



# Population ecology theory: implications for sustainability

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## Abstract

**Purpose** – The paper has dual objectives. First, the paper aims to consolidate prior research in the area of population ecology theory and provide a review and critique of this influential organizational theory. The review is both broad and extensive, covering all major theoretical streams in population ecology. Second, the paper aims to highlight a new and hitherto unexplored area for future research, which lies at the intersection of population ecology and sustainability.

**Design/methodology/approach** – The extensive and broad review included all salient published scholarly work on the topic of population ecology from 1996-2010. Findings are reported in nine separate tables, classified by primary research focus, chronology, author, etc. Additionally, a brief summary of prior research on sustainability is provided.

**Findings** – Population ecology continues as a valuable and influential perspective for organizational scholars. In comparison, sustainability is a relatively new entrant in the organizational literature, since 2008. Several areas of convergence between population ecology and sustainability exist (construct dimensions, levels of analysis and outcomes). An important gap in the literature allows future research agendas to be pursued.

**Practical implications** – The major, and most widespread, global implication is that unsustainable organizational practices and strategies may be selected by ecological pressures, and that such organizations may face a decline in population density, or mortality. Sustainable practices may allow for greater firm density and a rise in survival rates for organizational populations. Future research directions investigating population ecology links to sustainability are provided.

**Originality/value** – This is the first instance where the potential contribution of population ecology to sustainability in organizations is provided.

**Keywords** Ecology, Population, Sustainable development

**Paper type** Research paper

## Introduction

From a theoretical standpoint, population ecology has been a relatively influential theory that has provided scholars with a valuable tool in understanding macro organizational phenomena since mid 1970s. In this paper, we trace the usage of population ecology in both theoretical and empirical research, providing a broad and generalized review along with a critique of the theory. Since prior scholars have consolidated findings till 1996, our focus in the review is on studies from 1996 to 2010.

From a practical standpoint, the issue of sustainability in organizational practice has emerged as one of the most critical issues facing an organization in recent times. We believe that population ecology has valuable insights for sustainability in organizations, and that its potential to make contributions to sustainability research and practice are yet to be fully realized. Hence, in addition to the generalized review, we explore a novel and hitherto unexplored convergence of population ecology theory to sustainability practice.



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In keeping with these dual aims of conducting a historical review and linking the theory to modern sustainable practice, our paper is structured in the following manner. First we provide an introduction to population ecology, its main assumptions, major theoretical streams, and criticisms. Second, we detail historically, in tabular format, extant research on the topic for approximately the past one and a half decades, i.e. 1996-2010. Third, we introduce the concept of sustainability, its importance and critical relevance to organizations. Finally, we outline the areas of convergence between population ecology and sustainability practice. We conclude the paper with implications and suggestions for future research.

### **Population ecology: assumptions and theoretical streams**

In trying to answer the question – Why are there so many kinds of organizations?, population ecology challenges the view that individual organizations effectively and without consequence adapt to changes in the environment (Hannan and Freeman, 1977). Population ecology theory proposes that change occurs at the population level and is a result of the process of organizational selection and replacement (Carroll, 1988). An individual organization's survival is then based on environmental selection of those organizations that best fit their particular localized environment. Although, "adaptive change is not impossible, or even rare, but it is severely constrained" (Carroll, 1988, p. 2) at the individual organization level due to inert internal and external forces (Hannan and Freeman, 1977).

In examining populations of organizations the problem of setting population boundaries needs to be considered. One of the most widely used methods follows from the pioneering work of Hannan and Freeman (1977). Here organizational populations can be defined so that they have a unitary character (Amburgey and Rao, 1996) – members must have a common standing with respect to the processes of creation, dissolution, and transformation (Hannan and Freeman, 1989). While commonplace, this method has nonetheless been criticized. Critics suggest that organization ecology requires a more rigid scientific methodology, where classifications should be identified for each organization and population and those classifications should not change from one analysis to another (McKelvey, 1975).

### **Basic assumptions**

Population ecology has several key assumptions that must be discussed first before a deeper examination of the research streams can be addressed. The first assumption is that organizational change occurs at the population level through organizational births and deaths (Hannan and Freeman, 1989). This does not mean that individual organizations cannot change. Organizations can and often do change, in sometimes, radical ways, but often the transformation can be extremely detrimental to organization survivability (Barnett and Carroll, 1995). Organizations adapt to their environment, and become institutionalized by retaining and reproducing their form. This in turn promotes growth and survival as long as the environment does not change. This institutionalization creates inertial forces against organizational change that does not allow the organization to adapt to the changing environment rendering the reliability and routines to be ineffective (Hannan and Freeman, 1984).

The idea of inertia is a second major assumption of population ecology, which states that the environmental selection favors organizations with high level of inertia

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(Hannan and Freeman, 1984). To achieve high levels of inertia, an organization must have high levels of reliability and accountability, which in turn help to create high reproducibility (standardized routines). High levels of reproducibility generate strong inertial pressures. Again, the inertial pressure makes it difficult to change organization core structure and therefore increase survivability (Hannan and Freeman, 1984). While inertia makes it difficult to change form, only organizational changes that negatively affect an organization's accountability, reliability, and reproducibility increase mortality rates, whereas smaller peripheral changes in organizational features may actually enhance performance (Haveman, 1992; Greve, 1999).

### **Theoretical streams of research in population ecology**

Though we find a vast array of research streams within population ecology, it is still said to have the greatest theoretical and methodological consensus within organizational studies (Pfeffer, 1993). Through these different research streams, population ecology has become a quantitative study of organizational vital rates (founding, growth, and mortality) that emphasizes the force of external selection over internal adaptation (Van Witteloostuijn, 2000). In the study of these vital rates there are several key categories where most population ecology research can fit. Specifically, these categories are; organization founding, organization mortality, niche-width, liability of newness and smallness, resource partitioning, density dependence, organizational change, and population dynamics (identity and demography) (Freeman and Hannan, 1989; Singh and Lumsden, 1990; Amburgey and Rao, 1996; Van Witteloostuijn, 2000). Each of these theoretical streams is described in greater detail in the following.

#### *Organizational founding*

Examining organizational founding is useful for the ecological perspective as it helps to identify the new organizations forms that are being selected in. In identifying founding rates, research has predominately focused on the time of creation of operating entity (Delacroix and Carroll, 1983) or incorporation. Although there have been some studies that focus on organizing attempts. Research on organizational founding is essential for organizational studies in terms of organizational forms, but it has also been a very useful tool for the study of entrepreneurship and offers many areas for future research in entrepreneurship from an ecological perspective (Carroll and Khessina, 2005).

#### *Organizational mortality*

Organizational mortality has been the predominant focus of researchers, within which are several more narrowly focused research streams as described in the following:

*Niche-width theory.* Fitness has most notably examined from a niche perspective, which is defined by Hannan and Freeman (1977) as "the area in constraint space (the space whose dimensions are levels of resources, etc.) in which the population out competes all other local populations" (p. 947). This has been studied using the niche-width theory that specifies under what specific conditions generalist or specialist strategies attribute to greater levels of survivability (Hannan and Freeman, 1977). This model predicts that specialists have the advantage in stable environments and occupy narrow niches (Popielarz and Neal, 2007). Generalists then occupy wide niches and are

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favored in variable environment. This model holds except when the environment frequently changes between fine and coarse-grained states. Fine-grained variations are many small periodic variations and coarse-grained variations are fewer large periodic variations (Hannan and Freeman, 1977). These predictions have been empirically validated by Freeman and Hannan's (1983, 1989) examination of death rates in restaurants and semiconductor manufacturers. Although, more recently the model has been revised (Popielarz and Neal, 2007) such that the niche-width dichotomy of fine and coarse grained variations has now become a continuum on which environmental variations fall (Bruggerman and O'Nuallain, 2000).

*Liability of newness.* According to Stinchcombe (1965), due to liability of newness, new organizations have a propensity for higher failure rates, which can occur because of internal and external forces. Hannan and Freeman (1984) further explain that the selection process favors high levels of reliability and accountability in organizations as they produce high reproducibility. Reproducibility of organization structure increases with age as processes of internal learning, coordination, and socialization within the organization and external legitimacy become more routine (Singh and Lumsden, 1990). As greater reproducibility leads to greater inertia, organizations become more inert with age (Hannan and Freeman, 1984). Since selection favors organizational inertia (Hannan and Freeman, 1984), mortality rates decrease with age. The liability of newness construct has been empirically validated in numerous studies such as research on newspapers in Argentina and Ireland during the nineteenth and twentieth centuries (Carroll and Delacroix, 1982) and in research that analyzed 56 populations from retail stores to chemical manufacturers (Carroll, 1983).

*Resource partitioning.* Another research stream within the fitness model is Carroll's (1985) resource partitioning theory. The basic hypothesis states that increasing market concentrations among generalists opens opportunities in peripheral markets for specialists (Carroll *et al.*, 2002). There are several assumptions in resource partitioning theory such as the following:

- the resource in the market are scarce and finite;
- resources are concentrated at the market center;
- firms realize economies of scale in production, marketing, and distribution; and
- the ability to adapt to market conditions is limited (Vermeulen and Bruggerman, 2001).

Empirically this model has also been validated in Carroll and Swaminathan's (2000) study of microbreweries and brewpubs, where they were founded at higher rates and failed at lower rates as the mass production became concentrated among a few large generalist organizations (Popielarz and Neal, 2007). This model focuses on efficiency interpretations and is based on the notion that environmental and market conditions will be determining factors in which organizational forms will outperform others by virtue of market compatibility and not internal efficiencies (Carroll, 1993).

*Liability of smallness.* Another related area of research under the organization mortality stream examines organizational size and its effect on mortality rates. Aldrich and Auster (1986) offer several insights into reasons for the liability of smallness. Smaller organizations may have difficulty raising capital. Governmental regulation might have more of an impact on smaller organizations than larger ones. Smaller

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organizations also may not have the ability (especially at the time of founding) to offer the stability that larger organizations can provide. It should be noted that adjusting for size did not diminish the effect of aging on mortality in study of newspaper firms, semiconductor manufacturers, and labor unions.

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### *Density dependence*

The density dependence model holds that founding and mortality rates in organization populations are a function of the number of organizations existing in populations at any given point in time (Hannan and Carroll, 1992). The original density dependence model included the processes of competition and legitimation as functional in representing population density (Hannan, 1986). The density dependence model is based on non-economic or non-efficiency drives such as density dependent legitimation and competition (Hannan, 1986). Density dependence is important both in the terms of organization founding and mortality. Patterns in founding rates can be affected by prior organizational founding, and failures in the population can be affected on the availability of resources (Delacroix and Carroll, 1983). The available resources could go to the new organizations, but an increase in failures could also signal resource scarcity in that particular environment and discourage new foundings (Singh and Lumsden, 1990). Density has a non-monotonic effect on founding rates (i.e. at low density, legitimation increases founding rates, but at high rates of density, competition leads to declining founding rates). This model has also been applied to competition between populations by a cross-population density mode (Hannan and Freeman, 1988a). Empirically the density dependence model has been validated in numerous studies and populations, including labor unions, which found the predicted non-monotonic effect of density on rates of founding (Hannan and Freeman, 1987) and mortality (Hannan and Freeman, 1988a). The model also held for semiconductor manufacturing (Brittain and Wholey, 1988; Hannan and Freeman, 1989), founding and mortality of local telephone companies (Barnett and Carroll, 1987), voluntary social service organizations (Tucker *et al.*, 1988), and the expansion and contraction of populations of educational organizations (Nielsen and Hannan, 1977; Carroll, 1981).

### *Population dynamics*

Population dynamics includes several other area of research within population ecology. These perspectives include examining the identity, diversity, and demography of organizations (Carroll and Hannan, 2000a; Hannan, 2005, Hsu and Hannan, 2005). This stream of research looks to define organization populations.

Another grouping of studies has examined effects on populations from exogenous changes (Van Witteloostuijn, 2000) such as political turbulence (Carroll and Delacroix, 1982; Delacroix and Carroll, 1983; Carroll, 1987), localized competition, mass-dependent competitive intensity (Barnett, 1997), inter-population mutualism (Barnett and Carroll, 1987), strategic groups (Carroll and Swaminathan, 1992), technological change (Podolny and Stuart, 1995), human capital (Bruderl *et al.*, 1992), and multi-market rivalry (Barnett and Hansen, 1996) legal changes in status of labor unions (Hannan and Freeman, 1987, 1988b), and funding for social services (Singh *et al.*, 1986a, b).

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### Criticisms of population ecology

Population ecology has been criticized on many fronts (see, for example, Perrow, 1986; Young, 1988; Donaldson, 1995), and many of these criticisms have been the focus of open debate between organization researchers (Freeman and Hannan, 1989; Brittain and Wholey, 1989; Young, 1989; Zucker, 1989; Peterson and Koput, 1991). This also includes several syntheses to identify the current state of the theory and future directions (Ulrich and Barney, 1986; Singh and Lumsden, 1990; Amburgey and Rao, 1996; Baum, 1996). Each of these works offers a unique perspective on population ecology although some central themes stand out such as lack of clear consensus on key constructs, the classification and nature of the populations being studied, the deterministic nature of ecological ideas (Singh and Lumsden, 1990), issues with application and methodology, lack of attention to organizational adaptation and change, and most notably issues surrounding the density-dependence model.

#### *Lack of clearly defined constructs*

A major critique of the population ecology model deals with the ambiguity and the lack of discipline-wide consensus about definitions that surrounds key constructs (Young, 1988; Donaldson, 1995; McKinley and Mone, 2003). As Donaldson (1995) states "Population ecology is pursued through research literature which contains its own technical vocabulary, mathematical models and methodologies making it a research paradigm relatively inaccessible to other organizational scholars" (p. 3). For example, niches, inertia or rates of environmental change are difficult to measure or define precisely (Young, 1988). Lacking a precise definition of the construct, common conceptualization across the field is difficult and therefore generalizability between different contexts is not feasible (Young, 1988). On the other hand some argue that criticizing the lack of discipline wide definition is not useful because many constructs that are used in population ecology (e.g. birth and death rates) are used in other disciplines and do not have a "workable" definition in those fields as well (Singh and Lumsden, 1990). This perspective illustrates that it is more reasonable to determine that constructs have been adequately defined and conceptualized within the specific study context being examined (Singh and Lumsden, 1990).

#### *Issues with application and methodology*

Criticisms also lie with areas of application and methodology implemented by population ecologist scholars. One area of contention has to do with the classification of populations. There are two main schools of thought on the issue of population classification (Carroll, 1984a, b). The first, offered by Hannan and Freeman (1977), states that organizational forms should be defined within the context of the specific research problem. This is because organizations are not exactly alike and they may change from one investigation to another depending on the type of analysis. The second perspective, by McKelvey (1975), states that organization ecology requires a more rigid scientific methodology. Hence, scientific classifications should be identified for each organization and population and those classifications should remain unchanged from one analysis to another.

Another criticism deals with the mechanisms through which selection operates, since most population ecology studies seem content with an indirect measurement of selection through rates of organizational death. The question as McKinley and Mone



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(2003) state is whether “selection is primarily the result of active environments operating on passive, inert organizations, the product of an interaction between active environment and active, but misdirected organizational adaptation efforts, or some other combination of events”.

An often-heard critique of population ecology has to do with the demography of the organizations be examined. It has been said that research focused only on examining smaller organizations because larger organizations are immune to the selection process (Astley and Van de Ven, 1983; Perrow, 1986). Perrow (1986) states that large organizations are the most important, because selection only applies to small organizations, which are insignificant compared to the changing effects of large firms. Along this same line of thought is the idea that selection can only be used in the study of competitive and market based competitive organizations, as public organizations such as the federal government will not be allowed to fail (Perrow, 1986). This is a very narrow criticism, as there have been numerous studies that have examined a broad range different sized organizations (for example, Hannan and Freeman, 1988a, b; Carroll, 1987; Haveman *et al.*, 2007). Power organizations have also been examined and addressed with several studies examining size dependence (Carroll, 1984a, b; Wholey *et al.*, 1992), dominance in technological systems (Barnett, 1990) and size-based segmentation of populations (Amburgey *et al.*, 1994).

There are several of criticisms dealing with the application and methodology used, which include some of the following. There is too much focus on large-scale quantitative studies and therefore there is a lack of detailed investigation and description into the organizations and industries being examined (Van Witteloostuijn, 2000). Studies on organizational founding are somewhat limited because they do not often include examination of unsuccessful founding attempts (Delacroix and Carroll, 1983). There has not been enough empirical evidence that identifies whether risk jeopardizes survival and how it interacts with performance and constrains the life chances of organizations. Also, there have been issues taken with the treatment of highly diversified organizations in terms of classification and population boundary definitions (Van Witteloostuijn, 2000)

#### *Adaptation and organizational change*

Accounting for and acknowledgement of an organization’s ability to change has also been an area that has seen several criticisms. It is said that population ecology is too deterministic and leaves no room for a voluntaristic approach (Astley and Van de Ven, 1983). Specifically, there is too much reliance on an excessively “reified” notion of the environment (McKinley and Mone, 2003). There is little acknowledgement that organizations sometimes penetrate and even enact their environments (rather than being selected for death or survival), and they also tend to neglect the internal structures of organizations (Astley and Van de Ven, 1983; Fombrun, 1988; Perrow, 1986; Young, 1988; Donaldson, 1995). This view is not solely incorrect, but the focus of population ecology is on selection and change at the population level, not the individual organizational level. Although, there have been some studies on the performance effect of organizational change (Amburgey *et al.*, 1993), and organizational learning (Bruderer and Singh, 1996; Ingram and Baum, 1997a). While change and adaptation are being examined by population ecology scholars, there are several areas for future research, including; the sources and effects of changes in goals, authority, and

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technology on the life chances of organizations and their financial performance (Barnett and Carroll, 1995); how population-level learning processes facilitate adaptation and reduce mortality rates (Amburgey and Rao, 1996); examination of how adaptation and founding become competing risks for network organizational form (creating new organizational forms or adaptation of existing business units) (Amburgey and Rao, 1996); and more focus on whether industry evolution operates through replacement of one unchanging organizational form by another or through mutation of the members of one organizational form into another (Haveman, 1995)

### *Density dependence*

Criticisms, debates, and reappraisal surrounding the density dependence model have been a major area of focus. This includes issues with failing to directly operationalize the institutional processes (e.g. legitimation) that are a major explanatory resource in the density dependence model (Zucker, 1989; Peterson and Koput, 1991). Specifically, it is argued that the process of legitimation and competition are not studied directly, instead only the models are tested, and therefore the link between legitimation, and competition have not been effectively made (Zucker, 1989). Carroll and Hannan (1989) replied to this argument by identifying that their indirect use of legitimacy is quite consistent with how institutional theories treat the concept. Another criticism is that just counting the number of organizations in a population does not take into account the idea that larger organizations may have a stronger competitive advantage (Singh and Lumsden, 1990). However, this has been address by introducing population mass density, where each organization is weighted by its size (Barnett and Amburgey, 1990). An unresolved aspect of density dependence concerns studies with predicted results for organizational founding but with discrepant findings for mortality (Tucker *et al.*, 1988). This may be due to that fact that data on the early history of populations are not available (Singh and Lumsden, 1990).

### **Review of extant research in population ecology**

In this section, we move on to provide a historical review of prior research on population ecology. It must be noted that there have been several extensive reviews of population ecology since Hannan and Freeman (1977), which have outlined the main theoretical streams, empirical research, and critiques of the theory (Freeman and Hannan, 1989; Singh and Lumsden, 1990; Aldrich and Wiedenmayer, 1993; Amburgey and Rao, 1996; Baum, 1996; Van Witteloostuijn, 2000; Baum and Shipilov, 2006). These prior reviews have consolidated research findings in population ecology till 1996. A single review appeared in 2006, but the focus was on only two specific topics of population ecology.

Our purpose, therefore, was to add to these prior reviews by identifying salient research in the field of population ecology from the time frame of 1996 to 2010. Our review differs from previous reviews in another important way. Earlier reviews focused on only a few of the research streams within population ecology. In contrast, our review is fairly extensive, broad and generalized, as our approach was to compile works across all major population ecology research streams as identified earlier in the paper. For the sake of parsimony, and given that we were dealing with a vast array of studies, we provide our historical and extensive review in a tabular format that extends over nine separate tables. The tables are further separated out by theoretical, and



empirical studies, and topic, or focus areas. Hence, Table I shows theoretical work on various research topics within population ecology. The remaining eight tables summarize empirical work on each major research stream within population ecology such as organizational foundings (see Table II), organizational mortalities (see Table III), change at organizational and population levels (see Table IV), Niche theory (see Table V), resource partitioning (see Table VI), density dependence (see Table VII), studies on two or more key constructs in population ecology topics (see Table VIII) and studies on other varied constructs such as identity, growth, etc. (see Table IX).

As the nine tables reveal, it is evident that population ecology has continued to have an impact on the various theoretical streams since 1996. However, we did not find any prior research that addresses the topic of sustainability from a population ecology perspective. In the next section we discuss how population ecology can provide a new research agenda for sustainability practice in organizations.

### Sustainability in organizations

Sustainability has become an issue of central importance and critical relevance to the survival and economic viability of organizations. The United Nations (1987) is credited with defining the term sustainability in the well known Brundtland Commission Report: “sustainable development is development that meets the needs of the present

| Author(s)/year                      | Research focus                              | Approach  | Population | Theory/<br>empirical |
|-------------------------------------|---|-----------|------------|----------------------|
| Baum <i>et al.</i> (2006)           | Ecology and strategy                        | Synthesis | N/A        | Theory               |
| Carroll and Khessina (2005)         | Entrepreneurship                            | Synthesis | N/A        | Theory               |
| Breslin (2008)                      | Entrepreneurship                            | Synthesis | N/A        | Theory               |
| Hannan <i>et al.</i> (2007)         | First order logic for organization ecology  | Synthesis | N/A        | Theory               |
| Galunic and Weeks (2002)            | Intraorganizational ecology                 | Synthesis | N/A        | Theory               |
| Denrell and Kovacs (2008)           | Population ecology – sampling issues        | Synthesis | N/A        | Theory               |
| Beck (2008)                         | Population ecology and competition          | Synthesis | N/A        | Theory               |
| Barron (2001)                       | Population ecology and industrial economics | Synthesis | N/A        | Theory               |
| Geroski (2001)                      | Population ecology and industrial economics | Synthesis | N/A        | Theory               |
| van Witteloostuijn and Boone (2006) | Population ecology and industrial economics | Synthesis | N/A        | Theory               |
| Baum and Amburgey (2002)            | State of population ecology                 | Synthesis | N/A        | Theory               |
| Amburgey and Rao (1996)             | State of theory                             | Synthesis | N/A        | Theory               |
| McKinley and Mone (2003)            | State of theory                             | Synthesis | N/A        | Theory               |
| Scott and Davis (2007)              | State of theory                             | Synthesis | N/A        | Theory               |
| Baum and Shipilov (2006)            | State of theory                             | Synthesis | N/A        | Theory               |
| Swaminathan (1996)                  | State of theory                             | Synthesis | N/A        | Theory               |
| Swaminathan (1996)                  | State of theory – review of symposia        | Synthesis | N/A        | Theory               |
| Barnett (2008)                      | The Red Queen effect                        | Synthesis | N/A        | Theory               |

**Table I.**  
Theoretical perspectives on various topics within population ecology (1996-2010)

| Author(s)/year                   | Research focus          | Approach                                     | Population  | Theoretical or empirical |
|----------------------------------|-------------------------|--|---|--------------------------|
| Mascarenhas (1996)               | Organizational founding | Density dependence and resource partitioning | Offshore oil-drilling industry, 1966-1984                                       | Empirical                |
| Mascarenhas and Sambharya (1996) | Organizational founding | Density dependence                           | World airline industry and global offshore drilling industry                    | Empirical                |
| Baum and Haveman (1997)          | Organizational founding | Density dependence                           | Manhattan Hotel industry, 1898-1990   | Empirical                |
| Dobbin and Dowd (1997)           | Organizational founding |  | Massachusetts railroad firms, 1825-1922   | Empirical                |
| Messallam (1998)                 | Organizational founding | Population dynamics                          | Five Egyptian industries, 1974-1998   | Empirical                |
| Neilsen and Salkl (1998)         | Organizational founding | Collective action                            | 183 information offices in Europe   | Empirical                |
| Schulz (1998)                    | Organizational founding | Density dependence                           | Rule production in large US research universities                               | Empirical                |
| Swaminathan (1998)               | Organizational founding | Resource partitioning and niche formation    | US brewing industry   | Empirical                |
| Baum (1999)                      | Organizational founding |  | Nursing home chains in Ontario, 1971-1996                                       | Empirical                |
| Fotopoulos and Spence (1999)     | Organizational founding | Population dynamics                          | Three Greek manufacturing industries – consumer, intermediate and capital goods | Empirical                |
| Harhoff (1999)                   | Organizational founding | Regional spillovers                          | West German industries, 1989-1993   | Empirical                |
| Lomi (2000)                      | Organizational founding | Density dependences                          | Danish commercial banks, 1846-1989  | Empirical                |
| Mezias and Mezias (2000)         | Organizational founding | Resource partitioning                        | American feature film industry, 1912-1929                                       | Empirical                |
| Ruef (2000)                      | Organizational founding | Density dependence and organizational size   | 48 organizational forms in health care sector                                   | Empirical                |
| Dobrev (2001)                    | Organizational founding | Legitimation and political turbulence        | Bulgarian newspaper enterprises, 1846-1992                                      | Empirical                |
| Phillips (2002)                  | Organizational founding |  | Silicon Valley law firms, 1946-1997   | Empirical                |
| Sine <i>et al.</i> (2007)        | Organizational founding | Population dynamics in a specific niche      | US independent power industry   | Empirical                |
| Ruef (2005)                      | Organizational founding | Entrepreneurship                             | 591 entrepreneurs   | Empirical                |
| Audia <i>et al.</i> (2006)       | Organizational founding |  | US instrument manufacturing firms, 1978-1988                                    | Empirical                |
| Kuilman and Li (2006)            | Organizational founding | Identity formation                           | Foreign banks in Shanghai   | Empirical                |
| Lazzeretti (2006)                | Organizational founding | Density dependence                           | Arezzo jewelers district, 1947-2001   | Empirical                |

(continued)

**Table II.**  
Studies focusing on  
organizational founding  
(1996-2010)

Table II.

| Author(s)/year               | Research focus          | Approach                  | Population                               | Theoretical or empirical |
|------------------------------|-------------------------|---------------------------|--|--------------------------|
| Sine <i>et al.</i> (2007)    | Organizational founding | Institutional perspective | US independent power industry, 1978-1992 | Empirical                |
| Khessina and Carroll (2008)  | Organizational founding | Product demography        | Optical disk drive industry, 1983-1999   | Empirical                |
| Stuart and Sorenson (2003)   | Organizational founding | Density dependence        | Biotechnology firms                      | Empirical                |
| Sorenson (2000)              | Organizational founding | Population level learning | American automobile industry             | Empirical                |
| Cattani <i>et al.</i> (2003) | Organizational founding | Population dynamics       | Dutch accounting industry                | Empirical                |

without compromising the ability of future generations to meet their own needs". Hence sustainability is concerned with balanced development along with ecological concerns that has important ramifications for both intra and inter-generational equity.

Sustainability also considers the inclusion additional criteria in the evaluation of business performance, such as the commonly known "triple bottom line". The term triple bottom line (Elkington, 1994) refers to the integration of ecological and social performance along with financial performance. It is also sometimes referred to as the three pillars of social, environmental and economic demands. Thus the combination of people, planet and profit effectively and simply describes the goal of sustainability.

Scholarly research on the topic of sustainable organizations is surprisingly limited. There is no consensus on a unified definition of sustainability. Furthermore, the measurement and interpretation of this construct appears to be idiosyncratic to specific aims or research interests. In addition, most of the published work seems to have occurred in the past two years (2008-2010) indicating the relative novelty of the topic in management and organizational sciences. Since a detailed discussion of prior sustainability literature is beyond the scope of the present paper, we provide a quick summary of salient scholarly research on the topic. The approaches to sustainability appear to be quite varied (Wikström, 2010), addressing the role of strategies (Loorbach *et al.* 2010), co-evolutionary perspectives (Benn and Baker, 2009), sustainability reporting (Milne *et al.*, 2009), green management (Pane Haden *et al.*, 2009) and 360-degree sustainability (Hollingworth, 2009). There have been attempts to introduce sustainability concepts to the management and logistics literature (Aras and Crowther, 2009; Carter and Rogers, 2008), sustainable global chains (Cruz and Boehe, 2008), conceptualizing a sustainability business model (Stubbs and Cocklin, 2008a, b), the role of leadership in practicing sustainability (Quinn and Norton, 2004), evolutionary processes of sustainability (Wilkinson and Cary, 2002), multilevel and system perspectives of ecologically sustainable organizations (Starik and Rands, 1995), and even sustainability during turbulent times (Edwards, 2009). Seager (2008) suggests that multiple perspectives are needed to understand the full spectrum of sustainability, while other scholars have considered either systems views (Starik and Rands, 1995) or ecological modernization perspectives (Pataki, 2009) to explain sustainability in organizations.

| Author(s)/year                 | Research focus           | Approach  | Population  | Theoretical or empirical |
|--------------------------------|--------------------------|---|---|--------------------------|
| Ingram (1996)                  | Organizational mortality | Strategic perspective                                 | US hotel chains, 1896-1980                              | Empirical                |
| Welbourne and Andrews (1996)   | Organizational mortality | HRM and performance                                   | 136 non-financial companies with an IPO in 1988         | Empirical                |
| Ranger-Moore (1997)            | Organizational mortality | Size and age  | New York life insurance companies, 1813-1985            | Empirical                |
| Silverman <i>et al.</i> (1997) | Organizational mortality | Transaction cost perspective                          | US interstate for-hire trucking industry                | Empirical                |
| Baum and Ingram (1998)         | Organizational mortality | Organizational learning                               | Manhattan hotel industry, 1898-1990                     | Empirical                |
| Lamertz and Baum (1998)        | Organizational mortality | Downsizing  | Media accounts, 1988-1995                               | Empirical                |
| Pennings <i>et al.</i> (1998)  | Organizational mortality | Combine resource-based view and population ecology    | Dutch accounting firms, 1880-1990                       | Empirical                |
| Ruef and Scott (1998)          | Organizational mortality |   |   | Empirical                |
| Zingales (1998)                | Organizational mortality | Niche and Size  | US trucking industry                                    | Empirical                |
| Doi (1999)                     | Organizational mortality | Liability of smallness                                | Japanese manufacturing industry, 1981-1989              | Empirical                |
| Henderson (1999)               | Organizational mortality | Liability of newness – from a contingency perspective | US personal computer industry, 1974-1994                | Empirical                |
| Dowell and Swaminathan (2000)  | Organizational mortality |   | US bicycle producers, 1880-1918                         | Empirical                |
| Ingram and Simons (2000)       | Organizational mortality | Institutional perspective                             | Israeli workers cooperatives, 1920-1992                 | Empirical                |
| Barnett and Freeman (2001)     | Organizational mortality |   | US semiconductor manufacturers                          | Empirical                |
| Phillips (2001)                | Organizational mortality | Employee promotion chances                            | Silicon Valley law firms, 1946-1996                     | Empirical                |
| Shane (2001)                   | Organizational mortality |   | US business format franchise systems, 1984-1996         | Empirical                |
| Dobrev and Carroll (2003)      | Organizational mortality | Organizational size                                   |   | Empirical                |
| Ruef (2004)                    | Organizational mortality |   | Plantation agriculture in the American South, 1860-1880 | Empirical                |
| Dobrev <i>et al.</i> (2006)    | Organizational mortality | Population identities                                 | Financial cooperatives in Singapore                     | Empirical                |

(continued)

**Table III.**  
Studies focusing on organizational mortality (survival and failures) (1996-2010)

| Author(s)/year                         | Research focus           | Approach   | Population   | Theoretical or empirical |
|--|--------------------------|--|--|--------------------------|
| Nunez-Nickel and Moyano-Fuentes (2006) | Organizational mortality | Liability of size  | Spanish olive oil industry, 1944-1998  | Empirical                |
| Sorenson <i>et al.</i> (2006)          | Organizational mortality | Niche-width  | Machine tool manufacturing, 1975-1995; computer workstation manufacturing, 1980-1996 | Empirical                |
| Strotmann (2007)                       | Organizational mortality | Liability of newness                                       | German manufacturing sector, 1981-1994   | Empirical                |
| Mudambi and Zahra (2007)               | Organizational mortality | Liability of newness – strategic perspective               | 275 British international new ventures   | Empirical                |
| Perrigot (2008)                        | Organizational mortality | Network survival   | Franchising networks in France, 1992-2002  | Empirical                |
| Pindard-Lejarraga and Gutierrez (2010) | Organizational mortality | Liability of connectedness                                 | Spanish Railway, 1848-1935   | Empirical                |
| Ingram and Baum (1997a)                | Organizational mortality | Strategic perspective                                      | US hotel chains, 1896-1980   | Empirical                |
| Ingram and Baum (1997b)                | Organizational mortality |  | US hotel chains, 1898-1980   | Empirical                |
| Hannan <i>et al.</i> (1998a)           | Organizational mortality |  | European and American Automobile industries  | Empirical                |
| Hannan <i>et al.</i> (1998b)           | Organizational mortality |  | European and American automobile industries  | Empirical                |
| Khessina (2006)                        | Organizational mortality | Population dynamics  | Disk drive industry, 1983-1999   | Empirical                |
| Hannan (1998)                          | Organizational mortality | Liability of newness – logical formalizations              | N/A  | Theoretical              |
| Lomi and Larsen (1998)                 | Organizational mortality | Density delay model  | Simulation of synthetic data   | Theoretical              |
| Swaminathan and Wade (1999)            | Organizational mortality | Liability of newness and social movement theory            | N/A  | Theoretical              |
| Polos and Hannan (2000)                | Organizational mortality | First order logic for age dependence                       | N/A  | Theoretical              |
| Lomi <i>et al.</i> (2005)              | Organizational mortality | Density dependence   | N/A  | Theoretical              |
| Carayannopoulos (2009)                 | Organizational mortality | Overcoming with liability of newness disruptive technology | N/A  | Theoretical              |
| Christensen (1997)                     | Organizational mortality | Innovation   | N/A  | Theoretical              |

Table III.

| Author(s)/year               | Research focus | Approach  | Population   | Theoretical or empirical |
|------------------------------|----------------|---|--|--------------------------|
| Usher and Evans (1996)       | Change         | Founding, failure, and transformation             | Canadian retail gasoline industry, 1059-1988   | Empirical                |
| Ruef (1997)                  | Change         |   | California hospital industry, 1980-1990  | Empirical                |
| Dobrev (1999)                | Change         |   | Bulgarian newspapers, 1987-1990.   | Empirical                |
| Meeus and Oerlemans (2000)   | Change         | Innovation  | Industrial firms in the North Brabant region of the Netherlands  | Empirical                |
| Sorensen and Stuart (2000)   | Change         | Organization age                                  | Semiconductor industry, 1984-1992; Biotech industry, 1987-1994   | Empirical                |
| Baron <i>et al.</i> (2001)   | Change         |   | High-technology firms in California's Silicon Valley – The Stanford Project on Emerging Companies (SPEC) | Empirical                |
| Dobrev <i>et al.</i> (2003)  | Change         | Niche   | US automobile manufacturers, 1885-1981   | Empirical                |
| Hannan <i>et al.</i> (2006)  | Change         | Identity  | High-technology firms in California's Silicon Valley – The Stanford Project on Emerging Companies (SPEC) | Empirical                |
| Rhee <i>et al.</i> (2006)    | Change         | Niche-width                                       | UK automobile manufacturers, 1894-1981   | Empirical                |
| McKendrick and Wade (2009)   | Change         |   | Floppy disk drive manufacturers, 1970-1989   | Empirical                |
| Winsor (1998)                | Change         | Integration of pop ecology and market integration | N/A  | Theoretical              |
| Peli <i>et al.</i> (2000)    | Change         | Logical formalization of structural inertia       | N/A  | Theoretical              |
| Rao (2002)                   | Change         | Interorganizational ecology                       | N/A  | Theoretical              |
| Hannan <i>et al.</i> (2004)  | Change         | Cascading change – reworking theory               | N/A  | Theoretical              |
| Baum (2006)                  | Change         | Institutional perspective                         | N/A  | Theoretical              |
| Gharavi and Sor (2006)       | Change         | Pop ecology and institutional perspectives        | Australian travel agencies   | Theoretical              |
| Peli and Bruggeman (2007)    | Change         | Niche-width                                       | N/A  | Theoretical              |
| Schwarz and Shulman (2007)   | Change         | Structural Inertia                                | N/A  | Theoretical              |
| Hannan <i>et al.</i> (2003a) | Change         | Cascading change – reworking theory               | N/A  | Theoretical              |
| Hannan <i>et al.</i> (2003b) | Change         | Cascading change – reworking theory               | N/A  | Theoretical              |
| Hannan (2005)                | Change         | Diversity and Identity                            | N/A  | Theoretical              |
| Greve (1999)                 | Change         |   | N/A  | Theoretical              |

**Table IV.**  
Studies focusing on  
change at organizational  
and population levels  
(1996-2010)



| Author(s)/year                  | Research focus                        | Approach  | Population                                   | Theoretical or empirical |
|---------------------------------|---------------------------------------|---|--|--------------------------|
| Podolny <i>et al.</i> (1996)    | Niche                                 | Development of organizational-specific niche          | Semiconductor industry, 1984-1991            | Empirical                |
| Dobrev <i>et al.</i> (2001)     | Niche-width and resource partitioning |   | European automobile manufacturing firms      | Empirical                |
| Massey (2001)                   | Niche-width                           |   | US airline industry                          | Empirical                |
| Dobrev <i>et al.</i> (2002)     | Niche and population dynamics         |   | US automobile manufacturers, 1885-1981       | Empirical                |
| Hsu (2006)                      | Niche-width                           |   | US produced feature film projects, 2000-2003 | Empirical                |
| Haveman <i>et al.</i> (2007)    | Niche-width                           |   | US wineries, 1940-1989                       | Empirical                |
| Hsu <i>et al.</i> (2009)        | Niche-width                           | Market specialization and social outcomes of products | eBay auctions and US feature-film products   | Empirical                |
| Bruggeman (1997)                | Niche-width                           | Logical formalization of model                        | N/A  | Theoretical              |
| Peli (1996)                     | Niche                                 | Rebuild theory using first order logic                | N/A  | Theoretical              |
| Usher (1999)                    | Niche-width                           | Critique  | Multi unit firms in a single industry        | Theoretical              |
| Bruggeman and O'Nuallain (2000) | Niche-Width                           | Criticism   | N/A  | Theoretical              |
| Hannan <i>et al.</i> (2003)     | Niche                                 | Reworking theory                                      | N/A  | Theoretical              |
| McPherson (2004)                | Niche-width                           |   | N/A  | Theoretical              |
| Popielarz and Neal (2007)       | Niche                                 | Synthesis   | N/A  | Theoretical              |
| Hannan (1997a)                  | Niche-width                           | Comment – logical formalization                       | N/A  | Theoretical              |

**Table V.**  
Studies focusing on niche theory (1996-2010)

These recent works seem to indicate an increasing trend towards greater understanding of sustainability issues in organizations. It is expected, that many fundamental, organizational, practices, and strategies, will be radically transformed, by the types of issues, that sustainability will bring to the management fields (Hopkins, 2009). Growing societal and economic understanding of sustainability is expected to foster changed practices such as sustainability designed workplaces, sustainability choices, sustainability profile and quality, sustainability outcomes, sustainability collaborations, and transparency on sustainability issues (Hopkins, 2009).

No doubt, sustainability will continue to be of relevance to future management of organizations. Recent evidences of unsustainable business practices and their detrimental effects on ecological environments, societal well being and economic considerations (e.g. Exxon-Valdez oil spill, British Petroleum under-ocean gas leakage)

| Author(s)/year                 | Research focus        | Approach  | Population  | Theoretical or empirical |
|--------------------------------|-----------------------|---|---|--------------------------|
| Boone <i>et al.</i> (2000)     | Resource partitioning |   | Dutch audit industry, 1896-1992                   | Empirical                |
| Carroll and Swaminathan (2000) | Resource partitioning |   | US brewing industry                               | Empirical                |
| Dobrev (2000)                  | Resource partitioning |   | Bulgarian newspapers, 1987-1990                   | Empirical                |
| Park and Podolny (2000)        | Resource partitioning | Combining with status-based model of market competition | US investment banking, 1920-1949                  | Empirical                |
| Swaminathan (2001)             | Resource partitioning | Organizational identity                                 | US wineries, 1940-1990                            | Empirical                |
| Boone <i>et al.</i> (2002)     | Resource partitioning |   | Dutch national and regional newspapers, 1968-1994 | Empirical                |
| Boone <i>et al.</i> (2004)     | Resource partitioning |   | Dutch national and regional newspapers, 1968-1994 | Empirical                |
| Greve <i>et al.</i> (2006)     | Resource partitioning |   | Low power FM radio stations                       | Empirical                |
| Archibald (2007)               | Resource partitioning |   | Self-help/mutual-aid organizations 1955-2000      | Empirical                |
| Peli and Nooteboom (1999)      | Resource partitioning | Market partitioning                                     | N/A   | Theory                   |
| Vermeulen and Bruggeman (2001) | Resource partitioning | Refining the theory                                     | N/A   | Theory                   |
| Carroll <i>et al.</i> (2002)   | Resource partitioning | Synthesis of theory                                     | N/A   | Theory                   |

**Table VI.**  
Studies focusing on  
resource partitioning  
(1996-2010)

have raised the consciousness of multiple stakeholders and created a renewed impetus for recognizing sustainability impacts of organizational practices.

In the following section, we outline possible areas of convergence between sustainability and population ecology, and conclude with implications for future research on sustainability.

### Population ecology and sustainability: a convergence

It is pertinent to note that one popular theoretical stream in population ecology, i.e. organizational change, reflects an ecological perspective to explain the diversity in organizations (Aldrich and Pfeffer, 1976; Aldrich, 1979; Hannan and Freeman, 1977; McKelvey, 1982). In this context, population ecologists attempt to account for the changes in the composition of organizations over long periods of time, by addressing “how social, economic, and political conditions affect the relative abundance and diversity of organizations” (Baum, 1996, p. 77). Ecological approaches to firm birth and death rates stress the environmental and contextual causes that affect opportunity structures and in turn cause variation in organization populations (Aldrich and

**Table VII.**  
Studies focusing on  
density dependence  
(1996-2010)

| Author(s)/<br>year              | Research<br>focus     | Approach   | Population  | Theoretical<br>or empirical |
|---------------------------------|-----------------------|--|---|-----------------------------|
| Barron <i>et al.</i><br>(1998)  | Density<br>dependence | Competitive intensity at<br>system and population level<br>– effects of regulation | US financial industry                                     | Empirical                   |
| Barron<br>(1999)                | Density<br>dependence | Vital rates and<br>organizational size   | Credit unions in New York<br>City                         | Empirical                   |
| Greve (2002)                    | Density<br>dependence | Introducing spatial<br>evolution   | Tokyo banking industry,<br>1894-1936                      | Empirical                   |
| Bogaert <i>et al.</i><br>(2006) | Density<br>dependence |  | Dutch audit industry, 1884-<br>1939                       | Empirical                   |
| Dobrev and<br>Kim (2006)        | Density<br>dependence | Population dynamics  | US auto industry, 1895-1981                               | Empirical                   |
| Archibald<br>(2008)             | Density<br>dependence |  | Self-help/mutual-aid<br>organizations 1955-2000           | Empirical                   |
| Hannan<br>(1997b)               | Density<br>dependence |  | European automobile<br>manufacturing firms, 1886-<br>1981 | Empirical                   |
| Kuilman<br><i>et al.</i> (2009) | Density<br>dependence | Logical formalization of the<br>density delay model                                | N/A   | Theoretical                 |
| van Wissen<br>(2004)            | Density<br>dependence | Comparison   | N/A   | Theoretical                 |
| Carroll<br>(1996)               | Density<br>dependence | Synthesis  | N/A   | Theoretical                 |

Wiedenmayer, 1993; Carrol, 1984a; Romanelli, 1991). The considerations of social and economic conditions from an ecological perspective are closely aligned with the notion of triple bottom line of people, planet and profits that are essential for arriving at sustainability. Conceptually, both population ecology and sustainability converge in their consideration of these three separate but interrelated systems.

A second area of convergence is that both entail macro systems assumptions. Population ecology considers topics like survival and mortality at the macro population level. Likewise, sustainability, because it relies on balance between social, economic and ecological dimensions, is a systems level concept. As such, both operate at macro and not individual levels of analysis.

Population ecology specifies that organizational change at the population level basically reflects four basic processes of variation, selection, retention and competition (Aldrich, 1979; McKelvey, 1982). Organizations that can withstand these pressures will survive or be “selected into” the population, while the rest will be “selected out” or face mortality. From an outcomes perspective, this actually refers to the longevity or sustainability of these organizational populations. It is likely that ecological pressures of variation, selection, retention and competition, may in fact allow sustainable organizations the benefit of longevity and survival, while disallowing unsustainable populations from continuity. Sustainability assumptions likewise imply that a failure to consider the balance between social, economic and ecological criteria will generate unsustainable practices that have no chance for continuity in the long term. Herein is a third point of convergence, in that both the outcomes overlap significantly.

| Author(s)/year                | Research focus                                 | Approach  | Population  | Theoretical or empirical |
|-------------------------------|--|---|---|--------------------------|
| Carroll and Teo (1996)        | Organizational change and mortality            |   | American automobile producers, 1885-1981                  | Empirical                |
| Paulino (2009)                | Organizational change and mortality            | Combining adaptation and selection theories         | Space HROs  | Empirical                |
| Bigelow <i>et al.</i> (1997)  | Organizational founding and density dependence |   | American automobile producers, 1885-1981                  | Empirical                |
| Barron (1998)                 | Organizational founding and growth             | Institutional legitimacy and density dependence     | Credit unions and Morris Plan banks, 1914-1934            | Empirical                |
| Barnett and Sorenson (2002)   | Organizational founding and growth             | Red Queen   | Retail banks in Illinois, 1900-1993                       | Empirical                |
| Barnett <i>et al.</i> (2000)  | Organizational founding and growth             | Generalist and specialist                           | US R&D consortia  | Empirical                |
| Haveman and Noonemaker (2000) | Organizational founding and growth             |   | California savings and loan industry                      | Empirical                |
| Klepper (2002)                | Organizational founding and growth             | Liability of newness                                | US automobile industry 1895-1966                          | Empirical                |
| Bayus and Agarwal (2007)      | Organizational founding and growth             |   | US personal computer industry, 1974-1994                  | Empirical                |
| Patzelt and Audretsch (2008)  | Organizational founding and growth             | Environmental turbulence                            | German biotech industry, 2002-2004                        | Empirical                |
| Geroski <i>et al.</i> (2010)  | Organizational founding and growth             | org ecology and resources-based view perspectives   | New firms in Portugal, 1983-993                           | Empirical                |
| Ingram and Inman (1996)       | Organizational founding and mortality          |   | Hotels in Niagara Falls area, 1885-1991                   | Empirical                |
| Swaminathan (1996)            | Organizational founding and mortality          | Environmental conditions                            | US Brewing industry and Argentine newspaper organizations | Empirical                |
| Barnett (1997)                | Organizational founding and mortality          | Organizational growth and strength, competitiveness | US Breweries and PA Telephone Companies                   | Empirical                |
| Wade <i>et al.</i> (1998)     | Organizational founding and mortality          | Institutional effects                               | American brewing industry, 1845-1918                      | Empirical                |
| Carroll and Teo (1999)        | Organizational founding and mortality          |   | Commercial Banks in Singapore, 1840-1994                  | Empirical                |

(continued)

**Table VIII.**  
Studies with a research focus on two or more key constructs of population ecology (1996-2010)

| Author(s)/year                      | Research focus                                 | Approach  | Population                                 | Theoretical or empirical |
|-------------------------------------|--|---|--|--------------------------|
| Ilmakunnas and Topi (1999)          | Organizational founding and mortality          | Population dynamics                             | Finnish manufacturing industry             | Empirical                |
| Sorenson and Audia (2000)           | Organizational founding and mortality          | Density dependence – geographical concentration | US shoe manufacturing, 1940-1989           | Empirical                |
| Horvath <i>et al.</i> (2001)        | Organizational founding and mortality          | Population dynamics                             | US beer brewing industry, 1880-1890        | Empirical                |
| Kaya and Ucdogruk (2002)            | Organizational founding and mortality          | Population dynamics                             | Turkish manufacturing firms, 1981-1997     | Empirical                |
| Disney <i>et al.</i> (2003)         | Organizational founding and mortality          | Population dynamics                             | UK manufacturing establishments, 1986-1991 | Empirical                |
| McKendrick <i>et al.</i> (2003)     | Organizational founding and mortality          | Population identities and density               | Disk array industry                        | Empirical                |
| Dowell and Swaminathan (2006)       | Organizational founding and mortality          |   | US bicycle producers, 1880-1918            | Empirical                |
| Barnett and Pontikes (2008)         | Organizational founding and mortality          | Organizational change                           | US computer industry, 1951-1994            | Empirical                |
| Zaring and Eriksson (2009)          | Organizational founding and mortality          | Density dependence and age                      | Sweden IT industry, 1990-2004              | Empirical                |
| Carroll <i>et al.</i> (1996)        | Organizational founding, growth, and mortality |   | American automobile producers, 1885-1981   | Empirical                |
| Roberts and Thompson (2003)         | Organizational founding, mortality, and growth | Population dynamics                             | Polish manufacturing firms                 | Empirical                |
| Martin-Marcos and Jaumandreu (2004) | Organizational founding, mortality, and growth | Density dependence                              | Spanish manufacturing industry, 1979-1990  | Empirical                |
| Ruef (2006)                         | Organizational founding, mortality, and growth | Entrepreneurship                                | US Medical Schools, 1765-1930              | Empirical                |
| Wezel and van Witteloostuijn (2006) | Organizational mortality and change            | Organizational change                           | UK motorcycle industry, 1895-1993          | Empirical                |
| Becker (2007)                       | Organizational growth and change               | Knowledge management                            | N/A  | Theoretical              |
| Peli (2009)                         | Organizational change and niche                | Refine concepts of the Red Queen and inertia    | N/A  | Theoretical              |

Table VIII.

(continued)

| Author(s)/year              | Research focus                               | Approach                                    | Population  | Theoretical or empirical |
|-----------------------------|--|---|---|--------------------------|
| Baum (1996)                 | Organizational founding and change           | Synthesis                                   | N/A   | Theoretical              |
| Freeman and Engel (2007)    | Organizational founding and growth           |   | N/A   | Theoretical              |
| Caves (1998)                | Organizational founding and mortality        | Turnover and firm mobility at country level | Country level analysis of primarily manufacturing organizations | Theoretical              |
| Barnett and Pontikes (2005) | Organizational founding, mortality, learning | Red Queen effect and competition intensity  | Illinois retail banks and worldwide disk drive manufacturers    | Theoretical              |
| Barnett and Sorenson (2002) | Organizational founding and growth           | Red Queen                                   | N/A   | Theoretical              |

Table VIII.

It is indeed interesting to note that despite these potential areas of overlap, the intersection of population ecology and sustainability in organizations has failed to generate scholarly research to date. As our examination of prior extant work (see Tables I to IX) clearly demonstrates, this is a gap that is indeed worthy of future research. We hope to stimulate and begin the conversations in this newly identified area.

### Implications and future research

Given that there are several probable areas of convergence; population ecology does have the potential to contribute significantly to our understanding of how sustainable organizational populations have a higher rate of survival. One major implication is that sustainability (in business practice and strategy) will be sustainable (or lead to firm founding and survival) and furthermore, that unsustainability (in business practice and strategy) is unsustainable (or leads to firm death and mortality).

Among avenues for future research, scholars can pursue a variety of research questions that lie at the intersection of population ecology and sustainability. For example, future research could examine whether and to what extent the population density of organizations may be affected by sustainable practices prevalent in the industry. Simulation models can be generated to assess the effect of evolutionary processes on sustainable and unsustainable business practices. Longitudinal studies that start from firm founding or inception are likely to be of greatest value in this area. However, cross sectional examination of successful (survivor firms) vs failed firms would also provide a rich arena to understand different antecedent conditions that may have causal or predictive variability.

In summary, we hope to motivate future research in a hitherto unidentified domain, i.e. the application of population ecology principles and assumptions to examine sustainability in organizations.



| Author(s)/ear                      | Research focus         | Approach  | Population                                      | Theoretical or empirical |
|------------------------------------|------------------------|---|---|--------------------------|
| Bruderer and Singh (1996)          | Organizational growth  | Organizational learning through organizational evolution and simulation | 250 learning organizations                      | Empirical                |
| Geroski and Mazzucato (2001)       | Population dynamics    |   | US car producers, 1902-1995                     | Empirical                |
| Sandell (2001)                     | Organizational growth  |   | Sweden social movement organizations, 1881-1940 | Empirical                |
| Zuckerman and Kim (2003)           | Identity               | Organizational growth   | Feature film industry                           | Empirical                |
| Zuckerman <i>et al.</i> (2003)     | Identity               | Organizational growth   | Feature film labor market                       | Empirical                |
| Bothner (2005)                     | Organizational growth  | Organizational size   | Global computer industry                        | Empirical                |
| Ivery (2007)                       | Population dynamics    | Collaborative partnerships  | Tri-cities partnership                          | Empirical                |
| Negro <i>et al.</i> (2008)         | Identity               | Niche width   | US Winemaking industry                          | Empirical                |
| Soytas (2009)                      | Population dynamics    |   | Turkish manufacturing firms, 1950-2000          | Empirical                |
| St-Jean <i>et al.</i> (2010)       | Population dynamics    | Entrepreneurial orientation   | 717 forestry small to medium-sized enterprises  | Empirical                |
| Zhou and van Witteloostuijn (2010) | Organizational growth  | Institutional constraints and ecological processes                      | Chinese construction industry, 1993-2006        | Empirical                |
| Carroll and Hannan (2000a)         | Population demography  | Synthesis   | N/A   | Theoretical              |
| Carroll and Hannan (2000b)         | Population demography  | Synthesis   | N/A   | Theoretical              |
| Polos <i>et al.</i> (2002)         | Identity               | Using first order logic to define populations                           | N/A   | Theoretical              |
| Baron (2004)                       | Identity               | Employment-based organizational identities                              | N/A   | Theoretical              |
| Baum and Rao (2004)                | Population dynamics    | Synthesis   | N/A   | Theoretical              |
| Hsu and Hannan (2005)              | Population dynamics    | Identity  | N/A   | Theoretical              |
| Romanelli and Fiol (2008)          | Identity               |   | N/A   | Theoretical              |
| Oertel and Walgenbach (2009)       | Liability of smallness | Synthesis   | N/A   | Theoretical              |
| Zimmerman and Zeitz (2002)         | Organizational growth  | Institutional perspective   | N/A   | Theoretical              |

**Table IX.** Studies with a research focus on varied key constructs (identity, demography, population dynamics, growth) (1996-2010)

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**References**

- Aldrich, H. (1979), *Organizations and Environments*, Prentice-Hall, Englewood Cliffs, NJ.
- Aldrich, H.E. and Auster, E.R. (1986), "Even dwarfs started small: liabilities of age and size and their strategic implications", *Research in Organizational Behavior*, Vol. 8, pp. 165-98.
- Aldrich, H.E. and Pfeffer, J. (1976), "Environments of organizations", *Annual Review of Sociology*, Vol. 2, pp. 79-105.
- Aldrich, H.E. and Wiedenmayer, G. (1993), "From traits to rates: an ecological perspective on organizational foundings", *Advances in Entrepreneurship, Firm Emergence, and Growth*, Vol. 1, pp. 145-95.
- Amburgey, L. and Rao, H. (1996), "Organizational ecology: past, present, and future directions", *The Academy of Management Journal*, Vol. 39 No. 5, pp. 1265-86.
- Amburgey, T.L., Dacin, T. and Kelly, D. (1994), "Disruptive selection and population segmentation: Interpopulation competition as a segregating process", in Baum, J.A.C. and Singh, J.V. (Eds), *Evolutionary Dynamics of Organizations*, Oxford University Press, New York, NY, pp. 240-54.
- Amburgey, T.L., Kelly, D. and Barnett, W.P. (1993), "Resetting the clock: the dynamics of organizational change and failure", *Administrative Science Quarterly*, Vol. 38, pp. 51-73.
- Aras, G. and Crowther, D. (2009), "Making sustainable development sustainable", *Management Decision*, Vol. 47 No. 6, p. 975.
- Archibald, M. (2007), "An organizational ecology of national self-help/mutual-aid organizations", *Nonprofit and Voluntary Sector Quarterly*, Vol. 36 No. 4, pp. 598-621.
- Archibald, M. (2008), "The impact of density dependence, sociopolitical legitimation and competitive intensity on self-help/mutual-aid organizations", *Organization Studies*, Vol. 29 No. 1, pp. 79-101.
- Astley, W.G. and Van de Ven, A.H. (1983), "Central perspectives and debates in organization theory", *Administrative Science Quarterly*, Vol. 28, pp. 245-73.
- Audia, P., Freeman, J. and Reynolds, P.D. (2006), "Organizational foundings in community context: instrument manufacturers and their interrelationship with other organizations", *Administrative Science Quarterly*, Vol. 51, pp. 381-419.
- Barnett, W. (1997), "The dynamics of competitive intensity", *Administrative Science Quarterly*, Vol. 42, pp. 128-60.
- Barnett, W.P. (1990), "The organizational ecology of a technological system", *Administrative Science Quarterly*, Vol. 35 No. 1, pp. 31-60.
- Barnett, W.P. (2008), *The Red Queen among Organizations: How Competitiveness Evolves*, Princeton University Press, Princeton, NJ.
- Barnett, W.P. and Amburgey, T.L. (1990), "Do larger organizations generate stronger competition?", in Singh, J.V. (Ed.), *Organizational Evolution: New Directions*, Sage, Newbury Park, CA, pp. 78-102.
- Barnett, W.P. and Carroll, G. (1987), "Competition and mutualism among early telephone companies", *Administrative Science Quarterly*, Vol. 30, pp. 400-21.
- Barnett, W.P. and Carroll, G. (1995), "Modeling internal organizational change", *Annual Review of Sociology*, Vol. 21, pp. 217-36.
- Barnett, W.P. and Freeman, J. (2001), "Too much of a good thing? Product proliferation and organizational failure", *Organization Science*, Vol. 12 No. 5, pp. 539-58.

- Barnett, W.P. and Hansen, M. (1996), "The Red Queen in organizational evolution", *Strategic Management Journal*, Vol. 17, pp. 139-57.
- Barnett, W.P. and Pontikes, E.G. (2005), "The Red Queen: history dependent competition among organizations", *Research in Organizational Behavior*, Vol. 26, pp. 351-71.
- Barnett, W.P. and Pontikes, E.G. (2008), "The Red Queen, success bias, and organizational inertia", *Management Science*, Vol. 54, pp. 1237-51.
- Barnett, W.P. and Sorenson, O. (2002), "The Red Queen in organizational creation and development", *Industrial and Corporate Change*, Vol. 11 No. 2, pp. 289-325.
- Barnett, W.P., Mischke, G. and Ocasio, W. (2000), "The evolution of collective strategies among organizations", *Organization Studies*, Vol. 21, pp. 325-54.
- Baron, J. (2004), "Employing identities in organizational ecology", *Industrial and Corporate Change*, Vol. 13 No. 1, pp. 3-32.
- Baron, J., Hannan, M.T. and Burton, M.D. (2001), "Labor pains: change in organizational models and employee turnover in young, high-tech firms", *American Journal of Sociology*, Vol. 106 No. 4, pp. 960-1012.
- Barron, D. (1998), "Pathways to legitimacy among consumer loan providers in New York City", 1914-1934, *Organization Studies*, Vol. 19, pp. 207-33.
- Barron, D. (1999), "The structuring of organizational populations", *American Sociological Review*, Vol. 64 No. 3, pp. 421-45.
- Barron, D. (2001), "Organizational ecology and industrial economics: a comment on Geroski", *Industrial and Corporate Change*, Vol. 10 No. 2, pp. 541-8.
- Barron, D., West, E. and Hannan, M. (1998), "Deregulation and competition in the financial industry", *Industrial and Corporate Change*, Vol. 7 No. 1, pp. pp1-p32.
- Baum, J.A.C. (1996), "Organizational ecology", in Clegg, S., Hardy, C. and Nord, W. (Eds), *Handbook of Organization Studies*, Sage Publications, Thousand Oaks, CA, pp. 77-114.
- Baum, J.A.C. (1999), "The rise of nursing home chains in Ontario, 1971-1996", *Social Forces*, Vol. 78, pp. 543-84.
- Baum, J.A.C. (2006), "Competitive and institutional isomorphism in organizational populations", in Powell, W.W. and Jones, D.L. (Eds), *Bending the Bars of the Iron Cage: Institutional Dynamics and Processes*, University of Chicago Press, Chicago, IL.
- Baum, J.A.C. and Amburgey, T.L. (2002), "Organizational ecology", in Baum, J.A.C. (Ed.), *Companion to Organizations*, Blackwell, Oxford, pp. 304-26.
- Baum, J.A.C. and Haveman, H. (1997), "Love thy neighbor? Differentiation and agglomeration in the Manhattan hotel industry, 1898-1999", *Administrative Science Quarterly*, Vol. 42, pp. 304-38.
- Baum, J.A.C. and Ingram, P. (1998), "Survival-enhancing learning in the Manhattan hotel industry, 1898-1980", *Management Science*, Vol. 44 No. 7, pp. 996-1016.
- Baum, J.A.C. and Rao, H. (2004), "Dynamics of organizational populations and communities", in Poole, M.S. and Van de Ven, A.H. (Eds), *Handbook of Organizational Change and Innovation*, Oxford University Press, New York, NY, pp. 212-58.
- Baum, J.A.C. and Shipilov, A.V. (2006), "Ecological approaches to organizations", in Clegg, S. (Ed.), *Handbook of Organization Studies*, Sage, Thousand Oaks, CA, pp. 55-110.
- Baum, J.A.C., Dobrev, S. and van Witteloostuijn, A. (2006), "Ecology and strategy", *Advances in Strategic Management*, Vol. 23, JAI Press, Oxford.

- 
- Bayus, B. and Agarwal, R. (2007), "The role of pre-entry experience, entry timing and product technology strategies in explaining firm survival", *Management Science*, Vol. 53 No. 12, pp. 1887-902.
- Beck, N. (2008), "Organizational ecology as a theory of competition", in Ebner, A. and Beck, N. (Eds), *The Institutions of the Market: Organizations, Social Systems, and Governance*, Oxford University Press, New York, NY, p. 202.
- Becker, F. (2007), "Organizational ecology and knowledge networks", *California Management Review*, Vol. 49 No. 2, pp. 42-61.
- Benn, S. and Baker, E. (2009), "Advancing sustainability through change and innovation: a co-evolutionary perspective", *Journal of Change Management*, Vol. 9 No. 4, p. 383.
- Bigelow, L., Carroll, G., Seidel, M. and Tsai, L. (1997), "Legitimation, geographical scale, and organizational density: regional patterns of foundings of American automobile producers, 1885-1981", *Social Science Research*, Vol. 26, pp. 377-89.
- Bogaert, S., Boone, C. and Carroll, G. (2006), *Contentious Legitimacy: Professional Association and Density Dependence in the Dutch Audit Industry, 1884-1939*, Research Paper No. 1944, Graduate School of Business, Stanford University, Stanford, CA.
- Boone, C., Brdcheler, B. and Carroll, G. (2000), "Customer service: application and tests of resource-partitioning theory among Dutch auditing firms from 1896 to 1992", *Organization Studies*, Vol. 21 No. 2, pp. 355-81.
- Boone, C., Carroll, G. and van Witteloostuijn, A. (2004), "Size, differentiation and the performance of Dutch daily newspapers", *Industrial and Corporate Change*, Vol. 13 No. 1, pp. 117-48.
- Boone, C., van Witteloostuijn, A. and Carroll, G. (2002), "Resource distribution and market partitioning: Dutch daily newspapers, 1968-1994", *American Sociological Review*, Vol. 63 No. 3, pp. 408-31.
- Bothner, M. (2005), "Relative size and firm growth in the global computer industry", *Industrial and Corporate Change*, Vol. 14 No. 4, pp. 617-38.
- Breslin, D. (2008), "A review of the evolutionary approach to the study of entrepreneurship", *International Journal of Management Reviews*, Vol. 10 No. 4, pp. 399-423.
- Brittain, J. and Wholey, D. (1988), "Competition and coexistence in organizational communities: population dynamics", in Carroll, G. (Ed.), *Ecological Models of Organizations*, Ballinger, Cambridge, MA.
- Brittain, J. and Wholey, D. (1989), "Assessing organizational ecology as a sociological theory: comment on Young", *The American Journal of Sociology*, Vol. 95 No. 2, pp. 439-44.
- Bruderer, E. and Singh, J.V. (1996), "Organizational evolution, learning, and selection: a genetic-algorithm-based model", *Academy of Management Journal*, Vol. 39 No. 5, pp. 1322-49.
- Bruderl, J., Preisendorfer, P. and Ziegler, R. (1992), "Survival chances of newly founded business organizations", *American Sociological Review*, Vol. 57, pp. 227-42.
- Bruggeman, J. (1997), "Niche width theory reappraised", *Journal of Mathematical Sociology*, Vol. 22 No. 3, pp. 201-20.
- Bruggeman, J. and O'Nuallain, B. (2000), "A niche width model of optimal specialization", *Computational and Mathematical Organizational Theory*, Vol. 6, pp. 161-70.
- Carayannopoulos, S. (2009), "How technology-based firms leverage newness and smallness to commercialize disruptive technologies", *Entrepreneurship Theory and Practice*, Vol. 33 No. 2, pp. 419-38.

- 
- Carroll, G. (1988), *Ecological Models of Organizations*, Ballinger, Cambridge, MA.
- Carroll, G. (1993), "A sociological view on why firms differ", *Strategic Management Journal*, Vol. 14 No. 4, pp. 237-49.
- Carroll, G. (1996), "The fates of *de novo* and *de alio* producers in the American automobile industry", 1885-1981, *Strategic Management Journal*, Vol. 17, pp. 117-37.
- Carroll, G. and Delacroix, J. (1982), "Organizational mortality in the newspaper industries of Argentina and Ireland: an ecological approach", *Administrative Science Quarterly*, Vol. 27, pp. 169-98.
- Carroll, G. and Hannan, M. (2000a), *The Demography of Corporations and Industries*, Princeton University Press, Princeton, NJ.
- Carroll, G. and Hannan, M. (2000b), "Why corporate demography matters: policy implications of organizational density", *California Management Review*, Vol. 42 No. 3, pp. 148-63.
- Carroll, G. and Swaminathan, A. (1992), "The organizational ecology of strategic groups in the American beer brewing industry from 1975-1990", *Industrial and Corporate Change*, Vol. 1, pp. 65-97.
- Carroll, G. and Swaminathan, A. (2000), "Why the microbrewery movement? Organizational dynamics of resource partitioning in the US brewery industry", *American Journal of Sociology*, Vol. 106, pp. 715-62.
- Carroll, G. and Teo, A. (1996), "Creative self-destruction among organizations: an empirical study of technical innovation and organizational failure in the American automobile industry, 1885-1981", *Industrial and Corporate Change*, Vol. 5 No. 2, pp. 619-44.
- Carroll, G. and Teo, A. (1999), "How regulation and globalization affected organizational legitimation and competition among commercial banks in Singapore, 1840-1994", paper presented at the Academy of Management Meeting, San Diego, CA.
- Carroll, G.R. (1981), "Dynamics of organizational expansion in national systems of education", *American Sociological Review*, Vol. 46, pp. 585-99.
- Carroll, G.R. (1983), "A stochastic model of organizational mortality: review and reanalysis", *Social Science Research*, Vol. 12, pp. 303-29.
- Carroll, G.R. (1984a), "Organizational ecology", *Annual Review of Sociology*, Vol. 90, pp. 1262-83.
- Carroll, G.R. (1984b), "Dynamics of publisher succession in newspaper organizations", *Administrative Science Quarterly*, Vol. 29 No. 1, pp. 93-113.
- Carroll, G.R. (1985), "Concentration and specialization: dynamics of niche width in populations of organizations", *American Journal of Sociology*, Vol. 90, pp. 1262-83.
- Carroll, G.R. (1987), *Publish and Perish: The Organizational Ecology of Newspaper Industries*, JAI Press, Greenwich, CT.
- Carroll, G.R. and Hannan, M.T. (1989), "On using institutional theory in studying organizational populations", *American Sociological Review*, Vol. 54 No. 4, pp. 545-8.
- Carroll, G.R. and Khessina, O.M. (2005), "The ecology of entrepreneurship", in Alvarez, S.A., Agarwal, R. and Sorenson, O. (Eds), *Handbook of Entrepreneurship Research: Disciplinary Perspectives*, Springer, New York, NY, pp. 167-200.
- Carroll, G.R., Dobrev, S.D. and Swaminathan, A. (2002), "Organizational processes of resource partitioning", in Kramer, R. and Staw, B. (Eds), *Research in Organizational Behavior*, Vol. 24, JAI/Elsevier, Oxford, pp. 1-40.

- 
- Carter, C.R. and Rogers, S.D. (2008), "A framework of sustainable supply chain management: moving toward new theory", *International Journal of Physical Distribution & Logistics Management*, Vol. 38 No. 5, p. 360.
- Cattani, G., Pennings, J.M. and Wezel, F.C. (2003), "Spatial and temporal heterogeneity in founding patterns", *Organization Science*, Vol. 14, pp. 670-85.
- Caves, R.E. (1998), "Industrial organization and new findings on the turnover and mobility of firms", *Journal of Economic Literature*, Vol. 36, pp. 1947-82.
- Christensen, C.M. (1997), *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*, Harvard Business School Press, Cambridge, MA.
- Cruz, L.B. and Boehe, D.M. (2008), "CSR in the global marketplace, towards sustainable global value chains", *Management Decision*, Vol. 46 No. 8, p. 1187.
- Delacroix, J. and Carroll, G. (1983), "Organizational foundings: an ecological study of the newspaper industries of Argentina and Ireland", *Administrative Science Quarterly*, Vol. 28, pp. 274-91.
- Denrell, J. and Kovacs, B. (2008), "Selective sampling of empirical settings in organizational studies", *Administrative Science Quarterly*, Vol. 53, pp. 109-44.
- Disney, R., Haskel, J. and Heden, Y. (2003), "Entry, exit and establishment survival in UK manufacturing", *The Journal of Industrial Economics*, Vol. 51, pp. 91-112.
- Dobbin, F. and Dowd, T. (1997), "How policy shapes competition: early railroad foundings in Massachusetts", *Administrative Science Quarterly*, Vol. 42, pp. 501-29.
- Dobrev, S. (1999), "The dynamics of the Bulgarian newspaper industry in a period of transition: organizational adaptation, structural inertia and political change", *Industrial and Corporate Change*, Vol. 8 No. 3, pp. 573-605.
- Dobrev, S. (2000), "Decreasing concentration and reversibility of the resource partitioning process: supply shortages and deregulation in the Bulgarian newspaper industry, 1987-1992", *Organization Studies*, Vol. 21 No. 1, pp. 383-404.
- Dobrev, S. (2001), "Revisiting organizational legitimation: cognitive diffusion and sociopolitical factors in the evolution of Bulgarian newspaper enterprises", *Organization Studies*, Vol. 22 No. 3, pp. 419-44.
- Dobrev, S. and Kim, T. (2006), "Positioning among organizations in population: moves between market segments and the evolution of industry structure", *Administrative Science Quarterly*, Vol. 51, pp. 230-61.
- Dobrev, S., Kim, T. and Carroll, G.R. (2002), "The evolution of organizational niches: US automobile manufacturers, 1885-1981", *Administrative Science Quarterly*, Vol. 47 No. 2, pp. 233-64.
- Dobrev, S., Kim, T. and Carroll, G. (2003), "Shifting gears, shifting niches: Organizational inertia and change in the evolution of the US automobile industry, 1885-1981", *Organization Science*, Vol. 14, pp. 264-82.
- Dobrev, S., Kim, T. and Hannan, M.T. (2001), "Dynamics of niche width and resource partitioning", *American Journal of Sociology*, Vol. 106 No. 5, pp. 1299-337.
- Dobrev, S.D. and Carroll, G.R. (2003), "Size (and competition) among organizations: modeling scale-based selection among automobile producers in four major countries", *Strategic Management Journal*, Vol. 24, pp. 541-58.
- Dobrev, S.D., Ozdemir, S. and Teo, A. (2006), "The ecological interdependence of emergent and established organizational populations: legitimacy transfer, violation by comparison, and unstable identities", *Organization Science*, Vol. 17, pp. 577-97.



- 
- Doi, N. (1999), "The determinants of firm exit in Japanese manufacturing industries", *Small Business Economics*, Vol. 13, pp. 331-7.
- Donaldson, L. (1995), *American Anti-management Theories of Organization: A Critique of Paradigm Proliferation*, Cambridge University Press, New York, NY.
- Dowell, G. and Swaminathan, A. (2000), "Racing and back-pedaling into the future: new product introduction and organizational mortality in the US bicycle industry, 1880-1918", *Organizational Studies*, Vol. 21 No. 20, pp. 405-31.
- Dowell, G. and Swaminathan, A. (2006), "Entry timing, exploration, and firm survival in the early US bicycle industry", *Strategic Management Journal*, Vol. 27, pp. 1159-82.
- Edwards, M.G. (2009), "An integrative metatheory for organisational learning and sustainability in turbulent times", *The Learning Organization*, Vol. 16 No. 3, p. 189.
- Elkington, J. (1994), "Towards the sustainable corporation: win-win-win business strategies for sustainable development", *California Management Review*, Vol. 36 No. 2, pp. 90-100.
- Fombrun, C.J. (1988), "Crafting an institutionally informed ecology of organizations", in Carroll, G.R. (Ed.), *Ecological Models of Organizations*, Ballinger, Cambridge, MA, pp. 223-39.
- Fotopoulos, G. and Spence, N. (1999), "Net entry behaviour in Greek manufacturing: consumer, intermediate and capital goods industries", *International Journal of Industrial Organization*, Vol. 17, pp. 1219-30.
- Freeman, J. and Engel, J. (2007), "Models of innovation: startups and mature corporations", *California Management Review*, Vol. 56 No. 1, pp. 94-119.
- Freeman, J. and Hannan, M. (1983), "Niche width and the dynamics of organizational populations", *American Journal of Sociology*, Vol. 88, pp. 1116-45.
- Freeman, J. and Hannan, M. (1989), "Setting the record straight on organizational ecology: rebuttal to Young", *American Journal of Sociology*, Vol. 95 No. 2, pp. 425-39.
- Galunic, C. and Weeks, J.R. (2002), "Intraorganizational ecology", in Baum, J.A.C. (Ed.), *Companion to Organizations*, Blackwell, Oxford, pp. 75-97.
- Geroski, P. (2001), "Exploring the niche overlaps between organizational ecology and industrial economics", *Industrial and Corporate Change*, Vol. 10 No. 2, pp. 507-40.
- Geroski, P. and Mazzucato, M. (2001), "Modeling the dynamics of industry populations", *International Journal of Industrial Organization*, Vol. 19, pp. 1003-22.
- Geroski, P., Mata, J. and Portugal, P. (2010), "Founding conditions and the survival of new firms", *Strategic Management Journal*, Vol. 31, pp. 510-29.
- Gharavi, H. and Sor, R. (2006), "Population ecology, institutionalism and the internet: travel agencies evolving into middleman", *Journal of Organizational Change Management*, Vol. 19 No. 2, pp. 104-18.
- Greve, H. (1999), "The effect of core change on performance: inertia and regression toward the mean", *Administrative Science Quarterly*, Vol. 44, pp. 590-614.
- Greve, H. (2002), "An ecological theory of spatial evolution: local density dependence in Tokyo banking, 1894-1936", *University of North Carolina Press*, Vol. 80 No. 3, pp. 847-79.
- Greve, H., Pozner, J. and Rao, H. (2006), "Vox populi: Resource partitioning, organizational proliferation, and the cultural impact of the *insurgen microradio* movement", *American Journal of Sociology*, Vol. 112 No. 3, pp. 802-37.
- Hannan, M.T. (1986), *Competitive and Institutional Processes of Organizational Ecology*, Technical Report 86-13, Department of Sociology, Cornell University, Ithaca, NY.

- 
- Hannan, M.T. (1997a), "Comment: on logical formalization of theories from organizational ecology", *Sociological Methodology*, Vol. 27, pp. 145-9.
- Hannan, M.T. (1997b), "Inertia, density and the structure of organizational populations: entries in European automobile industries, 1886-1981", *Organization Studies*, Vol. 18 No. 2, pp. 193-228.
- Hannan, M.T. (1998), "Rethinking age dependence in organizational mortality: logical formalizations", *American Journal of Sociology*, Vol. 104 No. 1, pp. 136-64.
- Hannan, M.T. (2005), "Ecologies of organizations: diversity and identity", *Journal of Economic Perspectives*, Vol. 19 No. 1, pp. 51-70.
- Hannan, M.T. and Carroll, G.R. (1992), *Dynamics of Organizational Populations*, Oxford University Press, New York, NY.
- Hannan, M.T. and Freeman, J. (1977), "The population ecology of organizations", *American Journal of Sociology*, Vol. 82, pp. 929-64.
- Hannan, M.T. and Freeman, J. (1984), "Structural inertia and organizational change", *American Sociology Review*, Vol. 49, pp. 149-64.
- Hannan, M.T. and Freeman, J. (1987), "The ecology of organizational founding: American labor unions, 1836-1985", *American Journal of Sociology*, Vol. 92, pp. 910-43.
- Hannan, M. and Freeman, J. (1988a), "The ecology of organizational mortality: American labor unions, 1836-1985", *American Journal of sociology*, Vol. 94, pp. 25-52.
- Hannan, M. and Freeman, J. (1988b), "Density dependence in the growth of organizational populations", in Carroll, G. (Ed.), *Ecological Models of Organizations*, Ballinger, Cambridge, MA.
- Hannan, M.T. and Freeman, J. (1989), *Organizational Ecology*, Harvard University Press, Cambridge, MA.
- Hannan, M.T., Carroll, G.R. and Polos, L. (2003), "The organizational niche", *Sociological Theory*, Vol. 21 No. 4, pp. 309-40.
- Hannan, M.T., Polos, L. and Carroll, G.R. (2003a), "The fog of change: opacity and asperity in organizations", *Administrative Science Quarterly*, Vol. 48, pp. 399-432.
- Hannan, M.T., Polos, L. and Carroll, G.R. (2003b), "Cascading organizational change", *Organization Science*, Vol. 14 No. 5, pp. 463-82.
- Hannan, M.T., Polos, L. and Carrol, G.R. (2004), "The evolution of inertia", *Industrial and Corporate Change*, Vol. 13 No. 1, pp. 213-42.
- Hannan, M.T., Polos, L. and Carroll, G.R. (2007), *Logics of Organization Theory: Audiences, Codes and Ecologies*, Princeton University Press, Princeton, NJ.
- Hannan, M.T., Baron, J., Hsu, G. and Kocak, O. (2006), "Organizational identities and the hazard of change", *Industrial and Corporate Change*, Vol. 15 No. 5, pp. 755-84.
- Hannan, M.T., Carroll, G.R., Dobrev, S.D., Han, J. and Torres, J.C. (1998a), "Organizational mortality in European and American automobile industries, part I: revising age dependence", *European Sociological Review*, Vol. 14, pp. 279-302.
- Hannan, M.T., Carroll, G.R., Dobrev, S., Han, J. and Torres, J. (1998b), "Organizational mortality in European and American automobile industries, part I: revisit the effects of age and size", *European Sociology Review*, Vol. 14, pp. 297-302.
- Harhoff, D. (1999), "Firm formation and regional spillovers: evidence from Germany", *Economics of Innovation and New Technology*, Vol. 8, pp. 27-55.

- 
- Haveman, H. (1992), "Between a rock and a hard place: organizational change and performance under conditions of fundamental environmental transformation", *Administrative Science Quarterly*, Vol. 37, pp. 48-75.
- Haveman, H. and Noonemaker, L. (2000), "Competition in multiple geographic markets: the impact on growth and market entry", *Administrative Science Quarterly*, Vol. 46, pp. 232-67.
- Haveman, H., Swaminathan, A. and Johnson, E.B. (2007), *Structure at Work: the Division of Labor in US Wineries, 1940-1989*, Department of Sociology, University of California, Berkeley, CA.
- Haveman, H.A. (1995), "The demographic metabolism of organizations: industry dynamics, turnover, and tenure distributions", *Administrative Science Quarterly*, Vol. 46, pp. 586-818.
- Henderson, A. (1999), "Firm strategy and age dependence: a contingent view of the liabilities of newness, adolescence, and obsolescence", *Administrative Science Quarterly*, Vol. 44, pp. 281-314.
- Hollingworth, M. (2009), "Building 360 organizational sustainability", *Ivey Business Journal Online*, p. 1.
- Hopkins, M.S. (2009), "Eight reasons sustainability will change management (that you never thought of)", *MIT Sloan Management Review*, Vol. 51 No. 1, p. 27.
- Horvath, M., Schivardi, F. and Woywode, M. (2001), "On industry life-cycles: delay, entry, and shakeout in beer brewing", *International Journal of Industrial Organization*, Vol. 19, pp. 1023-52.
- Hsu, G. (2006), "Jack of all trades and masters of none: audiences' reactions to spanning genres in feature film production", *Administrative Science Quarterly*, Vol. 51, pp. 420-50.
- Hsu, G. and Hannan, M. (2005), "Identities, genres, and organizational form", *Organization Science*, Vol. 16 No. 5, pp. 474-90.
- Hsu, G., Hannan, M.T. and Kocak, O. (2009), "Multiple category membership in markets: an integrative theory and two empirical tests", *American Sociological Review*, Vol. 74, pp. 150-69.
- Ilmakunnas, P. and Topi, J. (1999), "Microeconomic and macroeconomic influences on entry and exit of firms", *Review of Industrial Organization*, Vol. 15, pp. 283-301.
- Ingram, P. (1996), "Organizational form as a solution to the problem of credible commitment: the evolution of naming strategies among US hotel chains, 1896-1980", *Strategic Management Journal*, Vol. 17, pp. 85-98.
- Ingram, P. and Baum, J.A.C. (1997a), "Opportunity and constraint: organizations' learning from the operating and competitive experience of industries", *Strategic Management Journal*, Vol. 18, pp. 75-89.
- Ingram, P. and Baum, J.A.C. (1997b), "Chain affiliation and the failure of Manhattan hotels, 1898-1980", *Administrative Science Quarterly*, Vol. 42, pp. 68-102.
- Ingram, P. and Inman, C. (1996), "Institutions, intergroup competition, and the evolution of hotel populations around Niagara Falls", *Administrative Science Quarterly*, Vol. 41, pp. 629-58.
- Ingram, P. and Simons, T. (2000), "State formation, ideological competition, and the ecology of Israeli workers cooperatives, 1920-1992", *Administrative Science Quarterly*, Vol. 45, pp. 25-53.
- Ivery, J. (2007), "Organizational ecology: a theoretical framework for examining collaborative partnerships", *Administration in Social Work*, Vol. 31 No. 4, pp. 7-19.

- 
- Kaya, S. and Ucdogruk, Y. (2002), *The Dynamics of Entry and Exit in Turkish Manufacturing Industry*, Economic Research Center Working Papers in Economics, No. 02/02, Middle East Technical University, Ankara.
- Khessina, O.M. (2006), "Direct and indirect effects of product portfolio on firm survival in the worldwide Optical Disk Industry, 1983-1999", in Baum, J.A.C., Dobrev, S.D. and van Witteloostuijn, A. (Eds), *Advances in Strategic Management*, Vol. 23, JAI/Elsevier, Oxford, pp. 591-630.
- Khessina, O.M. and Carroll, G.R. (2008), "Product demography of *de novo* and *de alio* firms in the optical disk drive industry, 1983-1999", *Organization Science*, Vol. 19 No. 1, pp. 25-38.
- Klepper, S. (2002), "The capabilities of new firms and the evolution of the US automobile industry", *Industrial and Corporate Change*, Vol. 11, pp. 645-65.
- Kuilman, J. and Li, J. (2006), "The organizers' ecology: an empirical study of foreign banks in Shanghai", *Organization Science*, Vol. 17 No. 3, pp. 385-401.
- Kuilman, J., Vermeulen, I. and Li, J. (2009), "The consequents of organizer ecologies: a logical formalization", *Academy of Management Review*, Vol. 34 No. 2, pp. 253-72.
- Lamertz, K. and Baum, J.A.C. (1998), "The legitimacy of organizational downsizing in Canada: an analysis of media accounts, 1988-1995", *Canadian Journal of Administrative Sciences*, Vol. 15, pp. 93-107.
- Lazzeretti, L. (2006), "Density dependence dynamics in the Arezzo jewellery district (1947-2001): focus on foundings", *European Planning Studies*, Vol. 14 No. 4, pp. 432-58.
- Lomi, A. (2000), "Density dependence and spatial duality in organizational founding rates: Danish commercial banks, 1846-1989", *Organization Studies*, Vol. 21, pp. 433-61.
- Lomi, A. and Larsen, E.R. (1998), "Density delay and organizational survival: computational models and empirical comparisons", *Computational and Mathematical Organizational Theory*, Vol. 3 No. 4, pp. 219-47.
- Lomi, A., Larsen, E. and Freeman, J. (2005), "Thing change: dynamic resource constraints and system-dependent selection in the evolution of organizational populations", *Management Science*, Vol. 51 No. 6, pp. 882-903.
- Loorbach, D., van Bakel, J.C., Whiteman, G. and Rotmans, J. (2010), "Business strategies for transitions towards sustainable systems", *Business Strategy and the Environment*, Vol. 19 No. 2, p. 133.
- McKelvey, B. (1975), "Guidelines for the empirical classification for organizations", *Administrative Science Quarterly*, Vol. 20, pp. 509-25.
- McKelvey, B. (1982), *Organizational Systematics*, University of California Press, Berkeley, CA.
- McKendrick, D. and Wade, J. (2009), "Frequent incremental change, organizational size, and mortality in high-technology competition", *Industrial and Corporate Change*, Vol. 19 No. 3, pp. 613-39.
- McKendrick, D.G., Jaffee, J., Carroll, G.R. and Khessina, O.M. (2003), "In the bud? Disk array producers as a (possibly) emergent organizational form", *Administrative Science Quarterly*, Vol. 48, pp. 60-93.
- McKinley, W. and Mone, M. (2003), "Micro and macro perspectives in organization theory: a tale of incommensurability", in Tsoukas, H. and Knudsen, C. (Eds), *The Oxford Handbook of Organizational Theory*, Oxford University Press, New York, NY.
- McPherson, M. (2004), "A Blau space primer: prolegomenon to an ecology of affiliation", *Industrial and Corporate Change*, Vol. 13 No. 1, pp. 263-80.

- Martin-Marcos, A. and Jaumandreu, J. (2004), "Entry, exit and productivity growth: spanish manufacturing during the eighties", *Spanish Economic Review*, Vol. 6, pp. 211-26.
- Mascarenhas, B. (1996), "The founding of specialist firms in a global fragmenting industry", *Journal of International Business Studies*, Vol. 71 No. 1, pp. 27-42.
- Mascarenhas, B. and Sambharya, R.B. (1996), "The pattern of density dependence in two global industries", *Management International Review*, Vol. 36 No. 4.
- Massey, J.E. (2001), "Managing organizational legitimacy: communication strategies for organizations in crisis", *Journal of Business Communications*, Vol. 38 No. 2, pp. 153-83.
- Meeus, M. and Oerlemans, L. (2000), "Firm behaviour and innovative performance: an empirical exploration of the selection-adaptation debate", *Research Policy*, Vol. 29 No. 1, pp. 41-58.
- Messallam, A. (1998), "The organizational ecology of investment firms in Egypt: organizational founding", *Organization Studies*, Vol. 19 No. 1, pp. 23-46.
- Mezias, J.M. and Mezias, S.J. (2000), "Resource partitioning, the founding of specialist firms, and innovation: the American feature film industry, 1912-1929", *Organization Science*, Vol. 11 No. 3, pp. 306-22.
- Milne, M.J., Walton, S. and Tregidga, H. (2009), "Words not actions! The ideological role of sustainable development reporting", *Accounting, Auditing & Accountability Journal*, Vol. 22 No. 8, p. 1211.
- Mudambi, R. and Zahra, S.A. (2007), "The survival of international new ventures", *Journal of International Business Studies*, Vol. 38, pp. 333-52.
- Negro, G., Hannan, M.T. and Rao, H. (2008), "Categorical contrast and audience appeal: niche width and critical success in winemaking", working paper, Stanford Graduate School of Business, Stanford, CA.
- Neilsen, F. and Hannan, M.T. (1977), "The expansion of national educational systems: tests of a population ecology model", *American Sociological Review*, Vol. 42, pp. 479-90.
- Neilsen, F. and Salkl, J. (1998), "The ecology of collective action and regional representation in the European Union", *European Sociological Review*, Vol. 14 No. 3, pp. 231-54.
- Nunez-Nickel, M. and Moyano-Fuentes, J. (2006), "New size measurement in population ecology", *Small Business Economics*, Vol. 26, pp. 61-81.
- Oertel, S. and Walgenbach, P. (2009), "How the organizational ecology approach can enrich business research on small and medium-sized enterprises: three areas for future research", *Small Business Review*, Vol. 61, pp. 250-69.
- Pane Haden, S.S., Oyler, J.D. and Humphreys, J.H. (2009), "Historical, practical, and theoretical perspectives on green management: an exploratory analysis", *Management Decision*, Vol. 47 No. 7, p. 1041.
- Park, D.Y. and Podolny, J.M. (2000), "The competitive dynamics of status and niche width: US banking, 1920-1949", *Industrial and Corporate Change*, Vol. 9 No. 3, pp. 377-414.
- Pataki, G. (2009), "Ecological modernization as a paradigm of corporate sustainability", *Sustainable Development*, Vol. 17 No. 2, p. 82.
- Patzelt, H. and Audretsch, D.B. (2008), "The evolution of biotechnology in hostile environments", *Journal of Organizational Change Management*, Vol. 21 No. 6, pp. 773-85.
- Paulino, V.D.S. (2009), "Organizational change in risky environments: space activities", *Journal of Organizational Change Management*, Vol. 22 No. 3, pp. 257-74.
- Peli, G. (1996), "The niche hiker's guide to population ecology: a logical reconstruction of organization ecology's niche theory", *Sociological Methodology*, Vol. 27 No. 1, pp. 1-46.



- 
- Peli, G. (2009), "Fit by founding, fit by adaptation: reconciling conflicting organizational theories with logical formalization", *Academy of Management Review*, Vol. 34 No. 2, pp. 343-60.
- Peli, G. and Bruggeman, J. (2007), "The cricket and the ant: organizational trade-offs in changing environments", *Journal of Mathematical Sociology*, Vol. 31, pp. 205-35.
- Peli, G. and Nooteboom, B. (1999), "Market partitioning and the geometry of the resource space", *American Journal of Sociology*, Vol. 104 No. 4, pp. 1132-53.
- Peli, G., Polos, L. and Hannan, M.T. (2000), "Back to inertia: theoretical implications of alternative styles of logical formalization", *Sociological Theory*, Vol. 18, pp. 193-213.
- Pennings, J., Lee, K. and van Witteloostuijn, A. (1998), "Human capital, social capital, and firm dissolution", *Academy of Management Journal*, Vol. 41, pp. 441-52.
- Perrigot, R. (2008), "Franchising networks survival: an approach through population and survival analysis", *Recherche et Applications en Marketing*, Vol. 23 No. 1, pp. 21-36.
- Perrow, C. (1986), *Complex Organizations: A Critical Essay*, 3rd ed., Random House, New York, NY.
- Peterson, T. and Koput, K. (1991), "Density dependence in organizational mortality: legitimacy or unobserved heterogeneity?", *American Sociological Review*, Vol. 56, pp. 399-409.
- Pfeffer, J. (1993), "Barriers to the advance of organizational science; paradigm development as a dependent variable", *Academy of Management Review*, Vol. 18, pp. 599-620.
- Phillips, D.J. (2001), "The promotion paradox: organizational mortality and employee promotion chances in Silicon Valley law firms, 1946-1996", *American Journal of Sociology*, Vol. 106 No. 4, pp. 1058-98.
- Phillips, D.J. (2002), "A genealogical approach to organizational life chances: the parent-progeny transfer among Silicon Valley law firms, 1946-1996", *Administrative Science Quarterly*, Vol. 47 No. 3, pp. 474-506.
- Pindard-Lejarraga, M. and Gutierrez, I. (2010), "The liability of connectedness: mortality rates in interorganizational networks", working paper.
- Podolny, J. and Stuart, T. (1995), "A role-based ecology of technological change", *American Journal of Sociology*, Vol. 100, pp. 1224-60.
- Podolny, J.M., Stuart, T.E. and Hannan, M.T. (1996), "Network, knowledge, and niches: competition in the worldwide semiconductor industry, 1984-1991", *American Journal of Sociology*, Vol. 102 No. 3, pp. 659-89.
- Polos, L. and Hannan, M.T. (2000), *Reasoning with Partial Knowledge*, Research Paper Series, 1638, Graduate School of Business, Stanford University, Stanford, CA.
- Polos, L., Hannan, M.T. and Carroll, G.R. (2002), "Foundations of a theory of social forms", *Industrial and Corporate Change*, Vol. 11 No. 1, pp. 85-115.
- Popielarz, P. and Neal, Z. (2007), "The niche as a theoretical tool", *Annual Review of Sociology*, Vol. 33, pp. 64-84.
- Quinn, L. and Norton, J. (2004), "Beyond the bottom line: practicing leadership for sustainability", *Leadership in Action*, Vol. 24 No. 1, pp. 3-9.
- Ranger-Moore, J. (1997), "Bigger may be better, but is older wiser? Organizational age and size in the New York life insurance industry", *American Sociological Review*, Vol. 62, pp. 903-20.
- Rao, H. (2002), "Interorganizational ecology", in Baum, J.A.C. (Ed.), *Companion to Organizations*, Blackwell, Oxford, pp. 541-56.
- Rhee, M., Kim, Y. and Han, J. (2006), "Confidence in imitation: niche-width strategy in the UK automobile industry", *Management Science*, Vol. 52 No. 4, pp. 501-13.

- Roberts, B.M. and Thompson, S. (2003), "Entry and exit in a transition economy: the case of Poland", *Review of Industrial Organization*, Vol. 22, pp. 225-43.
- Romanelli, E. (1991), "The evolution of new organizational forms", *Annual Review of Sociology*, Vol. 17, pp. 79-103.
- Romanelli, E. and Foil, C.M. (2008), "Before identity: the emergence and objectification of new organizational forms", *Academy of Management Proceedings*.
- Ruef, M. (1997), "Assessing organizational fitness on dynamics landscape: an empirical test of the relative inertia thesis", *Strategic Management Journal*, Vol. 18, pp. 837-53.
- Ruef, M. (2000), "The emergence of organizational forms: a community ecology approach", *The American Journal of Sociology*, Vol. 106 No. 3, pp. 658-714.
- Ruef, M. (2004), "The demise of an organizational form: emancipation and plantation agriculture in the American south, 1860-1890", *The American Journal of Sociology*, Vol. 190 No. 6, pp. 1365-410.
- Ruef, M. (2005), "Origins of organizations: the entrepreneurial process", in Keister, L. (Ed.), *Research in the Sociology of Work*, Vol. 14.
- Ruef, M. (2006), "Boom and bust: the effect of entrepreneurial inertia on organizational populations", *Advances in Strategic Management*, Vol. 23, pp. 29-72.
- Ruef, M. and Scott, W.R. (1998), "A multidimensional model of organizational legitimacy: hospital survival in changing institutional environments", *Administrative Science Quarterly*, Vol. 43, pp. 877-904.
- Sandell, R. (2001), "Organizational growth and ecological constraints: the growth of social movements in Sweden, 1881 to 1940", *American Sociological Review*, Vol. 66 No. 5, pp. 672-93.
- Schulz, M. (1998), "Limits to bureaucratic growth: the density dependence of organizational rule births", *Administrative Science Quarterly*, Vol. 43 No. 4, pp. 845-76.
- Schwarz, G.M. and Shulman, A.D. (2007), "The patterning of limited structural change", *Journal of Organizational Change Management*, Vol. 20 No. 6, pp. 829-46.
- Scott, R. and Davis, G. (2007), *Organizations and Organizing: Rational, Natural, and Opens Systems Perspectives*, Prentice-Hall, Upper Saddle River, NJ.
- Seager, T.P. (2008), "The sustainability spectrum and the sciences of sustainability", *Business Strategy and the Environment*, Vol. 17 No. 7, p. 444.
- Shane, S. (2001), "Organizational incentives and organizational mortality", *Organization Science*, Vol. 12 No. 2, pp. 136-60.
- Silverman, B.S., Nickerson, J.A. and Freeman, J. (1997), "Profitability, transactional alignment, and organizational mortality in the US trucking industry", *Strategic Management Journal*, Vol. 18, pp. 31-52.
- Sine, W.D., David, R.J. and Mitsuhashi, H. (2007), "From plan to plant: effects of certification on operational start-up in the emergent independent power sector", *Organization Science*, Vol. 18, pp. 578-94.
- Singh, J. and Lumsden, C. (1990), "Theory and research in organization ecology", *Annual Review of Sociology*, Vol. 16, pp. 161-95.
- Singh, J., House, R. and Tucker, D. (1986a), "Organizational change and organizational mortality", *Administrative Science Quarterly*, Vol. 31, pp. 587-611.
- Singh, J., Tucker, D. and House, R. (1986b), "Organizational legitimacy and the liability of newness", *Administrative Science Quarterly*, Vol. 31, pp. 171-93.



- 
- Sorensen, J.B. and Stuart, T.E. (2000), "Aging, obsolescence, and organizational innovation", *Administrative Science Quarterly*, Vol. 45, pp. 81-112.
- Sorenson, O. (2000), "The effect of population level learning on market entry: the American automobile industry", *Social Science Research*, Vol. 29, pp. 307-26.
- Sorenson, O. and Audia, P.G. (2000), "The social structure of entrepreneurial activity: geographic concentration of footwear production in the United States, 1940-1989", *The American Journal of Sociology*, Vol. 106, pp. 424-61.
- Sorenson, O., McEvily, S., Ren, C.R. and Roy, R. (2006), "Niche width revisited: organizational scope behavior and performance", *Strategic Management Journal*, Vol. 27, pp. 915-36.
- Soytas, U. (2009), "Modeling firm population dynamics: an application to the Turkish manufacturing industry for the 1950-2000 period", *International Journal of Business and Economics*, Vol. 8 No. 3, pp. 213-23.
- St-Jean, E., LeBel, L. and Audet, J. (2010), "Entrepreneurial orientation in the forestry industry: a population ecology perspective", *Journal of Small Business and Enterprise Development*, Vol. 17 No. 2, pp. 204-17.
- Starik, M. and Rands, G.P. (1995), "Weaving an integrated web: multilevel and multisystem perspectives of ecologically sustainable organizations", *The Academy of Management Review*, Vol. 20 No. 4, p. 908.
- Stinchcombe, A.L. (1965), "Social structure and organizations", in March, J.G. (Ed.), *Handbook of Organizations*, Rand McNally, Chicago, IL, pp. 153-93.
- Strotmann, H. (2007), "Entrepreneurial survival", *Small Business Economics*, Vol. 28, pp. 87-104.
- Stuart, T.E. and Sorenson, O. (2003), "The geography of opportunity: spatial heterogeneity in founding rates and the performance of biotechnology firms", *Research Policy*, Vol. 32, pp. 229-53.
- Stubbs, W. and Cocklin, C. (2008a), "An ecological modernist interpretation of sustainability: the case of Interface Inc.", *Business Strategy and the Environment*, Vol. 17 No. 8, p. 512.
- Stubbs, W. and Cocklin, C. (2008b), "Conceptualizing a 'sustainability business model'", *Organization & Environment*, Vol. 21 No. 2, p. 103.
- Swaminathan, A. (1996a), "Environmental conditions at founding and organizational mortality: a trial-by-fire model", *Academy of Management Journal*, Vol. 39 No. 8, pp. 1350-77.
- Swaminathan, A. (1996b), "Organizational ecology: neither straightjacket nor big tent", *Administrative Science Quarterly*, Vol. 41 No. 3, pp. 543-50.
- Swaminathan, A. (1998a), "Entry into new market segments in mature industries: endogenous and exogenous segmentation in the US brewing industry", *Strategic Management Journal*, Vol. 19, pp. 389-404.
- Swaminathan, A. (1998b), "Entry into new market segments in mature industries: endogenous and exogenous segmentation in the US brewing industry", *Strategic Management Journal*, Vol. 19, pp. 389-404.
- Swaminathan, A. (2001), "Research partitioning and the evolution of specialist organizations: the role of location and identity in the US wine industry", *Academy of Management Journal*, Vol. 44 No. 6, pp. 1169-85.
- Swaminathan, A. and Wade, J.B. (1999), "Social movement theory and the evolution of new organizational forms", *Academy of Management Proceedings*, p. 11.

- Tucker, D., Singh, J., Meinard, A. and House, R. (1988), "Ecological and institutional sources of change in organizational populations", in Carroll, G. (Ed.), *Ecological Models of Organization*, Ballinger, Cambridge, MA.
- Ulrich, D. and Barney, J.B. (1986), "Perspectives in organizations: resource dependence, efficiency, and populations", *The Academy of Management Review*, Vol. 93, pp. 471-81.
- United Nations General Assembly (1987), *Report of the World Commission on Environment and Development: Our Common Future, Toward Sustainable Development*, chapter 2, paragraph 1.
- Usher, J.M. (1999), "Specialists, generalist, and polymorphs: spatial advantages of multiunit organization in a single industry", *Academy of Management Review*, Vol. 24 No. 1, pp. 143-50.
- Usher, J.M. and Evans, M.G. (1996), "Life and death along gasoline alley: Darwinian and Lamarckian processes in a differentiating population", *Academy of Management Journal*, Vol. 39 No. 5, pp. 1428-66.
- van Wissen, L. (2004), "A spatial interpretation of the density dependence model in industrial demography", *Small Business Economics*, Vol. 22 Nos 3/4, pp. 253-64.
- Van Witteloostuijn, A. (2000), "Organizational ecology has a bright future", *Organization Studies*, Vol. 21 No. 2, pp. V-XV.
- van Witteloostuijn, A. and Boone, C. (2006), "A resource-based theory of market structure and organizational form", *Academy of Management Review*, Vol. 31 No. 2, pp. 409-26.
- Vermeulen, I. and Bruggeman, J. (2001), "The logic of organizational markets: thinking through resource partitioning theory", *Computational and Mathematical Organizational Theory*, Vol. 7, pp. 87-111.
- Wade, J., Swaminathan, A. and Saxon, M. (1998), "Normative and resource flow consequences of local regulations in the American brewing industry, 1984-1918", *Administrative Science Quarterly*, Vol. 43, pp. 904-35.
- Welbourne, T. and Andrews, A.O. (1996), "Predicting the performance of initial public offerings: should human resource management be in the equation", *Academy of Management Journal*, Vol. 39 No. 4, pp. 891-919.
- Wezel, F.C. and van Witteloostuijn, A. (2006), "From scooters to choppers: product portfolio change and organizational failure: evidence from the UK motorcycle industry 1895 to 1993", *Long Range Planning*, Vol. 39 No. 1, pp. 11-28.
- Wholey, D.R., Christianson, J.B. and Sanchez, S.M. (1992), "Organizational size and failure among health maintenance organizations", *American Sociological Review*, Vol. 57, pp. 829-42.
- Wikström, P. (2010), "Sustainability and organizational activities: three approaches", *Sustainable Development*, Vol. 18 No. 2, p. 99.
- Wilkinson, R. and Cary, J. (2002), "Sustainability as an evolutionary process", *International Journal of Sustainable Development*, Vol. 5 No. 4, p. 381.
- Winsor, R. (1998), "Regional integration and competition form a bio-geographic perspective: an extension and elaboration of organization ecology", *Advances in Competitiveness Research*, Vol. 6 No. 1, pp. 30-8.
- Young, R. (1988), "Is population ecology a useful paradigm for the study of organizations?", *The American Journal of Sociology*, Vol. 94 No. 1, pp. 1-24.
- Young, R. (1989), "Reply to Freeman and Hannan and Brittain and Wholey", *The American Journal of Sociology*, Vol. 95 No. 2, pp. 445-6.

- 
- Zaring, O. and Eriksson, M. (2009), "The dynamics of rapid industrial growth: evidence from Sweden's information technology industry", *1990-2004, Industrial and Corporate Change*, Vol. 18 No. 3, pp. 507-28.
- Zhou, C. and van Witteloostuijn, A. (2010), "Institutional constraints and ecological processes: evolution of foreign-invested enterprises in the Chinese construction industry, 1993-2006", *Journal of International Business Studies*, Vol. 41, pp. 539-56.
- Zimmerman, M.A. and Zeitz, G.J. (2002), "Beyond survival: achieving new venture growth by building legitimacy", *Academy of Management Review*, Vol. 27, pp. 414-31.
- Zingales, L. (1998), "Survival of the fittest or the fattest? Exit and financing in the trucking industry", *Journal of Finance*, Vol. 53 No. 3, pp. 905-38.
- Zucker, L. (1989), "Combining institutional theory and population ecology: no legitimacy, no history", *American Sociological Review*, Vol. 54, pp. 542-5.
- Zuckerman, E.W. and Kim, T. (2003), "The critical trade-off: identity assignment and box-office success in the feature film industry", *Industrial and Corporate Change*, Vol. 12, pp. 27-66.
- Zuckerman, E.W., Kim, T., Ukanwa, K. and von Rittman, J. (2003), "Robust identities or non-entities? Typecasting in the feature film labor market", *American Journal of Sociology*, Vol. 108, pp. 1018-74.

### Further reading

- Aldrich, H. and Ruef, M. (2006), *Organizations Evolving*, 2nd ed., Sage, Thousand Oaks, CA.
- Baum, J.A.C. and Oliver, C. (1996), "Toward an institutional ecology of organizational founding", *Academy of Management Journal*, Vol. 39, pp. 1378-427.
- Burgelman, R.A. (1991), "Intraorganizational ecology of strategy making and organizational adaptation: theory and field research", *Organization Science*, Vol. 2, pp. 239-62.
- Carroll, G. (2007), "Long-term evolutionary change in organizational populations: theory, models and empirical findings in industrial demography", *Industrial and Corporate Change*, Vol. 6 No. 1, pp. 119-43.
- Carroll, G. and Hannan, M. (1995), *Organizations in Industry: Strategy, Structure, and Selection*, Oxford University Press, New York, NY.
- Cohen, W.M. and Klepper, S. (1996), "Firm size and the nature of innovation within industries: the case of process and product R&D", *Review of Economics and Statistics*, Vol. 78, pp. 223-43.
- Freeman, J. and Hannan, M. (1987), "The ecology of restaurants revisited", *American Journal of Sociology*, Vol. 92, pp. 1214-20.
- Freeman, J., Carroll, G. and Hannan, M. (1982), "The liability of newness: age dependence in organizational death rates", *American Sociological Review*, Vol. 48, pp. 692-710.
- Hannan, M.T. (1988), "Age dependency in the mortality of national labor unions: comparisons of parametric models", *Journal of Mathematical Sociology*, Vol. 14, pp. 1-30.
- Hannan, M.T. and Carroll, G.R. (1995), "Theory building and cheap talk about legitimation: reply to Baum and Powell", *American Sociological Review*, Vol. 60, pp. 539-44.
- Hannan, M.T., Carroll, G.R. and Barron, D.N. (1991), "On the interpretation of density dependence in rates of organizational mortality: a reply to Petersen and Koput", *American Sociological Review*, Vol. 56, pp. 410-5.
- Hannan, M.T., Carroll, G.R., Dundon, E. and Torres, J. (1995), "Organizational evolution in a multinational context: entries of automobile manufacturers in Belgium, Britain, France, Germany, and Italy", *American Sociological Review*, Vol. 60, pp. 509-28.

- Hannan, M.T., Carroll, G.R., Dobrev, S., Han, J. and Torres, J. (1998), "Organizational mortality in European and American automobile industries. Part I: revisiting the effects of age and size", *European Sociological Review*, Vol. 14 No. 3, pp. 303-13.
- Hannan, M.T., Carroll, G.R., Dobrev, S., Han, J. and Torres, J. (1998), "Organizational mortality in European and American automobile industries. Part II: coupled clocks", *European Sociological Review*, Vol. 14 No. 3, pp. 303-13.
- Lomi, A. (1995), "The population ecology of organizational founding: location dependence and unobserved heterogeneity", *Administrative Science Quarterly*, Vol. 40, pp. 111-44.
- McAuley, J., Johnson, P. and Duberley, J. (2006), *Organization Theory: Challenges and Perspectives*, Prentice-Hall/Financial Times Press, Harlow.
- McPherson, J. (1983), "An ecology affiliation", *American Sociological Review*, Vol. 48, pp. 519-35.
- Singh, J. (1990), *Organizational Evolution: New Directions*, Sage, Newbury Park, CA.
- Wholey, D. and Brittain, J. (1993), "Organizational ecology: findings and implications", *The Academy of Management Review*, Vol. 11 No. 3, pp. 513-33.

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