

Demystifying entrepreneurial name choice: insights from the US biotech industry

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name choice

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Abstract

Purpose – Drawing from legitimacy and institutional entrepreneurship theory, this study assesses the naming patterns of entrepreneurial firms in the US biotechnology industry.

Design/methodology/approach – The authors use a mixed-methods design of content analysis and regression to analyze a sample of 441 entrepreneurial biotechnology firms, for which data were obtained from Net Advantage. The authors track changes to the proportion of firms with naming attributes, such as name length and type of name. The authors also examine variability in those characteristics during the industry's evolution, comparing freestanding to acquired start-ups.

Findings – Start-ups select names that are longer, more descriptive, begin with rare sounds or hard plosives and have stronger discipline- or technology-specific links during nascent years of the industry. As the industry evolves, entrepreneurs are more likely to select names that are shorter, more abstract, begin with hard plosives and have stronger industry-specific links. The naming patterns of freestanding and acquired companies differ, and companies that conform to industry pressures tend to remain independent.

Originality/value – Unlike extant studies that assess established industries, the current study identifies shifting trends in the naming patterns of entrepreneurial firms in an emerging industry. By focusing on start-ups, the authors expand research on organizational naming practices, which focuses traditionally on name choices and name change patterns of incumbents. By using marketing and linguistics methods when analyzing organizational name attributes, naming patterns in these attributes are identified, including name length, name type, starting letter of the name and link to the industry.

Keywords Emerging industry, Entrepreneurial name choice, Organizational name attributes, Organizational naming patterns

Paper type Research paper

1. Introduction

A seeming contradiction exists in new ventures' searches for legitimacy and distinctiveness. To obtain legitimacy and access to critical resources (DiMaggio and Powell, 1983) and extend survivability (Rueff and Scott, 1998), start-ups must play by the rules, conforming to the norms, practices and organizational forms of incumbents. However, they must also identify ways to differentiate themselves from competitors. The legitimacy argument derives from institutional theory, which entrepreneurship research uses broadly to assess forces that define entrepreneurial success (Bruton *et al.*, 2010). Research suggests that the liability of



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newness constrains the agency and strategic decisions of the founders of new ventures (Ahlstrom and Bruton, 2002); in the absence of performance records, new ventures seek legitimacy to secure critical resources and garner support from important stakeholders. Contrarily, institutional entrepreneurship theory, also embedded in institutional theory, suggests that entrepreneurs occasionally use their agency to shape or transform their institutional environments in ways that promote their organizations or fields (Lawrence *et al.*, 2002). Entrepreneurial actions are used to differentiate the organization, and research on this topic explains how established institutions change.

Some explain the existence of this tension, new ventures experience, for simultaneously conforming to and differentiating from the industry incumbents, based on the dependence of new ventures on multiple stakeholders who apply differing normative expectations and use heterogenous criteria to assess the legitimacy of a venture and distribute resources accordingly (Fisher *et al.*, 2016). Moreover, these expectations and criteria evolve over time and new venture choices must reflect such changes to obtain and maintain legitimacy, which further challenges the comprehensibility and viability of a venture and decisions on how a new enterprise should link to resource-providing audiences to obtain legitimacy (Fisher *et al.*, 2016).

To reconcile the potentially contradictory criteria stakeholders use to judge the legitimacy of an enterprise, Tauscher *et al.* (2021) show that distinctiveness and legitimacy are not mutually exclusive with firms having to choose at a given time either one or the other as it is traditionally understood (Zhao *et al.*, 2017) but are part and parcel of the same issue; enterprises can leverage distinctiveness to gain legitimacy. While Navis and Glynn (2011) also recognize that distinctiveness and legitimacy can reinforce each other, there is a “tipping point” effect suggesting that new, unknown ventures should only be sufficiently different to stand out within their group and attract the attention of resource providers, but not too different to be perceived as outsiders. This line of research demonstrates that distinctiveness and legitimacy are key determinants of the survivability of a new venture, but the direction, intensity and evolution of their interplay is inadequately understood. The present investigation intends to further this line of inquiry in the context of startups.

One area of research that addresses tensions between isomorphism and differentiation for new ventures but that has received little attention is the choice of start-up names during an industry’s evolution, which is surprising because a firm’s name is infused with meaning and serves as an identifier, and naming a firm is a strategic decision that signals to stakeholders what a firm stands for (Boddewyn, 1967). Organizations select names to convey to internal and external audiences what is central, enduring and distinct about them (Albert and Whetten, 1985; Chuang and Baum, 2003; Glynn and Abzug, 2002; Lee, 2001). Regarding organizational naming practices, the institutional entrepreneurship argument suggests that organizations exercise discretion and make deliberate strategic choices when selecting their names; entrepreneurs’ efforts to shape the environment drive them to select distinctive names that help a firm stand out (Santos and Eisenhardt, 2009; Klink, 2000; Navis and Glynn, 2011). However, regarding legitimacy, some firms allow external forces to shape organizational forms and destinies (Oliver, 1988). Therefore, the legitimacy argument predicts that institutional pressures for legitimization are more likely to influence name choices than competitive differentiation forces are (Glynn and Abzug, 1998, 2002; Engel *et al.*, 2020). Institutional pressures for conformity blur boundaries between identity-driven name choices and the context within which an identity is established (Glynn and Abzug, 2002). Firms subjected to mimetic, normative and coercive pressures choose names that reflect features, categories and forms already established in the industry (Ashworth *et al.*, 2009; Brewster *et al.*, 2008).

Despite the importance of organizational names, few studies examine what drives a new firm’s name choice (Chuang and Baum, 2003; Fox, 2010; Belenzon *et al.*, 2017). Understanding

organizational naming practices in established industries is valuable, but little is known about name choices of entrepreneurial firms in emerging industries, where structure is undefined or fleeting, and ambiguity is high (Santos and Eisenhardt, 2009). New firms have fluid or non-existent identities, and they lack easily recognizable names and precedents for the kinds of activities they want to do (Aldrich and Fiol, 1994; Lounsbury and Glynn, 2001; Murphy, 2003; Santos and Eisenhardt, 2009). Due to their nascence, they also experience difficulties such as the inability to raise capital, lack of legitimacy and greater failures (Bruderl and Schussler, 1990; Bruderl *et al.*, 1992; Henderson, 1999).

Since nascent markets are characterized by lack of structure, extreme ambiguity and lack of institutional pressures (Santos and Eisenhardt, 2009; Rindova and Fombrun, 1999), they compound obstacles that entrepreneurial start-ups experience, including their vulnerability. The unpredictable environment makes an entrepreneur's name choice a pivotal decision that can determine a firm's success or failure (Klink, 2000), and yet research is scarce on potential naming patterns for start-ups in emerging environments.

Drawing on institutional entrepreneurship and legitimacy research, this paper assesses two empirical questions related to the naming patterns of start-ups. The first question explores how the interplay between conformity and legitimacy reflects the naming patterns start-ups use during the evolution of an emerging industry. The second question examines if the tension between conformity and legitimacy exposes differences in the naming patterns of acquired and freestanding start-ups. To address this gap, we use linguistics to analyze the nature of new ventures' names in an emerging industry. Findings suggest that during early years of industry formation, start-ups select names that are longer, more descriptive, begin with rare sounds or hard plosives and have stronger discipline- or technology-specific links. As the industry continues to evolve, entrepreneurs still prefer longer names that begin with hard plosives but choose more abstract names that have stronger industry-specific links. Once the industry evolution has reached a threshold, start-ups repeat the naming practices from the onset of the industry but are more likely to choose shorter, abstract names that begin with voiceless consonants and discipline- or industry-specific cues. We also find that the naming patterns of freestanding and acquired companies differ. Companies with longer, descriptive names that begin with K, T, P, C, F and S and that have incorporated the discipline in their names, tend to be freestanding.

This study's context is the biotechnology industry during its nascent years, which is appropriate for several reasons. First, the population of firms in the industry conveys to its stakeholders, through choice of the entrepreneurial firm name, its identity and the prospects of its product development (DeCarolis and Deeds, 1999). Second, early years during the biotechnology evolution provide an opportunity to study organizational naming patterns in an evolving industry. Third, the push for innovation, a constant need for funding and disparate motivations for the existence of biotech start-ups contributed to an environment that was dynamic and opportunity-rich, making the industry an appropriate context in which to study tensions between differentiation and conformity pressures (Castrogiovanni, 1991; Heeley *et al.*, 2006; Bansal *et al.*, 2018; Kang *et al.*, 2021).

This study makes several contributions to the literature. First, it identifies the shifting trend of naming patterns of entrepreneurial firms in an emerging industry, which reflects the initial lack of a dominant logic at the outset of the emerging industry, followed by the new ventures' contradictory quest for distinctiveness and conformity as the industry evolves. Second, by focusing on name choices of entrepreneurial firms and, the association of those choices with start-up survivability, the study expands extant literature on organizational naming practices that traditionally assesses name choices and name change patterns of existing corporations. Third, by integrating marketing and linguistics methods when analyzing organizational name attributes, the present work identifies specific naming patterns from such attributes, such as name length, name type, starting letter of the name and

link to the industry, not previously studied in the context of start-ups entering at different times in an emerging industry, and it assesses identifying differences between freestanding and acquired biotech start-ups.

2. Theoretical background

2.1 Name choice and organizational naming patterns

Names are infused with meaning and reputation and serve the purpose of identifying the firm to different audiences. The choice of a name is deliberate strategic decision regarding a symbolic organizational attribute, shaped by forces, internal for the organization, such as founders' identities, strategic plans and an organization's activities (Barney, 1991; Child, 1972; Fauchart and Gruber, 2011; Oliver, 1988; Zuzul and Tripsas, 2020). Since organizations are legitimate when they are understandable (Glynn and Abzug, 2002), and organizational names clarify their identity to the external audiences, the name choices of entrepreneurial firms become a mechanism for legitimization.

Name choices are also organizational responses to external forces, such as institutional pressures (Oliver, 1988). As firms are subject to mimetic, normative and coercive pressures, they adopt features, categories and forms already established in the industry (Ashworth *et al.*, 2009; DiMaggio and Powell, 1983; Ruef and Scott, 1998). Organizations choose names that mimic the dominant naming styles in their industries to gain legitimacy and attract the attention of external stakeholders (Glynn and Abzug, 2002).

Isomorphism occurs in the context of ongoing competitive pressures for differentiation (Villadsen, 2013). While firms must maintain legitimacy through similarity, they also need to remain competitive by being unique (Miller *et al.*, 2013). They experience pressure to balance being the same and different simultaneously (Deephouse, 1999). A start-up's name choice is subject to tensions from inward pressure to conform to collective institutional norms and outward pressure to enhance individual identity (Glynn and Marquis, 2004). Entrepreneurs are more likely to use a blend of novelty and familiarity when they define their organizations' identity and select a name (Santos and Eisenhardt, 2009). As a reflection of organizational identity, an organization's name might simultaneously achieve the goal of differentiating the company from competitors while signaling adequate conformity with industry norms (Navis and Glynn, 2011).

2.2 Naming patterns and industry evolution

Drawing on institutional entrepreneurship and legitimacy, we theorize that organizational naming practices change with patterned regularity (Glynn and Abzug, 2002). As institutional entrepreneurship suggests, nascent industries are ambiguous and uncertain, with lack of isomorphic pressures or dominant logic to guide choices and actions (Kaplan and Tripsas, 2008; Porac *et al.*, 2002), unclear or missing product definitions (Hargadon and Douglas, 2001) and undefined industry structure (Eisenhardt, 1989; Rindova and Fombrun, 1999). Entrepreneurs are likely to define their identities in ways that allow them to remain flexible (Glynn and Abzug, 1998); they choose names that convey to external and internal audiences what is central, enduring and distinctive about the organization (Albert and Whetten, 1985) and shape the nascent environment to achieve dominant, leadership positions (Santos and Eisenhardt, 2009; Gupta *et al.*, 2015; Zuzul and Tripsas, 2020).

With their name choices, entrepreneurs make their firms and a nascent market distinct, familiar and understandable to market audiences (Aldrich and Fiol, 1994; Santos and Eisenhardt, 2009). Entrepreneurs' desire to shape the environment drives them to select names that stand out, but entrepreneurs' desire to remain passive encourages them to choose names that blend in (Santos and Eisenhardt, 2009). Since entrepreneurs are free to choose

innovative and original names that stand out, and names that blend in, there is a greater variety of names and naming practices at the onset of industry evolution. As the industry evolves, an entrepreneur's choice of organizational name represents a means of legitimization to crucial stakeholders, who might not fully understand the nature of new ventures. As start-ups have restricted access to financial resources and capital, they must become more established and reputable, through the choice of symbols like names, so they can attract potential investors (Aldrich and Fiol, 1994; Garud *et al.*, 2014; Lounsbury and Glynn, 2001; Navis and Glynn, 2010). To obtain legitimacy, firms select names embedded in and synchronized with the industry and its relevant institutions (Glynn and Abzug, 2002). Names that correspond to expectations of the institutional environment are viewed as more understandable (Glynn and Abzug, 1998) and enjoy increased survivability (Glynn and Marquis, 2004).

Once an industry has reached a threshold, entrepreneurs are pressured to simultaneously be different from and similar to other organizations (Viladsen, 2013; McKnight and Zietsma, 2018). Despite isomorphic pressures, more entrepreneurs try to stand out and attract stakeholders' attention, rather than blend in and conform to industry norms, since firms that are different experience less competition and perform better and are more difficult for imitators to target (Barney, 1991). The legitimacy argument explains only the pressure for similarity. Entrepreneurs commonly choose names that conform to industrial norms, but not all do. The paradigm shifts toward greater fluctuation in variability, though less intense than the fluctuations in variability during nascent years, as during the outset of an industry companies are seeking to establish themselves, but once it reaches a threshold, they want to differentiate themselves. Such cyclical pattern is discussed for established firms in Fisher *et al.* (2016) who assert that "entrepreneurial ventures confront multiple legitimacy thresholds, as they evolve and grow" (p. 383), because "a new venture's legitimacy declines or is threatened after the single [legitimacy] threshold is crossed" (p. 384). Thus, they argue, the identity of new ventures must evolve in line with changes in the expectations of resource providers.

In the interplay between the two seemingly opposing forces, achieving legitimacy and signaling distinctiveness, we introduce theoretical concepts from the linguistics literature, to explore the naming patterns of start-ups and their effect on different stakeholders' group. We attempt to study the sociolinguistic impact on the naming patterns using the perspective of the Juliet – Joyce dichotomy.

The first theoretical framework—the "Juliet" principle, stems from Shakespeare's line from *Romeo and Juliet*: "... that which we call a rose, by any other name would smell as sweet ...", suggesting that words have no intrinsic meaning, and instead they acquire their meaning only through the associations that we make with them (Collins, 1977).

The second framework—the "Joyce" principle—follows the sound symbolism approach, suggesting that the sound of a name conveys a meaning (Sapir, 1929). Prior research on brand names has identified several characteristics of meaningful brand names that lead to enhanced attitudes towards the brand: name type, names with links to the industry, discipline and technology, name length and name's starting letter (Kohli *et al.*, 2005; Glynn and Abzug, 2002; Bergh *et al.*, 1984; Yorkston and Menon, 2004). Drawing on the Juliet-Joyce dichotomy and the brand literature, we extract several name attributes, including: name type, which depends on the association it evokes (i.e. Juliet principle), name length in syllables (i.e. Joyce principle), the starting letter of the name (i.e. Joyce principle) and specific cues to industry, technology or discipline present in the name (i.e. Juliet principle) (Arora *et al.*, 2015). As the name attributes have influenced the perception of the products, we find that these name characteristics provide a context, appropriate for studying and understanding their effect insights into the naming patterns of entrepreneurs.

3. Hypotheses

3.1 Organizational name length

Length is an objective linguistic structure of the name (Alter and Oppenheimer, 2009; MacKenzie, 2018). According to the Joyce hypothesis, it is an attribute that impacts the attractiveness of a name through its phonetic symbolism effect, i.e. the length of the name conveys a meaning (Kohli *et al.*, 2005). Longer names are less ambiguous, more descriptive and richer (Glynn and Abzug, 2002). They contain specific cues to a company's business or product and communicate that information to external stakeholders, making the company's identity more transparent and understandable and the companies more trustworthy (Glynn and Abzug, 2002; Glynn and Marquis, 2006).

At the onset of the industry, entrepreneurs choose longer names to overcome the "liability of newness" and make their firms and a nascent market distinct, familiar and understandable (Aldrich and Fiol, 1994; Glynn and Marquis, 2006; Santos and Eisenhardt, 2009). Since longer names are more effective in communicating organizations' identity, and organizations are legitimate when they are understandable (Glynn and Abzug, 2002), choosing a longer name becomes a mechanism for legitimization. We expect a greater proportion of longer names at the onset of the industry, since in the absence of dominant market norms and categories, companies follow the next best rule to survive—choosing a long name.

As the industry evolves and isomorphic pressures emerge, start-ups entering the market face different environment: crowded but less ambiguous and uncertain (Covin and Slevin, 1990). In their quest for legitimacy, firms do not need to select longer names to clarify their identity and mitigate the effect of environmental uncertainty. Once a dominant market category emerges, new ventures name choices will conform to it (Glynn and Abzug, 2002). Organizations select names that mimic the dominant naming styles in their industries to gain legitimacy and attract the attention of the external stakeholders (Glynn and Abzug, 2002). Since longer names are perceived as more complex, exclusive and unique (Pathak *et al.*, 2017), start-ups are likely to choose shorter names in an effort to blend in.

As the industry continues to evolve, new ventures entering the market face intense competition from incumbents and other start-ups (Covin and Slevin, 1990). Start-ups seek to appeal to the external stakeholders, while also remain legitimate (Deephouse, 1999). Once the industry reaches a threshold, entrepreneurs select names that help them blend-in and stand out at the same time, though the proportion of firms who select names that stand out will be smaller than at the onset of the industry. Since long names are perceived as unique and complex, we expect to find a greater proportion of long names once the industry reaches a threshold.

Nascent industries lack dominant industry design, categories and norms (Suarez *et al.*, 2015). Entrepreneurs in such environments engage in sense-giving as they convey to the external stakeholders, their organizational identity and support their perceived trustworthiness (Navis and Glynn, 2011; Glynn and Marquis, 2006). Yet, since there are multiple entrepreneurs in the industry, multiple organizational identities exist, that need to be communicated and explained to the external audiences. Furthermore, at the onset of the industry, fewer start-ups enter the market (Covin and Slevin, 1990). Once in the industry, they experience less intense competition, which encourages their innovativeness, reflected in their name choices. Therefore, a greater variety of organizational names and name lengths will be present in the nascent years of the industry evolution. As the industry evolves and market structures emerge, new ventures are likely to conform to the dominant naming style and the greater variety of names and name lengths diminishes. In addition, the number of start-ups entering the industry increases, leading to more intense competition and stronger push for internal efficiency rather than innovativeness among the firms in the industry (Covin and Slevin, 1990). In that context, we anticipate greater fluctuation in the variety for both organizational identities and start-up names attributes, such as name length, at the onset of

the nascent industry and more stable pattern in the variety of organizational names attributes later.

Therefore,

- H1a.* Fluctuations in the variability of organizational name length will decrease in the course of an emerging industry's evolution.
- H1b.* The proportion of start-ups with longer names increases during the nascent years of industry evolution and decreases until it has reached a threshold; the proportion of start-ups with shorter names increases as the industry continues to evolve.

3.2 Organizational name starting letter

As Joyce's hypothesis implies, the sound or a starting letter of a word conveys meaning and carries information about the size, speed, strength, weight or another quality of an object (Bolinger, 1975; Hinton *et al.*, 1994; Berlin, 2006; Abel and Glinert, 2008; Coulter and Coulter, 2010; Bergh *et al.*, 1984; Yorkston and Menon, 2004; Pathak *et al.*, 2017). Organizational names are infused with meaning that conveys the identity of their firm to the external audiences, effectively legitimizing them (Lee, 2001; Simões *et al.*, 2005). The main starting letter categories we examine are hard plosive, voiceless consonant or rare sound (Klink, 2000).

Hard plosives are consonants such as B, D, G, V, N, R, M and L, which, when pronounced, produce an explosive, popping sound (Klink, 2000). Names that start with hard plosives have better recall and recognition (Bergh *et al.*, 1984). Furthermore, they are associated with aggressiveness, power and dominance (Bergh *et al.*, 1984; Klink, 2000; Abel and Glinert, 2008), which firms signal to their stakeholders vis-à-vis their names.

Names that begin with voiceless consonants such as P, T, K, C and F on the other hand project social politeness, non-threat and non-violence (Yorkston and Menon, 2004; Bergh *et al.*, 1984). Names that start with voiceless consonants evoke nonviolent and non-aggressive preferences for conformity, which firms convey to their external audience, through their name choices.

Finally, names that begin with rare sounds, such as X, Y, Z, W and Q, project uniqueness, exclusivity and innovativeness (Pathak *et al.*, 2017). Names that start with rare sounds communicate the firm's uniqueness and commitment to innovativeness to its stakeholders through the sound of the selected names.

At the onset of the industry, in their quest for legitimacy, new ventures signal their organizational identity to the external stakeholders (Glynn and Abzug, 2002). In such uncertain environment, entrepreneurs are more likely to choose names, starting with hard plosives as they want to project strength, power, aggression and dominance. The projected image of strength and power is likely to convey to the external stakeholders and investors, the firm's stability, reliability and trustworthiness and effectively legitimize it (Glynn and Marquis, 2006).

Since competition is less intense in the formative years of the biotechnology, when isomorphic pressures have not yet emerged, firms have more resources and freedom to pursue exploration and innovativeness (Covin and Slevin, 1990). Firms that pursue innovation achieve strong performance and build strategic competitive advantage (Miller and Shamsie, 1996). Names starting with a rare sound project an image of a company adept at developing and innovative product or technology. Such firms are perceived as competitive, solid and trustworthy by external investors and stakeholders. In highly ambiguous environment, entrepreneurs are more likely to choose names, starting with rare sounds that convey innovativeness and uniqueness, so they can be perceived as legitimate (Simões *et al.*, 2005).

As the industry evolves and isomorphic pressures build up, start-ups experience different environment when they enter the industry. They face intensifying competition, emergence of dominant market category and reduced ambiguity (Covin and Slevin, 1990). In that environment, new ventures no longer need to project aggression, power and dominance; instead, they need to signal their conformity to the emerging industry standard (Glynn and Abzug, 2002). Entrepreneurs choose names that conform to the dominant naming styles in their industries to gain legitimacy and attract the attention of the external stakeholders (Glynn and Abzug, 2002). Since, names starting with voiceless consonants are perceived as non-violent, non-threatening and polite (Klink, 2000), start-ups will choose names with voiceless consonants, while trying to blend in.

As the industry continues to evolve, entrepreneurs face direct competition from incumbents and other start-ups entering the industry (Covin and Slevin, 1990). They need to find a balance between being different while also remain legitimate (Deephouse, 1999). New ventures that launch their businesses once the industry reaches a threshold are likely to select names that help them blend-in and stand out at the same time, though the proportion of entrepreneurs who select names that stand out will be smaller than it was at the onset of the industry.

At the onset of the industry, some entrepreneurs reduce ambiguity and complexity by engaging in shaping and co-constructing their markets, as they attempt to dominate them (Santos and Eisenhardt, 2009). These new ventures are more likely to choose names that start with hard plosives because they seek to actively reshape their environment and signal their stability, power and dominance. On the other hand, start-ups experience less intense competition and pursue innovativeness and exploration. Many entrepreneurs choose names starting with rare sounds, seeking to signal their stability and prospects for developing innovative products or technologies to the external audience. Yet, other new ventures respond passively to the industry evolution and choose not to seek dominance in their industry or signal innovative capabilities. The presence of these different groups of entrepreneurs during an industry's formative years drives the greater variety of organizational names with different starting letters. As the industry evolves and market structures emerge, new ventures conform to the dominant naming style, and the greater fluctuations in variability of names with different starting letters diminish. The number of start-ups entering the industry increases, leading to more intense competition and focus on internal efficiency rather than innovativeness among the firms in the industry (Covin and Slevin, 1990). In that context, we anticipate greater fluctuation in the variety of start-up name attributes, such as the starting letter of the name, at the onset of the nascent industry and more stable pattern in later years.

Therefore,

- H2a.* Fluctuations in the variability of an organizational name starting letter will decrease in the course of an emerging industry's evolution.
- H2b.* The proportion of start-ups with names starting with rare letters and hard plosives increases during the nascent years of industry evolution and decreases until it has reached a threshold; the proportion of start-ups with names that begin with voiceless consonants increases as the industry continues to evolve.

3.3 Organizational name type

The Juliet hypothesis argues, organizational names can be distinguished by the associations they evoke (Glynn and Abzug, 2002; Muzellec, 2006). Depending on the association evoked, names can be descriptive, when they describe organization's activity, geographic location or a founder's name. They can be abstract, when they are implicitly linked with the organization's activity, made of acronym or freestanding (names with no link to a product/service but with a

meaning of its own) (Muzellec, 2006). Names with both abstract and descriptive elements are dualistic.

Name type is an attribute that impacts the attractiveness of a name through the meaning of the association it evokes (Kohli, *et al.*, 2005; Muzellec, 2006). Descriptive names are less ambiguous, rich in details and more specific to a company's business, product or market than abstract names (Glynn and Abzug, 2002). To offset the "liability of newness" entrepreneurs signal and communicate information about their identity to the external stakeholders through their naming practices (Glynn and Marquis, 2006). Choosing a descriptive name becomes critical for the legitimacy of a start-up (Lounsbury and Glynn, 2001).

At the onset of the industry, entrepreneurs choose descriptive names to make their firms and the nascent market distinct, familiar and understandable to ensure their survival (Aldrich and Fiol, 1994; Glynn and Abzug, 2002; Glynn and Marquis, 2006; Santos and Eisenhardt, 2009). We anticipate greater proportion of descriptive names, since they make the company's identity more transparent and understandable, and the companies more trustworthy and effectively legitimize them (Glynn and Abzug, 2002; Glynn and Marquis, 2006).

As the industry evolves and isomorphic pressures build up, new ventures entering the market mimic the dominant naming styles in their industries to gain legitimacy and attract the attention of external stakeholders (Glynn and Abzug, 2002). Entrepreneurs entering the market face less ambiguous and uncertain environment because of the established industry standard (Covin and Slevin, 1990). Since a dominant market standard has emerged, start-ups don't need to convey information about their identity to gain legitimacy. They need to follow the naming practices of the dominant naming style in their industry. In that context, we anticipate that the proportion of descriptive names would decrease as the industry evolves.

As the industry continues to evolve, start-ups entering the market experience intense competition (Covin and Slevin, 1990). They need to be different and innovate, to appeal to their external stakeholders while also remain legitimate (Deephouse, 1999; Villadsen, 2013). New ventures that launch their businesses once the industry reaches a threshold, select names that help them blend-in and stand out at the same time, though the proportion of entrepreneurs who select names that stand out will be smaller than at the onset of the industry). Since abstract and dualistic names are perceived as more complex, exclusive and unique (Pathak, *et al.*, 2017), start-ups choose more abstract and dualistic names in an effort to differentiate.

At the onset of the industry entrepreneurs engage in sense-giving, by communicating their organizational identity through their name choices (Navis and Glynn, 2011; Glynn and Marquis, 2006). Since there are multiple entrepreneurs, multiple organizational identities exist, that need to be communicated and explained to the external audiences. A greater variety of organizational name types will be present in the nascent years of the industry evolution. As the industry evolves and market structures emerge, new ventures conform to the dominant naming style and the greater variety of name types subsides. In that context, we anticipate greater fluctuation in the variety of organizational identities and start-up names' attributes, such as name type at the onset of the nascent industry and more stable pattern in the variety of organizational names attributes later.

Therefore,

H3a. Fluctuations in the variability in organizational name type will decrease in the course of an emerging industry's evolution.

H3b. The proportion of start-ups with descriptive names increases during the nascent years of industry evolution and once it has reached a threshold; the proportion of start-ups with abstract and dualistic names increases as the industry continues to evolve.

3.4 *Organizational names with links to the industry*

Integrating the industry in an organization's name represents a symbol of conformity to an industry's norms, over which a company has full control. For example, during the Internet euphoria of 1998/1999, companies rushed to purchase legitimacy symbolically by incorporating a *dot com* appendix to their names, just as they symbolically detached from the industry when the dot-com bubble burst by removing Internet associations from their names (Glynn and Marquis, 2004). Including the moniker of market category to which an organization claims membership in the organization's name itself reduces uncertainty for and draws support from the company's stakeholders (Smith and Chae, 2016). Greater conformity of an organization's name to general industry naming trends thus associates with lower organizational mortality (Kuilman and Wezel, 2013). Signaling identity to stakeholders through name selection to obtain even superficial legitimacy is vital when information on a company and its quality is difficult or costly to acquire (Smith and Chae, 2016). Research suggests that access to capital, markets and governmental protection depends on such legitimacy (Aldrich and Fiol, 1994). To appeal to stakeholders for vital resources, start-ups convey an appropriate image that accords with industry stakeholders' expectations, often through their identity that is reflected partially in an organization's name (Simões *et al.*, 2005).

The choice of an organization's name has important implications in terms of who or what is referred to when the name is spoken and what the organization's pursuits are (Bruscella, 2015). The degree to which an organization's name resonates with employees, customers and other audiences determines the extent of the organization's legitimacy (Kulvisaecchana, 2009), and therefore, the ability to obtain vital resources. For example, in the context of hedge funds, Smith (2010) argues that investors allocate capital more readily to funds that conform, superficially or in reality, to the central investment tendencies of the industry and one way to signal conformity is selecting a name that includes the company's product, market or a similar identifier to communicate to investors the kind of work the company wants investors to perceive that the company does. The effectiveness of naming an organization by its work, even when superficial, was recognized by Bricker (2014), who exposed the success of anti-environmental think tanks that tried to conceal industry ties by misleadingly integrating greenness into their organization's names (e.g. Citizens for the Environment and Greening Earth Society).

During the nascent period of a new market category's development (e.g. a business environment that has not yet been defined), a clear prototypical organization for others to imitate is absent, and entrepreneurs in such environments must exemplify defining attributes of the new market category, thereby serving as a prototype to reduce ambiguity and complexity and support investor confidence in the entrepreneur's predictability (Navis and Glynn, 2011). In nascent industries, entrepreneurs use their agency to shape the industry (Dorado, 2005) by engaging in sense-giving to stakeholders (Navis and Glynn, 2010). Among multiple entrepreneurs, multiple prototypes exist as a market category emerges. Given the lack of a dominant industry design and norms, greater fluctuation in both organizational identities and characteristics of start-up names are expected.

As industries evolve and environmental structures emerge, a different, often less-entrepreneurial, strategic posture is adopted (Covin and Slevin, 1990), prompting selection of less-ambiguous organizational identities and choices of names linked to a market category (in this case, a new industry) (Glynn and Marquis, 2007). Organizations change their names to conform to prototypical naming styles in their industries and attract greater stakeholder attention (Glynn and Abzug, 2002). Companies that launch their businesses in established industries commonly choose names accordingly, and as the industry continues to evolve, start-ups begin to experience direct competition from incumbents and thus experience greater pressures for legitimization, in comparison to a nascent industry. As the industry evolved, multiple horizontal alliances among incumbents appeared in biotechnology that

discouraged start-ups (Calabrese *et al.*, 2000). As the number of new entrants peaks, competition intensifies and multiple start-ups seek capital to support their ground-breaking ideas, a time we expect entrepreneurs to adopt more familiar templates to appeal to prospective investors, but the trend reverses as start-ups try to differentiate themselves. As the industry continues to evolve, entrepreneurs are more likely to choose names that integrate cues that link the start-up with the industry directly (e.g. biotechnology and pharmaceuticals) to signal legitimacy. Due to a lack of established, dominant designs for firms to conform to at the onset of the industry, and competitive pressures that force start-ups to differentiate once an industry has reached a threshold, cues in names are specific to an applied research field, such as R&D/technology (e.g. lab, laboratory and science) and/or to a discipline (e.g. oncology, neuroscience, genetics and immunology). During early years of industry evolution, fewer organizational forms exist, making it less crowded, and less crowded industries are characterized by less competition, which means greater resources for firms in the industry. Additional resources motivate firms to be even more daring in their explorations and innovativeness, reflected in their name choices. Therefore,

- H4.* The proportion of start-ups with names with links to a discipline and/or technology increases during the nascent years of industry evolution and once it has reached a threshold; the proportion of start-ups with names with links to the biotechnology industry increases as the industry continues to evolve.

3.5 Organizational naming patterns of acquired versus freestanding companies

Organizations respond to isomorphic pressures to gain legitimacy, enhance access to resources and increase their chances of survival (DiMaggio and Powell, 1983). Start-ups can overcome the liability of newness and become legitimate to stakeholders as they conform to industry norms and mimic the name attributes of successful companies in the industry (Fox, 2010). While launching their business, many start-ups succumb to isomorphic pressures to conform to industry naming patterns. Entrepreneurial firms overcome their inherent liability of newness through conformity, which legitimizes them and allows them to access resources easily (Aldrich and Fiol, 1994; Garud *et al.*, 2014; Lounsbury and Glynn, 2001; Navis and Glynn, 2010). Ample access to resources likely facilitates development of groundbreaking products or technologies, strengthening a firm's chances of remaining freestanding.

Not all start-ups enter the biotechnology industry with the goal to remain independent. For a number of entrepreneurial ventures, as suggested by the institutional entrepreneurship, they strive to reshape their surroundings and dominate the environment, while remaining freestanding (Santos and Eisenhardt, 2009). Other start-ups, however, launch their businesses to develop groundbreaking research, gain prominence, capture the attention of large industry companies and be acquired (Kolchinsky, 2004; Patzelt and Audretsch, 2008). Such start-ups focus on standing out rather than blending in, and entrepreneurs are thus likely to opt for names that differentiate the company and create distinction, which is likely to result in acquisition of the start-up by a large industry company. Therefore,

- H5.* Attributes of freestanding start-up names are different from attributes of acquired start-up names.

4. Data and method

4.1 Sample and data

We content analyzed the names of all firms in the contemporary US biotechnology industry during its nascent years. Following prior research (Argyres and Liebeskind, 2002; Shan *et al.*, 1994), we consider 1973, the year during which recombinant-DNA technology was invented,

as the first year of the industry, or the beginning of the nascent period in the evolution of biotechnology. In line with Chandler's (1990) and Klepper and Graddy's (1990) argument that the maturity of an industry begins with a shakeout period and consolidation, we use 1999 as the final year of the nascent period of modern biotechnology because by the end of that year, only a handful of start-ups were acquired by incumbents and no signs of consolidation have been observed since (Argyres and Liebeskind, 2002). At the beginning of 2000, the biotechnology industry was characterized by heavy M&As, consistent with the expected industry shakeout and consolidation during maturity (Chandler, 1990; Klapper and Graddy, 1990).

We obtained data from Standard and Poor's Net Advantage, a comprehensive source of investment information. Descriptions of companies, industries and mutual funds are included in the dataset, which covers more than 3 million private and public companies. Industry trends, forecasts, major companies, financial ratios and statistics are also included. Research consistently considers three SIC codes as representative of the pharmaceutical and biotech industry (Rothaermel and Thursby, 2007; George *et al.*, 2001, 2008; Demirkan and Demirkan, 2012). Following prior studies, we restricted the sample to three SIC codes—pharmaceutical preparations (SIC#2834), *in vitro* and *in vivo* diagnostic substances (SIC#2835), and biological products except diagnostic products (SIC#2836), as they have consistently been used to represent the pharmaceutical and biotechnology industries. We further limited the sample to firms with primary industry designations as *biotechnology*, resulting in a final sample of 441 start-ups that launched their businesses during the twenty-seven years of biotechnology industry evolution.

We use a concurrent mixed-methods framework that combines content analysis of names with logistic regression as complementing tools of research, not as a sum of methods (Creswell, 2003). Name length and whether a name begins with rare sounds or plosives were determined objectively. Name type and whether a name links to a discipline, industry or technology were coded by the authors. Each author coded relevant variables separately, and results were compared. Acceptable interrater reliability corresponds to a Cronbach's alpha coefficient of 0.70 (Riffe *et al.*, 2005), and our interrater reliability was between 0.85 and 0.90, with discrepancies resolved through discussions. Drawing from extant research (Bergh *et al.*, 1984; Klink, 2000; Glynn and Abzug, 2002; Yorkston and Menon, 2004; Muzellec, 2006), we identified potential name attributes and developed a coding scheme to capture, as comprehensively as possible, all of them. We analyzed only eight name attributes. Variable descriptions and coding appear in Table 1, with the full sample of coding schema available on request.

4.1.1 Name length fluctuation. Following prior research (Glynn and Abzug, 2002), we measured organizational name length as a name's length in syllables. We used the variance of name length in syllabus over time, calculated as the standard deviation from the average.

4.1.2 Name length proportion. Following prior research (Podacar *et al.*, 2021), we used three categories for name length—short (i.e. 1 or 2 syllables), medium (i.e. 3 or 4 syllables) and long (i.e. 5 or more syllables). We calculated the variable as the proportion of the total number of firms in each category.

4.1.3 Starting letter fluctuation. To measure the fluctuation in the starting letter, we used the Blau index (Blau, 1977) as a measure of diversity. It is calculated using formula $B = [1 - \sum(p_i^2)]$, where p is the percentage of members in the i -th category group.

Blau index captures the relative heterogeneity of the population. We used it to examine the category distribution of start-up name attributes. The categories used matched the start-up name attributes we explored in our study: rare sounds, hard plosives and voiceless consonants. We also used a category "other" for all other firm names that didn't start with a rare sound, hard plosive or a voiceless consonant. We then plotted the Blau values to visualize fluctuations in the variability in the proportion of firms with certain name attributes.

Name attribute variables	Name attribute variables description
Name	The full name of the entity at time of birth
Length (symbols)	Count of the number of symbols in the name of the entity
Starting letter is rare	Binary variable (Yes/No) capturing if the name starts with X, Z, Q, Y, W, H
Starting letter is hard plosive	Binary variable (Yes/No) capturing if the name starts with D, G, B, L, R, M, N
Starting letter is a voiceless consonant	Binary variable (Yes/No) capturing if the name starts with K, T, P, C, F or S
Name type	Categorical variable (descriptive, abstract and dualistic) capturing the association the name of the entity evokes
Name with an industry cue	Binary variable (Yes/No) capturing if the name contains a link/cue to the biotechnology industry, such as “biotech”, “biotechnology”, etc.
Name with a discipline cue	Binary variable (Yes/No) capturing if the name contains a link/cue to the specific discipline, such as “proteins”, “enzymes”, “antibodies”, “liposomes”, “polymers” etc.
Name with a technology cue	Binary variable (Yes/No) capturing if the name contains a link/cue to technology, such as “informatics”, “IT”, “bioinformatics”, “engineering”, “laboratories”, “R&D”, “research”, etc.

Table 1.
Name attributes
variables

Values closer to 1 suggest that there is greater diversity in the categories of starting letters, while values closer to 0, imply no diversity in the categories of starting letters.

4.1.4 Starting letter proportion. We used three categories for starting letter—rare sounds (i.e. names that begin with X, Z, Q, Y, W and H), hard/voice consonant plosives (i.e. names that begin with D, G, B, L, R, M and N) and voiceless consonants (i.e. names that begin with K, T, P, C, F and S). We calculated the variable using a method applied in prior research (Bergh *et al.*, 1984; Abel and Glinert, 2008).

4.1.5 Name type fluctuations. According to Muzellec’s (2006) taxonomy of corporate brand names, companies manage their choice of brand name to evoke associations. Based on the type of association evoked, names can be descriptive (i.e. an explicit association with a product offered), geographic (i.e. association with a location), patronymic (i.e. association with a founder’s name), acronymic (i.e. a short form of a name), associative (i.e. an implicit association with a product offered) and freestanding (i.e. arbitrary and abstract names). Since most names in the sample were either descriptive or freestanding, or contained elements of both, we combined the three descriptive name types (i.e. descriptive, patronymic and geographic) into one descriptive name category. We similarly combined the three abstract name types (i.e. acronymic, associative and freestanding) into one abstract name category. We created a third name type category—dualistic—and assigned names with both abstract and descriptive cues to it. To capture name type fluctuations in diversity, we again used Blau’s (1977) method, calculating a diversity index for descriptive, dualistic and abstract name categories.

4.1.6 Name type proportion. We calculated name type proportion as the proportion of the total number of firms in each of the three name type categories—descriptive, abstract and dualistic.

4.1.7 Domain links proportion. We used three categories to describe the domain link of names: industry specific cues (i.e. names with a cue to the biotechnology industry, such as *biotech* and *biotechnology*); discipline specific cues (i.e. names with a link to a discipline, such as *proteins*, *enzymes*, *antibodies*, *liposomes* and *polymers*); and technology specific cues (i.e. names with a link to a technology, such as *informatics*, *IT*, *bioinformatics*, *engineering*, *laboratories*, *R&D* and *research*). We calculated the variable as the proportion of the total number of firms in each category.

5. Results

We examine trends in organizational naming for name attributes such as name length, starting letter, name type and domain links. We find that firms that enter a nascent industry use different organizational naming patterns than firms that enter at a later point during and emerging industry's evolution, regarding name length, starting letter, name type and domain links. We also find that operating and acquired companies' naming patterns are different. Figure 1 shows name length fluctuations in variability for the study period. The fluctuations in variability in new ventures name length fluctuated more sharply during early years of biotechnology's evolution, but those fluctuations decreased as the industry continued to evolve. Name length fluctuations were still intense during the later years, but less so than at the onset. Thus, during early years of the biotechnology industry, organizational name length had greater fluctuations in variability than during later years, supporting H1a.

Figure 1 also shows the trends for the percentage of firms in terms of their name length, aggregated into 5-year periods. The results reflected in Figure 1 suggest that the proportion of entrepreneurial firms with longer names increased during the industry's nascent years. Contrary to what was hypothesized, as the industry continued to evolve, the length of start-up's names peaked. We found a similar trend for shorter names, but the proportion of medium length names had a decreasing trend. Thus, H1b was not supported.

Figure 2 shows the plotted trends of organizational names based on starting letters. In support of H2a, the plot suggests high fluctuations in variability of name starting letters during biotechnology's early years, which decrease as the emerging industry continued to evolve.

Figure 2 also shows trends regarding the percentage of organizational names that began with plosives, voiceless consonants and rare sounds, aggregated into 5-year periods. Entrepreneurs appear to have selected greater names with rare sounds during early years, and the trend decreased as the industry evolved, supporting H2b. However, the proportion of names with hard plosives decreased at the onset of the industry and once it reached a tipping point. As the industry continued to evolve, they peaked. Similarly, names that began with voiceless consonants trended counter to our prediction; the proportion of names that began with a voiceless consonant increased, generally, but reached the lowest point as the industry continued to evolve. Thus, H2b was partially supported.

Figure 3 shows trends regarding organizational names based on type of name category. The plot suggests high fluctuations in variability of name types during early years of

Figure 1. Fluctuation in name length (syllables) variability (H1a) and proportion of name length categories (H1b)

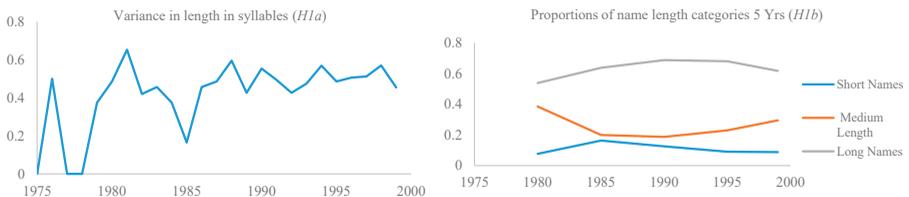
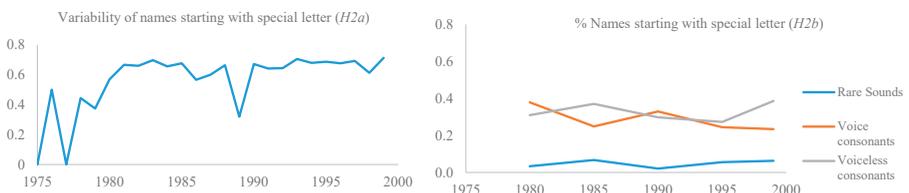


Figure 2. Fluctuation in starting letter variability (H2a) and proportion of names that start with special letter (H2b)



biotechnology's evolution, which decreases as the emerging industry continued to evolve, which provides support H3a.

Figure 3 shows trends in organizational name types aggregated into 5-year periods. Results suggest that entrepreneurs selected names that were more descriptive during early years, and the trend decreased once the industry reached a threshold. As the industry evolved, start-up names became more abstract and dualistic, supporting H3b.

Figure 4 shows trends of the percentage of organizational names with cues to the industry, discipline and technology, aggregated to 5-year periods. The plots suggest a prevalence of organizational names with links to the industry as the industry continued to evolve, not during its formative years. We found a greater proportion of organizational names with links to their respective disciplines and technologies during nascent years and once the industry reached a tipping point, supporting H4.

H5 suggests that start-up name attributes are different for freestanding and acquired organizations. Four of the name attributes are statistically significant and predict the likelihood that a start-up remains independent. Specifically, longer names, names starting with a voiceless consonant, descriptive names and names with discipline specific cues increase the likelihood of start-ups to remain independent which provides support for H5. Descriptive statistics are available in Table 2 and the results in Table 3.

6. Discussion and conclusion

This paper identifies patterns in organizational name choices in an emerging industry. Extant research offers conflicting findings regarding such trends. The legitimacy argument from institutional theory suggests that name choices are driven by institutional pressures to conform, but the institutional entrepreneurship literature suggests that a desire for competitive differentiation motivates entrepreneurs to challenge an industry's prevalent practices. The study found that both perspectives are valid at different times of an industry's

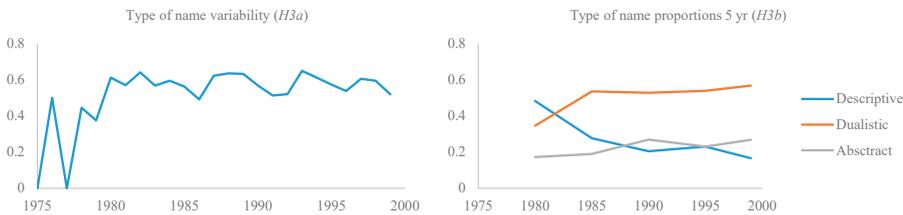


Figure 3. Fluctuation in type of name variability (H3a) and type of name proportions general trend (H3b)

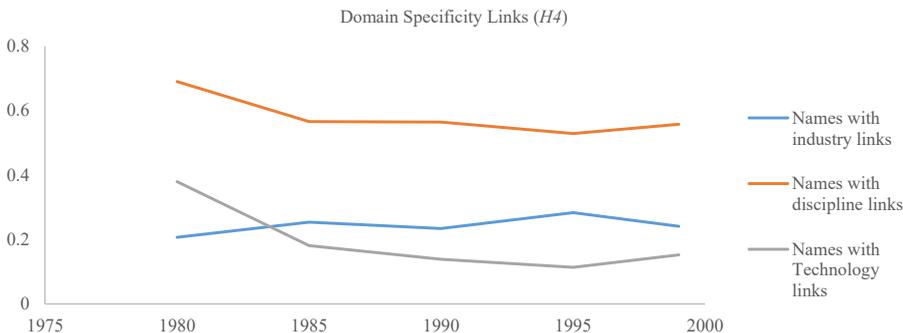


Figure 4. Domain Specificity Links General Trend (H4)

Table 2.

Descriptive statistics

Variables	Mean	SD	Min	Max
Length: No. of syllables	5.62	2.49	1	15
Name starts with XQYWHQ	0.06	0.23	0	1
Name starts with DGBLRMN	0.27	0.45	0	1
Name starts with KTPCFS	0.32	0.47	0	1
Domain specificity: Industry	0.25	0.43	0	1
Domain specificity: Discipline	0.25	0.43	0	1
Domain specificity: Technology	0.15	0.36	0	1
Type of name*	3.28	1.74	1	6
Company status**	0.49	0.50	0	1

Note(s): Type of Name: 1 = Descriptive; 6 = Abstract
Company status: 0 = Acquired; 1 = operating

Table 3.Logistic regression
assessing likelihood of
still operating
independently

	β	SE
Length: No. of syllables	1.10**	0.06
Name starts with XQYWHQ	1.16	0.52
Name starts with DGBLRMN	0.84	0.22
Name starts with KTPCFS	1.50*	0.37
Domain specificity: Industry	1.36	0.42
Domain specificity: Discipline	2.09***	0.54
Domain specificity: Technology	0.86	0.25
Type of name	1.24***	0.09
Constant	0.15***	
Pseudo-log likelihood	293.35	
Number of firms	440	

Note(s): * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

evolution during which there is an interplay between the quest for differentiation and the need for conformity. Absence of norms and rules during an industry's formative years encourages innovative and creative organizational name choices. In contrast, institutional pressures are strong determinants of organizational name choices among new ventures that enter in later years.

After a threshold is reached the search for distinctiveness takes over again, but it is less intense than at the outset of the industry. Therefore, the timing of entry for the new venture is associated with differing pressures, some of which can be addressed vis-à-vis the start-up's name. These findings are in line with a growing body of research that underscores the temporality of the interactions among organizational identity, legitimacy and distinctiveness and the need to manage it (e.g. Fisher *et al.*, 2016; Zhao *et al.*, 2017).

This study suggests that start-ups used their names to shape the industry and respond to industry pressures for legitimacy that arose as the industry evolved, which corresponded to greater fluctuations in the variety of names early during industry formation, followed by growing name similarity later. The process repeated with patterned regularity; a tipping point was evident regarding name choice conformity, beyond which start-ups were prone to manifesting greater distinctiveness, deviating from industry patterns with their names. Thus, a push for distinctiveness was observed after a threshold during the industry's evolution, but the amplitude of variability in names was smaller than at the outset of the industry due to industry norms. Corroborating institutional entrepreneurship arguments, according to which in any field are actors who use resources to create new rules or transform

existing ones (Maguire *et al.*, 2004), choice of an organization's name represents a valid means for start-ups to signal their standing with the industry's isomorphic pressures.

Despite an absence of institutional pressures as the industry emerged, organizational name choices were not subject entirely to founders' whims; in an emerging industry, the liability of newness and important legitimacy considerations interfered with shaping and constructing the environment dynamics (Santos and Eisenhardt, 2009). Most companies in the sample chose dualistic names that signaled both conformity and distinctiveness and that remained the greatest percentage of name types throughout the industry's evolution, a finding consistent with the argument that entrepreneurs use a blend of novelty and familiarity when they define their organizational identities and select names (Santos and Eisenhardt, 2009; Zhao *et al.*, 2017).

We hypothesized that the proportion of start-ups with names linked to the discipline and technology increases during the nascent years of industry evolution and once it has reached a threshold and the proportion of start-ups with names linked to the industry increases as the industry continues to evolve. Current findings suggest trends that accord with the expected pattern of regularity, and the importance of links to industry increases as the industry starts to take shape, but in the biotechnology industry, it appears that the discipline represented an integral part of most companies' names throughout the industry's evolution. This finding might be industry specific. As an industry characterized by intense intellectual property, biotech relies greatly on s and copyrights that affect the industry's structure. According to Lee (2019), these effects are discrepant at different periods of industry evolution; they stimulate initial entry in young fields and erect barriers to entry later. Use of discipline-specific cues that reflect a company's exclusive rights to a technology at the onset of a fragmented industry might establish a company's identity, and it might stand out in the crowd later during the industry's evolution.

We argued that the proportion of new ventures with longer names increases during nascent years, decreases until the industry reaches a threshold and after the tipping point, the proportion of longer names decreases. Contrary to the hypothesis, as the industry evolved, many entrepreneurs chose longer names, and that trend reversed when the industry reached a tipping point during its evolution. This finding might have been driven by a need for legitimation by communicating to external stakeholders what is central and distinctive about the start-up. The industry continued to evolve, and despite some norms, many start-ups continued to rely on longer names to communicate their identities to enhance legitimacy (Simões *et al.*, 2005; Smith and Chae, 2016). Once the industry reached a tipping point, norms emerged and start-ups were no longer pressed to signal their identities for legitimacy, and thus they opted for short- or medium-length names.

Findings also indicate that the choice of name characteristics associated with whether a firm was acquired or freestanding. Companies with longer, descriptive names that began with voiceless consonants (e.g. K, T, P, C, F and S), and that incorporated the discipline in their name, tended to be freestanding. Thus, companies that conformed to industry naming standards with their name patterns, which reflected common characteristics of most companies in the industry at a given time, tended to remain independent. It is possible that conformity with industry expectations protected companies from takeovers or signaled a company's alignment with industry standards, an argument that corroborates classical institutional theory, according to which organizations respond to isomorphic pressures to, among other reasons, increase their chances of survival (DiMaggio and Powell, 1983).

7. Theoretical contributions

This study contributes to research on organizational names in several ways. Research has assessed organizational name dynamics, but no study focuses on initial name selection of

entrepreneurial firms. We address this gap by constructing and testing a theoretical model that predicts organizational name trends in emerging industries. We also extend institutional entrepreneurship theory by suggesting that entrepreneurial name choices might be driven by a need for legitimacy, as much as it is perceived to shape the environment and construct a nascent market. We contribute to institutional theory by evidencing that external forces drive organizational name choice. We extend the argument to propose that despite missing institutional forces, other external factors—industry evolution—influence organizational name choices in emerging industries. By using integrated content analysis, we build on extant organizational theory to provide an in-depth analysis of differential dynamics of organizational name patterns during an industry's evolution.

8. Implications for practice

That naming patterns of entrepreneurial firms differ, depending on their time of entry during an industry's evolution and their long-term intentions, has important implications for entrepreneurs, investors and executives. For entrepreneurs, this study suggests that the names they choose for their start-ups send a powerful message to legitimate stakeholders, communicates the identity of their firm and signals objectives and intentions for the future (Glynn and Abzug, 2002; Lee, 2001). For investors, start-ups names convey meaningful attributes that can be considered during investment decisions. Since they also convey additional information, they reduce information asymmetry among investors, who can then estimate the future prospects of entrepreneurial firms better. For executives, naming choices represent a strategic mechanism that aligns the signal of a firm's name with its objectives and intentions.

9. Limitation and future research

We do not control for founders' attributes such as experience, training/education, gender and research background, which, according to human capital theory, influence decision-making and therefore affect organizational name attributes. We focus on establishing trends in the naming patterns during an industry's evolution, but we do not control for an owner's agency or organizational factors, such as organizational identity, which might influence naming patterns. Findings nevertheless suggest that industry evolution associates with organizational naming patterns. The generalizability of findings is limited by context, since only biotechnology start-ups were examined. Absent more control variables, focusing on a single industry allowed us to study patterns of organizational name choice in an evolving industry more precisely. Future research should address these omissions by investigating naming patterns in other industries and controlling for owner and organizational attributes. Investigating outcomes such as survival rate and profitability might also corroborate the strategic importance of an organization's name and advance research on organizational naming patterns.

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