over 80% of all breweries.

Another factor that could impact both brewery appeal and the appeal of their products is the size of the brewery. Large breweries run the risk of violating a collective identity built on authenticity and small production within the microbrew industry, which could lead to perceptions or associations with mass-production brewing. While in the original models I control for the largest craft breweries by including a dummy variable for the largest 50 craft breweries in the industry in a given year, I ran further analyses to account for this size effect. In order to do this I include a variable that was a count of the number of barrels of beer that a brewery produced in the year that it entered the dataset. Breweries which are already large once they enter the dataset may be perceived differently than breweries that enter when they are small and simply grow as a result of increasing popularity. Results are robust to the inclusion of this variable. However, like the brewpub and contract controls, data are incomplete for all breweries. Therefore this model was run using a subset of 1,177 breweries.

## Discussion and Conclusion

This study identifies a fundamental paradox in craft based specialist organizations, which has important implications for a number of different theoretical areas of management and organization theory. While nascent and entrepreneurial organizations should ostensibly benefit from the emergence and success of a signature product, specialist craft based organizations face market penalties when they grow or gained notoriety because this runs counter to their collective social identity which is built on a sense of authenticity, creativity, and uniqueness. In order to reconcile these two

perspectives, I suggest that craft based specialists are unique in that, because their identity is founded on this sense of authenticity, leveraging a diffuse product identity may help mitigate the market penalty for gaining notoriety and becoming mainstream.

Specifically, I find that as craft breweries become well known for a signature product, the appeal for that product falls. This places these organizations in a very difficult strategic position, because particularly for nascent entrepreneurs, growth and survival is often driven by the ability to create and sustain these types of products. However, I also find that these craft based specialists can mitigate the damage that this notoriety creates by expanding their product scope. While traditionally specialists are thought to benefit from a focused, not a diffuse, identity, I argue that craft based specialists are unique in that they are able to diversify their product portfolio because their collective identity specifically values the notions of creativity, uniqueness and authenticity. As a result, microbreweries are more easily able to leverage a signature product, without the risks associated with being perceived as too mainstream.

I also find that breweries' reputations, as conferred by stakeholders that also share their collective identity, mitigates this notoriety penalty. In essence, evaluators appear to be overlooking the fact that breweries are becoming mainstream, because the reputation of a brewery signals that despite this notoriety they are still engaging in high quality and authentic production practices.

These findings deepen our understanding of specialist craft based organizations. While this study focuses on the U.S. craft brewing industry, the implications are generalizable to a number of other industries. These types of craft based industries appear to be gaining in number and popularity and represent a unique context through

which to apply extant theoretical perspectives as well as build new theoretical insights. Moreover, while the craft beer industry has been ubiquitously cited in the management literature as the prototype for a specialist organization, as well as a social movement operating under a collective identity, there are relatively few studies that use it as an empirical setting to test specific hypotheses (for example, relative to the automobile, biotechnology, technology/computer/silicon valley/, banking, and pharmaceutical industries etc.). The reality is that we know relatively little about the nuances of the industry beyond it serving as the classic example of a specialist industry, vis-a-vis generalists as understood within the construct of resource partitioning theory.

More broadly speaking, the results suggest that these specialist industries may be evolving, and that our theoretical understanding of the constraints that these organizations operate under should also evolve as well. Thus, I build on the theoretical insights outlined within the context of resource-partitioning theory, but I also identify important boundary conditions for how specialists are in some instances constrained, and in others emboldened by their specialist identity. This paper also contributes to the literature related to collective social identities by providing insight on how these identities evolve and change beyond their emergence and formative years. Additional research in this area may seek to distinguish between what happens to collective identities as they decline over time relative to how they may change and evolve, by incorporating new members or changing the core logics of the identity itself. Finally, the paper contributes to the literature related to product scope and product proliferation, which has implications not only for craft based specialists but a wide range of entrepreneurial organizations.

Overall, this paper seeks to highlight the strategic paradox that craft based

specialist organizations face when growth and success lead directly to the violation of one's collective identity. The implications of this are clear: should these actors simply be content to maintain a stable size and growth trajectory? Or are there mechanisms at their disposal which will allow them to reconcile these countervailing forces? These questions seem particularly relevant and we see the increased popularity of these types of organizations across all manner of industries and competitive environments.

Table 2.1

Descriptive Statistics for Signature Beers

| Variables | mean | sd | min | max |
|---|---|---|---|---|
| **Brewery Density/100 (t)** | 10.96028 | 3.5838 | 0.01 | 15.83 |
| **Industry Reviews ln (t)** | 11.40365 | 1.114336 | 0 | 12.44525 |
| **Cumulati ve Brewery Reviews/1,00(** | 0.4269 | 1.779196 | 0.001 | 40.36 |
| **American Lager Reviews/10 (t)** | 0.2753 | 1.564124 | 0 | 40.3 |
| **Reviewer Count/100 (t)** | 1.7513 | 1.84337 | 0.01 | 16.02 |
| **Top 50 Producti on = 1 (t)** | 0.0579516 | 0.233664 | 0 | 1 |
| **Brewery Tenure (t)** | 4.887752 | 3.212566 | 1 | 17 |
| **Signature Beer Notoriety (t)** | 0.4111759 | 0.2854162 | 0.0201613 | 1 |
| **Product Scope (t)** | 10.89394 | 14.03492 | 1 | 276 |
| **Reputati on (t)** | 1.151279 | 4.212765 | 0 | 85 |

Number of Breweries = 1,930; Number of brewery-year observati ons = 11,145

Table 2.2

GEE Estimates of Signature Beer Notoriety

| Variable | Model 3.1<br>GEE | Model 3.2<br>GEE |
|---|---|---|
| **Brewery Density/100 (t)** | **-0.019*** ** | **-0.018*** ** |
| | (0.004) | (0.004) |
| **Industry Reviews ln (t)** | **0.023*** | **0.015** |
| | (0.011) | (0.011) |
| **Cumulati ve Brewery Reviews/1,000 (t)** | **0.021*** ** | **0.021*** ** |
| | (0.005) | (0.005) |
| **American Lager Reviews/10 (t)** | **-0.010** ** | **-0.010** ** |
| | (0.003) | (0.003) |
| **Reviewer Count/100 (t)** | **0.002** | **-0.000** |
| | (0.003) | (0.003) |
| **Top 50 Producti on = 1 (t)** | **-0.017** | **-0.031** |
| | (0.034) | (0.034) |
| **Time Since First Review (t)** | **-0.008*** | **-0.011*** ** |
| | (0.003) | (0.003) |
| **Signature Beer Notoriety (t)** | | **-0.164*** ** |
| | | (0.028) |
| **Constant** | **4.050*** ** | **4.213*** ** |
| | (0.123) | (0.126) |
| **State Dummies** | **Yes** | **Yes** |
| *Wald Chi-Squared* | 223.81 | 257.98 |
| *Scale Parameter* | 0.2758837 | 0.2689239 |
| *df* | 57 | 58 |

Dependent variable is yearly signature beer appeal and is led by 1-year

N = 8,726

+p<0.1, *p<0.05, **p<0.01, ***p<0.001 two tailed test

Unstandardized coeff ecients reported

Robust standard errors clustered by brewery in parentheses

Table 2.3

GEE Estimates of Product Scope and Reputation

| Variable | Model 4.1 GEE | Model 4.2 GEE | Model 4.3 GEE | Model 4.4 GEE | Model 4.5 GEE |
|---|---|---|---|---|---|
| **Brewery Density/100 (t)** | **-0.017*** ** | **-0.015*** ** | **-0.016*** ** | **-0.017*** ** | **-0.016*** ** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| **Industry Reviews In (t)** | **0.012** | **0.008** | **0.012** | **0.016** | **0.013** |
| | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) |
| **Cumuiati ve Brewery Reviews/1,000 (t)** | **0.011*** | **0.012** ** | **0.011*** | **0.012** ** | **0.012** ** |
| | (0.005) | (0.004) | (0.005) | (0.005) | (0.004) |
| **American Lager Reviews/10 (t)** | **-0.008** ** | **-0.008** ** | **-0.008** ** | **-0.008** ** | **-0.008** ** |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| **Reviewer Count/100 (t)** | **-0.001** | **-0.001** | **-0.001** | **-0.001** | **-0.001** |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| **Top 50 Producti on = 1 (t)** | **-0.042** | **-0.044** | **-0.048** | **-0.054** | **-0.056** |
| | (0.034) | (0.034) | (0.034) | (0.035) | (0.035) |
| **Time Since First Review (t)** | **-0.014*** ** | **-0.016*** ** | **-0.015*** ** | **-0.016*** ** | **-0.017*** ** |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| **Signature Beer Notoriety (t)** | **-0.129*** ** | **-0.162*** ** | **-0.133*** ** | **-0.148*** ** | **-0.174*** ** |
| | (0.030) | (0.032) | (0.030) | (0.031) | (0.032) |
| **Product Scope (t)** | **0.003*** ** | **0.002*** | **0.003*** ** | **0.003*** ** | **0.002*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| **Scope*Notoriety (t)** | | **0.015*** ** | | | **0.012** ** |
| | | (0.004) | | | (0.004) |
| **Reputati on (t)** | | | **0.005*** | **-0.002** | **-0.001** |
| | | | (0.002) | (0.003) | (0.003) |
| **Reputati on*Notoriety (t)** | | | | **0.032*** ** | **0.027*** ** |
| | | | | (0.009) | (0.008) |
| **Constant** | **4.215*** ** | **4.247*** ** | **4.197*** ** | **4.150*** ** | **4.183*** ** |
| | (0.126) | (0.126) | (0.126) | (0.127) | (0.127) |
| **State Dummies** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** |
| *Wald Chi-Squared* | 280.85 | 307.06 | 279.5 | 308.88 | 326.94 |
| *Scale Parameter* | 0.266399 | 0.2649888 | 0.2656279 | 0.2636447 | 0.2627746 |
| *df* | 59 | 60 | 60 | 61 | 62 |

Dependent variable is yearly signature beer appeal and is led by 1-year

N = 8,726

+p<0.1, *p<0.05, **p<0.01, ***p<0.001 two tailed test

Unstandardized coeff ecients reported

Robust standard errors clustered by brewery in parentheses

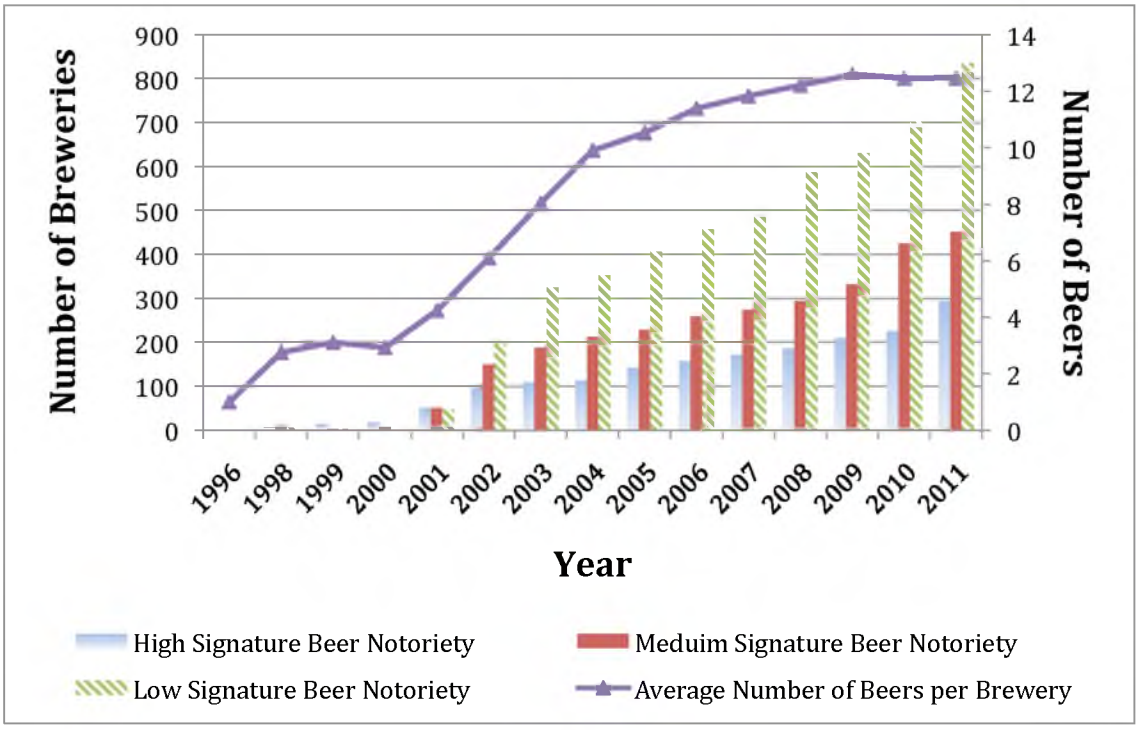


Figure 2.1: Number of Breweries By Year

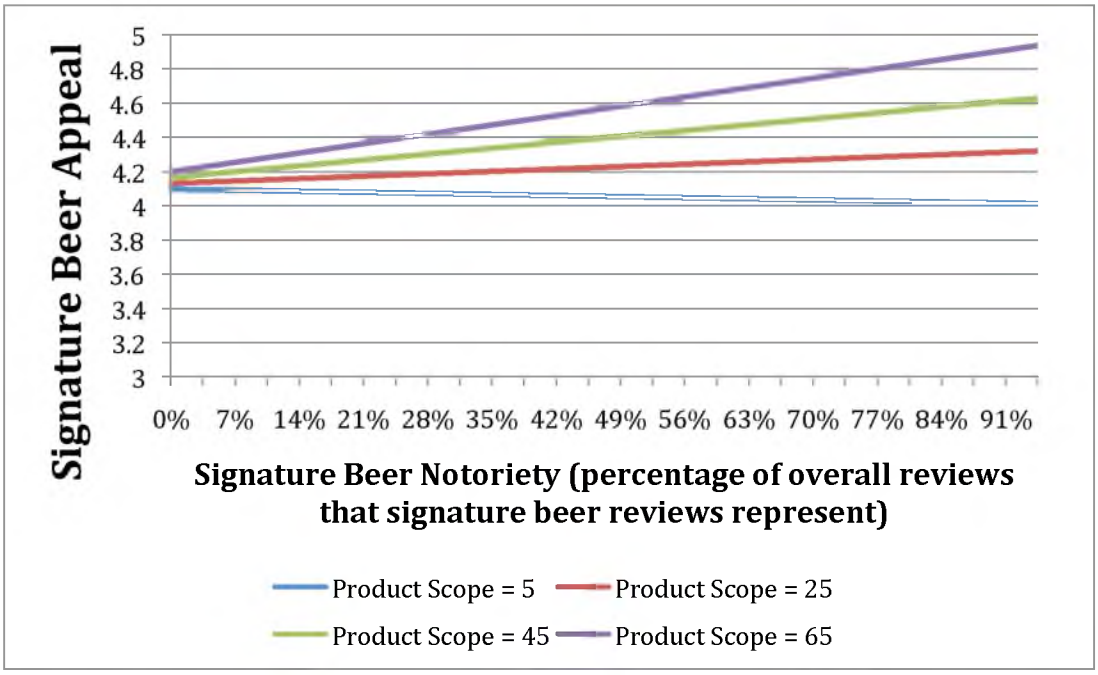


Figure 2.2: Product Scope and Signature Beer Notoriety Interactions

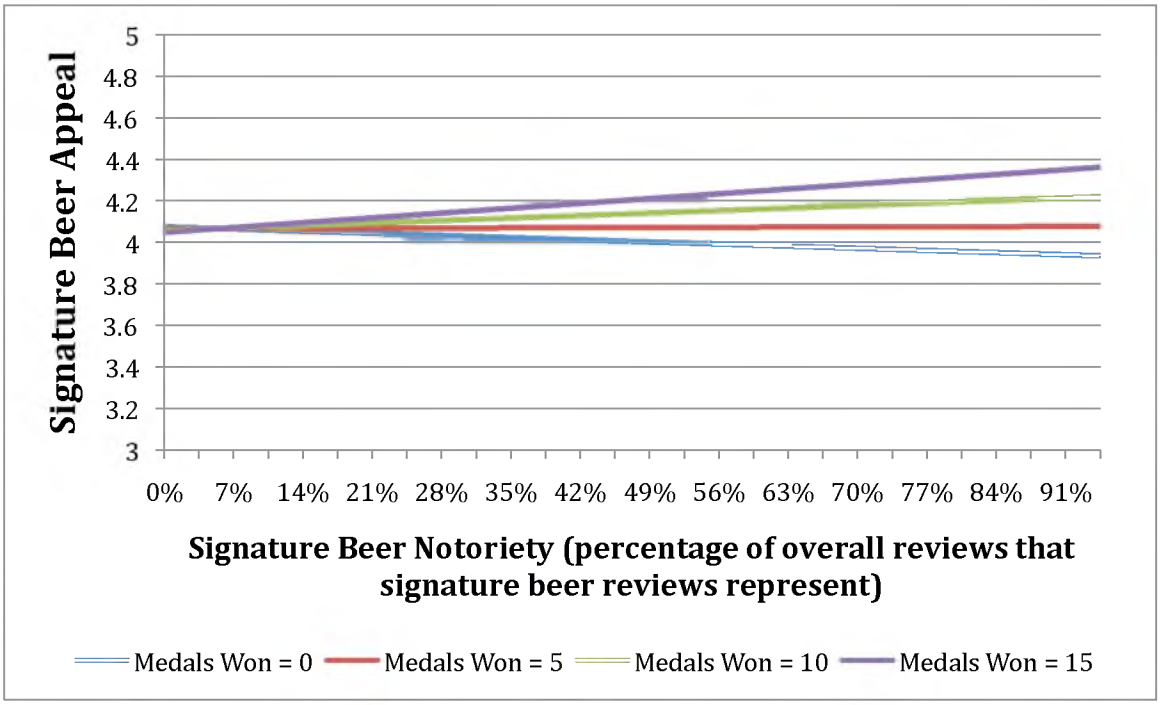


Figure 2.3: Reputation and Signature Beer Notoriety Interactions

# CHAPTER 3

# OPPOSITIONAL PRODUCT NAMES[3]

## Introduction

The questions of why new industries emerge and how they manage to persist and develop have long interested researchers. Scholars have studied how new markets come into existence as a result of new technological inventions (Tushman & Anderson, 1986; Klepper, 1996; Benner & Tripsas, 2012), recombination of existing technologies (Levinthal, 1998; Fleming & Sorenson, 2001), customer demand left unaddressed by dominant players in highly concentrated industries (Carroll, 1985; Carroll, Dobrev & Swaminathan, 2002), new consumer demand (Dobrev, Ozdemir & Teo, 2006), and displaced old industries (Hyatt, Sine & Tolbert, 2009; Dowell & David, 2011).

In recent years, researchers have begun to investigate a distinct category of emerging markets: those that form by way of ideological opposition to existing industries, for example, the green energy sector (Sine, Haveman & Tolbert, 2005), the grass-fed meat and dairy markets (Weber, Heinze & DeSoucey, 2008), microradio stations (Greve, Pozner, & Rao, 2006), the organic food industry (Lee, 2009), and the traditional whisky distillery market (McKendrick & Hannan, 2013) among others. Such

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oppositional markets coalesce around collective identities shared by producers who define themselves as categorically opposed to the dominant market logic employed by incumbent firms in existing product space (Carroll & Swaminathan, 2000; Rao, 2008). Adherence to a shared ideology, or the belief system about how the social world should operate (Parsons, 1951), sparks social movement dynamics that lead to collective action eventually giving rise to new market institutions (Carroll, 1997; Swaminathan & Wade, 2001; Schneiberg, King & Smith, 2008; King & Pearce, 2010). This process of institution building and new market emergence, however, begins with market actors seeking to engage their audience by the force of their ideological commitment (Hannan, Pólos & Carroll, 2007). At the core of that effort lies the consonance of market actors' organizational identities, which cohere around the oppositional message they collectively are able to convey.

The burgeoning literature on organizational form identities has shown that firms with sharp, resonant identities are better able to engage their audience than firms with diffuse, category-spanning identities (McKendrick et al., 2003; Hsu, Hannan & Kocak, 2009). Focused identities can easily be differentiated from and indeed juxtaposed to other identities and, thus, help the firms embodying such identities transform their potential intrinsic appeal into actual appeal (Hannan, Pólos & Carroll, 2007). Audience members are enticed by the singularity of purpose and perceived dedication to specific tastes displayed by focused identity firms. Although many studies offer convincing evidence in support of this thesis, the actual transition from intrinsic to actual appeal seems undertheorized (Hannan, 2010). A typical supposition is that if a producer focuses its offerings on catering to specific tastes of consumers in a narrow market category, that

producer will garner greater actual appeal from its audience (Zuckerman, 1999; Hsu, 2006; Negro & Leung, 2013). Yet, the theoretical detail of this supposition appears to be a missing link in the extant theory. What mechanisms underpin the transition from intrinsic to actual appeal? Based on what we already know, the operative condition relates to the tradeoff between breadth and strength of appeal. The sharper and more focused a producer's identity is, the stronger the appeal of that producer's offerings to the focal audience will be (Zuckerman et al., 2003; Hsu, Hannan & Kocak, 2009; Leung & Sharkey, 2013).

I conjecture that this supposition should be developed further and scrutinized empirically. Specifically, I focus on two related and, I think, underdeveloped conditions. First, while I agree with the strength vs. breadth of appeal trade-off, I set to investigate what other factors contribute to the effective transformation of intrinsic into actual appeal. I do not believe that firms with equally focused offerings carry uniform audience appeal. Within a category of focused producers, compliance with the specific categorical tenets of the collective identity of the market is a variable and the ability to demonstrate high levels of compliance likely increases actual appeal. Second, in addition to the benefit of claiming an organizational identity that closely reflects the categorical imperatives inherent in a sharp and resonant collective identity, developing such an identity is a gradual process that takes time. So, I also investigate the dynamic process of identity building, specifically focusing on the role of product names as a means of eliciting audience recognition of ideological compliance.

I develop and test arguments in the context of an emerging oppositional market because I think this setting is particularly apt for applying my theory. Oppositional

markets build around oppositional identities which are sharp and focused by definition because they build around a clear antipode to an already established, clearly defined identity of the incumbent market (Carroll & Swaminathan, 2000; Barron, 2004). Moreover, oppositional markets by their very nature contain a strong ideological component invoked as a means of garnering attention and mobilizing resources (Rao, 2009).

Starting with my first premise, that the appeal of a firm's offerings increases with that firm's ability to demonstrate ideological compliance to the collective identity, I posit that firms will use their product names to convey to the audience claims that their organizational identity is attuned to the key logic of an oppositional market. At their core, markets are exchange structures between producers and consumers (White, 1992; DiMaggio, 1994; Weber et. al, 2008) and products are a key element that connects the two together (Carroll, Khessina & McKendrick, 2010). A product's appeal to consumers determines how well the product does on the market and ultimately how well a firm that offers this product performs (de Figueiredo & Kyle, 2006). The degree of collective appeal of a new class of products in an emerging industry may determine whether this industry will stay around or ultimately disappear (Hannan et al., 2007). Yet, what shapes the appeal of a product in an oppositional market?

I believe that in oppositional markets rhetoric and language play a crucial role and propose that names of products, by embodying linguistically the narrative of an oppositional discourse, may significantly shape a product's appeal to customers. If new entrants succeed by staking a reactionary claim about who they are in direct reference to a set of established incumbents, the ability to effectively communicate the oppositional

identity becomes paramount. Serving as a link between producers and their customers, product names effectively serve as the means for conveying categorical claims.

Viewing the choice of product names as an identity building mechanism, I propose that to establish a strong focused identity a firm must not only satisfy the objective criteria for membership in the oppositional category (e.g., craft production method in the microbrewing market or minimal pollution in the green energy sector), but must also communicate its ideological commitment to its audience. Product names afford firms the opportunity to do so at little apparent cost. The existing research on names in management theory suggests that names signify categories of meaning, sorting social entities such as firms and products in equivalent and nonequivalent sets (Glynn & Marquis, 2005; Hannan, Pólos & Carroll, 2007; Khessina & Reis, 2013) and, as a result, help audiences make sense of social entities independent of their objective characteristics (Glynn & Abzug, 2002; Lee, 2001; Barnett, Feng & Luo, 2012). I theorize that in oppositional markets certain names make products appear more appealing to customers even when they are not tangibly different from other products in their peer category. This ability to differentiate products in identity space eventually creates an association with the producer thereby shaping its organizational identity.

The second premise, that transforming intrinsic into actual audience appeal is a continuous process that hinges on developing a focused organizational identity, suggests that while product names can facilitate the establishment of a focused organizational identity, they cannot substitute for it. Ultimately, a firm must become recognized as a legitimate actor that embodies the identity claims put forth by its product names. In addition, as the locus of proving ideological compliance shifts from the product to the

firm, the role of product names in demonstrating categorical congruity with the collective identity should diminish. Therefore, I see the process of transforming intrinsic to actual appeal as comprising two distinct stages. At the first stage, firms strategically use their product names to demonstrate adherence to the ideology embodied in the collective identity of a market category. At the second stage, as an organization's identity as a legitimate participant in a market category coheres, the appeal of its offerings hinges less on its products' names and more on its own recognition as an established actor in the focal market.

I test my theory on the U.S. craft beer industry. This market emerged in unabashed ideological opposition to the incumbent market of large mass producers in the 1980s and since then has been growing and flourishing. The antimass production sentiment has been an essential part of the craft beer market identity, which is centered on a sense of small production scale, craft methods and high quality ingredients (Carroll & Swaminathan, 2000). What matters the most to consumers is the authentic production of craft beer (Carroll & Wheaton, 2009). The discourse based on antimass production sentiments shared by beer enthusiasts, craft producers and consumers stimulate lovers of specialty beer to continually prefer craft-produced over mass-produced beer (Carroll & Swaminathan, 2000).

I think that names of products play an essential part in the discourse surrounding craft beer, particularly for new entrants that lack established organizational identities. I argue that when a product's name is aligned with the collective identity of the craft beer market, it reinforces the product's appeal to customers. Specifically, beers with oppositional names, defined as names congruent with the collective identity centered on

an antimass production sentiment, should resonate more strongly with customers' expectations than beers with other names. I thus predict that among focused producers with similar products with arguably identical intrinsic appeal, those employing oppositional product names will have stronger actual appeal. I also expect that as market actors become recognized as legitimate craft producers, the appeal of their offerings will increasingly become a function of their organizational identity and will hinge less on the names of their products. I find support for these ideas in the longitudinal analysis of all beers that were evaluated by consumers on the online website BeerAdvocate.com from its inception in 1996 through 2012.

## Names in Product Appeal

To make a purchasing decision, consumers need to determine which products among the variety available on the market appeal to them (Rosa et al., 1999). The actual appeal of a product is driven by (1) its intrinsic appeal defined as the perceived fit between product attributes and a consumer's taste, and (2) a producer's engagement of consumers with the intent to convert the product's intrinsic appeal into actual appeal (Hannan, Pólos & Carroll, 2007). Intrinsic appeal is higher when a product's characteristics important to consumers are aligned with a collective identity of the market, i.e., meet audience expectations about what attributes the product in a given market should possess (Hannan, Pólos & Carroll, 2007). In many industries, objective, easily identifiable characteristics are sufficient for consumers to evaluate whether a specific product is intrinsically appealing to them (Rao, Monin & Durand, 2003; Weber et. al., 2008; Lee, 2009). In other industries, however, physical differences among

products are not significant enough to easily discriminate among various offerings (Carroll & Swaminathan, 2000; Sine, Haveman & Tolbert, 2005; McKendrick & Hannan, 2013). In such markets, producers' ability to convert their intrinsic appeal into actual appeal hinges on the extent to which producers can engage their audience. I argue that product naming is one possible producer engagement practice that may shape a product's actual appeal to customers.

Product naming is an attractive producer engagement practice for two key reasons. First, when physical attributes of a product are not sufficiently different from those of other products in competing market categories, consumers may look for differences in production processes to determine which one is authentic to the market that consumers care about (Carroll & Swaminathan, 2000; Baron, 2004; Carroll & Wheaton, 2009). The production process is, however, not always easily deduced from a product (McKendrick & Hannan, 2013). By contrast, a product's name is highly visible, easily available, and often one of the first characteristics that a consumer notices about the product. By making an explicit reference to the nature of the production process in a product's name, a producer delivers a message to relevant audiences that this product is authentic, i.e., it is congruent with the collective identity of the market. Therefore, a product's name can be used to make identity claims about both the product (Khessina & Reis, 2013) and its producer (Phillips & Kim, 2009), and in this way increase the actual appeal of the product to relevant audiences (Hannan, Pólos & Carroll, 2007). Second, naming products is an engagement practice with very little apparent cost to a producer. Product naming is a routine organizational operation that neither requires many resources nor creates substantial interruptions in the production processes (Delacroix &

Swaminathan, 1991; Dobrev, 1999).

Based on this discussion, I propose that in markets where the intrinsic appeal of producers' offerings is hard to evaluate, producers will attempt to strengthen their actual appeal by engaging consumers through the strategic naming of their products. If the meaning conveyed by the product's name is congruent with the collective identity of the market, that product's actual appeal to its audience will increase. I further believe that product names should have an especially profound effect in oppositional markets, where discourse between producers and audiences is a crucial engagement practice and product names serve as one important conduit of this discourse.

## Oppositional Names and Product Appeal

In oppositional markets, an organizational form identity is based on the oppositional ideology, promoted by collective action that seeks to challenge the established authority of incumbents, alter the existing status quo and carry out change on a cultural level (Rao, Monin & Durand, 2003; Snow, 2004; Schneiberg, King & Smith, 2008; Weber, Heinze & DeSoucey, 2008). For example, the rise of craft breweries in the United States, often called a microbrewery revolution, represents the evolution of a social movement under a collective oppositional identity (Carroll, 1997; Swaminathan & Wade, 2001; Carroll, Dobrev, & Swaminathan, 2002). This identity has been strategically deployed in order to challenge mainstream cultural and institutional norms and educate different audiences (Carroll & Swaminathan, 2000; Rao, 2009, Ch.3).

In oppositional markets, customers driven by ideological concerns strongly prefer products that are congruent with their ideology (Carroll & Swaminathan, 2000; Greve,

Pozner & Rao, 2006; Rao, 2009). As a result, identity claims both about products and their producers delivered through product names become increasingly important for generating actual product appeal. Resonance and authenticity are key dimensions of organizational form identity in oppositional markets. Resonant identities 'capture or activate powerful distinctions along social, ethnic, religious, economic, political, and cultural lines' (Baron, 2004: 11). Authentic identities preclude 'certain alternatives from consideration simply on the grounds that they would not be genuine or thinkable, even if they might be profitable' (Baron, 2004: 14). Authentic identities embody broader social and moral expectations about how things should work, about what is socially and morally appropriate, as opposed to what is most efficient (Hsu & Hannan, 2005). By employing product names as a means of delivering a message to customers that a producer uses traditional methods (even though they are less efficient than other methods) to make products that contrast sharply with incumbent producers, that producer effectively makes claims about authenticity that resonate (due to the direct comparison) with the audience and conform with the collective identity of the market category.

For craft breweries, the most salient manifestation of the oppositional identity is an open antagonism towards the notion of mass production of beer and the breweries that produce it. Craft breweries often go to great lengths to use only traditional ingredients and artisanal production methods and make only small quantities of beer in an attempt to create a high quality authentic product. However, consumers often have trouble distinguishing between different beers based solely on taste (Carroll & Swaminathan, 2000). Instead, producers in this industry make identity claims by engaging consumers with deliberate storytelling about the authentic production of craft beers (Rao, 2009).

Breweries that manage to leverage the antimass production sentiment by developing a discourse around their traditional methods of production are considered more authentic and of higher quality, and thus are more likely to appeal to consumers both relative to large mass producers and to other craft breweries that do not overtly claim an oppositional identity.

Product names are an important part of public discourse built around the craft brewery collective identity. Many beer names are oppositional and make a clear reference to antimass production ideology. For example, Breckenridge Brewery's *Small Batch 471* and Morgantown Brewing Company's *Small Batch-Honey Raspberry Amber Ale* explicitly express the antimass production sentiment by highlighting the fact that the beer was produced in small batches. Since a product name plays a key role in how the product is perceived (at least initially), oppositional names will contribute more strongly to conveying the ideological message implied by producers' collective identity than other names. Therefore, products with oppositional names are likely to be perceived as more aligned with the collective identity of the craft beer market than products with other names, and thus generate higher actual appeal.

- H1: *In oppositional markets, products with oppositional names will have higher actual appeal than products with other names.*

## Prototypes and Strength of Appeal

Although oppositional naming is an attractive engagement practice for producers who seek to make identity claims to relevant audiences, it can be more or less effective depending on characteristics of their specific products. Building on the key finding from

research about the importance of name congruence with expectations of audiences (Dobrev, 1999; Glynn & Abzug, 2002; Lee, 2001; Cooper, Gulen & Rau, 2005), I propose that the predicted beneficial effect of oppositional names may attenuate and even disappear, if relevant audiences see an oppositional name as incongruent with the characteristics of the product. I consider one key product feature, the similarity to a prototypical incumbent product, which may drive such incongruence and diminish and even eliminate the benefits of an oppositional name.

In interpreting the oppositional discourse in a market, it is important to define clearly the reference category, in other words oppositional to what? Understanding the key features of the incumbent category is essential because an oppositional category must be focused on targeting these very features and must offer specific counter-alternatives to them (Schneiberg, King & Smith, 2008; Hyatt, Sine & Tolbert, 2009; Rao, 2009). This mode of differentiation with recourse to established producers is what helps new market entrants eventually cohere into a new producer category (Carroll & Swaminathan, 2000; Weber et. al., 2008). Firms vying for membership in an oppositional market typically center attention on the prototypical product in the offerings of incumbents and strive to offer an antipode (Greve, Pozner, & Rao, 2006; Negro, Hannan & Rao, 2011; Hollands & Vail, 2012). A prototypical product includes the most salient features associated with its category and these central features, when countered by reactionary market actors, provide sharp and focused contrast to the original (Baron, 2004). A prototype can be countered tangibly, in terms of objective product characteristics, and cognitively, by distinguishing it categorically from the original. Hypothesis 1 is about the beneficial effect of the latter, even when objective product characteristics are the same.

The next hypothesis is predicated on the argument that even when antipode products are entirely different from incumbent products in production techniques, the sheer overlap in product space between the two may curtail the categorical detachment that oppositional names help to articulate. In other words, the risk in making a product similar (albeit only superficially) to an incumbent's prototypical product is that even when successfully countered in terms of the feature set comprising the prototype category, an overlap in the less salient, broader features of the offerings (e.g., similar class or type of product) may create a cognitive association between incumbent and oppositional products (Barron, 2004). Such association would then undermine the effort to cognitively distance the oppositional product from the incumbent by using an oppositional name. This happens because relevant audiences do not associate oppositional ideology with products that are similar to prototypical incumbent products. The use of oppositional names in such products is seen as incongruent with product characteristics; it violates audience expectations and is unlikely to increase product actual appeal.

In the brewing industry, the prototype of a mass-produced beer is associated with automated production, large quantities, and limited variety. Firms in the oppositional craft beer market objectively depart from that prototype by strictly adhering to craft production techniques, small batch production and a healthy variety of beer style offerings. Despite (and in fact as part of) these clear differences in production, many craft breweries also offer a type of beer known as American lager which happens to be the beer style almost exclusively offered by the mass producers (18 of the 20 beers with

the largest market share in the U.S. are still American lagers[4]). The craft lagers are different from the mass produced ones because they are brewed by artisanal methods with traditional ingredients. The identity of craft breweries should send signals to the market regarding the authenticity and quality of these lagers. However, this is not necessarily the case. Barlow and Verhaal (2013) found that craft beers in the American lager category have lower consumer appeal because they are implicitly associated with mass-produced beers that dominate this product space. Despite clear differences along all key prototype features between mass and craft-produced American lagers (scale, production methods, etc.), sharing a broad product category fosters consumer biases, either intentionally or unknowingly, against craft lagers because of the implicit association with products from the incumbent industry. This association undermines the identity claims put forth by craft beer producers and, thus, devalues the categorical detachment that oppositional names are intended to establish. Based on this discussion I predict the following:

- H2: *In oppositional markets, the beneficial effect of a product's oppositional name on actual appeal will be lower for products associated with prototypical products in the incumbent market.*

## Organizational Identities and Strength of Appeal

Oppositional naming becomes less important as an engagement practice of transforming a product's intrinsic into actual appeal when more salient indicators for making inferences about the firm's products become available to audiences. I believe that an organizational identity is one such indicator.

[4] INFORMS (www.beerinsights.com)

Organizations become known for what they are through interactions with all of their audiences, but mostly their customers. The more consumers learn about a firm, the greater basis they have to make informed decisions about buying its offerings. A nascent organization is disadvantaged because its lack of track record makes it difficult for audiences to understand and evaluate its products. This disadvantage is at the core of Stinchcombe's (1965) liability of newness thesis which emphasizes the 'lack of legitimacy' as an impediment to young organizations. Yet, although age may be a logical proxy, it is not aging per se that alleviates this disadvantage, but the experience that an organization accumulates through its interaction with relevant audiences. Over time, as such experience accumulates, there emerges a set of stable expectations among the key audience about the purpose of the organization and its *raison d'être*. Eventually, social consensus about these expectations solidifies. This is the process by which a firm develops an organizational identity (Pólos, Hannan & Carroll, 2002).

Once a set of stable expectations about what the organization is forms on the basis of that learning and experience, appeal of the firm's products becomes clearly tied to these expectations. That is, intrinsic appeal materializes into actual appeal as a function of the emergent organizational identity which conforms to the collective codes of the market category that the firm seeks membership in (Hannan, Pólos & Carroll, 2007). There is the inherent duality underlying strength of appeal: an organization must develop its unique identity, yet this identity must conform to the codes and features of the collective identity of its market category. This process is largely driven by the experience and recognition that audience members gain about the organization. Consequently, the actual appeal of products should be higher for firms whose identities

are closely aligned with the collective identity in the market. In other words, firms that become synonymous with their market will have a strong positional advantage over their competitors in that market.

For example, in the empirical context of the craft beer market, breweries develop a strong oppositional identity when audiences believe that the firms use traditional production methods. The authenticity of craft production is tied to a producer's ability to offer a variety of beer styles. That product variety is considered evidence for mastery of the craft and is an essential feature of the oppositional identity of craft producers; it stands in stark contrast to the very narrow offerings of mass producers (Carroll & Swaminathan, 2000). Accordingly, the number of beer styles that a brewery has offered is a factor that forges its oppositional identity formation.

Another important factor necessary for solidifying an identity is the firm's prolonged interaction with and public recognition by relevant audiences (Hannan, Pólos & Carroll, 2007). In my empirical setting – an online community of beer enthusiasts rating their experience with craft beers – the most direct evidence of social interaction between a producer (i.e., a craft brewery) and its key audience (i.e., beer enthusiasts) is the total number of reviews that a brewery has received across all of its offerings over time. The cumulative number of reviews garnered by a brewery captures the extent to which its recognition both as a social entity and as a member of the craft beer market category has developed. It also clearly signals the audience engagement accomplished by the brewery.

To reiterate, my central proposition is that actual appeal of a product will increase as an organization's identity develops and conforms to the broader collective identity in

the market category. Building a strong identity is a gradual process which is primarily driven by the organization's capacity to demonstrate continuous compliance with the collective codes of the market category where it seeks membership. This capacity hinges on the exposure to and interaction with the audience. In oppositional markets, product actual appeal rises with the strength of its firm's oppositional identity, and thus should increase with (1) the firm's ability to fulfill the codes of the collective oppositional identity (e.g., a brewery is acknowledged for its diverse offerings); and (2) the extent of audience engagement the firm can accomplish (e.g., cumulative number of online reviews across a brewery's entire product offerings).

- H3a: *In oppositional markets, the actual appeal of a firm's products is an increasing function of that firm's fulfillment of the codes of the collective oppositional identity.*
- H3b: *In oppositional markets, the actual appeal of a firm's products is an increasing function of that firm's recognition by the audience.*

I think that product names are a powerful tool that organizations can use to make a membership claim in a market category and develop an identity. Product names facilitate the coherence of an organizational identity because products offer a communication platform on which producers and audiences learn about each other and gain experience with each other. However, while product names allow the firm to make claims about its emergent identity and rite of passage into the focal market category, once that organizational identity solidifies and the firm's category membership status becomes taken for granted, the importance of product names should subside, as audiences start making inferences about the firm's offerings based on its organizational identity:

- H4a: *In oppositional markets, the beneficial effect of oppositional product names on the actual appeal a firm's products is a decreasing function of that firm's fulfillment of the codes of the collective oppositional identity.*
- H4b: *In oppositional markets, the beneficial effect of oppositional product names on the actual appeal of a firm's products is a decreasing function of that firm's recognition by the audience.*

## Empirical Setting

I test the developed hypotheses on the population of beers produced by American craft breweries. The Brewer's Association, which is considered to be the authority on craft brewing and microbrews in the United States,[5] officially classifies a beer producer as a craft brewer only if it produces less than 6 million barrels of beer per year. The craft brewing industry is further partitioned into two market size segments: microbreweries and brewpubs that produce less than 15,000 barrels of beer per year and regional breweries that produce between 15,000 and 6 million barrels per year. Breweries that produce more than 6 million barrels per year are considered to be mass production breweries, and cannot be called a craft brewery[6].

The craft brewing market in the U.S. emerged in the 1980s and saw tremendous

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[5] The Brewer's Association is an advocate for craft breweries. It serves as a lobbyist, publisher and organizer of the two largest beer festivals in the world: the Great American Beer Festival and the World Beer Cup.

[6] This threshold was recently changed by the Brewer's Association, and had previously been 2 million barrels per year. However, as large regional breweries, such as Boston Beer Company (i.e., Sam Adams), began to reach this production limit, the limit was increased to include them. At the same time, lawmakers from Massachusetts also successfully lobbied Congress to extend current tax breaks for craft breweries to include production up to 6 million barrels per year.

growth in the ensuing years. This phenomenon is well documented in previous research (e.g., Carroll & Swaminathan, 2000; Rao, 2009, Ch.3) and represents a clear example of resource partitioning, whereby consolidation of mass producers that sold homogenized 'industrial' beer opened a resource space on the periphery of the market for the proliferation of specialist microbreweries and brewpubs that differentiated themselves based on technical product dimensions, such as taste and ingredients (Carroll, 1985; Carroll, Dobrev & Swaminathan, 2002). The emergence of microbreweries and brewpubs gave rise to a social movement that promoted the idea of an imperative for tradition and authenticity in beer brewing. The organizational form identity based on tradition and authenticity has largely prevented the large mass producers from encroaching on the specialist resource space and winning over microbrew consumers. This happened even though over time mass breweries learnt to remove the technical impediments that at first objectively disadvantaged their products relative to craft beers. As a result, it is now seen as an identity constraint. Consumers of specialty beer often refuse to buy products brewed by mass producers because they believe that mass producers focus more on profits than on quality and hence make only low-quality beer (Carroll & Swaminathan, 2000).[7]

Craft brewers offer a variety of different products within a broad range of beer categories. Indeed, it is not uncommon for even the smallest microbrewery to offer multiple styles of beer that all require different ingredients and brewing techniques. For

[7] Thus, the previous research on the craft beer industry focused on either the industry dynamics driven by the resource partitioning processes or on the differences between generalist mass producers and specialist craft breweries documenting many advantages of specialists over generalists. It has not, however, explored what drives performance differences within the segment of specialist craft breweries. By contrast, my goal is to uncover factors that may create the variance among craft breweries.

example, Epic Brewing Company located in Salt Lake City, Utah is a relatively small microbrewery that was founded in 2010. Since it commenced its operation, it has already produced over 40 different beers that span the entire range of beer styles. This includes: stouts, American lagers, barleywine, pumpkin ale, Belgian ales, fruit beers, and even organic and gluten-free styles. This sense of diversity, originality and playfulness in the brewing process is a hallmark of the craft beer movement's collective identity.

One way this identity is reinforced is through product names and labels. There are internet forums, message boards, and even whole websites dedicated to the discussion of cool names of craft beer. Some of them even conduct beer name competitions (e.g., www.aleheads.com). Consumers like interesting names and some even believe that a cool name may make their beer drinking a more rewarding experience.

## Data Sources

In order to test how oppositional names of craft beers impact product appeal to consumers, I use consumers' ratings of beer. Consumers provide ratings to declare the value they attach to a firm's product (Zeithaml, 1988; Kovács, Carroll & Lehman, 2013). Such value ratings are one manifestation of product appeal (Kovács & Hannan, 2011). They tend to shape consumer product choices (Sweeney & Soutar, 2001) and consequently affect organizational performance (Luca, 2011). With the continued proliferation of the Internet as a means of communication and interaction, consumer value ratings have been increasingly declared in public forums through online reviews that are posted on review websites. These websites have recently become a popular data source for studies on product and organizational appeal (e.g., Kovács, Carroll & Lehman,

2013; Kovács & Hannan, 2011; Luca, 2011).

The reviews for this study come from the online beer review website BeerAdvocate (www.beeradvocate.com). BeerAdvocate has been in existence since 1996 and has data on ratings on over 83,000 different beers from all over the world. As of January, 2013, it has totaled 2.7 million reviews. These reviews were written by 25,974 unique users, for which the average number of reviews was 45.6 with a maximum number of reviews of 3,960. In 2013, BeerAdvocate received on average 25 million page views from 2.5 million unique visitors per month.

On BeerAdvocate, any user can create an account and then rate and write a review about a beer listed in the database. Reviewers can rate beers across four specific dimensions: look, smell, taste, and feel on a 1-to-5 scale (they can also provide an 'overall' score), as well as write additional commentary and critique about each dimension. Once a user gains a certain amount of reviewing experience and legitimacy on the website, s/he can suggest a new beer for review that has not been incorporated into the online database yet. The website uses a developed classification framework and places newly suggested beers into appropriate style categories before making them available for reviewing.

BeerAdvocate is an appropriate data source for testing my hypotheses for several reasons. First, the website is broadly recognized by mass media (e.g., the New York Times, USA Today, Boston Globe) and by Alexa Internet Inc. (a leading company that tracks web traffic data) as one of the two largest online beer review sites and online beer communities in the world. The other largest online website, RateBeer, was founded in 2000. Second, BeerAdvocate provides detailed information about reviews, reviewers,

beers, and breweries, such as, for example, beer style, beer review score, date of beer review and so on. It covers a great variety of beers, including very rare ones. Finally, BeerAdvocate is popular among craft beer enthusiasts and beer lovers and, thus, allows us to look at the effect of oppositional names on the audience for which these products are intended.

For the purposes of this study, the data are restricted to the U.S. craft breweries only (i.e., production less that 6 million barrels per year), and represents the entire population of reviews of these organizations and their beers from the website's inception in 1996 through May of 2012. The final dataset consists of 1,151,627 unique reviews of 41,982 different beers produced by 1,932 unique craft breweries. The data are aggregated at the beer-year level, and the final dataset consists of 104,491 beer-year observations.

## Operationalization of Variables

**Dependent variable**. The dependent variable in this study is *beer audience appeal*. This measure is based on reviews of beers provided by customers on BeerAdvocate. It was calculated in two steps. First, for each review of any specific beer, I calculated the average of scores that a reviewer provided. An individual reviewer evaluates a beer on a scale of 1-to-5 (in increments of 0.25) based on four dimensions: look, smell, taste, and feel. I took the mean of these four component scores for each review. Second, I aggregated all reviews that a specific beer received in a given year and calculated the beer's average review score in a given year. The resulting measure of *beer audience appeal* is a time-variant continuous variable ranging from 1 to 5.

**Independent variables.** The key independent variable is *beer oppositional name*, which is a time-invariant dummy that takes the value of 1 if the name of a beer contains an antimass production reference. I consider an antimass production reference to be any word that highlights the key features associated with the oppositional collective identity of the craft beer market, such as, small-scale production, artisanality, exclusivity, authenticity, and quality. These words include the following: aged, anniversary, authentic, barrel, barreled, batch, cask, cellar, classic, commemorative, craft, cuvee, edition, farmhouse, grand, limited, oak, old, reserve, select, special, traditional, unique, and vintage. Table 3.1 provides frequencies and justification for each antimass production reference used to construct the beer oppositional name variable.

Other independent variables include the following. *American lager* is a time-invariant dummy that takes the value of 1 if the style of a given beer is in the American lager category. This category includes the following sub-styles of beer: American Adjunct lager, American red lager, American imperial pilsner, American pale lager, California common/steam beer, and American light lager. This variable measures the categorical association of a given craft beer with the prototypical incumbent product – American larger.

To measure the extent to which a brewery complies with the collective identity code of producing a variety of craft beers, I created the variable *brewery cumulative beer count* as the cumulative number of unique beers for which the brewery received at least one review on BeerAdvocate since the website founding by a given year. To measure the extent of a brewery's recognition by its key audience, beer enthusiasts and lovers, I created the variable *brewery cumulative reviews,* which is the number of cumulative

reviews that a given brewery received on BeerAdvocate since the website's founding by a given year. These two variables are updated annually and lagged one year to avoid the simultaneity issue.

**Control variables.** Product, firm and industry characteristics may all affect the appeal of a product to consumers (Carroll, Khessina & McKendrick, 2010). Several controls are used to account for these influences. Unless otherwise noted, all time-variant variables are updated annually and lagged one year to avoid the simultaneity issue.

**Product controls.** Long beer names that consist of many words have a higher probability to include a word that references an antimass sentiment than short beer names that consist of one or few words. To control for this influence I created a time-invariant variable *beer name word count* which is the number of words in a beer's name. This count excludes stop words, such as, 'a,' 'the,' 'and,' 'or' and prepositions. To control for differences in a beer's average appeal due to the level of attention that the beer receives from consumers I created the variable *beer cumulative reviews,* which is the cumulative number of reviews that a beer has received on the website by a given year.

**Organizational controls.** Size of a producer may affect the appeal of its products to consumers. In the craft beer industry, consumers prefer beverages made by smaller breweries (Carroll & Swaminathan, 2000). To control for this influence, I created the variable measuring a brewery's size as a scale of its operations. Since I was able to obtain data on production volume for less than 75% of breweries, I constructed a brewery size variable based on whether or not a given craft brewery was a regional brewery or a microbrewery. The Brewers Association maintains a list, updated yearly, of all regional breweries in the industry. With these data, I built the variable *regional brewery* as a

dummy that takes the value of 1 if a given brewery was considered regional in a given year (i.e., produced more than 15,000, but less than 6 million barrels) and the value of zero if otherwise.

The degree to which a brewery uses traditional ingredients can impact perceptions of authenticity within the craft beer community. In its purest form, the four primary ingredients in beer are water, hops, malt, and barley. Therefore, the use of adjunct cereal grains in the brewing process (as a means of both cost reduction and muting the strong flavor of hops in certain beers) has been treated by the Brewer's Association as being contradictory to the underlying tenets of the craft beer identity. Therefore, I control for the breweries that are known to use these adjunct ingredients in some or all of their beers by creating dummy variable *adjunct brewery* which takes a value of 1 if the brewery has been identified by the Brewer's Association as using these types of ingredients.

The degree to which a brewery remains independently owned is also viewed as an identity constraint in the craft beer industry. Consolidation is a hallmark of the mass production beer market, and some of these mass producers have sought to gain inroads into the craft beer market by acquiring either a part of or a whole craft brewery. Brewer's Association sees craft breweries that are more than 25% owned by firms that are not craft breweries as counter to the ideal of the craft beer community. Therefore, I created the dummy variable *acquired brewery* that takes the value of 1 beginning the year that a craft brewery either has crossed the 25% non-independence threshold or has been fully acquired by a mass producer.

An additional characteristic differentiating breweries within the craft beer industry is whether or not a brewery contracts some or all of its production out to other

breweries. Craft breweries that contract out their beer production are seen by beer enthusiasts as 'stealth,' 'pretend,' 'fake,' and 'faux' breweries (Cottone, 1995) and are perceived as violating the expectations of the collective identity of the craft beer market (Carroll & Swaminathan, 2000). To control for this influence I created the dummy variable *contract brewery* that takes the value of 1 if a brewery contracts some or all of its production out.

Past public success of a brewery may affect the appeal of its current beers. To account for this effect I created the variable *brewery cumulative medals won*, which is the cumulative number of medals that a brewery won at the Great American Beer Festival by a given year. This measure is discounted by 20% per year, to reflect that medals received recently contribute more strongly to the audience perception of firm success than the medals received in the more distant past. Results hold whether this control is discounted or not. The length of time that a brewery has been actively reviewed on the website may impact the appeal of its subsequent beers. The variable *brewery time since first review*, measured as the number of years since the first review for a given brewery was posted on BeerAdvocate, accounts for this influence.

While BeerAdvocate was started in 1996, a number of breweries in the population were founded prior to 1996. To account for possible differences in beer appeal of such breweries, I created the time-invariant dummy variable *pre-1996 brewery,* which takes the value of one if a brewery was founded before 1996. Additionally, as a robustness check, I reran all the analyses only on breweries that entered since 1996 with the identical results.

**Industry controls**. Proliferation of products on the market may drive both

legitimation and competition processes, and thus affect product appeal in a non-monotonic way (Greenstein & Wade, 1998; de Figueiredo & Kyle, 2006; Khessina & Carroll, 2008). The variable *density of beers* and its squared term, measured respectively as the total number of beers that received at least one review on BeerAdvocate in a given year and its square, account for this influence. To account for the effect of other temporal differences on beer appeal I include *year dummies* in all models. Additionally, to control for the impact that differences in alcohol regulation and beer consumption patterns across states may have on beer appeal I include *state dummies* in all analyses.

**Specification.** The data are structured as an unbalanced panel with multiple observations of different length for each beer. When testing the hypotheses, it is necessary to take into account that each beer's observations are possibly autocorrelated across years because of permanent but unobserved brewery-level characteristics. These correlations violate the assumption of independence across observations necessary for ordinary least squares regression. To address this issue, I use a population-average technique, specifically, the method of generalized estimating equations (GEE) which allows us to model the variance both between beers and across time for each beer.

First introduced by Liang and Zeger (1986), and Zeger, Liang, and Albert (1988), GEE estimators produce consistent, asymptotically normal solutions even in cases with misspecification of the covariance structure of the panel data (Sullivan, Haunschild & Page, 2007). Consequently, GEE offers two advantages over fixed- or random-effect models when autocorrelation due to nonindependence is present: it does not assume that the dependent variable is normally distributed, and it is more robust than other panel data specifications because it offers multiple correlation matrix structures to best match the

data (Liang & Zeger, 1986). GEE is commonly used in analyses of longitudinal data with nonnormal dependent variables (Ballinger, 2004).

I use Stata to estimate the GEE models. To further relax the assumption of independence of observations within a beer, I calculate robust standard errors clustered on a beer based on the Huber-White sandwich estimator (Huber, 1967; White, 1981), which is appropriate for using in GEE regressions because it is insensitive to the choice of GEE correlation structure (Katila & Chen, 2008).

## Results

Table 3.2 provides descriptive statistics for variables used in analyses. The file contains multiple observations for each beer, and thus does not always reflect intuitively the experiences of beers on the market. Because I lagged all time-variant variables by one year, I lose (1) all beer records in the last observation year of the data and (2) beers with single-year observations. The final dataset used for all analyses consists of 53,031 beer-year observations on 18,044 unique beers made by 1,558 breweries.

Table 3.3 present GEE estimates for testing Hypotheses 1 and 2. Model 3.1 is a baseline model. Controls show common effects in expected directions. At the industry level, the density of beers shows a U-shaped influence on product appeal. At the organizational level, beers produced by regional breweries, contract breweries, acquired breweries, and breweries that use adjunct ingredients all have lower appeal, whereas beers offered by breweries that were founded before 1996 generate higher appeal. Furthermore, the greater the number of cumulative medals won by a given brewery the greater its beer appeal, while the longer a brewery has been on the BeerAdvocate website,

the lower its beer appeal. At the product level, beers with more cumulative reviews and longer names both have higher appeal, while beers in the American lager category are strongly less appealing.

Model 3.2 tests Hypothesis 1 by introducing a dummy variable that measures whether a beer's name is oppositional, i.e., has a reference to antimass production sentiments. The coefficient is positive and highly significant suggesting that beers with oppositional names generate significantly greater consumer appeal than beers with other names. This finding supports Hypothesis 1.

Model 3.3 tests Hypothesis 2 predicting that craft beers produced in a style which is closely associated with prototypical styles of incumbent mass producers will benefit less from having an oppositional name than craft beers in nonprototypical styles. The interaction between the oppositional name variable and the American lager beer style dummy (i.e., a prototypical style closely associated with incumbent and noncraft breweries) tests for this prediction. As expected, the interaction coefficient is negative and significant. It is interesting that the size of this interaction coefficient is so large that it almost completely overrides the main beneficial effect of an oppositional name, indicating that an oppositional name brings no appeal benefits to a craft beer made in an American larger style. This finding suggests that in oppositional industries, consumers perceive products that are similar to prototypical incumbent products as incongruent with oppositional collective identity. When such products have oppositional names they violate expectations of audiences and, as a result, audiences penalize such products by the displayed lack of appeal despite the products' oppositional names. This finding offers a strong support to Hypothesis 2.

Table 3.4 presents GEE estimates for testing Hypotheses 3a- 4b. Model 4.1 tests for Hypothesis 3a by adding the variable brewery cumulative beer count that measures the extent to which a brewery fulfills collective codes of craft brewing oppositional identity. The coefficient is positive and significant. It supports the notion that in oppositional markets, adhering to collective codes of the market oppositional identity increases actual appeal of the producer's products. In this context, creating a number of different beers suggests to consumers that a given brewery is an authentic craft producer. Thus, Hypothesis 3a is supported.

Model 4.2 tests for Hypothesis 3b by adding the variable brewery cumulative reviews, which measures the extent of a brewery's recognition by audiences on BeerAdvocate. The coefficient is positive and significant. It shows that the appeal for a brewery's beers increase with the degree of recognition and interaction that the brewery has with its key audience. Thus, Hypothesis 3b is supported. It is interesting that while the effect of cumulative brewery reviews is positive and significant, the control for the time since a brewery's first review is negative and significant. These two effects considered together suggest that it is not sufficient for a brewery to be simply present on the market to generate high appeal products; the brewery must engage in active interactions with audience members through the process of continually accumulating reviews.

Model 4.3 tests Hypothesis 4a by introducing the interaction between the variable beer oppositional name and the variable brewery cumulative beer count. The interaction is negative and significant, and thus shows that the beneficial effect of oppositional names for beers decreases, as their brewery develops its organizational identity through

the increasing conformance to the codes of the collective oppositional identity. Thus, Hypothesis 4a is supported.

Model 4.4 tests Hypothesis 4b by introducing the interaction between the variable beer oppositional name and the variable brewery cumulative reviews. The coefficient is negative and significant, and thus shows that greater audience recognition of a given brewery attenuates the beneficial effect of oppositional names on the appeal of the firm's beers. Thus, Hypothesis 4b is supported. Finally, Model 4.5 is fully saturated and includes all predicted effects together. Importantly, all hypothesized effects remain significant in expected directions, offering further support to my hypotheses.

## Discussion

I began with the question of what shapes the appeal of a product in an oppositional market. I proposed that when audiences cannot easily differentiate among products based solely on product physical attributes, they rely on ideological discourse about the production process. I argued that product names, by embodying linguistically the narrative of this discourse play a significant role in shaping actual appeal of oppositional products to customers. Specifically, I predicted that when products have names that are congruent with the collective identity of an oppositional market, they have higher appeal to consumers. This beneficial effect is attenuated and may even disappear when (1) audience expectations about what type of product should or should not have an oppositional name are violated, and (2) when a firm develops a strong organizational identity and an audience starts to rely on this identity to make inferences about the firm's products and production process. I find support for the theorizing in the longitudinal

analyses of products' appeal to consumers in the U.S. craft beer industry, 1996-2012. This industry emerged in ideological opposition to the incumbent market of large mass producers. Its collective identity has been centered on the antimass production sentiment expressed in a small production scale, craft methods and high quality ingredients.

The analyses revealed three key findings. First, as predicted, craft beers with oppositional names, defined as names with an antimass production reference, are significantly more appealing to beer drinkers than craft beers with other names. Second, this benefit may decrease and even completely disappear if audiences see the oppositional name as incongruent with product characteristics. Specifically, I found that if a beer is an American lager, it does not benefit from having an oppositional name. This happens because a craft American lager is perceived by consumers as too similar to the prototypical incumbent product of the mass-producer market. Consumers do not associate American lagers with the oppositional ideology and when they see such products carrying oppositional names, their expectations get violated. As a result, oppositional names do not increase the appeal of such beers.

Third, producers that develop strong organizational identity benefit from oppositional names less. Specifically, I found that breweries that were able to communicate the fact that they adhered to the codes of the collective oppositional identity, enjoyed higher audience appeal for their beers, but benefited significantly less from giving their products oppositional names. Similarly, breweries that acquired a high extent of audience notice and recognition experienced higher product appeal, but benefited significantly less from giving their products oppositional names. I suggest that the mechanism driving these two findings is rooted in the role that oppositional names

play in the building of organizational identity in ideological markets. When a firm does not have an established organizational identity, it benefits from projecting to audiences its compliance with the collective identity of the market by naming its products in ways that highlight the market oppositional ideology. However, once the firm develops a strong identity, audiences start relying more on firm identity to make inferences about the firm and its products rather than on product names and the importance of oppositional names diminishes.

When generalizing these findings, one should keep in mind limitations common to all one industry studies. For example, the operationalization of an oppositional name is context-specific, as it is based on the antimass production sentiment. Ideology in other oppositional markets may center on different issues, e.g., antipollution in the green energy sector, and oppositional names in such markets should be operationalized accordingly. Future studies on markets with different oppositional ideologies are necessary to test for generalizability of my theoretical construct across diverse contexts. Fortunately, there appear to be an increasing number of these oppositional industries gaining in prominence, such as, microdistilleries, artisan cheese producers, farm to table restaurants, and custom bicycle, snowboard and surfboard manufacturers among others. Next, the craft beer market is oriented toward a specific segment of consumers within a broader market. Indeed, this paper expressly targets a specific audience: craft beer enthusiasts. The name dynamics may be different in oppositional markets oriented to other businesses. Oppositional names may matter less in such industries, as businesses may evaluate product appeal using different criteria than consumers. Finally, oppositional names should matter more in oppositional markets that offer services, as it is

harder to evaluate services than physical products before purchase and oppositional names may help consumers make a choice.

Keeping these limitations in mind, this study contributes to several literatures. First, the study contributes to the emerging literature on product names. This literature has found that products names affect product financial performance (Zhao, Ishihara & Lounsbury, 2013) and product survival (Khessina & Reis, 2013), but did not study specific mechanisms that drive these differences in performance. Product appeal to consumers shapes both financial success and market longevity of products (Carroll, Khessina & McKendrick, 2010). To my knowledge, this paper is the first to look at how a product's name shapes its appeal to consumers. Additionally, by showing how oppositional names impact product appeal, this study is the first to identify the importance of oppositional names in these types of markets.

This paper has important implications for product demography research – the literature that systematically studies product vital rates, such as, rates of product launch, growth and withdrawal from the market (Carroll, Khessina & McKendrick, 2010). Although scholars have found that many factors may affect product vital rates, specific mechanisms driving these effects remain underexplored. Product appeal to customers molds product market fates (Hannan, Pólos & Carroll, 2007). By explaining the role of oppositional names in product appeal I suggest one mechanism, through oppositional names, that may drive product vital rates.

Next, the study contributes to the literature on organizational form identity (the collective market identity) by explaining how firms can perceptually reinforce their membership in an organizational form by naming their products in ways congruent with

the market ideology. I showed that product naming can function as an identity building tool. I also contribute to the literature on organizational categorization in general. Much research in this literature has focused on consequences of category spanning and advantages of having a crisp category membership (e.g., Zuckerman, 1999; Hsu, 2006; Hsu, Hannan & Koçak, 2010; Negro, Hannan & Rao, 2010, 2011; Kovács & Hannan, 2011), but not much is known about how a firm can strategically achieve this sharp categorization in the perception of audiences. By showing that names congruent with the ideological discourse in the market make products more appealing to customers, I suggest that strategic naming of products can be one way for a firm to attain perceptually crisp category membership.

This study also contributes to the literature on specialist and generalist organizations (e.g., literatures on resource partitioning and niche width (for review, Carroll, Dobrev, & Swaminathan, 2002). This literature has focused on either the industry dynamics driven by the resource partitioning processes or on the differences between generalists and specialists. It is much less known what drives performance differences within the segment of specialists. By showing that oppositional names may shape product appeal I identify a crucial factor that creates variance among specialists in oppositional markets.

Finally, this study has important practical implications for how firms can strategically make their products more appealing to consumers in oppositional markets. Managers can significantly increase their product appeal if they give their products oppositional names. However, they have to be aware of important limitations of this strategic practice and avoid giving oppositional names to products that are too similar to

prototypical incumbent products. They should be also aware that the effectiveness of oppositional names diminishes as an organization acquires a strong organizational identity.

There are a number of related research questions for the future research. For example, it is important to understand the role of oppositional product names in nonoppositional markets or in well-established incumbent industries. Another interesting question is whether firms with oppositional names enjoy the same benefits in consumer appeal as products with oppositional names. Yet another fascinating question concerns whether consumers are consciously aware of oppositional product names or whether these identity-based cues subconsciously create a positive reaction to a given product. Future research could address these and other related issues to fully understand the role of oppositional names in the evolution of products, firms and markets.

Table 3.1

Frequency of Antimass Production Reference

| Oppositional Reference | Reference Frequency | Antimass Production Sentiment Conveyed |
|---|---|---|
| Barrel(ed) | 2080 | Small-scale production, Artisanality |
| Old | 1819 | Artisanality, Exclusivity |
| Aged | 1736 | Artisanality, Exclusivity |
| Anniversary | 975 | Exclusivity |
| Special | 873 | Exclusivity, Quality |
| Oak | 749 | Small-scale production, Artisanality |
| Reserve | 684 | Exclusivity, Quality |
| Batch | 358 | Small-scale production, Artisanality |
| Grand Cru | 273 | Exclusivity, Quality |
| Farmhouse | 249 | Artisanality, Authenticity |
| Premium | 195 | Exclusivity, Quality |
| Classic | 132 | Artisanality, Quality |
| Select | 122 | Exclusivity |
| Cask | 121 | Small-scale production, Artisanality |
| Vintage | 102 | Artisanality, Exclusivity |
| Cuvee | 98 | Artisanality, Exclusivity |
| Traditional | 67 | Artisanality, Authenticity |
| Limited Edition | 64 | Exclusivity, Quality |
| Cellar | 61 | Artisanality |
| Craft | 18 | Artisanality, Quality, Authenticity |
| Commemorative | 14 | Exclusivity |
| Artisan | 8 | Artisanality, Quality |
| Unique | 5 | Exclusivity |

Table 3.2

Descriptive Statistics of Oppositional Names

| Variables | Mean | St.Dev | Min | Max |
|---|---|---|---|---|
| **Beer Audience Appeal (t)** | 3.7 | 0.47 | 1 | 5 |
| **Density of Beers/1,000 (t-1)** | 11.12 | 4.78 | 0.045 | 18.92 |
| **Pre-1996 Breweries=1** | 0.24 | 0.43 | 0 | 1 |
| **Regional Brewery = 1 (t-1)** | 0.37 | 0.48 | 0 | 1 |
| **Contract Brewery = 1** | 0.04 | 0.20 | 0 | 1 |
| **Adjunct Brewery = 1** | 0.03 | 0.16 | 0 | 1 |
| **Acquired Brewery = 1 (t-1)** | 0.04 | 0.2 | 0 | 1 |
| **Brewery Cumulati ve Medals Won (t1)** | 1.95 | 4.57 | 0 | 45.31 |
| **Brewery Time Since First Review (t-1)** | 6.18 | 3.14 | 1 | 16 |
| **Beer Cumulati ve Reviews/10 (t1)** | 0.57 | 1.45 | 0.01 | 30.48 |
| **Beer Name Word Count** | 3.04 | 1.38 | 1 | 13 |
| **Beer Style: American Lager = 1** | 0.04 | 0.2 | 0 | 1 |
| **Oppositi onal Name = 1** | 0.08 | 0.27 | 0 | 1 |
| **Brewery Cumulati ve Beer Count/100 (t-1)** | 0.42 | 0.64 | 0.01 | 8.47 |
| **Brewery Cumulati ve Reviews/1,000 (t1)** | 1.72 | 3.73 | 0.001 | 32.032 |

N of breweries =1,558; N of beers = 18,044; N of beer-year obseravti ons = 53,031

Table 3.3

GEE Estimates of Oppositional Names

| | Model (3.1) | Model (3.2) | Model (3.3) |
|---|---|---|---|
| **Constant** | **4.290*** ** | **4.316*** ** | **4.316*** ** |
| | (0.109) | (0.109) | (0.109) |
| **Density of Beers/1,000 (t-1)** | **-0.059*** ** | **-0.059*** ** | **-0.059*** ** |
| | (0.012) | (0.012) | (0.012) |
| **Density of Beers$^2$/1,000,000 (t-1)** | **0.002*** ** | **0.002*** ** | **0.002*** ** |
| | (0.000) | (0.000) | (0.000) |
| **Pre-1996 Breweries = 1** | **0.027*** ** | **0.027*** ** | **0.027*** ** |
| | (0.008) | (0.008) | (0.008) |
| **Regional Brewery = 1 (t-1)** | **-0.023*** ** | **-0.023*** ** | **-0.023*** ** |
| | (0.005) | (0.005) | (0.005) |
| **Contract Brewery = 1** | **-0.063*** ** | **-0.063*** ** | **-0.063*** ** |
| | (0.013) | (0.013) | (0.013) |
| **Adjunct Brewery = 1** | **-0.179*** ** | **-0.183*** ** | **-0.183*** ** |
| | (0.020) | (0.020) | (0.019) |
| **Acquired Brewery = 1 (t-1)** | **-0.145*** ** | **-0.147*** ** | **-0.147*** ** |
| | (0.023) | (0.023) | (0.023) |
| **Brewery Cumulati ve Medals Won (t-1)** | **0.009*** ** | **0.009*** ** | **0.009*** ** |
| | (0.001) | (0.001) | (0.001) |
| **Brewery Time Since First Review (t-1)** | **-0.006*** ** | **-0.007*** ** | **-0.007*** ** |
| | (0.001) | (0.001) | (0.001) |
| **Beer Cumulati ve Reviews/10 (t-1)** | **0.006*** ** | **0.006*** ** | **0.006*** ** |
| | (0.001) | (0.001) | (0.001) |
| **Beer Name Word Count** | **0.008*** ** | **-0.002** | **-0.002** |
| | (0.002) | (0.002) | (0.002) |
| **Beer Style: American Lager = 1** | **-0.532*** ** | **-0.530*** ** | **-0.518*** ** |
| | (0.021) | (0.022) | (0.022) |
| **Oppositi onal Name = 1** | | **0.160*** ** | **0.166*** ** |
| | | (0.011) | (0.011) |
| **Oppositi onal Name * American Lager** | | | **-0.165*** |
| | | | (0.074) |
| **Year Dummies** | ***Yes*** | ***Yes*** | ***Yes*** |
| **State Dummies** | ***Yes*** | ***Yes*** | ***Yes*** |
| N of beers | 18,044 | 18,044 | 18,044 |
| N of beer-year observati ons | 53,031 | 53,031 | 53,031 |
| Scale parameter | 0.170 | 0.169 | 0.168 |
| Wald chi-squared | 2186.68 | 2437.7 | 2482.88 |
| (d.f.) | (71) | (72) | (73) |

+p<0.10, *p<0.05, **p<0.01, ***p<0.001; two-tailed tests

Table 3.4

GEE Estimates of Oppositional Name Interactions

| | Model (4.1) | Model (4.2) | Model (4.3) | Model (4.4) | Model (4.5) |
|---|---|---|---|---|---|
| **Constant** | **4.343*** ** | **4.367*** ** | **4.339*** ** | **4.367*** ** | **4.380*** ** |
| | (0.109) | (0.109) | (0.109) | (0.109) | (0.109) |
| **Density of Beers/1,000 (t-1)** | **-0.061*** ** | **-0.061*** ** | **-0.061*** ** | **-0.061*** ** | **-0.062*** ** |
| | (0.012) | (0.012) | (0.012) | (0.012) | (0.012) |
| **Density of Beers$^2$/1,000,000 (t-1)** | **0.002*** ** | **0.002*** ** | **0.002*** ** | **0.002*** ** | **0.002*** ** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| **Pre-1996 Breweries = 1** | **0.028*** ** | **0.026** ** | **0.027*** ** | **0.026** ** | **0.026** ** |
| | (0.008) | (0.008) | (0.008) | (0.008) | (0.008) |
| **Regional Brewery = 1 (t-1)** | **-0.025*** ** | **-0.029*** ** | **-0.025*** ** | **-0.029*** ** | **-0.030*** ** |
| | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) |
| **Contract Brewery = 1** | **-0.062*** ** | **-0.063*** ** | **-0.062*** ** | **-0.063*** ** | **-0.062*** ** |
| | (0.013) | (0.013) | (0.013) | (0.013) | (0.013) |
| **Adjunct Brewery = 1** | **-0.185*** ** | **-0.179*** ** | **-0.184*** ** | **-0.179*** ** | **-0.180*** ** |
| | (0.019) | (0.019) | (0.019) | (0.019) | (0.019) |
| **Acquired Brewery = 1 (t-1)** | **-0.160*** ** | **-0.152*** ** | **-0.161*** ** | **-0.154*** ** | **-0.163*** ** |
| | (0.023) | (0.023) | (0.023) | (0.023) | (0.023) |
| **Brewery Cumulati ve Medals Won (t1)** | **0.007*** ** | **0.008*** ** | **0.007*** ** | **0.008*** ** | **0.006*** ** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| **Brewery Time Since First Review (t-1)** | **-0.007*** ** | **-0.009*** ** | **-0.007*** ** | **-0.009*** ** | **-0.010*** ** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| **Beer Cumulati ve Reviews/10 (t1)** | **0.006*** ** | **-0.003*** | **0.006*** ** | **-0.003*** | **-0.003*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| **Beer Name Word Count** | **-0.002** | **-0.004+** | **-0.002** | **-0.004+** | **-0.004** |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| **Beer Style: American Lager = 1** | **-0.516*** ** | **-0.515*** ** | **-0.516*** ** | **-0.515*** ** | **-0.514*** ** |
| | (0.022) | (0.022) | (0.022) | (0.022) | (0.022) |
| **Oppositi onal Name = 1** | **0.166*** ** | **0.162*** ** | **0.188*** ** | **0.177*** ** | **0.193*** ** |
| | (0.011) | (0.011) | (0.013) | (0.012) | (0.013) |
| **Oppositi onal Name * American Lager** | **-0.163*** | **-0.155*** | **-0.174*** | **-0.164*** | **-0.170*** |
| | (0.074) | (0.074) | (0.074) | (0.074) | (0.074) |
| **Brewery Cumulati ve Beer Count/100 (t-1)** | **0.027*** ** | | **0.030*** ** | | **0.021*** ** |
| | (0.006) | | (0.006) | | (0.006) |
| **Brewery Cumulati ve Reviews/1,000 (t1)** | | **0.008*** ** | | **0.009*** ** | **0.009*** ** |
| | | (0.001) | | (0.001) | (0.001) |
| **Oppositi onal Name * Brewery Cum. Beer Count/100 (t-1)** | | | **-0.044*** ** | | **-0.042** ** |
| | | | (0.013) | | (0.014) |
| **Oppositi onal Name * Brewery Cum. Reviews/1,000 (t-1)** | | | | **-0.006*** ** | **-0.003*** |
| | | | | (0.002) | (0.002) |
| **Year Dummies** | ***Yes*** | ***Yes*** | ***Yes*** | ***Yes*** | ***Yes*** |
| **State Dummies** | ***Yes*** | ***Yes*** | ***Yes*** | ***Yes*** | ***Yes*** |
| N of beers | 18,044 | 18,044 | 18,044 | 18,044 | 18,044 |
| N of beer-year observati ons | 53,031 | 53,031 | 53,031 | 53,031 | 53,031 |
| Scale parameter | 0.168 | 0.167 | 0.168 | 0.167 | 0.167 |
| Wald chi-squared | 2491.02 | 2632.25 | 2497.88 | 2638.74 | 2653.57 |
| (d.f.) | (74) | (74) | (75) | (75) | (77) |

+p<0.10, *p<0.05, **p<0.01, ***p<0.001; two-tailed tests

# CHAPTER 4

# GROWTH AND SURVIVAL IN THE IVF INDUSTRY[8]

## Introduction

When would firms adopt and benefit from a new technology? For organization theorists this general inquiry breaks down to specific questions, three of which seem central to the field and which I investigate here: are there firm characteristics that sort out organizations into more or less likely to adopt a new technology, how does the extent of disruption between the new technology and its predecessors affect its likely adoption and benefits, and how does competitive intensity facilitate or retard these likelihoods? All three lines of inquiry have been researched extensively in the prior literature, yet unanswered questions linger on.

First, in terms of firm characteristics, arguments about inertia and path-dependence in adoption propensity are often tied to firm size but research is inconclusive as to whether large firms are more or less prone to adopt—both arguments have been made and backed up with some empirical validity (Abernathy & Utterback, 1975; Aldrich & Auster, 1986; Cohen & Klepper, 1996; Dewar & Dutton, 1986; Greve, 2007; Haveman, 1993; Hitt, Hoskisson, & Ireland, 1990; King & Tucci, 2002; Scherer & Ross, 1990; Wade, 1996). Second, it is well established that which firms adopt a new

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technology and how fast depends on the type of technology—incremental innovations are thought to favor large, dominant incumbents while radical, disruptive technologies favor agile, fast and responsive firms that are typically small and unencumbered by bureaucracy. However, although the distinction between radical and incremental technology change features prominently in the technology management literature (Anderson & Tushman, 1990; Christensen & Bower, 1990; Tushman & Anderson, 1986), research attention has been confined almost exclusively to radical change, perhaps because 'incremental product innovation is often viewed as having relatively little impact on differential business performance' (Banbury & Mitchell, 1995: 162). I seek to demonstrate that incremental technology change matters significantly for firm growth and survival. Third, in terms of competition, while we know from prior research that escalating rivalry drives new technology adoption by encouraging strategic differentiation, the focus of investigation has been (often implicitly) confined to adoption of radical technology. It remains unclear whether competition also propels peripheral change and whether firm size plays a role in the relationship.

Motivated by the inconclusiveness in current research, I investigate the likelihood and outcome of incremental technology adoption as a function of both the firm's internal and external context. I make conjectures about an organization's internal context based on its size. In a way, I turn conflicting arguments about large size (whether it promotes or retards change) on their head and argue that, in the case of incremental technology, midsize firms are both more likely to initiate change and to benefit from it. While organizational size is an important predictor capturing a wide range of internal context factors like resource munificence and structural complexity, my theory also considers

size as a positional attribute which places the focal firm in relation to its competitors based on proximity on the size gradient. The predictions rest on the strong purported disadvantage of midsized firms as developed in both the strategy and the organization theory literature.

I develop predictions about the external context of incremental technology adoption and tie them to the firm's competitive environment. The initiative of implementing a radical technology typically crowds out the resources for and marginalizes the importance of other technology initiatives. To the extent that escalating rivalry leads to the adoption of radical technologies (as prior research suggests), it also diminishes the risk of nondisruptive technology adoption. Further, I also develop arguments tying incremental technology adoption to improved firm performance under conditions of intensified competition.

The intended contribution is to provide some theoretical import to the technology management literature by using the building blocks of research on change from organizational sociology and specifically the core-periphery imagery of change (Thompson, 1967; Hannan & Freeman, 1989) which I believe closely parallels notion of radical vs incremental technology adoption. In fact, I consider technology adoption as a special case of organizational change which allows me to benefit from a vast body of prior research focused on reconciling selection and adaptation arguments in theories of organizational change. Although the study of peripheral change has also been underwhelming within that literature and most developed theory focuses on change in the core, I am able to adapt arguments about structural inertia (Hannan & Freeman, 1984) and the content–process framework of change (Barnett & Carroll, 1995) to develop

theory about incremental technology adoption.

The empirical context is the in vitro fertilization industry (IVF) in the U.S. between 1989 and 2001. I focus on the specific introduction and adoption of intracytoplasmic sperm injection (ICSI) technology, which although heralded as a major scientific breakthrough at the time of its introduction in 1992 did not require any significant internal restructuring or costly resource allocation from the technology adopters. Because the observation window spans sufficient time before and after the arrival of the ICSI technology, the data are well suited for analyzing the dynamics pertinent to my theory. In the next section I develop my theory, research questions and hypotheses followed by a brief summary of the IVF industry in which I justify my conjecture that ICSI was in fact an incremental, competence-enhancing technology. I then describe the data and methods, discuss my findings and conclude by outlining the limitations and contributions of this research.

## Theory

Adaptation and selection theories offer conflicting predictions about the firm-level outcomes of change. In the organizations literature, one prism through which the adaptation-selection debate is made tractable is the core-periphery distinction (Thompson, 1967) between core organizational structures (those that carry out fundamental mission tasks and fulfill technical requirements) and peripheral structures (those that mediate between the external context and the protected core, buffering and filtering outside influences that threaten internal stability). The core-periphery framework was reintroduced to organization theory through Hannan and Freeman's (1977, 1984,

1989) work on structural inertia—the premise that organizations find it hard to change in pace with exogenous transformation. Since these early years of theory development on inertia and change, the core-periphery distinction has been indelible from research on change, almost to the point of being relegated to a scope condition. Indeed, inertia arguments only hold when change affects the organizational core. While the field has learned a great deal about how inertia affects both the likelihood and the aftermath of core change (for review, see Hannan et al. 2007, Ch 11), existing theory provides scarce guidance on how these processes relate to changes in the periphery.

In seeking to account for the relative lack of interest in peripheral and incremental change, I surmise that it may be related to another popular theoretical account that reconciles selection and adaptation arguments—the content-process model of organizational change (Barnett & Carroll, 1995). Every organizational change attempt constitutes a de facto transition from one state (broadly defined: market position, resource mix, employment model, and the like) to another. Successful adaptation hinges on selecting the destination state in a manner that produces a net positive benefit from the transition. The process of change is about the costs and disruptions associated with the transition itself, regardless of whether it leads to a state that is better or worse for the organization. Demonstrating the concurrent operation of adaptive and selective forces then requires weighing potentially beneficial content effects with disruptive process effects (Dowell & Swaminathan, 2000). Structural inertia theory is essentially about the deleterious process effects of change, which result from unintended cascades of change occurring in the densely interconnected core structures. By contrast, change in the periphery is unlikely to generate process disruptions of sufficient magnitude to affect the

outcome of change.

Given that the process effects of change are only likely to be observed in the organizational core, it seems natural that researchers attempting to reconcile adaptation and selection arguments have strayed from the study of peripheral change. After all, comparing process vs. content effects requires focusing on changes in the organizational core. As a result, theory about core change has made great strides but we lack systematic predictions about peripheral change. My goal is to develop and test such a theory by focusing on incremental technology adoption as a special case of peripheral change. The limited extant research on peripheral change has claimed that peripheral changes may be beneficial if they improve the organization-environment alignment (Benner & Tushman, 2003; Dewar & Dutton, 1986; Hill & Rothaermel, 2003). I build on this broad prediction by considering which firms and under what conditions are likely to embark on and benefit from peripheral change. My theory explicitly allows for the internal and external context of change to play a role. Specifically, I make suppositions about organizational size and firm density. Central to these suppositions is the well-established argument of the uniquely disadvantaged competitive position of midsize firms.

## Organizational Size and Peripheral Change

The first set of hypotheses considers internal organizational processes related to size. Existing theory suggests two mechanisms driving the relationship between size and change in opposite directions. On the one hand, research on rates of change in organizational populations shows that the propensity to initiate transformation generally declines with size (Freeman & Soete, 1997; King, Covin, & Hegarty, 2003; Rosen, 1991,

Scherer & Ross, 1990; Stringer, 2000; Wade, 1996). Researchers who report a negative relationship between size and change point to the complex and bureaucratic nature of large organizations (Damanpour, 1996; Hitt et al., 1990). Size drives internal complexity and with complexity come rigidity and inflexibility, hence the opportunity costs of change increase with organizational size. Liability-of-mass arguments also include accounts of the changing role of innovation and experimentation in complex large companies (Barnett & McKendrick, 2004). Large organizations tend to be more differentiated and the proliferation of structure leads to routinization of all activities including change and innovation (Benner & Tushman, 2003; Terziovski, 2010).

On the other hand, resource-based accounts of large firms report a positive relationship between size and change (Cohen & Klepper, 1996; Delacroix & Swaminathan, 1991; Jiang, Tan, & Thursby, 2010; King & Tucci, 2002; Wollebaek, 2009). Underpinning this logic is the notion that the negative process effects of change can be absorbed by existing slack which large firms are likely to possess. Thus, a firm commanding substantial resources can recover from the momentary decline in fitness attributed to internal disruptions in the aftermath of reorganization. For example, organizational size has been shown to: increase the propensity of new product launches (Greve, 2007); increase entry into new market niches (King & Tucci, 2002); and increase innovation in emerging fields (Jiang et al., 2010).

Extant research on change not only offers conflicting predictions about size effects but it typically models these effects on the outcome and hazard of *core* change. Whether and how organizational size matters for peripheral change is unclear: cosmetic changes are much less costly so the resource argument should be muted; at the same time,

changes in the periphery do not impinge on the technically intertwined core and should be less impeded by structural complexity. This suggests that regardless of the direction of its effects (positive or negative) organizational size may be less relevant for peripheral change. Would the likelihood to implement and benefit from peripheral change vary by size?

I think that midsize firms are more likely to engage in peripheral change based on an interpretation of size as a positional attribute, namely, the location of the focal firm in the organizational size distribution within the industry. Two theories about liability of middle size guide my conjectures.

The theory of size-localized competition (Hannan & Freeman, 1977, 1989; Baum & Mezias, 1992) posits that organizations compete most intensely with other similar-size organizations; that is, competitive intensity increases with crowding in location on the size gradient. The disadvantage of midsized organizations is that they face competition on both ends and thus operate in tightly packed regions of the size dimension. The second theory, that of resource partitioning (Carroll, 1985; Carroll, Dobrev, & Swaminathan, 2002), is premised on a distinction between generalist and specialist organizations. Generalists compete on scale while specialists differentiate by customization and stronger appeal, which is often underpinned by a collective identity or an overarching sense of authenticity (Carroll & Swaminathan, 2000). As scale competition unfolds, the selection pressures faced by each generalist are a function of the cumulative size difference between that firm and its bigger rivals. So small-scale competitors (or midsize firms that are bigger than specialists but smaller than dominant large scale generalists) neither benefit from the appeal of craft production and customization nor can match the big mass

producers on scale; midsize firms thus occupy the most precarious competitive position.

With the positional disadvantage of midsize firms well established, I surmise that these firms have a higher likelihood of initiating peripheral change. Mid-size organizations have a stronger incentive to embark on changes in the periphery simply because their unenviable strategic position forces them to operate in a continuously reactive mode, seeking to deploy any source of potential differentiation that may provide at least temporary competitive relief. Against the scale advantage of their bigger rivals and against the specialization advantage of their smaller rivals, midsize firms are likely to experiment with any opportunity to get 'unstuck' from the middle. One way to accomplish this is by attempting to differentiate on a competitive dimension unrelated to size where the order of firms on the size gradient can be reshuffled thus allowing midsize firms to establish a favorable position.

Being subjected to intense competition drains resources and curtails the ability to invest in significant core reorganization (e.g., pursue a radically new technology). Hence, the choice of strategic options for midsize firms may be limited to cosmetic, speculative changes. Due to limited alternatives midsize firms have stronger incentives than large and small firms to pursue peripheral changes. Within the in vitro industry, the low cost of adopting the ICSI technology seems particularly appealing for midsize firms. ICSI utilizes existing laboratory equipment and requires only minimal levels of training for lab technicians. Studies in the economics of assisted reproductive technology (Hamilton & McManus, 2005) concur that the organizational costs of acquiring the necessary resources are modest, as are the costs to the patient. For example, a cycle of IVF costs on average $10,000-$15,000, and medications cost approximately $3,000-$5,000, whereas

most clinics charge about $1,500 for ICSI. Lacking the financial resources or capabilities to make more substantial investments in infrastructure or technology, midsize firms will likely be drawn to adopting ICSI.

- H1a: *A clinic's hazard of ICSI adoption is a non-monotonic function of size, reversing from positive to negative.*

I also contend that midsize firms are more likely to benefit from peripheral transformation than small or large firms. To develop this prediction I first consider the purported benefits of peripheral change. Relevant arguments emphasize relatively low-cost and low probability of disrupting the core while improving external alignment (McKendrick & Wade, 2010). Viewed through the lens of most recent theorizing, the disruptions associated with core change stem from the high extent of relatedness among structural components in the core. For example, changing the mission of the organization would likely impact its principal technology, marketing strategy, and human capital requirements. Disruptions arise because core change generates cascading effects which are difficult to anticipate and prepare for by organizational leaders (Hannan, Polos, & Carroll, 2003). By contrast, peripheral transformation can be helpful in seeking to present the organization in a favorable light, particularly when environmental change demands organizational realignment. Although peripheral change may not necessarily prove beneficial, it is also unlikely to produce deleterious consequences. Past research has demonstrated that peripheral change does not negatively affect organizational fitness although support for its beneficial effects has been inconclusive. Delacriox and Swaminathan (1991) found that cosmetic and speculative changes did not affect wineries' survival chances, and Dobrev (1999) reported that product design changes in titles and format appearance of communist newspapers neither helped nor harmed their failure

hazards during the post-socialist transition.

The inconclusiveness of the prior studies may be explained if I consider the outcome of peripheral change, at least partly, as a function of organizational size. Given the severity of their competitive disadvantage, midsize firms are more likely to extract at least some benefit from peripheral change. For example, an organization can choose to aggressively market a fairly incremental, even meaningless improvement in its operations, especially when other sources of differentiation are few and far between. Because midsize firms are closer to failure than their bigger and smaller rivals, any potential performance benefit, however small, is likely to be magnified in comparative relief. Because of their unenviable starting position, midsize firms have lower opportunity costs (i.e., less 'at stake') associated with peripheral change and are thus more likely to benefit from it.

At the time of its introduction, ICSI was heralded by some professionals as one of the most important technology advances in assisted reproductive technology since the advent of in vitro fertilization in the late 1970s (Schoolcraft, 1999). However, in the ensuing years ICSI would turn out to be a clear example of a peripheral, albeit popular, technology based on a number of determining criteria. For example, ICSI functions as competence-enhancing technology which not only did not threaten to displace an existing technology but is not a stand-alone technology and can only be used in conjunction with existing in vitro procedures and technologies. The initial fanfare surrounding the technology might have been a marketing ploy but an effective one nevertheless: while ICSI eventually failed to improve success rates, ICSI adoption both within and across the clinics in this industry grew rapidly since its introduction in 1992. In a premium service

industry claiming to utilize the height of medical innovation, not adopting a technology, be it marginal, risks being misconstrued as a technological laggard—a worry particularly resonant with midsize clinics squeezed between small providers offering convenience and local access and large players boasting the reputations of their nationally renowned medical experts.

- H1b: *The growth rate of clinics adopting ICSI is a non-monotonic function of size reversing from positive to negative.*
- H1c: *The hazard of failure for clinics adopting ICSI is a non-monotonic function of size reversing from negative to positive.*

## Organizational Density and Peripheral Change

My second set of hypotheses examines how one facet of organizations' external context—the proliferation of other similar organizations (i.e., population density)—affects the likelihood and outcome of peripheral change. The idea that similarity in resource dependence breeds commensalism dates back to the origin of human ecology (Park, 1936; Hawley, 1956). Commensalism underscores the duality in a competitive relationship in which relevant actors at once compete for and protect the shared resource from external threats. The greater the number of homophilous actors, the more intense the rivalry for that resource is and the greater the need to grow and protect it becomes. Population density has been shown to drive up competition in numerous prior studies (Dobrev & Kim, 2006). Research in this direction has shown that increasing density not only has a direct positive effect on organizational failure but also has a second-order effect by way of instigating core transformation which itself often leads to disbanding (Dobrev, Kim, & Hannan, 2001; Khessina, 2010). Competition prompts firms to seek

alternate market positions or pursue other forms of nontrivial strategic response that typically involve core change (Greve, 1995; King & Tucci, 2002). Such attempts at significantly altering the firm's strategic model triggers inertia, which in turn elevate failure hazards. As competitive pressures rise, firms become more likely to engage in core transformation and thus are more likely to fail.

I conjecture that while intensifying competition increases the risk of core change, it simultaneously diminishes the propensity for peripheral change for two reasons. First, as a matter of resource constraints, any slack assets at the organization's disposal are likely mobilized in support of core change leaving little support for additional change efforts. Nonessential projects get crowded out and the human and capital resources they command are redeployed in support of core change. Second, the organizational functions embedded in peripheral structures are geared by design to complement those in the central core and to seek to align them with external requisites. Regardless of whether a firm actually embarks on core change or not, as long as core change is being considered as a strategic option, the likelihood of peripheral change should decrease.[9] Anticipating a change in core features makes external alignment either ephemeral (if the core features to be aligned are not yet known) or potentially obsolete (if current core features are not expected to be retained).

In the IVF industry competitors can monitor one another fairly closely. Because

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[9] This condition is important because its empirical implication is that the occurrence of peripheral change is not only less likely than that of core change but that peripheral change is also less likely than not embarking on any change. Even if firms contemplate core change as rivalry increases, they may not necessarily resort to it. Yet as long as the option of core change is under consideration, it deters the occurrence of peripheral change. Accordingly, H2a is tested against the null of no effect of density on peripheral change.

the U.S. mandates that firms report information on the type and frequency of procedures and technologies deployed, firms may be more likely to respond to competitors by adding a core technology simply because of the unusually high level of information on competitors which exists in this industry. Related to this issue of competitive transparency, firms (and their customers) also have access to success rates for each firm. The interviews with industry participants made it clear that physicians are keenly aware of the potential impact of technologies on success rates. For some clinics, e.g., the larger teaching hospital-based clinics, scientific proof of effectiveness is a prerequisite for adoption of a new technology. Still, all physicians I spoke to indicated that they are cognizant of the comparison of outcomes. While they may tailor their approach to their competitors differently in terms of treatment philosophy, patient care, and drug regimens, there is a consensus on matching core technologies.

In contrast, given a highly competitive environment, the degree to which these same mechanisms of monitoring and matching competitors are at play for peripheral technologies is less clear. Indeed, within the in vitro industry, the high cost of medical equipment, technological innovation and even ancillary needs such as malpractice insurance suggests that during periods of increased competition, clinics will likely be focusing resources on either current technologies or, future technologies that have the ability to significantly impact the competitive position of the clinic. As a result, the adoption of ICSI during these periods would appear to be a strategic course of action that is neither necessary, nor particularly pressing.

- H2a: *A clinic's hazard of ICSI adoption is a negative function of the number of clinics.*

I argued that peripheral change is less likely to be implemented when rising density intensifies market competition. I also conjecture that density affects the returns to peripheral change. My starting point again is the strong empirical base in support of inertia theory, namely that core change leads to a cascading effect, and increases in failure (Hannan & Freeman, 1984; Hannan, Polos & Carroll, 2003). Although a change in the right direction in response to rising competition may produce some performance benefits, these benefits are often offset by the high cost of structural disruptions (Hannan et al., 2006). If the decisive criterion for the successful outcome of change is to minimize disruptions, then peripheral change (which does not impinge on the core) ought to be more beneficial. So the overall outcome of peripheral change may be superior to that of core change even if the latter is more likely to occur as competition intensifies. The relevant question then becomes whether peripheral change is a more viable alternative for the firm than simply staying the course and avoiding any change.

I think that peripheral change is desirable when the firm's position is challenged because it affords the opportunity to signal a dynamic response to competition with little downside potential. Although substantively, the firm may undergo little or no change in its de facto strategic resources and capabilities, the signaling value of peripheral change alone may prove a prized, albeit transitive, tactic against aggressive rivals. By definition, peripheral change cannot meaningfully alter a firm's strategic direction and only core change may potentially provide a change in the right direction. Yet, the cost of implementing core change may more than offset its benefits thus making peripheral change a more viable course of action.

While this conjecture seems reasonable under any external conditions, the relative

benefits of peripheral change seem to rise proportionately with rising competition. First, as rivalry stiffens, the implementation costs of core change inevitably rise as the number of rivals to be outmaneuvered increases; in relative terms (compared with core change) this makes peripheral change more appealing. Second, doing nothing in response to increasing competition displeases stakeholders and signals tardiness, unresponsiveness and incompetence. External and internal constituents demand some reaction to competitors' inroads if only to assuage fears of misdirection and lack of leadership; in relative terms (compared with a no-change, 'stay the course' strategy), peripheral change becomes more effective as rivalry intensifies.

Within the in vitro industry, a unique feature of the evolution of the industry may help explain why clinics could ostensibly benefit from peripheral technology adoption, even in times of heightened competition. As mentioned above, while the advent of ICSI was initially trumpeted as a radical technological innovation, it clearly did not prove to be one. Wishful thinking may have been a deliberate strategy in an industry where major technological breakthroughs have been decidedly missing since the advent of two new core technologies (gamete intrafallopian transfer (GIFT) and zygote intrafallopian transfer (ZIFT)) in the mid-1980s. Moreover, these two technologies have steadily declined in their use over time and by 2001, less than 2% of all assisted reproductive procedures utilized either GIFT or ZIFT, with more than 98% representing procedures done with the original IVF technology. As a result, clinics' ability to differentiate through technology was practically nonexistent. What clinics saw in ICSI was an opportunity to make a claim (however inherently fictitious) for technological leadership and commitment to innovation otherwise unavailable to them. Thus, although heightened

competition rationally pushes either towards substantive differentiation on a nontechnology dimension (i.e., not changing a clinic's technology profile), or towards major technological change in the core (e.g., diversification into related medical services beyond assisted reproduction), the payoff to a well-thought out marketing effort (however speculative) around ICSI adoption that eliminates the perception of a technology laggard or the cost of learning fundamentally different technologies seems clear.

- H2b: *The growth rate of ICSI adopting clinics is a positive function of the number of clinics.*
- H2c: *The hazard of failure of ICSI-adopting clinics is a negative function of the number of clinics.*

## Empirical Setting: The IVF Industry

**Overview**. The in vitro fertilization (IVF) industry was launched with the birth of the world's first 'test-tube' baby in 1978 in the UK. Within three years, the first IVF clinic was founded in the U.S. and the industry has grown rapidly over the years. IVF refers to a three-step process in which eggs are retrieved from the patient, the eggs are fertilized with sperm in a lab, and finally, the resulting embryos are transferred back to the uterus. Over time, additional assisted reproduction technologies (ART) have emerged, although IVF remains the dominant technology. Initially, IVF success rates were relatively low. In 1984 there were 40 IVF live births. By 2009 there were 146,244 reported ART cycles performed, resulting in 45,870 live births. The industry has undergone tremendous growth, with density increasing from 175 clinics in 1989, the first year of observation, to 381 clinics in 2001, the final year of observation. Despite the fact

that the cost of treatment for infertility is largely paid directly out-of pocket by patients and not covered through insurance, the number of treatment cycles (retrievals) grew from 34,095 in 1989 to 537,439 by 2001.

Intracytoplasmic sperm injection (ICSI), was first utilized in a research lab in the U.S. in 1991, and became available to patients in 1992 (Devroey and Van Steirteghem, 2004). The new technology involves directly injecting a single sperm into an egg using microscopic needles and pipettes. Although developed in order to treat male-factor infertility cases, it was soon considered a possible candidate to improve outcomes for all infertility patients. Only after several years of analyzing outcomes as well as the unique chromosomal risks associated with ICSI, did it become clear that the technology could not deliver on its initial promise. Nevertheless, ICSI quickly diffused throughout the industry and by the end of the observation period was offered by the vast majority of clinics.

**Technology, competition and theoretical relevance.** My theory accords well with the dynamics of competition and technology adoption in the IVF industry. In most major metropolitan areas, the largest firms are embedded within teaching hospitals and the smallest firms are often comprised of only one or two physicians. In informational interviews with reproductive endocrinologists in two cities, I found anecdotal evidence that the smallest and largest clinics approach technology adoption differently than midsized firms. This seems to be due to differences in philosophy in weighing scientific evidence as well as concerns about managing patient demand. Physicians at a large teaching hospital based clinic indicated that they were interested in only adopting proven technologies. For example, they were not interested in adopting a new drug protocol that

a midsized clinic was offering due to the lack of scientific studies supporting claims of improvement in patient outcomes. A physician associated with a small, but thriving practice in the same city explained that none of his patients had requested this new drug protocol, thus he had not adopted it. Both the large and small clinics did not express concerns about attracting new patients. If anything, the opposite concern was expressed. For both the large and small clinics, the physicians I interviewed indicated that they were operating at capacity. They indicated the challenges they faced in supporting their current patient loads. On the other hand, the midsized clinic was clearly concerned with maintaining a flow of patients and one of the physicians couched the adoption of the unproven drug protocol as potentially beneficial. This physician described his groups as being willing and able to try unconventional treatments in order to satisfy and attract patients.

In the context of the IVF industry, adopting ICSI does not meaningfully impact on the established competencies and routinized work flow inside the firm. Since multiple eggs are collected for each cycle of treatment, even if ICSI does not improve outcomes, it is unlikely to worsen them because implementing the technology only requires a single egg. Further, there is minimal disruption in terms of the workflow and scheduling of procedures. ICSI is simply done in conjunction with the final steps used once gametes have been collected. The skills and equipment needed to adopt ICSI are highly-related to the lab skills already in use in established technologies. There is nevertheless a clear potential marketing benefit to offering ICSI. Fertility treatment is fraught with uncertainty even under the best circumstances and patients are often willing to do whatever possible to improve their odds of success. Physicians have wide discretion in

adopting ICSI and may concede to anxious patients' requests for it, even in the absence of justifiable medical imperatives. ICSI can also be used to signal to customers the strength of the firm's lab capabilities, capabilities that are also necessary for utilizing established primary technologies. The adoption of ICSI can be useful in attracting new patients by simply reflecting an image of technological competence.

## Data and Methods

**Data**. The data on the IVF industry span the period 1989-2001 and come from the Annual National Summary and Fertility Clinic Reports. These reports were initially administered by the Society for Artificial Reproductive Technologies (SART) and were voluntary. The passage of the *Fertility Clinic Success Rate and Certification Act of* 1992 mandated that organizations performing IVF services provide detailed annual data for all procedures performed to the CDC.[10] In reality, the transition from SART to CDC did not take effect until 1995 so my data from 1989 to 1994 are based on the SART-administered surveys and on the CDC surveys from 1995 to 2001. Although SART began administering the surveys in 1987, it was not until 1989 when they issued a voluntary mandate for reporting that produced much more reliable and comprehensive data. Moreover, the nature of the data collected changed in 1989 and remained consistent with the CDC data thus allowing us to combine the two data sources and reconstruct the life-history of each clinic from 1989 to 2001. Even after 1989 individual firms did occasionally fail or delay to report in a given year but I was eventually able to update the missing yearly records. While every survey is subject to self-reporting bias, one

[10] www.cdc.gov/art/ARTReports.htm

mitigating factor increasing the validity of the information reported by the clinics is the practice by the CDC to perform random site visits conducted on a yearly basis. For example, 29 of the 374 clinics reporting in 1999 were subject to on-site visits.

The reports filed by the individual clinics contain various performance and operational data including the type of ART procedure used (IVF, GIFT, ZIFT and ICSI) and the number of successful retrievals, pregnancies and live births resulting from each procedure. Further, the success rate is broken down by patient age and type of cycle (fresh vs. frozen embryo and donor vs. nondonor eggs). I constructed the dataset in a year-clinic format, updating the technology profile for each clinic by creating indicator variables for each technology. Of special interest to the analysis is whether a clinic is employing the ICSI technology so I include a dummy variable, *ICSI*. To measure ICSI adoption I marked up the first year in which a firm reported the use of the technology. I do not know the founding dates of clinics that entered prior to 1989 so unfortunately I do not have data to compute organizational age. I used the following rule to determine the year of clinic closing (failure): if a clinic failed to report a survey for a given year but did so the following year, I assumed that it continued to exist and used the available data to interpolate missing values on the covariates of interest by using the average value of the preceding and the subsequent yearly records. If a clinic failed to report data for two consecutive years, I did not feel confident interpolating missing data or assuming that the clinic continued to operate. Instead, I reasoned that the clinic must have shut down temporarily and then restarted operations again. So I did not treat cases of temporarily ceased operations as failures, unless of course, the clinic never reentered the industry.

Consistent with earlier studies I sought to measure organizational size as scale of

operations. While the data provide information on live pregnancies and births, I thought that the best measure of size is the count of annual *retrievals* performed in each clinic. Live pregnancies and births are obviously not accomplished with every patient and thus would bias the size measure, as in the case of a smaller clinic with a higher success rate. By contrast, a retrieval represents a treatment cycle that has been successful at getting the patient to the point of being capable of undergoing an assisted reproductive treatment via one of the available technologies (IVF, GIFT, ZIFT, ICSI). Although a successful retrieval does not guarantee a pregnancy, it does reflect the deployment of a key technology by the clinic and as such, in my view, is the most appropriate measure of 'scale' in the industry. I use both a linear and a squared function of this variable to test the predicted non-monotonic effects of size on adoption, growth, and failure. To control for the possible difference between content and process effects of organizational change I computed a clock variable, time since ICSI, which counts years since ICSI adoption for each firm. I also computed two measures that capture the effect of industry experience with the new technology: *cumulative ICSI adoptions* counts the number of clinics that have adopted the technology since its introduction in 1992 while *annual ICSI adoptions* counts the number of adoptions in the preceding calendar year. As usual, organizational proliferation is measured by annual *density of clinics*, or the number of clinics in existence each year. I complete the industry-level set of covariates by macroeconomic controls for *Inflation* and *GDP*.

**Methods**. I use event history analysis to model the rates of failure and peripheral (ICSI) technology adoption among IVF clinics. For the failure rate models, each clinic is at risk of failure in each of the years in which it is in operation, based on my data sources.

I assume that failure occurs at the end of the year in which the clinic files its last annual report or, in a few cases, it cedes to report for at least two consecutive years (as explained above). I do not know what happens to clinics at the end of 2001, the last year of the observation window so these records are uninformatively right-censored. It has become convention to use organizational age as the time-clock in event history analysis, a practice that allows researchers to model age-dependence in many of the observed effects of other covariates. Unfortunately, as I acknowledged above, I do not have reliable data on organizational age so I use calendar time instead. I experimented with several functional specifications and determined that an exponential model fits best. Allowing the rate to vary across calendar time does not produce any substantive results, and interferes with many of the industry-level effects so I constrain the rate to be constant across the observation period. The risk-set in the failure hazard models consists of 3,770 clinic-year spells for 562 clinics, 140 of which failed.

For the technology adoption models, only firms that have not yet adopted the ICSI technology are at risk, that is, I treat adoption as a nonrepeatable event and drop the clinic from the dataset in the year following ICSI adoption. Again, I assume that an adoption event occurs at the very end of the year preceding the one in which the firm first reported implementing ICSI. Of course, a clinic cannot become at risk of adopting the technology prior to (the turn of) 1992 when ICSI was first introduced, hence, I also eliminate the pre-1991 records for all firms. As with the failure hazard models, I right-censor records of nonadopters in the last observation year and use calendar time as the time-clock for the same reasons explained above. The number of clinic-year observations in the adoption risk-set comprises 885 clinic-year spells representing 300 firms of which 249 adopted

ICSI.

I model growth rates by regressing a clinic's number of retrievals in a given year on number of retrievals and other observables in the previous year. This completely eliminates all clinic records in the last observation year of the data because I cannot estimate growth rates without knowing the value of retrievals in the subsequent year. It also eliminates firms with single-year observations. As a result, the number of records in the data file I use for the growth rate models is 3,207, representative of 498 clinics. I used the method of generalized estimating equations (GEE) which allowed us to model variance both between clinics and across time for each clinic. The data are structured as an unbalanced panel with multiple observations of different length for each clinic. The different clinic-year records for each clinic are likely autocorrelated because of permanent but unobserved firm-level characteristics. To control for such serial correlation between the records for each clinic, I used the exchangeable correlation matrix, as implemented in STATA.

## Results

The inferential statistics are presented in Tables 4.1-4.3. I begin with the adoption models in Table 4.1. Model 2.1 is a baseline which shows positive rate dependence in ICSI adoption and negative time dependence across industry age. I test the prediction that the firm size effect is non-monotonic (H1a) and confirm that the adoption rate initially increases with size but then the effect reverses direction across high counts of the variable. In model 2.3 I test hypothesis H2a which predicts that as competitive crowding increases, ICSI adoption will decrease. The significant negative coefficient of density

confirms the prediction.

I next turn to the survival analysis presented in Table 4.2. The baseline model 3.1 suggests that there is monotonic negative size-dependence in the failure rate, consistent with numerous earlier findings. My prediction that the benefit to adopting an incremental technology will be non-monotonic across size (H1b) is tested in model 3.2 and is not confirmed. Adopting ICSI provides no survival advantage to any firm regardless of its size. Including the nonmonotonic specification testing the relationship between size and incremental technology (i.e., the interactions between number of retrievals and ICSI adoption) does not improve model fit significantly so I exclude it from the next model. That model, 3.3, tests H2b which predicts that ICSI adoption may be beneficial under conditions of rising competitive intensity. In support, the interaction coefficient between ICSI and density is negative and significant suggesting that the failure hazard of firms adopting ICSI improves as the number of their peers increases.

Finally, I present the results of the firm growth analysis in Table 4.3. The baseline model 4.1 suggests that growth rates are non-monotonic across size with midsize firms growing the fastest. Model 4.2 demonstrates that this pattern only holds among ICSI-adopting firms—a finding which confirms hypothesis H1c. Including the interactions between number of retrievals and ICSI adoption amplifies size-dependence in growth rates, which becomes positive and monotonic but non-proportionate, so growth rates are disproportionately higher for large firms. The next model, 4.3, tests hypothesis H2c which suggests that ICSI adoption provides a growth boost to firms as competitive intensity rises. The positive and significant coefficient for the interaction between density and ICSI adoption confirms this prediction.

With five of the six hypotheses confirmed, I next turn to summarizing the theoretical contribution of the research and tying it in with the broader research stream on technology management and organizational change.

## Discussion

The theory of peripheral change as a function of, at least partly, organizational size and population density that I developed was largely supported by my findings. Using incremental technology adoption in the IVF industry as the empirical context, I showed that midsize firms are more likely than small and large firms to resort to peripheral change. I explained this variation by size with the limited choice-set of strategic options available to midsize firms faced with strong selection pressures emanating from their unenviable market positions. I also predicted that midsize firms will benefit from peripheral change more than small and large firms because the value of a peripheral adjustment hinges on the incentive and susceptibility of the firm to appropriate that value. Firms under strong selection pressures will resort to any tactic to seek competitive relief. As such, midsize firms are unlikely to improve competitive positions by catching up volume with large competitors; and they find it hard to respond to small, specialized rivals by customizing their offerings because doing so would violate their scale economies. Seeking to differentiate by adopting a new technology, even when it represents little more than a process improvement, is an opportunity to play up a marketing strategy of technological leadership. Strategically, the goal is to detract from the perception of being a laggard in terms of scale and actual R&D capability or customer responsiveness.

By contrast, dominant market players renowned for their technical expertise would find it hard to impress constituents by pursuing cosmetic improvements. Small rivals, whose customer base is local, both geographically and in terms of relationship management with their clientele (e.g., word of mouth advertising, personal reputations, community engagement, etc.) are unlikely to see substantial business growth by adopting a non-impactful technology. My results partly support this logic as I find that growth rates for incremental technology adopters vary significantly by size, and that midsize firms have higher growth rates. Although I do not find support for the prediction that these firms will also directly benefit from peripheral change in terms of improved survival chances, it is clear that they do so indirectly, by way of higher growth. I concur with the practitioner view that '…in any business, if you're not growing, you're dying.'[11]

The findings also offer strong support for the predictions that variation in population density plays an important role in incremental technology adoption and its outcome. Building on the premise of density-dependence theory, I conjectured that if density drives competition and if intensified competition makes core change more likely, this will simultaneously decrease the likelihood of peripheral change. When market positions become tightly contested, organizations seek to either profoundly restructure operations and reformulate strategies, or commit fully to executing current strategies. Either option requires full deployment of resources leaving little room for piecemeal adaptations. Accordingly, I found that as the number of IVF clinics increases, adoption of the ICSI technology wanes.

Yet based on my results, this may not be the optimal strategy. I know from extant

[11] David B. Ingram quoted in 'Diverse Offering,' *Vanderbilt Business* online edition, Spring 2010.

research that core change frequently leads to failure and that firms that do not change are also at risk of being de-selected. I argued and provided evidence that under stiffening competition, the payoff to peripheral change increases. Rather than succumb to the hazard of structural misalignment in the core or risk the perils of inertial stasis, firms that retain their core intact yet engage in incremental changes geared to impress external constituents with their strategic flexibility and the swift response of their management, do better. As my findings demonstrated, incremental technology adopters experienced improved survival chances and higher growth rates with rising population density.

The data are good but not perfect. I offered an ad hoc definition of peripheral change—the definition of ICSI as an incremental technology was only idiosyncratically validated in the context of the IVF industry. While I am certain in the internal validity of my measure, perhaps the greatest improvement future research in this direction could make is to develop a more generalizable measure of peripheral change. Moreover, the measure is dichotomous and does not allow us to compare the impact of the covariates on core as well as on peripheral change. Either a continuous measure where variance in the extent of change is observed or two complementary dichotomous measures indicating the occurrence of core and peripheral change would help to establish the robustness and further generalizability of my theory and findings.

## Conclusion

I hope to have made some progress towards building an answer to the question which I began with: when would firms adopt and benefit from a new technology. Addressing only a piece of the puzzle, I deliberately limited myself to investigating the

adoption of an incremental, competence-enhancing technology partly because so much of the research in technology management centers on the study of radical innovation. My contribution to this research stream is to demonstrate the value of taking an ecological approach to the study of technological change. As it relates to technological change and innovation, the core-periphery distinction in organizational ecology is akin to the difference between disruptive and incremental technology adoption in the technology and innovation literature (e.g., Anderson & Tushman, 1990; Christensen, 1998). In this literature, the primary research focus has been on radical innovation with ideas about incremental technology adoption discussed indirectly as a competence-enhancing means of solidifying the position of industry leading firms (Sosa, 2009, 2011; Tripsas, 2011). Even here, the categorization of the type of technological innovation is complex and often ambiguous (Gatignon et al., 2002). I aimed to clarify what is meant by an incremental innovation by relying on the logic of the organizational core-periphery distinction, and in doing so I demonstrated the usefulness of this approach to those studying incremental change in the broader technology management area.

The contribution to organizational ecology was to develop and test theory about peripheral change which has been largely overlooked in prior studies. I developed the unconfirmed speculations from prior studies about the potential benefits of peripheral change into systematic predictions specifying under what conditions and for which organizations these benefits may accrue. While peripheral change is in fact speculative and cosmetic, it is still theoretically important in that it complements and hopefully improves our understanding of core change. For example, the relationship between size and change which has been left unresolved in prior research may be due to the fact that

arguments about resource endowments and bureaucratic complexity only apply to the study of core change. As I argued, peripheral adjustments do not require significant resources and do not impinge on the structurally complex organizational core. Instead, my predictions about the relationship between size and peripheral change are largely behavioral, based on a theoretically informed interpretation of the competitive disadvantage faced by midsize organizations.

I also reckon that my focus on midsize organizations will resonate with a large audience in the organization and management research community since size is perhaps the most powerful and ubiquitous explanatory covariate in organizational analysis of various kinds. Most contemporary theories in organizational sociology and strategic management contain predictions about the unenviable position of midsize organizations. In Porter's (1980) influential framework, firms that are unable to deploy a cost-leadership or a product-differentiation strategy are viewed as 'stuck in the middle.' In ecological theories of size-localized competition and resource partitioning, firms that sit in the middle of the size distribution are thought to be neither big enough to compete on par with large-scale rivals, nor small enough to legitimately offer craft based or customized products. Yet, despite the agreed upon severity of competitive pressures faced by midsized firms, their existence is a fact. Even in evolving industries where consolidation eventually produces a bimodal size distribution, midsize firms do not disappear overnight. Under some political and macroeconomic regimes, as with Germany's class of Mittelstand companies, they may even thrive and dominate their respective industries. While much prior research across a wide range of disciplinary and applied theoretical perspectives has focused on what drives the demise of middle-sized organizations, here I

considered what may at least partly alleviate the strong selection pressures to which they are subjected. The central finding was that midsize firms are more likely to resort to peripheral change and more likely to benefit from it.

Finally, I hope the results help to dispel some existing theoretical misconceptions and forge further integration within the field. A pervasive yet inaccurate interpretation of organizational ecology research, especially with respect to the theory of structural inertia, has been that it is somehow 'anti-managerial.' Because inertia theory predicts that organizations that change will fail (due to destabilizing the very structures that provide the organizational capacity to act with reliability and accountability) and those that do not change will also fail (because inability to keep up with external change will simply lead them to be replaced by firms with better external fit), it is assumed that there is not much managers can do to avoid a gloomy outcome in the face of external shifts: whether the firm changes or not, the hazard of failure increases. Using the toolkit of organizational ecology, I reiterated that these predictions only apply to core change. Embarking on peripheral change under conditions of intensifying competition improves survival chances and growth, hence—in full accord with inertia theory—it provides a desirable course of action, clearly within the realm of managerial discretion. Let further integration proceed.

Table 4.1

ML Estimates of Size and Density Effects on Technology Adoption

| | **Model 2.1** | | **Model 2.2** | | **Model 2.3** | |
|---|---|---|---|---|---|---|
| Industry Age | -2.70* | (1.33) | -4.27** | (1.35) | -1.45 | (1.75) |
| Inflation | -0.02 | (0.20) | -0.01 | (0.20) | -0.42 | (0.25) |
| GDP Billions ($\times 10^{-2}$) | 0.02 | (0.01) | 0.03** | (0.01) | 0.12** | (0.03) |
| ICSI adoptions at t-1 | 0.01* | (0.01) | 0.01* | (0.01) | -0.01 | (0.01) |
| Retrievals ($\times 10^{-2}$) | | | 0.51** | (0.10) | 0.51** | (0.10) |
| Retrievals $^2$ ($\times 10^{-1}$) | | | -0.28* | (0.12) | -0.28* | (0.12) |
| Density of clinics | | | | | -0.03** | (0.01) |
| Log-likelihood (d.f.) | -553.62 (4) | | -533.26 (6) | | -529.20 (7) | |

Numbers in parentheses are standard errors
Number of spells:885; Number of clinics: 300; Number of events: 249.
* significant at .05, ** significant at .01.

Table 4.2

ML Estimates of Size and Density Effects on Failure Rates

| | Model 3.1 | | Model 3.2 | | Model 3.3 | |
|---|---|---|---|---|---|---|
| Industry Age | 9.35* | (4.28) | 9.74* | (4.30) | 11.62** | (4.36) |
| Inflation | -0.74** | (0.24) | -0.73** | (0.24) | -0.68** | (0.24) |
| GDP Billions ($\times 10^{-2}$) | -0.09 | (0.05) | -0.09 | (0.05) | -0.11* | (0.05) |
| ICSI adoptions at t-1 | 0.002 | (0.01) | 0.002 | (0.01) | 0.001 | (0.01) |
| Density of clinics | -0.04 | (0.03) | -0.04 | (0.03) | -0.05* | (0.03) |
| Density of clinics $^2$ ($\times 10^{-3}$) | 0.07 | (0.06) | 0.08 | (0.06) | 0.12* | (0.06) |
| ICSI | 0.18 | (0.27) | -0.12 | (0.34) | 3.61** | (1.28) |
| Years since ICSI Adoption | -0.09 | (0.07) | -0.10 | (0.07) | -0.06 | (0.07) |
| Retrievals ($\times 10^{-2}$) | -0.30* | (0.15) | -0.64* | (0.29) | -0.27** | (0.10) |
| Retrievals $^2$ ($\times 10^{-1}$) | 0.08 | (0.18) | 0.44 | (0.44) | | |
| Retrievals ($\times 10^{-2}$) $\times$ ICSI | | | 0.49 | (0.36) | | |
| Retrievals $^2$ ($\times 10^{-1}$) $\times$ ICSI | | | -0.50 | (0.55) | | |
| Density of clinics $\times$ ICSI | | | | | -0.01** | (0.01) |
| Log-likelihood (d.f.) | -569.07 | | -568.04 | | -565.75 | |

Numbers in parentheses are standard errors
Number of spells:3770; Number of firms: 562; Number of events: 140.
* significant at .05, ** significant at .01.

Table 4.3

GEE Estimates of Size and Density Effects on Growth Rates

| | Model 4.1 | | Model 4.2 | | Model 4.3 | |
|---|---|---|---|---|---|---|
| Constant | -1.62** | (0.50) | -1.41** | (0.50) | -1.70** | (0.52) |
| Inflation | 0.03 | (0.03) | 0.03 | (0.03) | 0.02 | (0.03) |
| GDP Billions ($\times 10^{-2}$) | 0.01 | (0.01) | 0.01 | (0.01) | 0.01 | (0.01) |
| ICSI adoptions at t-1 | -0.003* | (0.00) | -0.001* | (0.00) | -0.003* | (0.00) |
| Density of clinics | 0.01** | (0.00) | 0.01** | (0.00) | 0.01** | (0.00) |
| Density of clinics $^2$ ($\times 10^{-3}$) | -0.02** | (0.01) | -0.02** | (0.01) | -0.02** | (0.01) |
| ICSI | 0.04 | (0.03) | -0.06 | (0.04) | -0.45* | (0.18) |
| Years since ICSI Adoption | -0.02 | (0.01) | -0.02* | (0.01) | -0.02* | (0.01) |
| Retrievals ($\times 10^{-2}$) | 1.04** | (0.03) | 0.85** | (0.03) | 0.85** | (0.03) |
| Retrievals $^2$ ($\times 10^{-1}$) | -0.04** | (0.02) | 0.33** | (0.08) | 0.34** | (0.08) |
| Retrievals ($\times 10^{-2}$) $\times$ ICSI | | | 0.19** | (0.03) | 0.20** | (0.04) |
| Retrievals $^2$ ($\times 10^{-1}$) $\times$ ICSI | | | -0.37** | (0.08) | -0.38** | (0.08) |
| Density of clinics $\times$ ICSI | | | | | 0.0003* | (0.00) |
| Scale Parameter | 0.2709 | | 0.2573 | | 0.2566 | |
| Wald $\chi 2$ (d.f.) | 5812 (9) | | 10787 (11) | | 11109 (12) | |

Numbers in parentheses are robust standard errors
Number of observations: 3207; Number of clinics: 498.
* significant at .05, ** significant at .01.

# CHAPTER 5

# CONCLUSION

Prior research finds that specialist organizations are at a competitive disadvantage relative to the broader market, and that their success is predicated on their ability to both maintain an oppositional identity, and avoid direct competition with generalist organizations. However, beyond these assumptions, relatively little is known about the unique competitive dynamics of specialist, craft based organizations. I find, however, a rich set of empirical contexts which seeks to shed light on this space in the market, and show (a) that these types of organizations are becoming increasingly competitive in the broader market, and (b) the success, growth, and survival of these organizations are often determined by firm-specific characteristics and competitive dynamics within these industries, rather than generalist strategies which drive collateral damage in specialist markets.

As a result, I argue that new theories need to emerge in order to address, understand, and interpret these emergent markets where specialist organizations are beginning to thrive. Moreover, I suggest that existing theories should be updated to incorporate these new trends as well. This leads to a great deal of potential for future research within this domain across a number of different theoretical perspectives. For example, the vast majority of empirical contexts used to study craft based, specialist

organizations, are traditional or artisanal in nature (for example, microbreweries, organic farming, and grass fed beef). Nevertheless, a great deal of potential exists related to the study of craft based organizations, which also leverage high levels of technology-intensive innovation. For example, custom bicycle frame manufacturers and high-end mountaineering or mountain climbing equipment are examples of industries that rely on identity-based perceptions of quality and exclusivity. Yet, they also rely on modern technological innovations, and are anything but traditional. Therefore, future research could look into the degree to which organizational (both individual and collective) identities are shaped by technological change or discontinuities in the market. This would be particularly interesting in a context where the industry is known for high levels of authenticity and tradition. Additional areas for future research, which continue along the lines of the findings in this dissertation, include studies of how consumers respond when consolidation begins to occur in specialist industries, either by specialists consolidating with one another, or large generalists acquiring smaller specialists. This has already begun to occur in the craft beer industry, however, the number of these acquisitions are not yet sufficient for a robust empirical test of the phenomenon.

Finally, understanding how craft based identities change as new set of consumers interact with specialists industries also holds promise. For example, the oppositional identity within the craft beer market has been so successful in large part because of a core group of stakeholders who socially identify with the craft breweries. Yet, as these breweries begin to cross over more and more into the mainstream market, this identity is increasingly being shaped by consumers, critics and competitors that are not nearly as dedicated as the core set of stakeholders. Thus, unpacking how diverse cohorts of

consumers change over time, and the implications this has on organizational identity and performance should be a fruitful domain of study moving forward.

While my results provide several important implications for existing theory, and contribute to a number of different theoretical perspectives (including work on identity, cooperative/competitive dynamics, innovation, and resource partitioning), much more work is needed to better understand these industries that appear to be growing in number, appeal, and economic significance.

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