Unpacking the Liability of Aging:

Toward a Socially-Embedded Account of Organizational Disbanding *

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Abstract

High rates of dissolution and bankruptcy among organizational startups have stimulated social scientific interest in the causes of disbanding for both business firms and NPOs (nonprofit organizations). While recent quantitative analyses have primarily addressed liabilities associated with organizational age and operational scale, some sociologists have considered a broader set of factors affecting the life chances of new startups. Following Stinchcombe (1965), these factors subsume such considerations as the resources that a startup has access to as a result of its status in a stratification system; the activities undertaken by organizational founders in their efforts to mobilize resources, secure legitimation, attract participants, and introduce new ways of doing things; and the extent to which organizational structures and routines tend to reflect idiosyncratic conditions prevailing at the time of founding. Using data on 766 business organizations, this chapter explores how unobserved temporal heterogeneity along these dimensions may account for ostensible liabilities of aging over the organizational life course. In the process, it seeks to develop fruitful connections between recent empirical work in organizational ecology and the 'old' institutionalist tradition.

Introduction

Although Stinchcombe's (1965: 148-150) "liability of newness" thesis remains the most widely-cited section of his influential paper in the *Handbook of Organizations*, the original impetus to that thesis -- relating formal organizations to their broader societal context -- has often been forgotten. As a result, many researchers have narrowly construed Stinchcombe's arguments regarding the risk of organizational disbanding as an age dependent property, assessed at the level of individual organizations (Freeman et al. 1983) or organizational forms (Ingram and Baum 1997). While early investigations found considerable support for the idea that young organizations are particularly vulnerable (see Carroll [1983] and Aldrich and Marsden [1988] for reviews), a variety of empirical evidence has since uncovered more complex patterns of age dependence, including those that point to *positive* age dependence (increases in disbanding rates with age) and *nonmonotonic* age dependence (increases in disbanding rates followed by decreases with age) (Hannan et al. 1998). This mixture of evidence has led to researchers to supplement Stinchcombe's thesis with a host of additional age dependent processes, including the liabilities of adolescence (Brüderl and Schüssler 1990; Fichman and Levinthal 1991), obsolescence and senescence (Barron et al. 1994; Ranger-Moore 1997).

Revisiting Stinchcombe's original statement, it can be argued that what is required is not further parameteric specification of age dependent rates of disbanding but greater substantive and empirical understanding of how the risk of organizational disbanding over time relates to changes in social structure, including the system of stratification within which the organization and its promoters are located, the historical 'imprinting' of social features on the organization at the time of its founding, and the attempts made by the organization and its promoters to influence social structure itself. Specifically, the argument advanced in this chapter holds that ostensible liabilities of aging may result from unobserved heterogeneity along three dimensions connecting an organization to its social environment, including: (1) the resource endowments that an organization has access to given its fiscal reputation within a stratified system of organizations (see Stinchcombe 1965: 171-173; Uzzi 1999) and identity within a broader organizational community (Ruef 2000); (2) the inertia of an organization's structure relative to changing societal conditions (Stinchcombe

1965: 153-169); and (3) the engagement of organizational founders with the social environment in their efforts to mobilize resources, secure legitimation from political authorities, attract participants, and introduce new ways of doing things (ibid: 146-148). Once the benefits and risks of these interactions between the organization and its environment are controlled for, different age dependent patterns in disbanding rates may be mitigated or even disappear entirely.

The argument echoes recent work on the logical formalization of age dependence in organizational mortality, which characterizes disbanding rates in terms of underlying concepts such as endowments, inertia, capability, and position (Hannan 1998; Carroll and Hannan 2000: Chapter 13). Exploring the empirical implications of these concepts requires attention to the social-embeddedness of organizational disbanding.[1] To this end, an original data set of 766 organizations was sampled from a population of business firms founded between 1945 and 1999. During data collection, particular emphasis was placed on the differential ability of founders to supply endowments to their organizations, the inertia displayed by the founders vis-à-vis their social environment, and attempts made by founders to develop organizational capabilities over time via engagement with external social structures. Consistent with the tenets of the 'old institutional' school, the project viewed the business firms as being "created by purposive people" (Stinchcombe 1997: 2) whose actions generated liabilities and benefits for the collective enterprises they were attempting to put into place.

In this chapter, I consider how heterogeneity in founder actions contributed to observed age-dependent patterns of disbanding among these organizations, beginning with a conceptual discussion of the underlying temporal dynamics, followed by a series of event history analyses that tease out the effects of social structure and mobilization efforts. The chapter concludes by relating studies of age dependence in organizational mortality to broader questions advanced within the 'old' institutionalist tradition of organizational analysis (see Selznick 1996), focusing in particular on the process whereby entrepreneurs imbue ventures with value beyond their immediate instrumental purposes.

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[1] As Zukin and DiMaggio (1990) and Dacin, Ventresca and Beal (1999) emphasize, the notion of organizational embeddedness may refer to a diverse set of mechanisms, including structural, cognitive, cultural, and political dimensions. To focus the present argument, attention is limited to *temporal* features of embeddedness that are thought to affect organizational disbanding and are likely to be correlated with organizational age.

Liabilities of Aging

The Liability of Newness

Studies of organizational mortality have identified three characteristic patterns with which disbanding rates tend to vary over the organizational lifecycle (see Figure 1). In the "liability of newness" account most commonly associated with Stinchcombe, young organizations are seen to lack reliability of performance and the ability to rationally account for their actions (Hannan and Freeman 1984). When these organizations are first created, core technologies may be unproven, standard operating procedures and relations of trust must be developed, and organizational members must be socialized within new roles (Stinchcombe 1965). Over time, organizations gradually acquire a reproducible social structure, which generates inertia but also decreases disbanding risk (see Figure 1a).[2] Although Stinchcombe and his contemporaries showed considerable interest in the micro-processes whereby purposive actors develop the social structure of new organizations (and, more broadly, new institutions), this aspect of the liability of newness argument has often gone ignored in empirical treatments.

[Insert Figure 1 About Here]

A key dynamic underlying the liability of newness is the unmeasured disruption resulting from attempts by organizational promoters to create capabilities and identities during the founding period of their enterprise. Arguably, pivotal founding activities such as resource mobilization, legal establishment, social organization, and operational startup all carry short-term risks as well as long-term benefits. In the process of developing a business plan or other organizational 'blue-print', for instance, the founders' motivation to organize confronts the exigencies of their social environment (cf. Stinchcombe 1965: 146-148). If the careful planning involved in the preparation of such a

[2] For recent logical formalizations of this argument, see Hannan (1998) and Péli, Pólos and Hannan (2000). It should be noted that tests of the liability of newness thesis have not always separated it from a liability of smallness. Since organizational age and size are often positively correlated, it is necessary to control for changes in size statistically in order to cull out aging effects (Aldrich and Auster 1986).

document suggests that an organization may not be sustainable from a material-resource perspective, that powerful interests oppose the venture, or that its identity is incongruent with the dominant forms in an organizational community, the enterprise may be abandoned at an early stage. Similarly, failure to legally legitimate a new venture -- e.g. by securing intellectual property rights or approval from political authorities -- often means that stakeholders move on to different business opportunities. Each pivotal founding activity imposes considerable risk of organizational failure with its execution, particularly when a venture is still emerging as a collective entity.

Once initial founding activities are completed, their disruptive effects gradually wear off and may be replaced by beneficial effects, particularly as experience translates into organizational capability and the accumulation of collective routines. In the aggregate, this often leads to patterns of negative age dependence in disbanding rates (Carroll 1983; Freeman et al. 1983). The specific pattern of decline in disbanding risk for any given organizational population, however, is likely to be affected to a considerable extent by the types of founding activities that are undertaken and when they ordinarily occur in the organizational lifecycle. Minimalist organizations -- such as trade and professional associations -- often engage in only limited mobilization during their early years and may operate out of the offices of other organizations they represent (Aldrich et al. 1994; Halliday, Powell and Granfors 1987). For these organizations, founding activities tend to pose negligible disruption, while the subsequent decline of disbanding risk may be modest.[3] High-tech startups, on the other hand, have come to rely on dramatic resource mobilization events and initial product announcements in recent years. Founding activities pose considerable risk to these enterprises, since stakeholders are likely to abandon them if there are early signs of weakness.

Variation in characteristic patterns (and salience) of startup events across organizational populations contributes to different levels of the liability of newness. Rather than presenting the liability as a monotonic function of age, then, a more nuanced account suggests that it be analyzed as the initial disruption implicit in the organization of resources, social arrangements, operational routines, and legal status for a new venture and the subsequent development of capability within each of these domains.

[3] An ecological study of trade associations by Aldrich and colleagues (1994) supports this contention. Using a quadratic specification of organizational age, they find that the first-order term has no significant effect on disbanding risk, while the second-order term has a negative effect of relatively small magnitude.

The Liability of Adolescence

A second characteristic pattern of age dependence involves the "liability of adolescence", or honeymoon effect. This account suggests that organizational founders start their ventures with a stock of endowments, including financial resources and the trust of internal and external supporters (Fichman and Levinthal 1991). As these endowments are exhausted in the early years of a new organization, the risk of disbanding increases until some crucial point is reached where renewed resource mobilization (e.g. second-stage funding) or operational success may reverse the disbanding risk (see Figure 1b).[4] Unfortunately, analyses of the liability of adolescence have typically treated endowments as an unobserved variable. A better specified argument regarding the liability of adolescence would need to attend to how changes in resource pools throughout the early years of an organization's existence affect disbanding rates. Such an argument needs to spell out: (a) the ability of founders to provide initial resources to the organization; (b) the ability of the organization to replenish resources; and (c) whether alternate dynamics that might generate a liability of adolescence -- *independently* of endowments -- can be ruled out.

As Stinchcombe pointed out in his groundbreaking paper, the ranking of organizations and their founders in a stratification system is one crucial structural feature affecting the life chances of new enterprises (1965: 171-173). While the existence of initial endowments is sometimes taken-for-granted within the liability of adolescence argument, from Stinchcombe's perspective, one must attend carefully to variance in the distribution of money and property among founders. Some founders will bring significant amounts of personal, familial, or asset-based financing to the table; others have limited resource endowments. The timing of progressive resource depletion in the liability of adolescence argument is obviously sensitive to such variability in endowments.

Perhaps even more important for a new venture is the fiscal reputation it is able to develop as a social unit (apart from its founders) in order to raise capital. In this regard, Stinchcombe

[4] The speed with which initial resource endowments are depleted is termed the "burn rate" in the popular business literature. The burn rate is likely to be especially high when new organizations are founded based on untested technologies. For instance, one study's recent cross-sectional statistics on internet startups suggested that over half would deplete their capital reserves within a span of two years (Willoughby 2000).

emphasizes the credit rating of organizations as a "reputational measure of stratification" (171) linked to debt financing, although modern firms often rely on more loosely defined valuations linked to equity financing. Because reputation and network contacts are so crucial in an organization's efforts to mobilize external funding (Uzzi 1999), these dimensions introduce substantial variance in the ability of organizations to replenish initial endowments and survive beyond their 'honeymoon' years. Resource replenishment may also be tied to other contextual factors, such as the startup activities that an organization has completed (Delmar and Shane 2001), the interests of dominant actors in supporting or opposing the venture (McAdam and Scott 2000), and the relationship of the startup's identity to more established organizational forms in a broader organizational community (Ruef 2000).

Specification of change in resource endowments is important because processes aside from resource depletion may account for the liability of adolescence. A simple extension of the liability of newness argument considers the fact that some startup activities are not undertaken for many months, or even years, *after* the initiation of organizational founding. Recent process-based specifications of founding (e.g. Carter et al. 1996; Ruef 2001) have documented significant lags in the time taken by new ventures to hire employees, attract supporters, and deliver their first product or service. The idea that a 'honeymoon effect' may result from the cumulative disruption of these startup activities dovetails with models of organizational change (Carroll and Barnett 1995). From a *process* perspective, the activities are risky undertakings that can expose weaknesses in an entrepreneurial idea (or in the entrepreneur(s)' competence) during the period shortly after organizational founding. Even those startup activities that appear relatively harmless when undertaken in a piecemeal fashion may yield uncertainty or organizational failure when combined with other startup efforts. From the perspective of change *content*, on the other hand, the same activities can yield long-term survival benefits to the entrepreneurial venture, once initial disruptive effects wear off.[5]

[5] Organizational theorists might even suggest that certain startup activities are 'functionally necessary' to the long-term viability of a venture. Despite the intuitive appeal of this claim, entrepreneurship scholars have found only weak or tautological relationships between the occurrence of startup activities and organizational longevity (see Reynolds and White 1997: 80-83). While some activities, such as operational startup, can be linked in an obvious fashion to the ability of an organization to avoid dissolution or bankruptcy, others, such as resource mobilization, may exercise a more complex influence in differentiating viable organizations from abandoned startup efforts.

The Liabilities of Obsolescence and Senescence

A final characteristic pattern of age dependent mortality involves the liabilities of obsolescence and senescence, in which older organizations are seen to be at greater risk of disbanding than younger ones. The "liability of obsolescence" builds on Stinchcombe's (1965: 153-169) arguments concerning imprinting, noting that both individual organizations and organizational forms often 'lock into' strategies and structures used during their early years. As the social environment of these organizations changes, they may become increasingly mismatched with contemporary conditions. The "liability of senescence" postulates a more direct effect of aging, noting the tendency of organizations to acquire more administrative rules, sunk costs, and oligarchy with age, leading to reduced effectiveness (Barron et al. 1994). Both liabilities are associated with an increase in disbanding risk over the organizational life course (see Figure 1c).

As in the case of other liabilities of aging, unobserved variation in the relationship between an organization and its social environment makes tests of obsolescence and senescence problematic. Without knowing anything about the relative pacing of drift in the environment, researchers may have difficulty separating the liabilities of obsolescence and senescence, even though the logical implications of the two arguments are quite distinct (see Hannan 1998: 142-157; Ranger-Moore 1997). According to the liability of obsolescence, an organization in a static environment will not exhibit an increasing risk of disbanding over time, since its alignment with political, economic, and social circumstances remains constant. Under the same conditions, the liability of senescence does suggest increasing risk of mortality, given an ongoing erosion of capability due to the conservatism of leadership and personnel within an aging organization.

Researchers may also question whether the liability of senescence simply results from disruptive transformations that threaten the reliability and accountability of an organization at later stages of existence. From this perspective, the increasing structural inertia of older organizations is not as problematic as entrepreneurs' *attempts* to change the organization under conditions of increased inertia. Applying Hannan and Freeman's (1984) hierarchy of inertia, this line of

argumentation suggests that changes in core aspects of an organization's identity -- such as goals -- may be especially risky for mature collectivities, while more routine changes -- such as modification of technologies, products, or services -- may impose less disruption.

Embeddedness and the Liability of Aging

By "unpacking" the liabilities of aging, analysts can distinguish various age-related processes and their respective impact on mortality risk. An embedded view of organizational disbanding further combines insights concerning the role of founder activities, resource endowments, and inertia with attention to organizational context. Following Selznick's (1949) early work, institutional scholars have called attention to the ways in which organizational processes may be permeated by contextual factors (and, conversely, how contexts may be influenced by organizations). For studies of entire organizational fields, context can subsume factors ranging from the role of regulatory agencies and professional associations to the distribution of ideas and identities (see Scott et al. 2000 for one recent study). Here, I focus more narrowly on temporal dimensions of context that contribute to age-dependent patterns of mortality.

One contextual issue that has already been alluded to concerns institutionalized expectations regarding the sequence of activities and risks that founders should engage in while creating their ventures. Professional advisors to entrepreneurs -- venture capitalists, lawyers, academics, journalists – tend to diffuse various entrepreneurial 'narratives' (Lounsbury and Glynn, forthcoming). Entrepreneurs themselves may actively choose different founding sequences based on the expected longevity of their startups. Startups that are valued beyond their instrumental purposes (in the process of becoming 'institutionalized', in Selznick's terms) may be subject to very different patterns of disruption during the founding period than those created with an eye toward more immediate goals. More generally, organizational fields may place emphasis on different events (and risks) in the founding process -- e.g. with manufacturing organizations focusing on operational startup as a crucial event and social movement organizations emphasizing resource mobilization (Ruef 2001).

Given the possibility of such institutional variation in founding sequences (and the disruption posed by them), the need to unpack the corresponding liability of newness becomes clear. Organizational researchers are unlikely to observe uniform age-dependent declines in disbanding rates unless the development of organizational structure is itself highly isomorphic. Similar arguments can be advanced with respect to the stratification processes -- influencing the liability of adolescence -- and organizational inertia -- generating the liabilities of senescence and / or obsolescence. The embeddedness of organizations in fields featuring different distributions of resources, different requirements on the part of entrepreneurs to access resources, and different opportunities to replenish resources inevitably renders any uniform 'honeymoon' effect to be somewhat suspect. By the same token, periods of economic and institutional stability in some organizational fields will mitigate concerns about obsolescence, while "unsettled" periods, involving economic or institutional disruption, may make obsolescence a central issue in other fields (Swidler 1986). In these respects, the liability of aging is never simply an endogenous property of organizations, but, rather, can be seen as resulting from the interplay of entrepreneurial action and broader dynamics of mobilization, stratification, and adaptation in organizational fields as a whole.

Data, Measures, and Methodology

Data

I examined processes underlying the liability of aging using an original dataset on business organizations founded between 1945 and 1999. In order to draw on examples from a variety of contexts, firms were not limited to any particular industry and included cases from the service sector (e.g. real estate, accounting, investment banking), the 'traditional' manufacturing / extractive sectors (e.g. agriculture, consumer products, industrial equipment), and the high-tech manufacturing sector (multimedia, networking, telecommunications, etc.). Because disbanding rates are likely to be sensitive to industry heterogeneity, control variables are included below to reflect this diversity.

A sampling frame was chosen to reflect the fact that disbanding rates are also sensitive to the competencies of the entrepreneurs involved in creating a new venture. To minimize the variance of human capital in this respect, I limited the targeted sampling frame to business organizations founded by professionals receiving MBA (masters of business administration) degrees from a graduate program in the western United States. This sampling frame explicitly controls for the wide variety of educational experiences and business skills typically found among nascent entrepreneurs (see Reynolds and White 1997), but obviously also limits the representativeness of the entrepreneurs studied. Given that the emphasis of the present study is on contextual factors affecting the survival of these organizations, rather than individual-level factors, the trade-off appears to be justified.

Surveys were sent to 1,786 entrepreneurs, requesting detailed information on the founding of their organizations, whether (and when) those organizations had been dissolved, the resource endowments available to the organizations at various stages, the environment within which the organizations sought to operate, and how the organizations changed over time. I received 766 surveys, yielding a response rate of nearly 43%. Following listwise deletion of missing values (see below), 533 organizations were included in the analysis.

Dependent Measure

The relationship between the liability of aging and mortality was analyzed using the timing of three types of organizational events: voluntary dissolution, bankruptcy, or acquisition by another organization. Among the sampled organizations, 28% experienced one of these events prior to the end of the study period. Equal-status mergers were specifically excluded from consideration, since they are commonly perceived to be a rather distinctive form of 'mortality' event by organizational researchers (cf. Carroll and Hannan 2000: 44).

Independent Measures

Founding Process. The liability of newness argument suggests that young organizations are at considerable risk due to the disruption posed by founding activities. To analyze this disruption in detail, I collected data on the timing of seven founding activities: (a) formation of a founding team; (b) legal establishment; (c) business plan preparation; (d) initial acquisition of external financing; (e) hiring of a firm's first employee; (f) first product / service announcement; and (g) first product / service sale. The founding of each organization in the sample was timed using the month and year in which the first of these activities occurred chronologically. Subsequent activities were considered as attempts by entrepreneurs to develop organizational capability.

For my sample, exploratory analyses revealed that some of these activities did not occur for a considerable length of time after the initiation of organizational founding. For instance, operational startup (sale or announcement of a product) occurred nearly a year after organizational founding on average, and, in some cases took as long as twenty years. This timing pattern suggests that a disruptive founding process may give rise to a liability of adolescence as well as newness.

Resource Endowments. Funding for the sampled organizations was tracked both in terms of the personal assets that entrepreneurs brought to the table (referred to as the 'resource base' in the following analyses) and subsequent actions to raise capital using debt and equity financing ('external funding'). All finance amounts were adjusted by the consumer price index (CPI) for inflation to 1999 dollars and subjected to a natural log transformation to reduce skewness.

Structural Inertia. The liabilities of senescence and obsolescence give rise to distinctive conceptualizations of structural inertia. The senescence argument suggests that organizations become less likely to change crucial aspects of their social structure with age and, if they do change,

that modification in this respect imposes considerable disruption. Data was collected using ten-point Likert scales indicating entrepreneurs' perceptions of change in three organizational characteristics: (a) the goals of the organization; (b) the organization's formal human resource structure; and (c) the portfolio of products or services offered by the organization. Sample statistics on changes in these characteristics suggest broad consistency with the hierarchy of structural inertia proposed by Hannan and Freeman (1984). Thus, substantial changes in organizational goals (Likert scale rankings of seven or higher) were rarely observed (23% of the cases), while substantial changes in HR structure were slightly more common (26%) and changes in product / service portfolios were the most frequent (32%).[6]

The obsolescence argument suggests that organizations located in "unsettled" periods of economic or institutional change are likely to experience difficulty in adapting to new environmental conditions. Assessment of the liability of obsolescence thus requires the measurement of *relative*, rather than absolute, structural inertia. Entrepreneurs were asked to consider dynamics in the competitive environment of the organization and how the organization was able to respond to them. Four categories of environmental conditions were assessed, including: (a) the degree of product / service overlap with other organizations; (b) competition for qualified labor; (c) competition for venture and investment capital; and (d) competition for production inputs (either materials or technologies). Perceived changes in each dimension were once again rank-ordered by the entrepreneurs on a Likert scale. An aggregated measure of relative structural inertia was computed as the mean of these rankings divided by the mean of the previously-noted rankings on changes in goals, HR structure, and product / service portfolios. Scores lower than 1 on the resulting index suggest that entrepreneurs believe their ventures are staying abreast of changes in the competitive environment (roughly 2/3's of the sampled firms fall in this category); higher scores suggest that businesses may be falling behind competitive trends (roughly 1/3 of the firms).

[6] Naturally, this data only indicates that the hierarchy of structural inertia is consistent with the *perceptions* of these entrepreneurs. Using more refined measures of change in organizational goals, structure, and products / services, other studies have identified more objective rank-orderings (see Scott et al. 2000: 103-109, on inertia in hospital organizations).

Control Variables. Following previous analyses of organizational mortality, I controlled for the structure, strategy, environment, and industries of the sampled firms. Organizational structure includes such considerations as whether the firm in question is an independent (*de novo*) startup and the size of the firm over time. Specifically, independent startups were distinguished from franchises, takeovers of existing businesses, and startups sponsored by existing businesses. The size of the organizations over time was assessed in terms of full-time employees.

Drawing on evolutionary theory (see Aldrich 1999), the analyses distinguish between two basic types of organizational strategies that may affect mortality: niche-width strategy and level of innovation. I evaluated the niche-width strategy of each firm in terms of the cumulative number of industries that it sought to compete in. Niches were selected from a standardized list of 60 industries. *Specialist* organizations are those seeking to compete in relatively few industries, while *generalist* organizations seek to compete in a larger number of industries. A second dimension of organizational strategy was gleaned from entrepreneurs' attitudes toward innovation. Innovative practices were grouped into eight analytical categories: (a) the attempted introduction of a new type of product / service in a market niche; (b) the attempted introduction of a new method of production, (c) distribution, or (d) marketing; (e) the development of new supplier linkages; (f) attempted entry into an unexploited market niche; (g) reorganization of an industry; and (h) a residual category of innovations identified by the entrepreneurs. *Reproducers* are represented by those entrepreneurs pursuing a relatively small number of these types of innovation; *innovators*, by contrast, attempt to take on a large number of types of innovation in managing their ventures. Rather than dichotomizing the variable, tendencies toward an innovator strategy were measured via the cumulative number of categorized innovations proposed for each organization.[7]

Entrepreneurs' perceptions concerning competition, legitimacy, and munificence serve as indicators of the organizational environment. Entrepreneurs were asked to rate pressures posed by five competitive features of the environment, two features related to the cognitive legitimacy of their organizational form, and fourteen features of resource availability (see *Appendix*). The first two sets of indicators were included in a confirmatory factor analysis (Bollen 1989) that tied the observed indicators to latent variables (competition, legitimacy) and the covariance among them.[8]

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[7] Unfortunately, these measures of organizational strategy were only gathered for one time point (the period of organizational founding) and are not available as time-varying characteristics. Following "imprinting" arguments, these measures thus represent relatively durable aspects of the entrepreneurs' vision for their firms, rather than behaviors observed over the organizational lifecourse.

[8] Entrepreneurs provided their perceptions of competition and cognitive legitimacy for two time points -- (a) when the firm was first being founded; and (b) when the the firm was disbanded (or the most recent year when they were involved in managing the venture). Both of these measures, as well as various interpolations over time, were evaluated in the following analyses, with little substantive change in results. Given the

Munificence was calculated as a weighted function of economic, political, social, and technological conditions confronting each business firm. Entrepreneurs were asked to rate both the favorability and importance of each condition with respect to their venture. Ten-point ratings of favorability were rescaled to range from -4.5 (highly unfavorable) to 4.5 (high favorable), with 0 indicating average conditions along some dimension. An overall measure of munificence was obtained from the mean of the favorability ratings, with each one weighted by its relative importance to the entrepreneur.

A final pair of variables control for the principal industrial sector within which a sampled organization operated. Analyses use dummy variables to distinguish 'traditional' manufacturing firms, high-tech manufacturing firms, and service sector firms.

Missing Values. For the measure of resource endowments, a conditional mean imputation procedure was employed to replace missing values and ensure that a maximum number of cases could be retained for analysis (see Little 1992). Using OLS regression, conditional means are calculated as:

$$X_i^* = E(X_i \mid X_1, \ldots, X_p) \qquad (1)$$

where X_i represents the missing value. Cases with missing values on any of the remaining independent and control variables were removed by listwise deletion. This reduced the total number of organizations in the analysis to 533 firms, with 138 observed exits prior to the end of the study period due to voluntary dissolution, bankruptcy, or acquisition (see Table 1 for selected descriptive statistics). For purposes of longitudinal analysis, the data were organized into 2522 spells, featuring changes in the business organizations over time.

[Insert Table 1 About Here]

relatively high measurement reliability of the indicators pertaining to environmental conditions at the time of organizational founding, these have been retained as time-invariant controls.

Methodology

I modeled the dynamics of organizational mortality using event history techniques. Exploratory analyses suggested a nonmonotonic pattern of age dependence among the sampled businesses, featuring relatively few exits for very new ventures (< 2 years in existence), far more exits for adolescent ventures (2-18 years in existence), and moderate exit rates for older ventures (> 18 years). This non-monotonic pattern of mortality matches the liability of adolescence noted in the literature (Brüderl, Preisendörfer and Ziegler 1996; Hannan 1998). A key analytic question is whether this pattern persists once the resource endowments, founding processes, and structural inertia of each organization are taken into account.[9]

The model of organizational mortality incorporates a basic pattern of age dependence, the process effects of founding activities, as well as other independent and control variables. These considerations suggest the use of the following piecewise exponential survivor model (see Carroll and Barnett 1995: 226-227):

$$r(t) = \exp(\gamma_n + A'X + B(\Delta Z_i) + C\tau_i) \qquad \text{if } t \in n \qquad (2)$$

where *r(t)* is the mortality rate of the organization; *t* indexes organizational age; *n* indexes time periods corresponding to young, adolescent, or mature ventures; and γ_n is a constant coefficient associated with the *n*'th time period.[10] The founding activity variable ΔZ_i is set to zero until a founding stage *i* has been reached, while τ_i accounts for the time that has passed since that activity (with $\tau_i = 0$ when $\Delta Z_i = 0$). According to liability of newness arguments, founding activities are risky events that may expose the weaknesses of a new venture (**B** > 0), but their disruptive impact tends to wear off over time (**C** < 0) and may ultimately yield survival advantages. Other covariates of interest (resource endowments, structural inertia, and control variables) are represented within the **X** matrix.

[9] In part, the high rate of disbanding and acquisition among 'adolescent' business ventures might also be explained by the expiration (or anticipated expiration) of patents, which are typically issued for a period lasting between fourteen and twenty years in the United States, depending on the type of patent involved (e.g. utility or design).

[10] In order to estimate age-dependent effects more precisely, the models presented below split the period of 'adolescence' into two stages: one featuring businesses in existence from 2 to 10 years and the other featuring businesses in existence from 10 to 18 years.

Results

The effects of resource endowments, founding processes, and structural inertia on rates of organizational exits were estimated using Rohwer's (1999) Transition Data Analysis (TDA) program. For expository purposes below, I translate coefficient estimates into concrete organizational comparisons, considering the relative odds of disbanding based on changes in selected explanatory variables (while holding all others constant). Table 2 reports the first set of results for a resource endowment model of organizational mortality.

[Insert Table 2 About Here]

The baseline specification (Model 1) suggests four notable dynamics affecting the chance of disbanding events. First, as intimated by our exploratory analysis, the business firms display a classic 'liability of adolescence' pattern with respect to age. There is a low exit rate for new ventures ($e^{-5.119} = 0.006$), a high exit rate for adolescent ventures (0.011 to 0.013), and a moderate exit rate for mature ventures (0.009). Newly minted organizations (with less than two years since the initiation of startup activities) thus display a disbanding risk that is merely half that of counterparts in existence from two to eighteen years and 2/3's that of mature organizations (in existence over eighteen years). This empirical pattern is plotted using dashed lines in Figure 1b. In addition to the point estimates, a Wald test reveals significant differences between exit rates of ventures in existence for less than two years and those in existence for two to eighteen years ($p < .05$).

A second dynamic affecting disbanding rates involves the relatively high risk of innovators compared to reproducers (odds ratio 1.25 per innovation category). Those businesses that depart substantially from industry norms governing the types of products or services that are typically offered (or conventional methods of production, distribution, or marketing) place themselves at increased risk of mortality. For instance, a startup offering a novel product that is sent out via an untested distribution mechanism (e.g. the internet) will experience a disbanding risk that is 1.55 times ($\exp[0.22 \times 2]$) that of a startup which offers *both* a conventional product portfolio and a conventional distribution method. In the baseline model, we also find that businesses in competitive environments are at higher risk of mortality, although the effect is only marginally significant ($p < .10$), and that businesses in the 'old economy' manufacturing / extractive sector are at greater risk than service sector firms. The latter result can be attributed largely to industrial restructuring during the time period considered (post-World War II).

To what extent is the liability of adolescence pattern of age dependence tied to the underlying resource endowments of these organizations and their founders? Model 2 explores this question by adding covariates for the personal financial resources invested by entrepreneurs ('resource base') and the amount of external first-stage funding received. The resource base of the entrepreneurs decreases risk of disbanding, as might be predicted by theories of stratification, but is not statistically significant. The amount of external funding, however, does have a significant and *positive* effect on organizational disbanding. For instance, a firm receiving one million dollars of equity or debt capital in its startup years is predicted to have a disbanding rate that is 2.6 times that of a firm with negligible capital infusion. This result, which seems counterintuitive from the perspective of conventional economic wisdom, is quite sensible when one considers resource dependence accounts in organizational theory (Pfeffer and Salancik 1978). As business organizations accept funding from stockholders, investment banks, venture capitalists, and wealthy individuals, they also expose themselves to the whims and fickle attachments of these investors. Entrepreneurs may evidence a durable commitment to their ideas and organization, but that commitment is not always shared by external constituencies, who are often more interested in myopic profit-maximization. Consequently, large-scale capitalization from outside the business organization commonly imposes the risks of external control rather than the fruits of resource infusion.

The findings for both the resource base and external funding variables are problematic for purely financial 'liability of adolescence' arguments. If the endowments initially held by entrepreneurs do not significantly improve the survival chances of their ventures and subsequent resource mobilization efforts create risky external dependencies, then the logic of resource depletion *per se* cannot explain a nonmonotonic pattern of age-dependent mortality.[11] As Model 2 shows, the qualitative pattern of age dependence demonstrates little change from Model 1 when resource endowments taken into account. Indeed, the only notable difference between the two specifications involves the disbanding risk of independent startups, which is significantly higher than that of organizations built on a pre-existing infrastructure (odds ratio 1.57) once resource endowments are controlled for.

[Insert Table 3 About Here]

[11] This does not, of course, exclude arguments based on a more generous interpretation of 'endowments', including such considerations as the initial motivation of entrepreneurs and the trust placed in an organization by members and external stakeholders.

As noted in earlier discussions, alternative explanations of the liability of adolescence can be posited based on the disruptive effect of founding activities that occur at some length after organizational initiation. Table 3 summarizes a series of analyses deployed to examine the relationship between founding activities and organizational mortality. The first model (3) combines 'process' effects (initial disruption) and 'content' effects (subsequent advantages or disadvantages) for each startup activity. More sophisticated specifications (Models 4-7) distinguish the two effects for four types of startup activities: legal establishment, resource mobilization (business plan preparation or acquisition of external founding), social organization (hiring an employee), and operational startup (announcement or delivery of a product / service). Due to a lack of variation in observed cases of founding team formation -- all ventures with more than one founder report creating a founding team at some point – a comparable analysis of mortality effects could not be pursued for this activity.

Model 3 reveals few startup activities that generate overall survival benefits or disadvantages for these organizations when process and content dynamics are conflated. Interestingly, the only activity with a statistically significant effect is initial external funding, which decreases subsequent disbanding rates (odds ratio of disbanding for organizations experiencing a funding event is 0.62 compared to those not experiencing such an event). In combination with previous results regarding the *level* of external funding, this suggests a complex effect of resource endowments. One possibility would appear to be that external funding levels actually have a curvilinear effect on disbanding rates, with small levels of capitalization decreasing disbanding risk and large levels leading to excessive resource dependence. Additional analyses (not shown here) suggest, however, that no such curvilinear effect applies to these business startups. A more viable explanation is that successful resource acquisition has a purely *symbolic* benefit, in which the event is seen as evidence of trust on the part of external investors. At the same time, the *material* effect of the funding event imposes a condition of resource dependence, roughly proportionate to the level of external funding. As in previous models, controlling for these effects of resource endowments has no clear impact on the 'liability of adolescence' pattern of organizational aging.

Due to concerns about multicollinearity, process and content effects were separated selectively for the different startup activities (see Models 4-7). Consistent with theoretical arguments, one finds that the implementation of startup stages presents significant disruptions and threats to the survival of emerging ventures, but that this disruptive effect tends to decay over time. The level of disruption varies by founding process: for instance, legal establishment is quite risky, increasing organizational mortality by a factor of almost ten ($p < .01$, Model 4), while the initial step in operational startup -- service or product announcement -- presents relatively little disruption

(rate multiplier of 1.56, Model 7). The tendency for the disruption to wear off, and possibly yield ultimate improvements in survival chances, varies in a corresponding fashion, with large annual decreases for legal establishment and a modest decay pattern for disruptions from service or product announcement. Paralleling the findings in Model 3, the initial acquisition of external funding is exceptional insofar as it does not produce disruptive effects and can yield immediate survival benefits. The largely symbolic character of the startup event is reflected in the weak benefits accruing to organizations in the time following its occurrence

In addition to separating startup 'process' and 'content' effects, another important difference can be noted between Models 4-7 and Model 3 concerning the age-dependence of mortality. Once the disruptive effects of startup activities are taken into account, the pattern of organizational mortality for age is no longer nonmonotonic but monotonic (and increasing). For instance, Model 7 estimates that young ventures have a mortality rate of 0.003, adolescent ventures have a rate between 0.008 and 0.024, and mature ventures have a rate of 0.033 (plotted as dashed lines in Figure 1c). Rather than a liability of adolescence, then, there may be an underlying 'liability of senescence', possibly because of increasing inertia and internal friction with organizational aging (Barron et al. 1994), or a 'liability of obsolescence', due to a growing mismatch between the organization and its social environment. The liability of adolescence observed at first is not due to the depletion of initial resource endowments -- which do not themselves lower organizational mortality -- but results instead from the cumulative disruptive effect of organizational startup activities. In fact, the average duration of founding processes in our sample (20 months) coincides quite precisely with the onset of a liability of adolescence for these organizations (at two years of existence). Given that the founding process confronts a formal organization with many of its most dramatic changes and decisions, it is not surprising that this process also yields the highest rates of mortality in the short term.

[Insert Figure 2 About Here]

Figure 2 plots the relative level of disruption from various startup activities and the tendency of that disruption to wear off over time. The disruption presented by each startup activity is indicated by the intercept for its respective line at the y-axis (time since activity $\tau = 0$). The slope of the lines expresses the tendency for this disruption to decay.[12] From the figure, one can see how

[12] The figure provides a simple graphical summary of the results in Table 3 (Models 4-7). For purposes of comparison, it would be best to derive all estimates from a common model of founding activity effects. Due to concerns about multicollinearity, this is not possible for the present sample.

different research designs can lead scholars to observe a liability of newness, as well as adolescence, resulting from the risks of the founding process. Specifically, let us assume that organizational founding events are not observed until most (or all) of the founding process is completed, as is common in studies focusing on operational startup (see Ruef [2001] for a review). The design will then lead scholars to emphasize the decline in disruption shown in Figure 2, especially if subsequent effects of organizational change (or lack thereof) are controlled for. Using the parameter estimate of operational startup and an initial disbanding rate of 0.01 as an example, Figure 1a plots the 'liability of newness' that would be observed for our sample following the initial announcement and sale of a product or service by a firm. At first, the risk of disbanding is quite high, since entrepreneurs have little experience in marketing and sales volume may be disappointing. Over time, though, the entrepreneurs become increasingly competent in reading 'signals' from the organization's environment; the consequent development of capability is reflected in a rapidly declining disbanding risk.[13]

[Insert Table 4 About Here]

Returning to the residual age dependence in Models 4-7, one might ask whether this pattern could not be explained in terms of structural inertia within the older firms in our sample. Fully controlling for the effects of inertia would require detailed reports of organizational changes following the founding process, as well as some indication of how those each of those changes map onto conditions in the social, economic, and political environments of the firms. Unfortunately, such detailed data is unavailable for the sample analyzed here and, as a result, only relatively general changes can be tracked from the perspective of the entrepreneurs (see section on *Independent Measures*, above). Still, as seen in Table 4, some substantive effects can be identified with respect to the risk of organizational disbanding.

Both Models 8 and 9 build on the specification in Model 7, which emphasized the operational startup of firms during the period of founding. The addition of a covariate for relative structural inertia improves model fit significantly, suggesting that those organizations which are slow to keep up with changes in their competitive environment are at increased risk of bankruptcy, dissolution, or acquisition (Model 8). While the result is broadly consistent with the logic of a liability of obsolescence, further support of the argument also requires that organizational age be

[13] For illustrative purposes, the disbanding risk is calculated at the *beginning* of each of the periodized age categories, considering decay in disruption from all aspects of operational startup (both product announcement and delivery / sale).

positively correlated with perceptions of relative structural inertia. Evidence for this link in the theoretical argument is lacking in the present case. Bivariate analyses (not shown) do not suggest a significant zero-order correlation between age and relative inertia. Moreover, Wald tests for the multivariate analysis in Table 4 reveal that the strength of monotonic age dependence does not change noticeably between Models 7 and 8 with the addition of the control for relative inertia.

If relative inertia does not account for the residual age dependence, perhaps the liability of senescence can. Model 9 includes covariates for perceived level of changes in organizational goals, human resource structure, and product / service portfolios. Two variants of the liability of senescence might be captured by these variables -- in one, major organizational transformations undermine the reliability and accountability of a firm (Hannan and Freeman 1984) and older firms are more likely to have undergone a large number of such changes; in the other, organizational transformation is seen as having potential positive benefits, but friction within older organizations prevents them from pursuing transformation in a meaningful way (Hannan 1998). The present data only allows us to explore the first of these arguments. Bivariate analyses suggest that older businesses in the sample are significantly ($p < .05$) more likely to have experienced major transformation of goals, HR structure, and products or services. But, as seen in Model 9, there is no evidence that these changes increase the disbanding risk for those firms (indeed, changes in human resource structures are generally viewed favorably by this criterion). A Wald test again reveals a negligible decline in the monotonic pattern of age dependence compared with earlier specifications.

Discussion

By unpacking the liability of aging, this chapter has identified ways that unobserved heterogeneity can give rise to two age-dependent patterns of organizational disbanding. The liability of adolescence can arise due to the interplay of founding activities and organizational mortality. These activities pose considerable risk to an emerging venture since they expose entrepreneurial ideas to the scrutiny of both external stakeholders and members of the founding team. The cumulative effect of this risk may lead to the truncation of startup efforts and helps explain the liability of adolescence observed after an initial period of maturation. When the disruption of startup activities is considered in combination with a research design that predicates organizational observations on the completion of certain activities (e.g. operational startup), then the same process can yield another age-dependent pattern: the liability of newness. Consistent with Stinchcombe's (1965) account, this pattern can reflect the initial lack of competence of organizational members in such domains as resource mobilization, social organization, and operations management, followed by subsequent development of capability.

Lacking detailed data on the timing and content of organizational changes following the founding process, this chapter has not been able to account for a third age-dependent pattern: the liability of obsolescence / senescence. Theory suggests, however, that a more detailed understanding of the way in which societal conditions are imprinted on organizations (combined with an understanding of the subsequent recalcitrance of organizations toward change) will also serve to explain much of the positive age-dependence observed for organizational populations. In principle, all of the age-dependent properties of disbanding can be seen as a function of characteristic interactions of organizations and their environments at crucial stages during the organizational life course.

Naturally, some of these interactions -- such as the relationship of a new venture to the system of stratification -- may not be subject to clear temporal patterning and therefore not as useful in explaining age-dependent properties (but still of considerable interest in their own right). Our results suggest that startups that are in good public standing from the standpoint of credit or equity valuation can actually incur considerable risk through large-scale capitalization. The resulting 'liability of dependence' places these organizations at the mercy of external investors and stakeholders (cf. Pfeffer and Salancik 1978). Given the emphasis in this chapter on *temporal* dimensions of embeddedness (Dacin, Ventresca and Beal 1999: 340-341), such structural dimensions have received limited attention. Nevertheless, it is clear that a satisfactory account of the social embeddedness of organizational disbanding will need to attend to both its temporal and

positional contingencies, as well as the interaction of these two dimensions. Indeed, logical formalizations indicate that certain age dependent patterns, such as the liability of obsolescence, may be especially sensitive to whether an organization occupies a robust or fragile structural position within its competitive environment (Hannan 1998: 149-157). Consequently, future research on disbanding should supplement timing data on founding activities and receipt of resource endowments with data on the external ties developed by organizations.

Conclusion

One of the criticisms launched by Stinchcombe (1997) against recent incarnations of institutional and ecological theory is that they offer an "impoverished view" of organizational processes such as competition, legitimation, and institutionalization. In the process of unpacking empirical regularities -- such as age dependence -- identified in this literature, a valid question then arises as to whether some of the insights of the old institutionalism can be recovered and elaborated. Especially relevant, from the present perspective, is Selznick's (1949) notion of how formal organizations come to be 'institutionalized', or imbued with value beyond their immediate instrumental purposes. Intuitively, this process of institutionalization would seem to be linked closely with the relative risks of organizational disbanding.

Figure 2 provides some intriguing hints as to how the process of organizational institutionalization may proceed, or fail to do so. From the standpoint of an entrepreneur, one can see areas above the zero-point reference line as representing risks to the emerging organization, while areas below the reference line represent long-term gains from startup activities to the reduction of mortality chances. Considered instrumentally, the sequencing of startup activities may reflect the interests of the entrepreneur in balancing the relative risks and advantages of each.[14]

One form of venture that can result from this balance is a 'disposable' organization, in which the entrepreneurs' interests are not oriented toward building a functional enterprise, but rather toward constructing a temporary venture that permits successful mobilization of resources from the environment while sustaining the appearance of pending operation. Examples include the philanthropy established to curry political favor in an upcoming election or the business startup designed to be acquired rapidly by the dominant firm in an industry. Such disposable organizations

[14] As suggested above, this assessment may be especially difficult for activities such as resource mobilization, which involves not just two, but three cost / benefit considerations: (1) the initial *symbolic* benefit of securing external resources; (2) the *social capital* accruing over time from successful resource mobilization; and (3) the external *dependency* imposed by high levels of resource obligations. Only the first two parameters are plotted in the figure.

will emphasize low-risk startup activities, such as announcing future services or products and seeking external funding. The entrepreneurs establishing them tend to minimize the short-term disruption of the founding process rather than seek long-term longevity for their ventures; consequently, they operate under an abbreviated planning horizon, in which the liabilities of organizing are evaluated over a period lasting only a few years (see Figure 2).

A dramatic contrast to 'disposable' organizations is offered by the concept of organizations as 'institutions', i.e. as composites of participants and activities that come to have a life of their own, often independent of the intentions of their creators (see Selznick 1949 1996).[15] Institutionalization may be initiated early on by a founding process that creates informal social structures beyond the narrow purview of a founding team and establishes a venture as a legal actor and activity system in its own right. From this perspective, the founding activities most relevant to the development of organizations as institutions include the preparation of detailed 'blue-prints' (e.g. business plans), legal establishment, and social organization. All three classes of activities tend to be highly disruptive when undertaken initially, but ultimately (given a planning horizon of more than twenty years) can provide some of the greatest benefits to organizational longevity (Figure 2).

How prevalent is institutionalization by this criterion? More specifically, does the present sample reveal clusters of organizations that are founded as being 'disposable', those that are founded with an eye toward institutionalization, and those that fall somewhere in between? Interestingly, there are no obvious cases of startups created by entrepreneurs merely for the sake of cashing out (e.g. founding sequences that only feature product / service announcement, funding mobilization, and founding team formation). When external stakeholders are vigilant such sequences may be suppressed. Another explanation for the rarity of disposable organizations is that a narrowly instrumental view of entrepreneurs is itself misplaced. Despite the fact that some founding activities pose great risk to a new venture (and contribute to a high level of startup failure), entrepreneurs are still willing to undergo this risk for uncertain future returns. An element of irrationality – coupled with a desire for compliance with institutional norms – seems critical to the social psychology of many entrepreneurs and may account for the many new arrangements formed with an eye toward institutionalization, rather than those formed as mere creatures to their creators.

Further research is required to clarify the relationship between institutionalization and the disbanding risks faced by organizations over their lifecourse. This research will need to address

[15] Despite the theoretical importance of 'disposable' organizations as an ideal-type opposite to 'institutionalized' organizations, they have received very limited attention in the institutional literature. One benefit of combining ecological insights on the liability of aging with an institutional lens is that such lacunae can be identified. Filling this lacunae may be especially important given contemporary growth in 'disposable workplaces', resulting from trends in globalization and the diffusion of a financial conception of control.

several key questions. First, what are the subjective motivations of entrepreneurs in creating their ventures and how do these motivations influence the disbanding risk of new organizations. Analytically, these motivations may be seen as an internalized orientation of the entrepreneurs, despite being linked to their previous career patterns (Burton, Sørensen and Beckman, [this volume]), exposure to field-level logics (Friedland and Alford 1991), and adoption of cultural narratives that guide the creation of new venture identities (Lounsbury and Glynn, forthcoming). Second, how do these internalized motivations of entrepreneurs interact with constraints and opportunities during organizational development to yield varying levels of disbanding risk over time. Attending to the interplay of entrepreneurial goals and broader contexts of stratification, mobilization, and societal change can produce a number of additional insights into the social embeddedness of organizational disbanding.

APPENDIX:

Measurement Model of the Organizational Environment

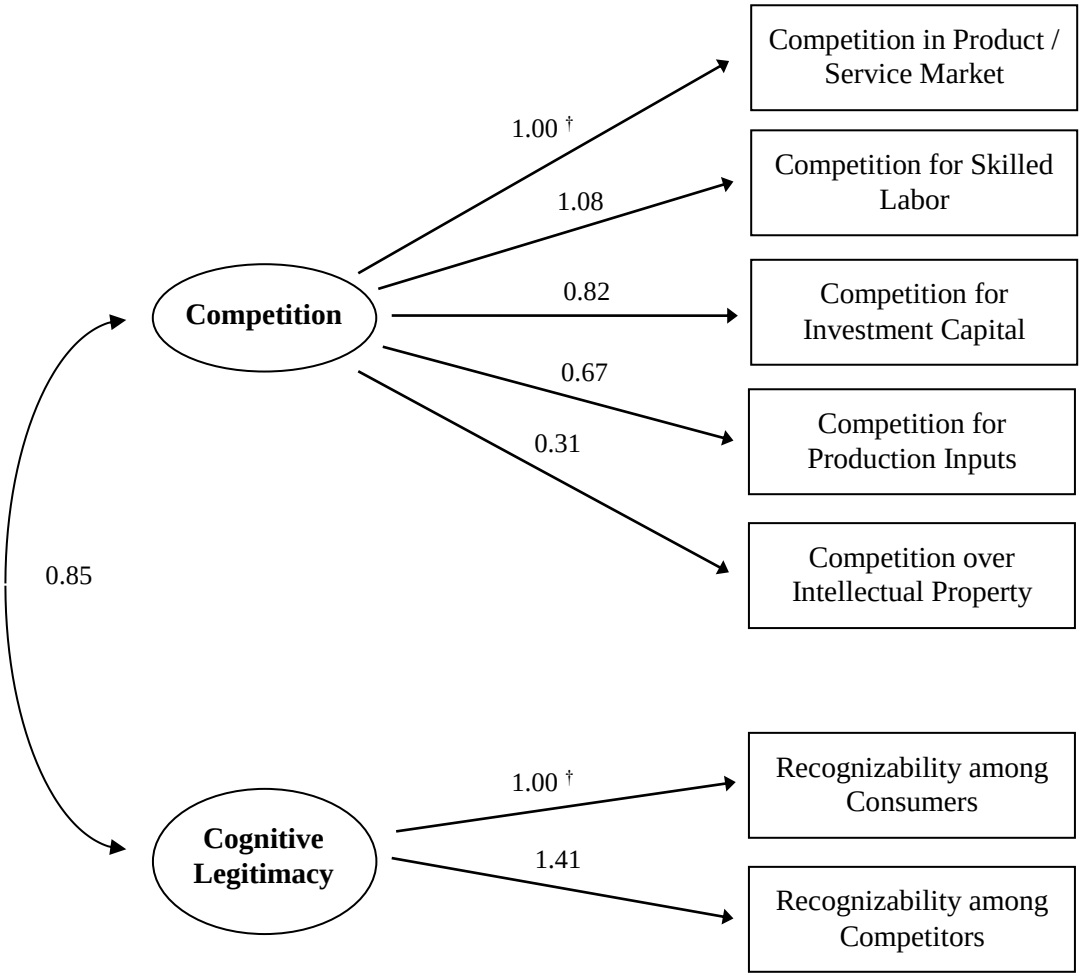

Figure A1. Confirmatory Factor Analysis Relating Indicator Variables to Latent Variables for Competition and Legitimacy ‡

† Constrained parameter estimate

‡ Comparative Fit Index (CFI) = 0.920

Table A1. Indicator Variables Assessing the Level of Environmental Munificence

Environmental Condition	Important?	Favorable?
	'1' – Least Important **'10' – Most Important**	**'1' – Least Favorable** **'10' – Most Favorable**
(a) General economic conditions (inflation, interest rates, etc.)		
(b) Availability of credit		
(c) Availability of investor / risk capital		
(d) General technological developments		
(e) Profitability of existing organizations in your industry		
(f) Educational and logistical infrastructure of local community		
(g) R&D infrastructure of community (universities / research facilities)		
(h) Support of local and / or state government		
(i) Federal tax policy		
(j) Federal regulatory policy		
(k) General media coverage of business enterprises		
(l) Public opinion about entrepreneurship and start-up activities		
(m) Culture of organizations that had previously employed you		
(n) Other: _____		

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Figure 1a. Liability of Newness

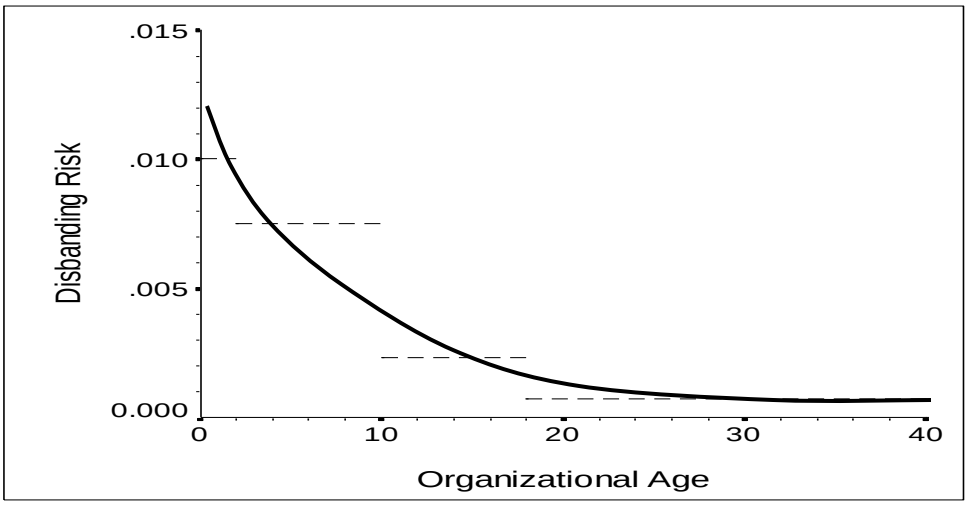

Figure 1b. Liability of Adolescence

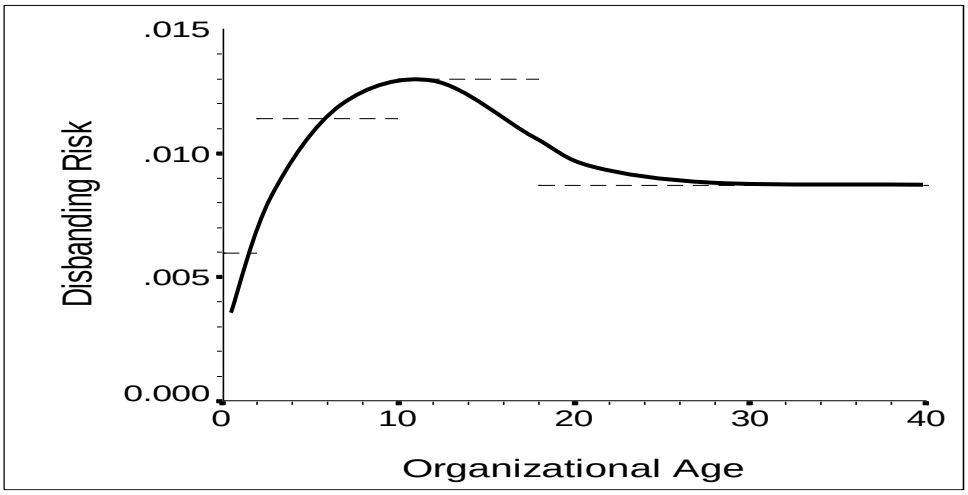

Figure 1c. Liability of Obsolescence / Senescence

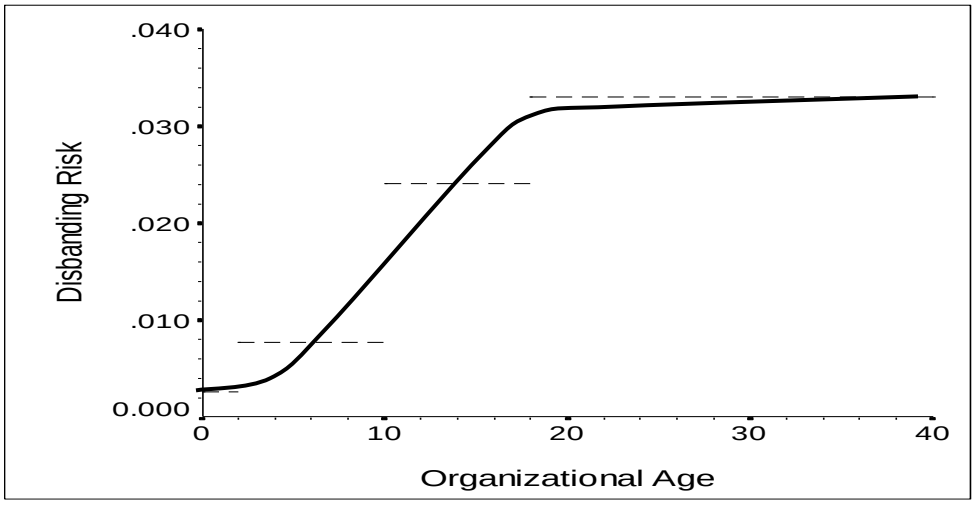

Figure 2. Estimated Effects of Founding Activities on Organizational Mortality

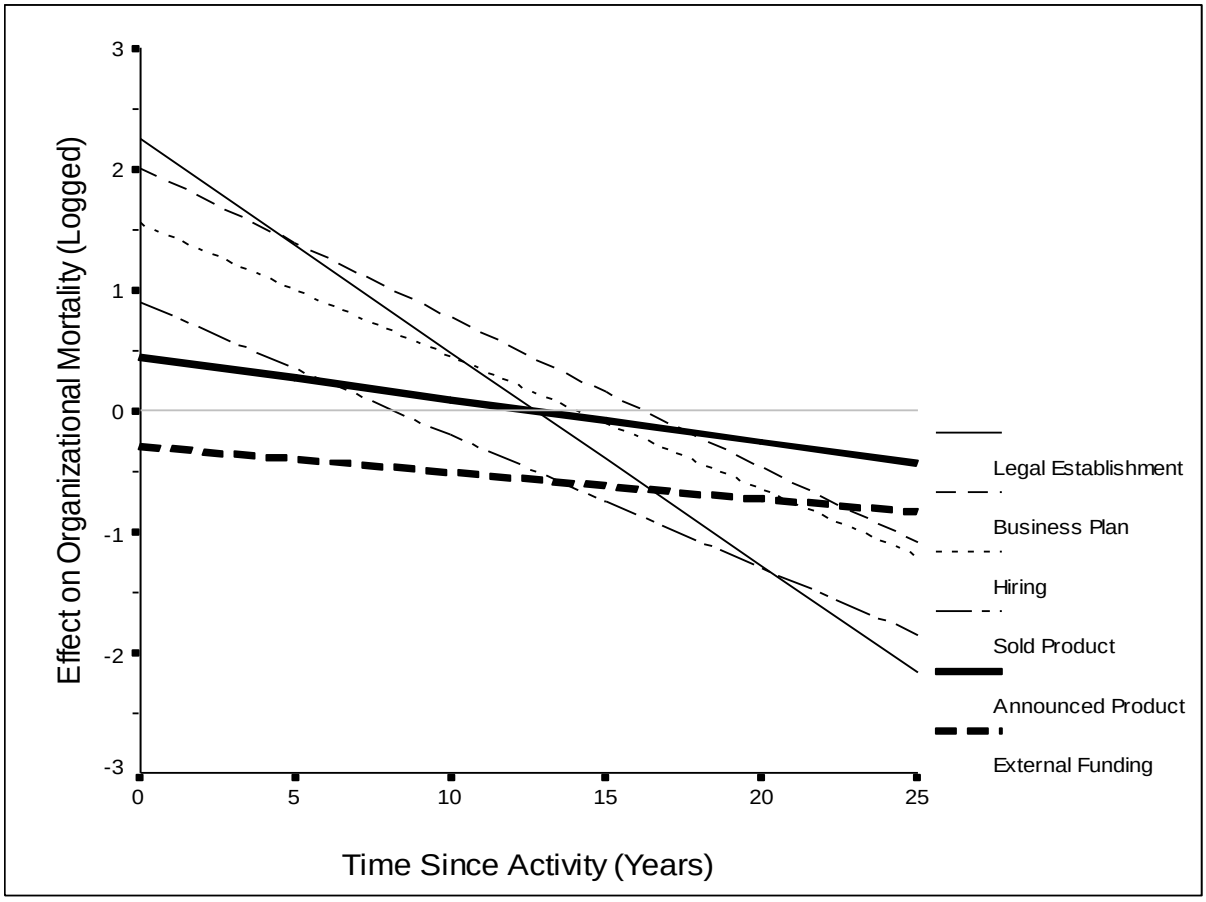

Table 2. Resource Endowment Model of Organizational Mortality (N=533) †

Variable	Model 1	Model 2
Organizational Age:		
< 2 years	-5.119 (0.459) **	-5.418 (0.520) **
2-10 years	-4.473 (0.397) **	-4.870 (0.474) **
10-18 years	-4.344 (0.410) **	-4.676 (0.485) **
> 18 years	-4.744 (0.467) **	-4.956 (0.534) **
Structure and Strategy:		
Independent Startup (1=yes)	0.276 (0.204)	0.449 (0.208) *
Size (Thousands of FTE's)	-0.041 (0.138)	-0.138 (0.238)
Generalist Strategy	-0.129 (0.098)	-0.056 (0.100)
Innovator Strategy	0.220 (0.074) **	0.156 (0.075) *
Resources:		
Resource Base (log $)	---	-0.009 (0.016)
External Financing (log $)	---	0.070 (0.013) **
Environment:		
Competition	0.227 (0.125) #	0.117 (0.126)
Legitimacy (Cognitive)	0.079 (0.140)	0.183 (0.143)
Munificence	-0.010 (0.062)	-0.023 (0.063)
Industry: ‡		
Manufacturing Industry	0.408 (0.208) *	0.387 (0.210) #
High-Tech Industry	0.105 (0.275)	-0.102 (0.282)
-2 Log Likelihood (d.f.)	1243.46 (13)	1213.11 (15)
Likelihood Ratio χ^2 (wrt / Model 1)	---	30.35 **

# $p < .10$; * $p < .05$; ** $p < .01$ (two-tailed tests)

† Analyses for 138 disbanding events and 2522 split spells.

‡ The service sector is the omitted reference category.

Table 4. Structural Inertia Model of Organizational Mortality (N=533) †

Variable	Model 8	Model 9
Organizational Age: < 2 years	-6.461 (0.663) **	-5.599 (0.654) **
Organizational Age: 2-10 years	-5.396 (0.639) **	-4.561 (0.623) **
Organizational Age: 10-18 years	-4.236 (0.635) **	-3.436 (0.621) **
Organizational Age: > 18 years	-3.991 (0.671) **	-3.116 (0.660) **
Independent Startup (1=yes)	0.610 (0.221) **	0.605 (0.225) **
Size (Thousands of FTE's)	-0.126 (0.233)	-0.074 (0.159)
Generalist Strategy	-0.051 (0.103)	-0.046 (0.104)
Innovator Strategy	0.174 (0.076) *	0.170 (0.078) *
Resource Base (log $)	-0.011 (0.016)	-0.015 (0.016)
External Financing (log $)	0.055 (0.016) **	0.055 (0.016) **
Competition	0.124 (0.130)	0.060 (0.130)
Legitimacy (Cognitive)	0.186 (0.138)	0.114 (0.140)
Munificence	-0.064 (0.063)	-0.060 (0.063)
Manufacturing Industry	0.412 (0.216) #	0.501 (0.219) *
High-Tech Industry	-0.026 (0.277)	-0.035 (0.280)
Startup Event:		
Legal Establishment	-0.123 (0.337)	-0.049 (0.338)
Business Plan	0.336 (0.259)	0.353 (0.260)
External Funding	-0.441 (0.241) #	-0.402 (0.243) #
Hiring	0.244 (0.269)	0.384 (0.272)
Product Announcement	0.407 (0.361)	0.404 (0.361)
Product Sale	0.953 (0.388) *	0.887 (0.386) *
Time Since Startup Event:		
Product Announcement	-0.026 (0.030)	-0.030 (0.030)
Product Sale	-0.116 (0.028) **	-0.108 (0.028) **
Structural Inertia:		
Relative Inertia	0.315 (0.107) **	---
Change in Goals	---	0.008 (0.034)
Change in HR Structure	---	-0.116 (0.036) **
Change in Products / Services	---	-0.029 (0.033)
-2 Log Likelihood (d.f.)	1122.49 (24)	1115.93 (26)
Likelihood Ratio χ^2 (wrt / Model 7)	7.56 **	14.12 **

# $p < .10$; * $p < .05$; ** $p < .01$ (two-tailed tests)

† Analyses for 138 disbanding events and 2522 split spells.

Table 1. Descriptive Statistics and Bivariate Correlations for Selected Independent Variables (Total N=533)

Variable	Definition	Mean	SD	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
[1] Independent Startup	0 = Franchise, Takeover, or Sponsored; 1 = Otherwise	0.73	---																
[2] Size†	Full-Time Employees (1,000s)	0.22	1.92	-.02															
[3] Generalist Strategy	# of Industry Categories	1.68	0.99	.13	-.01														
[4] Innovator Strategy	# of Innovation Categories	1.83	1.17	.02	-.01	.22													
[5] Resource Base	Funds from Personal Savings or Assets ($ millions) ‡	4.04	45.63	.03	-.00	-.04	-.08												
[6] External Financing	Funds from Debt or Equity Financing ($ millions) ‡	5.63	34.33	-.04	.01	-.01	-.07	.06											
[7] Competition	5-Indicator Factor Score	0.00	1.00	-.01	.06	-.04	-.03	-.09	-.01										
[8] Legitimacy	2-Indicator Factor Score	0.00	1.00	-.01	.08	.01	.04	.03	.03	.02									
[9] Munificence	14-Indicator Weighted Average	0.98	1.38	-.03	-.05	.02	.09	.02	-.02	.09	.13								
[10] Manufacturing	At Least One Manufacturing Industry Category	0.18	---	-.08	-.02	.06	.03	-.04	-.01	.02	-.00	-.11							
[11] High-Tech	At Least One High-Tech Industry Category	0.12	---	.07	-.00	.22	.01	-.02	-.03	.05	.10	.01	.01						
[12] Legally Established	↑	0.94	---	.07	.02	-.04	-.05	.01	.01	-.07	-.03	-.01	.10	-.00					
[13] Business Plan		0.81	---	-.06	-.09	-.06	.12	.03	.05	.04	-.05	.05	.07	.08	-.02				
[14] Funding Event	1 = Event Occurred Prior to Disbanding or	0.67	---	-.10	.07	-.06	.14	.04	.08	.07	-.04	.10	.07	.12	.06	.35			
[15] Hired Employee	Right-Censoring of Organizational History	0.84	---	-.04	.04	-.11	.06	.02	.01	.03	.03	-.00	-.03	.06	.13	.17	.35		
[16] Announced Product		0.69	---	.04	-.03	.06	.08	.03	-.06	-.09	-.01	.02	-.03	.09	.06	.08	.08	.20	
[17] Sold Product	↓	0.84	---	.11	-.07	-.00	-.04	-.09	-.11	-.04	.00	-.08	-.05	-.06	.05	-.03	.02	.12	.45

† 'Size' reported here corresponds to final year for which firm data was available

‡ Natural log transformation is employed in analytic models

Table 3. Startup Event Model of Organizational Mortality (N=533)

Variable	Model 3	Model 4	Model 5	Model 6	Model 7
Organizational Age: < 2 years	-5.337 (0.613) **	-7.032 (0.657) **	-6.480 (0.662) **	-6.142 (0.644) **	-5.951 (0.627) **
Organizational Age: 2-10 years	-4.691 (0.595) **	-5.537 (0.612) **	-5.174 (0.630) **	-5.106 (0.609) **	-4.869 (0.599) **
Organizational Age: 10-18 years	-4.452 (0.606) **	-3.952 (0.596) **	-4.063 (0.621) **	-4.188 (0.607) **	-3.724 (0.597) **
Organizational Age: > 18 years	-4.772 (0.642) **	-3.226 (0.620) **	-3.510 (0.662) **	-4.016 (0.631) **	-3.409 (0.633) **
Independent Startup (1=yes)	0.508 (0.215) *	0.485 (0.212) *	0.522 (0.210) *	0.504 (0.213) *	0.634 (0.224) **
Size (Thousands of FTE's)	-0.114 (0.227)	-0.129 (0.232)	-0.138 (0.274)	-0.085 (0.190)	-0.135 (0.245)
Generalist Strategy	-0.045 (0.101)	-0.008 (0.099)	-0.063 (0.104)	0.020 (0.099)	-0.049 (0.103)
Innovator Strategy	0.161 (0.075) *	0.122 (0.076)	0.138 (0.076) #	0.070 (0.075)	0.160 (0.076) *
Resource Base (log $)	-0.012 (0.016)	-0.011 (0.016)	-0.010 (0.016)	-0.011 (0.016)	-0.013 (0.016)
External Financing (log $)	0.079 (0.016) **	0.061 (0.015) **	0.080 (0.016) **	0.066 (0.015) **	0.055 (0.015) **
Competition	0.130 (0.128)	0.083 (0.128)	0.067 (0.130)	0.044 (0.131)	0.084 (0.130)
Legitimacy (Cognitive)	0.150 (0.144)	0.206 (0.142)	0.198 (0.141)	0.177 (0.144)	0.185 (0.139)
Munificence	-0.028 (0.064)	-0.006 (0.066)	-0.016 (0.064)	0.002 (0.065)	-0.055 (0.064)
Manufacturing Industry	0.406 (0.214) #	0.376 (0.216) #	0.253 (0.215)	0.309 (0.215)	0.413 (0.217) #
High-Tech Industry	-0.158 (0.286)	-0.093 (0.276)	-0.089 (0.276)	-0.084 (0.278)	-0.036 (0.278)
Startup Event:					
Legal Establishment	-0.193 (0.336)	2.257 (0.440) **	-0.062 (0.341)	0.043 (0.341)	-0.111 (0.338)
Business Plan	0.377 (0.252)	0.166 (0.254)	2.015 (0.359) **	0.305 (0.256)	0.316 (0.257)
External Funding	-0.473 (0.236) *	-0.375 (0.240)	-0.288 (0.313)	-0.448 (0.239) #	-0.472 (0.237) *
Hiring	0.169 (0.271)	0.315 (0.288)	-0.116 (0.273)	1.555 (0.344) **	0.158 (0.270)
Product Announcement	0.151 (0.228)	-0.062 (0.222)	0.116 (0.223)	0.088 (0.227)	0.446 (0.358)
Product Sale	-0.392 (0.272)	-0.134 (0.267)	-0.144 (0.268)	-0.214 (0.267)	0.903 (0.386) *
Time Since Startup Event:					
Legal Establishment	---	-0.177 (0.019) **	---	---	---
Business Plan	---	---	-0.124 (0.020) **	---	---
External Funding	---	---	-0.022 (0.021)	---	---
Hiring	---	---	---	-0.110 (0.017) **	---
Product Announcement	---	---	---	---	-0.035 (0.029)
Product Sale	---	---	---	---	-0.110 (0.028) **
-2 Log Likelihood (d.f.)	1205.28 (21)	1095.91 (22)	1120.18 (23)	1154.92 (22)	1130.05 (23)
Likelihood Ratio χ^2 (wrt / Model 2)	7.83	117.20 **	92.93 **	58.19 **	83.06 **

# $p < .10$; * $p < .05$; ** $p < .01$ (two-tailed tests)

† Analyses for 138 disbanding events and 2522 split spells.