Légitimité Sans Frontières¹: Entrepreneurial Name Choices in British Public Companies, 1844-1904²

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¹ “Légitimité Sans Frontières” is a French phrase that translates either to “Legitimacy without Borders” or “Legitimacy without Boundaries”.
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ABSTRACT

Legitimacy is a social characteristic of the environment and an important predictor of successful entry into a new market. Prior research has conceptualized the legitimacy of a potential entrant primarily as a feature of a socially bounded population of organizations in a single category. In this article I propose an alternative model based on a broad set of implicit rules embedded in the history of entrepreneurial behavior. In this model, legitimacy is conceptualized as a feature of the relationship between the potential entrant and its membership in a set of organizational categories. I argue that this model is more useful than a single-category population-based model because it is better able to account for the resolution of a key tension faced by entrepreneurs—the need to appear legitimate to investors while being distinct from competitors. I evaluate this model using data on the population of all British public share companies incorporated and registered prior to 1905. I show that entrepreneurs attend to rules that are implicit in the population of existing and recently founded companies in their choice of a new company name. I moreover show that the pattern of company names chosen by entrepreneurs reflects attempts to manage the tension between legitimacy and competition.
INTRODUCTION

One of the principal contributions of economic sociology to the study of entrepreneurship is the idea that the decisions involved in starting a new firm are not only driven by economic forces of market competition, but also by sociological forces of legitimacy (Aldrich and Fiol 1994; Thornton 1999; Hargadon and Douglas 2001). The issue of legitimacy defines a central tension for entrepreneurs seeking viable market opportunities. In the absence of concerns about legitimacy, entrepreneurs would presumably choose to pursue uncontested markets free of competition, as these would prove to be most profitable (Kim and Mauborgne 2005). One of the principal constraints on this logic is the potential cost of convincing key audience members of the value of an under-institutionalized market opportunity (Marrett 1980; Hannan and Freeman 1987).

Research on the sociology of entrepreneurship has successfully placed forces related to legitimacy alongside those related to competition as important factors in the entry process of new firms. However, legitimacy faces a conceptual problem that is not faced by competition—its conceptual dependence on a specifically identified set of mutually exclusive and bounded categories. It is difficult to base analyses of the entry of firms into new markets on the presumption that boundaries clearly distinguish incumbents from other producers as there are many contexts in which these boundaries are poorly defined. In some cases, these boundaries at best reflect researcher-imposed distinctions, rather than distinctions that are substantively meaningful to market actors (Geroski 1998, p. 678). This issue poses a specific challenge to the conceptualization of legitimacy as current theories concerning its mechanisms are particularly dependent on the identification of a well-specified organizational category (Hannan, Pólos and Carroll 2007).
As an example, consider the role of legitimacy in the founding of the Effuenta Gold Mines Company. On November 11, 1879, the proprietors of this company filed paperwork at the Registrar of Joint Stock Companies in London. In doing so, these entrepreneurs took a critical step towards raising the capital necessary to finance their mining efforts. The outside investors targeted by these entrepreneurs were presumably very interested in assessing the uncertainty associated with this new and unproven company, and likely evaluated its legitimacy in making this assessment. It is easy to imagine that the success of previous mining firms in recent gold rushes in California, British Columbia and Australia would have significantly lowered the anxiety of these investors about buying shares of this new company. On the other hand, the failure of any prior company to successfully organize a gold mining operation in West Africa might have considerably raised their uncertainty.\(^3\)

The possibility that this company could be identified by a potential investor as a member of two different categories illustrates the first of two challenges faced by existing theories of legitimacy in the entrepreneurial process. First, a framework that requires every organization to belong to a single category without specifying the boundaries of these categories can lead to conflicting predictions. A researcher using such a framework could conclude both that the Effuenta Gold Mines Company would have difficulty raising funding as an instance of an illegitimate West African gold mining organization, and that it should easily be able to raise funds as an instance of a highly legitimate global gold mining organization. Also troubling is the possibility that a researcher employing such a framework would fall victim to hindsight bias in attempting to account for legitimation processes in this industry. Eventually, a distinctive West African gold mining industry would emerge, complete with institutions that would sufficiently differentiate firms within its social boundary from those outside of it. These industry-level

\(^3\) While this was one of the first companies on record to file paperwork to engage in capital-intensive mechanized gold mining, many investors presumably would have been aware of the centuries-old tradition of traditional gold mining in the area. I focus here on the question of potentially evaluating the legitimacy of this company as an instance of the former rather than the latter.
institutions would serve as a basis for collective action among these companies to protect their collective interests. It is not clear, however, that either founders, investors, market intermediaries or any other key actors were in clear agreement that the hundreds of companies founded prior to the creation of these institutions were instances of a single coherent population (Hannan, Pólos and Carroll 2007, p. 86).

Sociological theories of entrepreneurship face a second challenge in those cases where audiences evaluating the legitimacy of a new organizational consider features that could potentially be identified with multiple categories. Many researchers have argued that “new combinations” are definitive of entrepreneurial activity (e.g. Schumpeter 1934; Kirzner 1973), yet extant models offer no more guidance for identifying the specific elements combined in a new business than they do for specifying category boundaries. For instance, the Effuenta Gold Mines Company was not only the first company organized to pursue mechanized gold mining in West Africa. It was the first company to attempt mechanized mining of any kind in the region. Even if a researcher were confident of having properly identified this act of entrepreneurship as a new combination, existing theories offer conflicting perspectives on the value of this combination. On the one hand, investors might have found the proposal to operate a gold mine in West Africa confusing and illegitimate, particularly in the context of market intermediaries that treated these as separate and distinct categories (Zuckerman 1999; Hsu 2006). On the other hand, investors might have viewed this as a profitable market opportunity if the new combination was identified as a defensible niche of the broader gold mining market (Gelman and Salop 1983; Carroll 1985; Carroll and Swaminathan 2000).

In this article I argue that these conceptual issues can be addressed by a framework in which the founding context of a new organization is conceptualized in terms the relationship between its multiple
category memberships and the history of prior entrepreneurial action. Specifically, I propose a model in which audiences evaluate the legitimacy of category membership and joint category membership using rules implicitly embedded in the history of organizational foundings. I exploit the strong correspondence between organizational names, function and structure apparent within a population of late 19th and early 20th century British companies to test a set of hypotheses concerning the role of legitimacy and competition in entrepreneurial founding processes. I moreover use this rule-based model to evaluate the efforts of new companies to build on the legitimacy of past companies while distinguishing themselves from new competition.

A RULE-BASED MODEL OF LEGITIMACY AND FOUNDING BEHAVIOR

The study of entrepreneurship focuses the collective attention of organizational sociology on the ways in which a new organization differs from its predecessors. While entrepreneurial organizations that radically differ from past tradition are relatively rare, and there are numerous forces that discourage significant deviations from accepted precedent (Hannan and Carroll 1986, 1989; Zuckerman 1999; Philips and Zuckerman 2001; Haveman and Rao 2006), every organization differs at least in some small way from all organizations that came before it. Recent extensions of the population ecology framework have begun to address some of the consequences of this heterogeneity (Hannan, Pólos and Carroll 2007). However, this framework does not easily capture heterogeneity attributable to the membership of individual organizations in multiple categories. In this section, I argue that given the processes by which audience members are likely to identify membership, many new organizations are likely to belong to multiple organizational categories. I then extend a model based on the presumption that organizations belong to single categories to show how it can be applied in the context of multiple-category membership. I conclude by illustrating how this rule-based model can be applied in the
context of new organizational name choice. I generate a set of hypotheses that relates these choices to naming rules implicit in the history of prior organizational foundings.

Sociological models of entrepreneurial processes invariably focus on features of the environment of a new organization. As one such environmental feature, the organizational category (Hannan, Pólos and Carroll 2007) offers a structured and logical relationship between heterogeneous organizational populations, legitimacy, and founding rates. Extending the concept of an ideal type (Weber [1924] 1947), ecologists propose that audiences use subsets of features or “test codes” to evaluate the category membership of an individual organization (Hannan, Pólos and Carroll 2007, p. 81). In this formulation, the likelihood of organizational founding is driven by the legitimacy of its category. This theory predicts that highly legitimate categories generate high rates of organizational founding, while few organizational foundings are expected in less legitimate categories. The framework is quite clear in establishing that legitimacy is a property of an organizational category and not a property of individual population members (Hannan, Pólos and Carroll 2007, p. 84).

This theory offers a fairly clean set of predictions about founding processes for organizations that are members of a single category. However, it suggests considerable uncertainty about the process by which audiences identify and judge the legitimacy of an organization that belongs to multiple categories (Hannan, Pólos and Carroll 2007, p. 111). Given the range of reasons that entrepreneurs would have to avoid founding organizations identified as members of multiple categories, it may seem easy to dismiss these organizations as relatively rare. Empirical research suggests that audiences have difficulty evaluating organizations with multiple category memberships (Zuckerman 1999, 2000; Zuckerman et al. 2003; Hsu 2006). In particular, audiences view organizations skeptically when they belong to categories that are perceived as oppositional, such as those perceived as members of both the “industrial brewer”
and “craft brewer” categories (Carroll and Swaminathan 2000) or both the “low power radio” and “chain-owned radio” categories (Greve et al. 2006). These concerns notwithstanding, some new organizations do in fact express features from multiple categories. For instance, despite substantial conflict between the “commercial theater” and “royal academy” categories, a specific institutional context led Pierre Perrin to incorporate significant elements of each of these in founding the Paris Opera (Johnson 2007). Moreover, the empirical identification of the difficulty audiences have evaluating actors that claim multiple category membership (e.g. Zuckerman 1999, 2000; Hsu 2006) is premised on the observation of at least some organizations that have attempted to do so.

The proposition that organizations with multiple category memberships are rare is further complicated by the difficulty inherent in evaluating such a claim. The number of categories that an organization belongs to is driven by a complex relationship between the distribution of features across organizations and the distribution of features across categories. Modern complex organizations presumably have quite a broad set of features that an audience seeking to evaluate category membership might evaluate. Market intermediaries may introduce and reinforce institutions that emphasize a subset of these features and raise the prominence of a subset of categories. For instance, securities analysts identify the membership of diversified firms in industry categories (Zuckerman 1999, 2000) and film critics identify the membership of films in genres (Hsu 2006). Market intermediaries can also influence the accumulation of similarity clusters (Hannan, Pólos and Carroll 2007, p. 41) by publicly identifying linkages between multiple organizations in emerging markets (Kennedy 2008). The fact that consumers value the intermediation of these market actors suggests that audiences prefer categories with test codes based on a relatively small number of features. Nevertheless, it is unlikely that audiences base their judgment of the uncertainty associated with a new organization or product entirely on category assignments provided by these intermediaries. Moreover, in many cases, audiences evaluate the
category memberships of an organization without the benefit of a market intermediary. To the extent that these organizations do not cluster significantly on feature values and audiences employ categories with narrow test codes, these organizations are quite likely to belong to many categories.

Accounting for the founding process of an organization that has multiple salient category memberships would be decidedly more straightforward with a model that provides a clear linkage between an individual organization, the categories it belongs to, and its likelihood of founding. I propose a model here that extends straightforwardly upon prior work suggesting that audiences not only evaluate the legitimacy of categories (Hannan, Pólos and Carroll 2007), but also evaluate the legitimacy of the choice to combine categories in a single organization (Zuckerman 1999, 2000; Carroll and Swaminathan 2000; Hsu 2006; Johnson 2007). The model builds on prior approaches by identifying a founding rate not only for discrete organizational categories, but also any potential combination of organizational category memberships.

Specifically, I extend the density-dependence model originally proposed by Hannan and Carroll (1987, p. 923) that relates the founding rate within an organizational category \( \lambda_t \) to the number of category members \( N_t \), the prior rate of founding within the category \( B_t \), and a set of period covariates \( x_t \):

\[
\lambda_t = N_t^\alpha \exp (\beta N_t^2) \cdot \exp (\gamma_1 B_t + \gamma_2 B_t^2) \cdot \exp (\pi' x_t).
\]  

(1)

Positive coefficient estimates for \( \alpha \) and \( \gamma_1 \) are interpreted as meaning that increasing legitimacy corresponds to increasing founding rates, and negative coefficient estimates for \( \beta \) and \( \gamma_2 \) are interpreted as meaning that high levels of competition lead to decreasing founding rates. In a traditional population-based model, every organization modeled by Equation 1 is a member of the same
organizational category. Accordingly, the independent and dependent variables in this equation implicitly reference a category membership C. Equation 2 makes this implicit relationship explicit by adding a subscript for category membership to each of these variables:

\[
\lambda_{t,C} = N_{t,C}^\alpha \exp \left( \beta N_{t,C}^2 \right) \cdot \exp \left( \gamma_1 B_{t,C} + \gamma_2 B_{t,C}^2 \right) \cdot \exp \left( \pi' x_t \right).
\]

(2)

In this new equation \( \lambda_{t,C} \) is the number of foundings of organizations with category membership \( C \), \( N_{t,C} \) is the number of organizations with category membership \( C \), and \( B_{t,C} \) is the number of recent prior foundings of organizations with category membership \( C \) at time \( t \). I use the phrase “category membership \( C \)” rather than “membership in category \( C \)” to clarify the possibility that individual organizations might be members of multiple categories. If, for instance, \( C \) is defined as simultaneous membership in the categories “Argentine organization”, “non-profit organization” and “newspaper publisher”, then Equation 2 models the dynamics of founding in the population of Argentine non-profit newspaper publishers.

As a next step, I introduce a density\(^4\) function \( \rho_t(C) \) that represents the fraction of organizations founded in a period of time \( t \) that have category membership \( C \), or equivalently, the probability that an entrepreneur will found an organization with this category membership at this time. If \( P_t \) is the total number of organizational foundings at this same time, then the number of organizations founded with category membership \( C \) is the product of these two variables:

\[
\lambda_{t,C} = P_t \rho_t(C).
\]

(3)

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\(^4\) My use of the term “density” here reflects a measure which ranges from 0 to 1, rather than the more common usage of “density” in organizational ecology as the cardinality of the number of organizations in a crisp or fuzzy set.
For example, Equation 3 states that if 2,208 companies were founded in 1889, and 3.22% of these companies were in the “steamship line” category, then 71 = 2,208 × 0.0322 steamship line companies were founded in 1889. The number of recent prior foundings of organizations with a particular category membership $B_{tC}$ similarly decomposes to the product $P_{t-1} \rho_{t-1}(C)$. If $V_t$ measures the number of existing organizations at time $t$ and $\eta_t(C)$ represents the fraction of the existing organizations at time $t$ that have category membership $C$, then $N_{tC}$ decomposes to the product $V_t \eta_t(C)$. These expressions can be used to decompose Equation 2 further as:

$$p_t \rho_t(C) = \left( V_t \eta_t(C) \right)^\alpha \exp \left( \beta (V_t \eta_t(C))^2 \right) \cdot \exp \left( y_1 P_{t-1} \rho_{t-1}(C) + y_2 (P_{t-1} \rho_{t-1}(C))^2 \right) \cdot \exp(\pi^t x_t).$$

Equation 4 is at best an obfuscating representation of Equation 1 for the analysis of organizational populations with homogeneous category memberships. It is more useful when $C$ is understood to represent the specific combination of category memberships that an audience associates with an individual organization. Equation 5 includes a subscript for the category membership of an individual organization $i$ in order to clarify the variable nature of this model feature:

$$p_t \rho_t(C_i) = \left( V_t \eta_t(C_i) \right)^\alpha \exp \left( \beta (V_t \eta_t(C_i))^2 \right) \cdot \exp \left( y_1 P_{t-1} \rho_{t-1}(C_i) + y_2 (P_{t-1} \rho_{t-1}(C_i))^2 \right) \cdot \exp(\pi^t x_t).$$

This representation shows more clearly that Equation 5 provides a general model of the likelihood $\rho_t(C_i)$ that an entrepreneur will found a new organization at time $t$ with category membership $C_i$. While Equation 5 can certainly model the density dependence of organizations that are members of mutually exclusive categories, it can also more broadly model the founding behavior of the many novel organizations that are not members of single well-bounded and differentiated categories. The following
section outlines how this model can be applied in a specific context where organizational categories are closely reflected in the names entrepreneurs choose for their new companies.

**Company Names and Organizational Categories**

Perfectly rational and fully-informed actors should find little value in knowing an organization’s name. Net of other commitment structures, the name of an organization does little to signal credibility and limit the uncertainty of audience members about its future performance (Ingram 1996). Moreover, the need for access to resources should influence founders to choose external structures that conform to audience expectations, and the name of an organization is decoupled relatively easily from its internal structure (Meyer and Rowan 1977; DiMaggio and Powell 1983). This being said, entrepreneurial organizations frequently operate in environments where sparse information significantly limits the potential rationality of audience members (Elsbach and Glynn 1996; Lounsbury and Glynn 2001). In these environments, audience members in general and investors in particular have been more than attentive to then name of an organization or changes therein. Shareholder reactions to the widespread adoption of “dot-com” names in the late 20th century provide at least some evidence that simple name elements can communicate quite a bit to audiences about the membership of an organization in a relevant category (Cooper et al. 2001; Lee 2001; Glynn and Marquis 2004).

Company names in the late 19th and early 20th centuries signified organizational category membership more strongly than the names of their modern counterparts (Boddewyn 1966; Glynn and Abzug 2002). Table 1 presents a representative list of company names from the sample analyzed in this study. Several of the companies from this time period appear to follow the “first name, second name, third name” structure common of late 19th century companies in the United States, where the first name identifies the owner or location, the second name identifies the processes and products, and the third name
identifies the formal structure of the organizational (Glynn and Abzug 2002). Most of the names of companies that do not follow this pattern still manage to transparently communicate these features. Audiences evaluating the majority of names in Table 1 should have little difficulty identifying proprietors (e.g. Sir W. G. Armstrong, Mitchell and Company, Ltd), the main product or service (e.g. Self-Threading Needle Company, Ltd) the location of operation (e.g. Glyncorwrg Colliery Company, Ltd) or something specific about the form of association (e.g. Silk Mills Syndicate, Ltd). Relatively few names have descriptors that do not appear to fall into one of these types (e.g. Pontite, Ltd).

Entrepreneurs registering a firm at the Registrar of Joint Stock Companies in this time period were particularly likely to attempt to choose a transparently descriptive name. The mid 19th century saw the passage of a series of acts (notably the Joint Stock Companies Acts of 1844 and 1856, the Limited Liability Act of 1855, and the Companies Act of 1862) in Britain that progressively increased the pressure on public companies to transact transparently when seeking to raise capital from private citizens (Jones and Aiken 1995). While entrepreneurs would likely have found the increase in legal provisions for limited liability in this series of legislation attractive, they also were well aware of a broad mistrust of public companies. Founders of these organizations were particularly interested in appearing legitimate to shareholders as an important audience. Given the substantial uncertainty in the era concerning investment in share companies, appropriate naming strategies were likely key in reducing the uncertainty of would-be shareholders who had few opportunities to evaluate the trustworthiness of a new venture (Ingram 1996). These entrepreneurs would have seen the choice of a clear, appropriate and legitimate name as a critical step in meeting the demands of potential shareholders who acted as
gatekeepers to much sought-after capital. Accordingly, in this study I conceptualize the choice of a name as a deliberate action by entrepreneurs to signal category membership.

An entrepreneur that chooses a company name that follows these conventions presents a relatively distinct set of labels that audiences can use to identify membership in organizational categories with fairly clear, simple and narrow test codes. In most cases, each word in a company name corresponds to the label of an organizational category. Accordingly, there are two kinds of questions that audience members attempting to judge the legitimacy of a new organization might ask about its name. The first question concerns the legitimacy of each individual organizational category indicated by words in a company name. For instance, an investor attempting to predict the success of the European and American Telegram Company would likely consider the uncertainty of doing business in Europe, of doing business in America, and of delivering telegrams. This uncertainty presumably would have been reduced to the extent that the environment was rich with examples of companies within each of these organizational categories.

A related second question concerns the legitimacy of joint membership in multiple categories. As a public rhetorical act, the choice of a name is more than a statement of independent membership in a set of organizational categories. Company names implicitly communicate an argument about how organizational categories relate to one another (e.g. Green, Li and Nohria 2009). In as much as the founding of the Paris Opera increased the legitimacy of joint membership in the “royal academy” and

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5 Presumably, structural words like “and” or “of” do not signify membership in any organizational category that could plausibly be informative to any audience. Other words that offered limited information about category membership were likewise excluded from the analysis. For instance, every limited liability share company was legally required to include the word “Limited” as a part of its legal name. Similarly, the overwhelming majority of companies included “company” in their name during this time period, suggesting that this word provided little additional information about a company to audience members. Finally, individual initials were dropped from the analysis (e.g. the “W” and “G” in “Sir W. G. Armstrong, Mitchell and Company, Ltd.”), as they presumably contribute little information about a company.
“commercial theater” organizational categories (Johnson 2007), the name “European and American Telegram Company, Ltd.” communicates a belief that it is legitimate to do business both in Europe and America, and to deliver telegrams in either place. Moreover, market intermediaries can reinforce and reproduce the legitimacy of joint membership by publicly expressing consensus about organizational fit into multiple categories (Hsu 2006, p. 427).

One way to account for the mechanisms identified by these questions is to model audience assessments of legitimacy by using the prevalence of both the individual and joint category memberships signified by a company name. Figure 1 illustrates this identification in the context of the founding of the European and American Telegram Company, Ltd. in 1878. Of the 6,374 companies in existence at the beginning of 1878, 0.44% (28 companies) were members of the “American” category, 0.14% (9 companies) were members of the “European” category, and 0.06% (4 companies) were members of the “Telegram” category. Labels on the linkages between these words indicate the prevalence of joint membership in these categories. For instance, 25% of the companies in the “Telegram” category at the beginning of 1878 are also in the “European” category and 11% of the companies in the “Telegram” category are in the “European” category—15.38% is a weighted average\(^6\) of these joint densities.

I take a weighted average to account for those cases in which one category is much more prevalent than the other. I assume that the frequency in the more prevalent category is more relevant to the relatedness of the two categories. Specifically, if \(c_i\) and \(c_j\) are the number of companies in categories \(i\) and \(j\) respectively, and \(p_{ij}\) is the proportion of companies in category \(i\) that are also in category \(j\), then I use the weighted mean \(p_{ij}(c_j/(c_i+c_j)) + p_{ji}(c_i/(c_i+c_j))\) in the analyses presented here.

Figure 1 presents a fairly broad set of information about a company with a name that only signifies membership in three organizational categories. It is unlikely that audience members judge the

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legitimacy of a new company on the basis of every word in its name and every implied combination of
category memberships. A company with \( n \) category memberships has \( n \times (n-1)/2 \) pairwise joint
memberships, and there are many companies with four or more distinct words in their names. For
example, an investor evaluating the West African (Gold Coast) Mining Corporation might quite likely
consider whether or not she has seen companies that have combined the words “West” and “African”,
“Gold” and “Coast”, or “Gold” and “Mining”, but is somewhat less likely to be influenced by the pairing
frequency of “West” and “Corporation”.

With these challenges in mind, I propose that audience members incorporate information about
multiple category membership by using the most prevalent individual category and the most prevalent
joint categories. For instance, the bold outline in Figure 1 around the word “American” indicates that it
is the most prevalent of the three categories identified by this name. The dotted line between
“American” and “European” indicates that it is not in the set of high prevalence joint memberships—all
three categories in this name can be connected with higher prevalence combinations. Substantively,
this means that the multiple category membership signified by this company name can be interpreted as
a series of qualifications to a primary category membership. Figure 1 identifies this company as
primarily operating in the American market, as providing telegram services in the American market, and
also as providing telegram services in the European market. I use this logic to measure the density of a
particular configuration of category memberships \( \rho_t(C_i) \) within the population of organizations founded
at time \( t \) as:

\[
\rho_t(C_i) = \max_{w \in \text{labels}(C_i)} \left( \frac{1}{|\text{links}(C_i)|} \prod_{l \in \text{links}(C_i)} \rho_t(l) \right),
\]

(6)
where \( \text{labels}(C_i) \) is the set of labels in an configuration of category memberships \( C_i \), \( p_t(w) \) is the fraction of companies founded at time \( t \) that include the label \( w \) in their name, \( \text{links}(C_i) \) is the set of linkages between labels in a configuration of category memberships \( C_i \), and \( p_t(l) \) is the likelihood that a linkage \( l \) appears in a company name\(^7\). The density of a configuration of category memberships \( \eta_t(C_i) \) within a population of organizations active at time \( t \) can similarly be measured as:

\[
\eta(C_i) = \max\left(n_t(w) | w \in \text{labels}(C_i)\right) \cdot \frac{1}{|\text{links}(C_i)|} (n_t(l) | lelinks(C_i)),
\]

(7)

where \( n_t(w) \) is the fraction of companies active at time \( t \) that include the label \( w \) in their name. These measures essentially scale down the prevalence of an organization’s principal category to the extent that it incorporates uncommon linkages between categories.

The density measures defined by Equations 6 and 7 situate the judgment of legitimacy by key audience members in a set of naming rules implicitly embedded in the history of entrepreneurial activity in a population. A population of existing company names and prior founding events serves as a set of resources (Giddens 1984; Sewell 1992; Stryker 1994, p. 855) for entrepreneurs attempting to choose a new company name as well as for investors seeking to evaluate those names. For example, a sociologist employing a single-category population-based ecological model (e.g. Hannan and Freeman 1987, 1989) might predict that an entrepreneur in the year 1900 would have been more likely to start a company in the “gold mining” industry than in the “cycling products” industry. The comparatively larger number of gold mining companies in existence at that time encoded a collective rule suggesting that gold mining was a more legitimate and thus viable business opportunity. The prediction that an entrepreneur

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\(^7\) The second term in the right-hand side expression of Equation 6 is an average linkage probability, rather than the product of all linkage probabilities. This means that \( p_t(C_i) \) as calculated in Equation 6 is a pseudo-probability rather than an actual probability. For a given prior distribution on the number of words in a company name, it reflects an actual probability scaled to a constant.
should be more likely to found a company named “West African (Gold Coast) Mining Corporation” than one named “Perfection Cycle Stand Company” in 1900 follows this same logic, except that it incorporates rules about joint membership in organizational categories in addition to rules about principal category membership.

**Hypothesis 1:** Entrepreneurs are more likely to found companies with names that correspond to more prevalent naming rules.

A second prediction of the population-based theory of founding rates is that there should be a non-monotonic relationship between founding rates and density. Specifically, ecologists argue that founding rates should initially rise and then fall with increasing levels of density (Hannan and Freeman 1987). The mechanism underlying this prediction is that with increasing density, organizations within a population will compete more intensely with one another. Implicit in this logic is the idea that some entrepreneurs are sufficiently rational and forward looking to anticipate this competition, and choose not to enter niches that appear highly competitive (Hannan and Freeman 1988; Carroll and Khessina 2005).

A similar logic should hold for entrepreneurs considering the choice of a name that signifies membership in multiple organizational categories. The additional detail that a name with multiple category referents provides about the market position sought by an entrepreneur is similar to the information product characteristics provide about individual customer demand (Berry, Levinsohn and Pakes 1995; Nevo 2000, 2001), that a specific portfolio of patents provides about a technological niche (Podolny and Stuart 1995; Podolny, Stuart and Hannan 1996), or that geographic location provides about a spatial niche (Baum and Singh 1994; Baum and Haveman 1997; Sorensen and Audia 2000; Sorensen and Stuart 2001; Sørensen and Sorensen 2003; Stuart and Sorensen 2003a, 2003b). If an audience member does in fact
attend to a company name as an indicator of the organizational categories that an entrepreneur intends to compete in (e.g. Cooper et al. 2001; Lee 2001; Glynn and Marquis 2004), she should be reluctant to invest scarce resources in new companies that draw upon naming rules that significant numbers of existing competitors have already used. This competition should cause density to have a non-linear effect on name choice such that entrepreneurs are less likely to choose new company names reflective of very high densities.

Hypothesis 2: The positive effect of naming rule prevalence on the selection of new company names will decline with increasing naming rule prevalence.

A model that predicts vital rates purely as a function of existing organizational prevalence within a category is only consistent with monotonic growth or decline (Delacroix and Carroll 1983; Ruef 2006). The regular occurrence of speculative booms and busts in overall founding rates of share companies during the late 19th and early 20th century suggests that entrepreneurs within this population are driven by more complicated dynamics in their choice of new company names. In the context of organizational founding within a single category, Delacroix and Carroll (1983: 279) argue that high founding rates signal the availability of resources. At a low rate of foundings, this leads to a positive correspondence between recent founding rates and the founding rate in the focal period. Invoking the logic of forward-looking rationalism about high competition for these resources (e.g. Carroll and Khessina 2005), they propose that this effect diminishes at high levels of recent founding rates.

Entrepreneurs choosing a new company name should be similarly attentive to rules recently used by their peers. If organizational names reflect cultural choices in addition to choices about economic
investment then they are likely to follow cyclical trends (Peterson and Berger 1975; Ruef 2006). When names chosen by entrepreneurs reflect the prevalence of choices by proximate actors, complex dynamics often result (Lieberson 2000; Lieberson, Dumais and Baumann 2000), particularly when actors have a preference for specific levels of prevalence (Lieberson and Lynn 2003). If entrepreneurs track the recent behavior of their peers in attempting to choose company names that balance legitimacy and the threat of competition by being in the middle range of prevalence, the following two hypotheses should hold:

**Hypothesis 3:** Entrepreneurs are more likely to found companies with names that correspond to rules used by recently founded companies.

**Hypothesis 4:** The positive effect of recent rule use on the selection of new company names will decline with increasing recent rule use.

A final prediction of the rule-based model presented here concerns the fundamental entrepreneurial tension between presenting audiences with something new and presenting audiences with something legitimate. While researchers continue to disagree about the right definition of entrepreneurship, there is at least some consensus that it involves organizing to bring something new together. This idea is present in a definition of an entrepreneur as “the innovator who implements change in markets through the carrying out of new combinations” (Schumpeter 1934) and the definition of an entrepreneur as one who “recognizes and acts upon profit opportunities, essentially an arbitrageur” (Kirzner 1973). Each of these definitions suggests that entrepreneurs will attempt to found organizations that audiences might view as members of new configurations of organizational categories.
Institutional theorists argue compellingly that these new combinations need to combine innovative ideas with features that cause investors, potential adopters, and other key audience members to view the new venture as legitimate. Hargadon and Douglas (2001) illustrate how Edison’s innovative electric lighting system would have been unlikely to succeed had he not made a concerted effort to communicate how it was connected to the existing, legitimate, and taken-for-granted institutions and structures of the prevailing gas light system. Notably, Edison changed the name of the company from “Edison Electric Light” to “Edison Illuminating Company” when it was reorganized under existing gas statutes (Hargadon and Douglas 20001, p. 483), further strengthening its public linkage to gas lighting companies as an established organizational category. A key insight that can be drawn from this and other examples (e.g. Johnson 2007) is that entrepreneurship may be most successful when the new combination includes elements that are viewed as legitimate by audience members in addition to those that are novel and innovative.

It is unclear how to characterize an innovative organization that combines both novel and prevalent features in a way that captures the insights offered by these examples of entrepreneurship using a population-based framework that defines legitimacy strictly as a feature of an individual organizational category. Individual audience segments in such a framework would by definition either view the Edison Illuminating Company as a member of the illegitimate and novel “electric lighting” category, a member of the legitimate and established “gas lighting” category, or as an organization with no category membership at all. Each of these options belies the possibility that a customer or investor might comprehend the multiple category memberships of this company.

The rule-based model proposed here can model an organization with multiple category memberships much more straightforwardly, and allows the legitimacy of each underlying rule concerning category
membership to be treated separately. While the formulation in Equation 6 measures the extent to which a company invokes an entire set of naming rules, the framework can also be used to measure the extent to which a company name relates to a rule about a single organizational category. As an example, a crude measure of the innovativeness of a new company is the prevalence of the least prevalent organizational category that it is a member of. For instance, the Universal Simplex Typewriter Company was the first public share company registered in Britain to include the word “Typewriter” in its name. While this name choice signified membership in the very novel if illegitimate “typewriter manufacturer” category, it also signified membership in the significantly more prevalent and legitimate category of companies claiming to be “universal” in their geographic scope, and the likewise more prevalent category of companies involved in the manufacture of “simplex” machinery. The ability of the rule-based model to separately identify the prevalence of each rule signified by a company name allows for a large-scale empirical test of the proposition that companies are more likely to pursue innovation when they are otherwise able to communicate legitimacy to key audience members.

**Hypothesis 5:** Entrepreneurs are more likely to identify membership in an innovative organizational category when they choose names that also signify membership in established organizational categories.

**METHOD**

**Data**

I test the proposed hypotheses using the names of all British companies registered at the Registrar of Joint Stock Companies between 1844 and 1904 that were dissolved prior to 2009. I compiled data on company names, founding dates and dissolution dates using two major sources. The United Kingdom
Board of Trade maintains a file for every dissolved company that includes documents such as certificates of incorporation, memoranda and articles of association and lists of shareholders and managers. These files are indexed through the UK National Archive website, which is searchable by the unique registration number\(^8\) assigned to each public share company\(^9\). I collected a name and founding date for 71,647 companies founded prior to 1905 with a registration number accessible through this source.

I identified dissolution dates using the names collected from the UK National Archive source. The Companies Act, 1862 requires any winding-up company to post notice of this action in the London Gazette, the Edinburgh Gazette or Dublin Gazette, depending on the location of its registered office. I searched the online version of each of these publications to identify the first mention of a company name after the year of its founding, and recorded the date of this mention as the dissolution date. While it is possible that this approach will identify a dissolution date that is earlier than the actual mortality event of a company, an inspection of several individual cases indicates that the overwhelming majority of mentions in these publications correspond to company dissolution and failure. I was able to identify a dissolution date using this method for 58,932 companies.

Figure 2 presents the number of foundings and active companies from 1844 through 1904 corresponding to these data. The initial pattern of company founding likely reflects the introduction of

\footnote{8 There are a very small number of individual cases where more than one company was apparently assigned the same registration number—many of these cases appear to reflect typographical errors and were adjusted accordingly. Additionally, a small series of numbers between #1995 and #2957 were assigned to different companies before and after the Companies Act of 1862.}

\footnote{9 Specifically, the search string “Company no n” will return a list of documents related to the company with registration number n.}
the Joint Stock Companies Acts of 1844, 1856 and 1862. In order to avoid confounds arising from these changes in the legislative environment, I do not analyze the 2,270 founding events that take place before 1865. I do, however, include information on companies that were active after 1864 but founded before 1865 in measuring the prevalence of and recent prior use of naming rules. Finally, I exclude 4,502 companies with names that include one or fewer words, yielding a sample of 52,161 company names and founding dates.

Variables

The dependent variable *Current Rule Use* in the analyses presented here is the predicted number of times that entrepreneurs would choose a new company name using rules consistent with multiple category membership signified by the name of an organization. This variable is constructed by using Equation 6 to evaluate the multiple-category density of a company name in the context of all companies that were founded in the same year, and multiplying this density by the number of actual foundings in that year. Figure 3 illustrates the measurement of multiple-category density for three hypothetical organizations—the “Mining Company”, the “Silver Company”, and the “Sliver Mining Company”. The first two companies signify membership in a single organizational category. Accordingly, the predicted densities associated with these company names in a given year are the percentage of newly founded companies with names that include the word “mining” or “silver”, respectively.

The measurement of the predicted density of the hypothetical company name “Silver Mining Company” company illustrates the incorporation of rules about joint category membership embedded in a population of company names. As a company identified as a member of two organizational categories,
its expected density is between the densities of each individual category. The expected density of “Silver Mining Company” tracks the density of the “silver” category much more closely than it does the broader “mining” category because almost every company in this period involved with silver engages in mining, while many mining company do not mine silver.

I construct the independent variables Rule Use Prevalence and Prior Rule Use using a similar approach. I use Equation 7 to assess the density of multiple category membership signified by the name of a focal company in the context of the population of companies that are active at the beginning of its founding year. I compute Rule Use Prevalence by multiplying this density by the size of this population of active companies. I compute Prior Rule Use by using Equation 6 to assess the density of multiple category membership signified by a company name in the context of the names of companies founded in the prior year, and multiplying this density by the number of companies founded in the prior year.

Finally, I construct two independent variables to measure membership in innovative organizational categories. I construct a variable Established Category Use by identifying the most prevalent word in a company name and computing its prevalence in the population of names of all companies that are active at the beginning of the founding year of the focal company. I also construct a variable Innovative Category Use by identifying the most prevalent word in a company name in the context of the population of names of active companies and computing the reciprocal of its prevalence. Measuring Innovative Category Use using a reciprocal allows higher values of the variable to connote the identification of a less common organizational category.

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Insert Table 2 about Here
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p. 25
Table 2 presents descriptive statistics for the main variables in the analysis, along with pairwise correlations. First-order relationships between these variables are as expected. There is a relatively high correlation between the measure of established category membership and the current use of naming rules. This is not substantively surprising—a name that indicates membership in categories that are prevalent in its founding year is likely to identify membership in a category that is prevalent in the population as a whole. Importantly, the measures of innovative category use and established category use do not show a strong negative pairwise correlation.

**Analysis**

I use negative binomial regression to model the number of times that entrepreneurs are predicted to choose a new company name using a specific combination of naming rules. While the computation of the dependent variable yields non-integral values, the variable conceptually models a count outcome. The multiple category density defined by Equation 6 corresponds to the rate with which entrepreneurs will choose a given name in a specified time frame. Accordingly, the model should predict a negative binomial distributed dependent variable conditional on the independent variables. I cluster errors by year in order to further minimize the effect of dependent variable over- or under-dispersion.

**RESULTS**

Table 3 presents coefficient estimates from a set of models that explore the separate and combined effects of explanatory variables on new company name choice hypothesized in this study. As a whole, these results support the predictions of the proposed rule-based model of entrepreneurial name choice and multiple category identification and signification. The quantitative results suggest that entrepreneurs attend closely to the prevalence of existing companies in multiple organizational categories, as well as to the recent use of naming rules by their peers. Moreover, these results provide
quantitative evidence in support of the hypothesis that entrepreneurs are more likely to engage in innovative behavior in when they are simultaneously able to signal legitimacy to key audience members.

I begin testing the rule-based framework with Model 1, which includes baseline coefficients that measure the effects of naming rule prevalence on the choice of a new company name. The positive coefficient for Rule Use Prevalence suggests that entrepreneurs are in fact more likely to choose company names consistent with rules prevalent in the population of active companies in support of Hypothesis 1. The negative coefficient for the quadratic Rule Use Prevalence term suggests that this tendency to employ rules that are prevalent in the population of active companies diminishes as a rule becomes very broadly adopted, in support of Hypothesis 2. These coefficients are stable and highly significant across both Model 1 and Model 2, providing strong support for both hypotheses.

Taken together, Hypotheses 1 and 2 correspond to the substantive claim that entrepreneurs are more likely to choose a name if it is legitimate, but less likely to do so when they anticipate intense competition in the categories the name signifies. Evidence for the competitive mechanism is particularly strong when the estimated coefficients imply that some organizations actually experience a context where competitive forces are stronger than those associated with legitimacy. Figure 4 presents a plot of the estimated relationship between naming rule prevalence and the relative likelihood of company name choice over the central 90% range of observed values of Naming Rule Prevalence. This graph shows that there is indeed an inverted U-shaped relationship between these variables within the population of companies actually modeled in the sample. The maximum multiplier of the founding rate is reached when Naming Rule Prevalence=225. 4,550 of the 52,161 companies modeled have names
consistent with rules with a higher prevalence than this maximum value. The fact that the overwhelming majority of these companies entered the highly populous and very competitive mining and gas industries provides some degree of substantive support for these quantitative results.

Model 2 extends Model 1 by adding coefficients that measure the effect of recent rule use on company name choice. The positive coefficient for the linear Prior Rule Use term suggests that entrepreneurs are more likely to choose a new company name consistent with rules that are reflected in the population of recent new company name choices, even while controlling for the possibility that these rules may also reflect broader trends in the population of existing companies. The negative coefficient for the quadratic Prior Rule Use term suggests that this tendency decelerates as naming rules become more prevalent in recent choices, again, net of the effect of increased prevalence in the entire population of existing companies. Like the coefficients for Rule Use Prevalence, these coefficients are stable and highly significant across most of the models tested, providing strong support for Hypotheses 3 and 4.

The results obtained in Models 3 and 4 establish both legitimacy and competition as important mechanisms in the process by which entrepreneurs evaluate the proximate behavior of their peers. However, these results suggest that the substantive impact of competition is qualitatively different in the context of evaluating recent behavior than it is the context of entering into an existing population of potential competitors. Specifically, these results suggest that recent naming choices signal legitimacy much more strongly than they signal competition. Figure 5 presents a plot of the estimated relationship between recent rule use and the relative likelihood of company name choice, again over the central 90% range of observed values of Recent Rule Use. Within the observed range of values, this graph suggests
that there is a monotonic relationship between these two variables. The maximum multiplier of the founding rate would only be reached when Recent Rule Prevalence=597, which is well outside the range of observed values.

Models 3 through 5 extend Model 2 by adding covariates that measure the extent to which a company name indicates membership in an innovative organizational category, and the extent to which this innovation is accompanied by simultaneous signifiers of legitimacy. Models 3 and 4 examine the independent role that identification in established and innovative organizational categories play in determining company naming choices, while Model 5 examines their combined and interactive effect. The positive and strongly significant coefficient for Established Category Use in Model 3 confirms that entrepreneurs are indeed more likely to identify their new company as a member of an established category. In some sense, this result confirms the basic density dependence model for single-category membership (e.g. Hannan and Freeman 1987). The relatedness of different measures of category membership may in part explain why the coefficient for Naming Rule Prevalence is insignificant in Model 3. The positive and strongly significant coefficient for Innovative Category Use in Model 4 likewise confirms that entrepreneurs seek to distinguish their new companies by choosing a name that indicates distinctiveness from their competitors.

Model 5 extends Models 3 and 4 by including terms for both Established Category Use and Innovative Category Use and a third term modeling the interaction of these two variables. The large and highly
significant coefficient for this interaction term suggests that entrepreneurs are much more likely to identify membership in an innovative category when they also identify membership in an established category. This result provides strong support for Hypothesis 5. Figure 6 presents this result graphically by plotting curves for the estimated relationship between innovative category membership for companies with names that use highly established categories (one standard deviation above the mean) and for companies with names that identify membership in less established categories (one standard deviation below the mean). Entrepreneurs that make little use of established categories in identifying their new company are roughly as likely as they are not to identify their new company as a member of an innovative category. Entrepreneurs entering into a well established category, on the other hand, are much more likely to distinguish themselves by using a novel label in the name of their new company.

CONCLUSIONS

Attempts by entrepreneurs to present a new organization as both legitimate and innovative are difficult to analyze using ecological theories that assign organizations to a system of mutually exclusive and bounded organizational categories. In this study I used a rule-based model to show that British entrepreneurs in the late 19th and early 20th centuries based their choices of new company names using a system of multiple overlapping categories. I specifically show that these entrepreneurs are more likely to choose new company names that signify membership in a set of categories legitimated by the actions of prior entrepreneurs, while avoiding identification with categories that show evidence of dense competition. I moreover provide large-scale quantitative evidence showing that entrepreneurs that choose company names that signify membership in new and innovative organizational categories support these ventures by simultaneously indicating membership in more established categories.
These results build upon and extend recent efforts of population ecologists to introduce greater heterogeneity into the conceptualization of the social environment of organizations (Pólos, Hannan and Carroll 2002, Hsu and Hannan 2005; Hannan, Pólos and Carroll 2007). By introducing the idea that organizations may vary in their grade of membership in a category, this work identifies one of many possible dimensions of variation in the relationship of organizations to their environments. The rule-based model I propose in this study identifies multiple category membership as an additional dimension of variation. This dimension may be increasingly relevant as scholars continue to identify the prevalence and importance of hybrid organizational forms (Minkoff 2002; Haveman and Rao 2006). By conceptualizing legitimacy as a feature of multiple category membership, I am able to extend the application of the organizational category construct to a broad set of organizations that might otherwise be difficult to conceptualize in the ecological framework. In the context of company names that straightforwardly indicate their founder’s presumed intentions, I am at least partially able to mitigate the problem of identifying organizational category boundaries by basing category membership on a very simple and narrow test code—the inclusion of a single word in a company name. It is substantially easier to argue that audience members can use simple labels to identify members of organizational categories than it is to argue that audience members are able to clearly delineate sharp category boundaries (Geroski 1998, p. 678). As such, the rule-based model potentially broadens the scope of contexts in which researchers can apply the ecological framework.

The approach presented here also offers a modest step forward on a pair of related outstanding issues in population-level organizational sociology. The first of these issues is rooted in a long-standing if unresolved tension about the measurement and conceptualization of legitimacy. Several researchers have questioned whether the legitimacy of an organizational founding is adequately conceptualized in terms of the number of existing organizations embodying its organizational form (e.g. Zucker 1989,
Advocates of the density-dependence framework acknowledge that detailed features of a founding context can play an important role in the legitimacy process, but argue that a focal contribution of their proposed approach is its broad generalizability (e.g. Carroll and Hannan 1989). The choice of a company name is at least as generalizable as the identification of population counts, and is perhaps more closely related to the role that legitimacy plays in the founding process. The generalizability of basing the conceptualization of legitimacy on the company naming process also addresses a recently raised concern about the impact of sampling on the identification of population-level process parameters. Selectively sampling populations based on their large size or the success of the organizational form can lead to spurious identification of density-dependent effects (Denrell and Kovács 2008). By exploiting the definitional ubiquity of company names and considering all public company foundings, the approach presented here avoids this potential sampling bias. Accordingly, the empirical results supporting Hypotheses 1-4 do not only confirm prior density-dependence findings, but establish them in a context considerably less subject to selective population sampling.

The results of this study moreover contribute to recent efforts seeking to clarify the origin and genesis of those organizational forms, populations and industries that do eventually emerge as coherent, distinctive, and substantively bounded entities (Hannan and Freeman 1986; Ruef 2000; McKendrick and Carroll 2001; Kennedy 2008). A basic challenge in the empirical analysis of the emergence of a new organizational form is the identification of the appropriate population of analytic subjects. For instance, McKendrick and Carroll (2001) are very careful to characterize the intrinsic uncertainty in defining the population of disk array manufacturers as an instance of a form that may or may not become institutionalized, and supplement their conclusions about the appropriate population boundary with a substantial amount of qualitative evidence. In the absence of such evidence, the rule-based model presented here offers an alternative approach to the empirical study of the emergence of coherent
organizational categories, populations and forms. Researchers can empirically identify the emergence of the legitimacy of joint category membership that precedes the legitimation of broader composite categories (e.g. Kennedy 2008) by studying identification with multiple narrow and simple categories within a broad population of organizations.

Finally, these results contribute to institutional studies of entrepreneurship that have uncovered elements of the process by which entrepreneurs attempting to introduce new ventures address audience demands for legitimacy (Hargadon and Douglas 2001; Johnson 2007). These detailed case studies have contributed substantially to our understanding of how entrepreneurs balance this tension. However, few studies have empirically documented the extent to which these processes are widespread among organizations. While the choice of a company name only captures a thin slice of the communication of innovative activity and the relationship to established precedent, the results presented here provide at least preliminary confirmation that late 19th century and early 20th century British entrepreneurs employed some of these institutional processes in establishing their new companies. Moreover, the analysis presented here illustrates at least one way to incorporate the language used by entrepreneurs in the analysis of the creation of new institutional arrangements (Kennedy 2008; Green et al. 2009).

The limitations in this study offer at least two interesting directions for future research. A first direction involves expanding the types of category labels used to assess organizational category membership. Contemporary organizations are much less likely than their 19th century counterparts to use names that clearly predict the intentions of their leaders. As such, future researchers may not be able to straightforwardly apply the analysis presented here to the entrepreneurial behavior of contemporary organizations. On the other hand, the widespread prevalence of audience-generated organizational
identifiers and classifications in the modern internet economy may provide future researchers with an ample source of category labels that could be used in similar analyses. A second direction for future research involves a more elaborate conceptualization of the ways that entrepreneurs signify innovative content. The rule-based model implemented in this study is limited in that it only captures innovation to the extent that it is reflected in a company name that signals membership in a relatively obscure category. While I was able to use this measure to distinguish some degree of entrepreneurial innovation among late 18th and early 19th century British companies, further investment in the assessment of innovation would likely yield a more interesting set of conclusions, particularly in the context of contemporary organizations. The rule-based model proposed here has the potential to lead to a rich set of empirical findings about the role of legitimacy in the entrepreneurial process if it is extended in either or both of these directions.
REFERENCES


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<th>Dissolution</th>
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<td>1871</td>
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<tr>
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<td>1881</td>
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Table 2: Descriptive Statistics and Pairwise Correlations

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<td>1. Current rule use</td>
<td>6.986</td>
<td>10.244</td>
<td>0.106</td>
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<td>0.142</td>
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<td>257.922</td>
<td>0.744</td>
<td>0.735</td>
<td>0.330</td>
<td>0.208</td>
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<td>4. Recent rule use</td>
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<td>6. Established category use</td>
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Note: N=52,161.
Table 3: Negative Binomial Regression Coefficient Estimates of Current Rule Use in Name Choices of New Companies

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<tr>
<th></th>
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<th>Model 3</th>
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<tr>
<td>ln(Prior rule use)</td>
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<td>0.112***</td>
<td>-0.007</td>
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<td></td>
<td>(0.014)</td>
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<td>Prior rule use²/1,000</td>
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<td>-0.001***</td>
<td>-0.001***</td>
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<td>Recent rule use</td>
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<td>0.007***</td>
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<td>Recent rule use²/1,000</td>
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<td>28.816***</td>
<td>24.763***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.699)</td>
<td>(1.769)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovative category use/10,000</td>
<td></td>
<td></td>
<td>0.590***</td>
<td>-0.300**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.154)</td>
<td>(0.100)</td>
<td>(0.100)</td>
</tr>
<tr>
<td>Innovative category use/10,000 × Established category use</td>
<td></td>
<td></td>
<td>37.662***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(6.849)</td>
<td></td>
<td>(6.849)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.544***</td>
<td>1.472***</td>
<td>0.994***</td>
<td>1.425***</td>
<td>1.051***</td>
</tr>
<tr>
<td>α</td>
<td>0.907</td>
<td>0.862</td>
<td>0.418</td>
<td>0.859</td>
<td>0.402</td>
</tr>
<tr>
<td>BIC</td>
<td>312,391</td>
<td>309,708</td>
<td>274,768</td>
<td>309,519</td>
<td>273,426</td>
</tr>
<tr>
<td>Wald χ²</td>
<td>128.217</td>
<td>399.228</td>
<td>1,195.461</td>
<td>603.060</td>
<td>1,334.033</td>
</tr>
</tbody>
</table>

Note: *p<0.05, **p<0.01, ***p<0.001. Robust standard errors, clustered by year.
Figure 1: Illustration of Naming Structure—European and American Telegram Company

Figure 2: Number of Foundings and Active Companies, 1844-1904
Figure 3: Yearly Founding Density for Three Hypothetical Company Names

Figure 4: Effect of Rule Prevalence on Company Name Choice
**Figure 5:** Effect of Prior Rule Use on Company Name Choice

**Figure 6:** Interaction Between Established Category Use and Innovative Category Use