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[Dennis McCay](#)*

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Review

The Evolution of Management Population Ecology Theory—A Literature Review

Dennis O. McCay

PhD, Assistant Professor, School of Public Health, Samford University, Birmingham, Alabama; dmccay@samford.edu

Abstract: While researching the life cycle and survival of rural hospitals, I was faced with the choice of which theoretical model would best support my thesis. Population Ecology (PE) theory was the obvious choice, but my research needed to address not only the macro environment for these hospitals, but their micro and meso environments as well. Further research for the best theory added to my confusion. Most of the early formulations of PE Theory addressed only the macro aspects of an organization, using additional theories to describe the organization's micro and meso attributes because, at this early stage in the life of PE theory, it was considered unsuitable for use as anything but a macro analysis tool. Other researchers were using PE to describe all the environmental properties, even though respected sources still insisted that it was incorrect. The solution was to discover what was happening to PE theory; what was I missing? Had PE Theory evolved? This paper explores Population Ecology theory, starting with the development of the theory in 1977 by Hannan and Freeman, and follows it through the changes and refinements that led to its current version as an integrated toolkit by Soylyu in 2008. This Literature Review documents the beginnings and evolution of Population Ecology Theory from a partially accepted theory, suitable only for a macro view of an industry to that of a robust, well-accepted tool that is suitable for the analysis of an organization's total environment.

Keywords: population ecology; environmental analysis; organizational ecology; community ecology; macro environment; meso environment; micro environment

1. Introduction

This literature review assists in understanding the use of Population Ecology Theory (PE) as a theoretical framework because it: (1) has traditionally been associated with the macro-environment (an entire industry), (2) is generalizable across an entire industry, (3) constitutes a large portion of the theoretical literature associated with business growth and closure, and (4) is often used as the primary theory in studies, either alone or in combination with other theories such as Resource Dependency Theory (RDT) or Contingency Theory (CT) (D'Aunno & Zuckerman, 1987; McKinley & Monet, 2005). The purpose of this study was to: (1) explore the possible evolution of PE theory from a discipline that was only suitable for the macro analysis of an industry to that of an overarching theory that is also suitable for use in the study of individual organizations and their communities.

This paper's sections include:

- (1) Definition of PE
- (2) Method used for the selection of articles
- (3) Review of the literature included in this study
- (4) A Discussion of the points that are posited by the authors
- (5) A Conclusion that draws inferences from the articles and identifies gaps in our existing knowledge and future research.

2. Theory Definition

Population ecology theory addresses changes in organizational populations that occur over time, as if they were a living organism. The stages of these changes are typically labeled as: founding, growth, transformation, decline, and death (Hannan & Freeman, 1977; Miles, 2012; Yarbrough & Powers, 2006). According to population ecology theorists, five factors that determine the survivability

of an organization: age; size; strategy; relational density (i.e., the number of competitors in an organization's environment); and linkages (i.e., the associations between suppliers, allies and competitors) (Mick, Morlock, de Lissovoy, Malitz, Wise, & Jones, 1993; Miles 2012; Shortell, 1989).

3. Research Methods

Initial searches using EBSCO, ABI Inform, Google Scholar, Business Source Premier, and Scopus with the keywords: "Population Ecology Theory" and "Organizational Ecology Theory" resulted in the discovery of over 2000 articles. Preliminary screening was done by reviewing the article titles and then rejecting those not associated with PE **and** organizational management (as opposed to biological studies) or Organizational Ecology. This screening eliminated most of the articles, as most of them were associated with either biological studies or were articles that only mentioned the theories but did not delve into the tenets of the theories.

Following the detailed search of the articles obtained from the keyword search, a hand search was initiated, examining the cited works from the previously selected articles. This process identified additional publications, which were also evaluated for their inclusion of a definition of PE (or OE). Most of these publications were eliminated because they lacked either a usable definition of PE (or OE) theory. The net result was a total of 22 usable sources.

What remained was a group of publications that describe the "Definition and Scope of Population Ecology." As the title suggests, this work identifies and includes different scholars' arguments regarding the correct definition, scope, and uses of PE (Amburgey & Rao, 1996; Aldrich, 1990; Astley, 1985; Barnette & Carroll, 1995; Carroll, 1984, 1988; Hannan, 1998, 2005; Hannan & Freeman, 1977, 1984; Singh & Lumsden, 1990; Wholey & Sanchez, 1991; Soylu, 2008; Young, 1988).

4. The Articles

Definition and Scope of Population Ecology

Since the publication of Hannan and Freeman's seminal 1977 article, *The Population Ecology of Organizations*, which introduced Population Ecology (PE) as a theoretical framework for examining organizational lifecycles, a substantial body of literature has emerged in response. These subsequent contributions—descriptive in nature—have sought either to support, critique, or extend the original propositions regarding the birth, development, and dissolution of organizational forms. When examined chronologically, this body of work reveals a progressive evolution of PE theory, enabling scholars to trace the conceptual refinements and methodological advancements that have shaped its trajectory over time.

Hannan and Freeman's (1977) work is widely regarded as the foundation of population ecology (PE) studies in organizational theory, particularly in relation to organizational lifecycles. They conceptualize PE by drawing an analogy to the life processes of biological organisms—highlighting stages such as birth, growth, maturity, decline, and death. This ecological perspective supports what they termed the *adaptation perspective*, which suggests that organizations, like living organisms, strive to adapt by formulating strategies aimed at achieving a better fit within their environments.

According to Hannan and Freeman (1977), survival is not so much a blueprint of specific actions, but rather a combination of inputs and strategies, with the organizations that do survive being those best able to forecast and adapt their existing operations to their evolving environment. Organizations that eventually fail are the ones that:

1. Do not properly forecast their environment's evolution
2. Fail to properly strategize to fit the anticipated environment
3. Have a structural inertia or an existing business model that is not capable of being transformed into the mode needed for survival.

In 1977, Hannan and Freeman's view of PE was one of only a macro environment, composed of an aggregate of like organizations that comprise an industry. The authors posited that because of this theory's macro-orientation, it provides limited support for the strategic management attempts of individual managers or individual organizations.

Hannan and Freeman's (1984) update to their 1977 work investigated structural inertia and its effects on the ability of organizations to make strategic changes. In this update, the authors posited that there are three views of organizational change: (1) variability—most of the variation in

organizational structure is brought about by new organizational forms replacing older forms which were de-selected for survival, (2) rational adaptation theory—industry changes are brought about by the systematic and strategic changes enacted by the individual organizations of an industry, and (3) random transformation theory—organizations evolve and change their structure in response to indigenous processes which are only loosely associated with the forecasts, plans, and the desires of the organization's leaders. In this work, the researchers concluded that an organization's structural inertia is the major factor affecting its ability to change.

Hannan and Freeman were not the only researchers who were working to expand their 1977 work. Carroll (1984) also expanded on the earlier work of Hannan and Freeman (1977) and posited that a gap existed in their theory because it presented an incomplete view of an organization's ecology. Carroll's view of an industry's ecology was made up of three different sections, which the author labeled: (1) Organizational Ecology, which represents an organization microenvironment consisting of the demographics and lifecycle processes of the individual organization; (2) Population Ecology, which represents an industry's macro environment. It deals with the growth and decline of an entire industry over time; and (3) Community Ecology, which represents an industry's expanded macro environment and deals with the creation, evolution, and death of organizational forms.

Astley's (1985) work was a critique of Hannan and Freeman's (1977) study in which the researcher presented a comparison of Population Ecology to Community Ecology as proposed by Carroll (1984). Astley pointed out that PE did not support the diversity of the different organizational forms that existed within industries. These arguments centered on the following conditions: (1) organizations selected for survival usually have much in common and over time begin to look alike (isomorphism), and (2) PE does not consider the role of technology and its ability to connect populations. This connection, Astley maintained, allows organizations to leverage their differences, thus improving both growth and diversity across an industry.

Young (1988) questioned the use of PE in the study of organizations because it was neither conducive to the understanding of an associated social phenomenon nor empirically sound. Young dismissed most of Hannan and Freeman's work as imprecise stating that it relied on unfounded assumptions and poorly defined terms and ignored critical issues such as competition for resources. Young's study concluded that PE theory might be suited to a very narrow application that only focused on an industry's macro environment. The author posited that unless steps were taken to improve its reliability the theory's utility as a research framework was doubtful.

To pull together all the conflicting views of PE, Carroll (1988) organized a collection of works by multiple PE researchers for the purpose of unifying the components of PE into one overarching framework which Carroll referred to as an Organizational Population (OP). In this publication, the variables normally associated with PE (macro) studies were related to the founding, maturity, and death of individual organizations within the context of multiple organizational populations (newspaper, labor union, wine producers, volunteer organizations, and electronics manufacturers). This collection suggested there was no longer any question that PE (now generally referred to as OE) is a usable theory for the study of organizational life and death. There is, however, still room for the development of understanding in the areas of: (1) founding, (2) density dependence, (3) organizational diversification, and (4) coordination and competition. Following the publication of this book, theoretical works using PE theory for their research methods generally referred to it as Organizational Ecology (OE) Theory.

Singh and Lumsden (1990) attempted to expand the use of PE theory by using a similar path to Carroll (1984). The authors examined the tenets of an industry's ecological lifecycle from an organizational, population, and a community point of view. Like Young (1988), Singh and Lumsden posited that PE had its place in a narrowly defined macro view of the industry; however, they also suggested that OE had more to offer in the determination of an individual organization's survival.

Singh and Lumsden concluded that the following six dynamics must be considered when studying organizational mortality: (1) Fitness Set Theory—a selection approach using a combination of competition theory and niche-width theory to evaluate an organizations fit and capabilities within its environment, (2) Liability of Newness—new organizations are more susceptible to early mortality due to a lack of trust, social learning, and evidence of reproducibility, (3) Density Dependence and population dynamics—how the founding and mortality rates of organizations are related to the density of competitors, (4) Resource Partitioning Theory—an application of density dependence and the appropriateness of specialization versus generalization based upon the competition for resources, (5)

Liability of Smallness—organizational size may systematically influence mortality rates with larger organizations exhibiting more structural inertia, and (6) The Effects of Founding Conditions—the association between the historical time of an organization's founding and the existing social structure.

Aldrich (1990) attempted to further refine the use of Population Ecology as an evaluation tool for the study of industrial populations, entrepreneurship, and organizational founding. Relying on the theoretical foundations of both Hannan and Freeman (1977) and Carroll (1984), Aldrich studied the effects of the environment on the founding and death of organizations. Using the micro, meso, and macro aspects of organizational life cycles, which Aldrich referred to as institutional, intra-population, and inter-population, the author concluded that the founding of new organizations are greatly influenced by the existing ones; not only in their own population, but also in the larger community of populations.

Aldrich further maintained that intra-population processes (prior findings, dissolutions, density, and the structure of a population's) inter-population processes (relations between populations, whether competing or cooperating); and institutional factors (government policies, political events, cultural norms) all affected the founding, growth, and dissolution of an organization. However, intra-population issues were the most important aspect.

Wholey and Sanchez (1991) used a model derived from PE to look at the cause and effect of governmental regulation on the founding, growth, and demise of business organizations. The researchers used a PE framework to look at market structures, organizational conduct, and organizational performance across industries. They discussed regulation and market structure in terms of how organizations can be managed by the government to augment the health and diversity of an industry, and attempted to resolve some of the issues between Aldrich, Carroll, and Hannan and Freeman by showing how regulations can be used to affect an industry more efficiently at the population level.

By 1995, PE was a mature theory that had evolved from Hannan and Freeman's original 1977 work. Most articles from 1995 on still mentioned and tied their theoretical frameworks to PE but also expanded into Organizational Ecology (OE), Community Ecology (EC), or more closely followed the works of Carroll (1984). Over the next decade (1995-2005) there were several studies dealing with PE as an integral building block of OE, but now, instead of debating the usefulness of PE as a theory, theorists concerned themselves with how the tenets of PE could be successfully applied to the adaptability and survival of individual organizations (Amburgey & Rao, 1996; Barnett & Carroll, 1995; Hannan, 1998, 2005). Since 2005, there has been little expansion of either PE or OE theory, only occasional comments offering elaboration and/or justification for the use of PE or OE as a theoretical framework.

Soylu's (2008) work revisited the controversy between the importance of the microenvironment versus the importance of the macro environment. Soylu's work compared PE theory to Contingency Theory (CT). The centerpiece of this argument is an explanation of Donaldson's (1995) work which maintains that CT is better than PE because it is intellectually superior, more structurally sound, and more empirically correct. Soylu's response to Donaldson's critique came directly from Hannan and Freeman's 1977 seminal article in which the authors suggested: (1) PE works best when it is applied to an industry's entire population, and (2) There is little doubt that there is pressure on leaders to evolve their organization to meet environmental contingencies, but also there are often external as well as internal situations limiting an organization's ability to adapt.

5. Discussion

The evolution of PE theory throughout the 1980s and 1990s has been instrumental in the study of multiple industries. By examining the chronological order, one can observe the metamorphosis of a theory from its inception in 1977 to the present day. From this evaluation of the literature, there are four areas of agreement between the authors and two areas of disagreement.

The areas of agreement are: (1) Population ecology is most useful for the study of an industry's macro environment; (2) Organizational Ecology (OE), a term that is often used interchangeably with PE, is a branch of environmental study that is more correctly associated with that of individual organizations, and thus is useful for the understanding of an organization's micro and/or meso environment; (3) Community Ecology (CE) is the study of the interactions between multiple populations and from a PE point of view would be considered "Super Macro" in nature; and (4) There are many factors limiting an individual organization's ability to alter its operations to improve its chances of

survival, these factors include variables from the organizations' micro, meso, and macro environment.

Disagreements regarding the scope and use of PE among the scholars and researchers centers around two issues: (1) whether the scope of PE is too narrowly defined to be useful for the general study of an industry's environment, and (2) is Community Ecology (CE) better suited to study an industry's macro environment than PE. Soylu (2008) provided a recap of the current generation of PE theory and its companions (OE and CE) that have evolved into an integrated toolkit for the environmental study of organizations within all three environments: micro, meso, and macro.

6. Contribution to the Literature

The purpose of this literature review was **initially** to explore empirical articles published using a PE framework to study U.S. hospitals. Although previously published research articles (Alexander et al., 1986; Gifford & Mullner, 1988; Yarbrough & Powers, 2006) have provided abbreviated literature reviews as parts of their empirical studies, no comprehensive literature review was discovered by this researcher that explicitly addressed the importance and proper use of population ecology theory in understanding the micro thru macro environment of industries the U.S.. Findings from this study will help future researchers understand how PE theory has been used to guide and inform existing studies, thereby assisting them in applying this theory in the support of their specific applications.

There are two major gaps in the PE literature addressed by this study: (1) the absence of a clear analysis of the evolution of PE from its beginnings to its present form, and (2) there is not a well-defined method for utilizing PE, OE, or CE as an overarching theory for the study of organization(s). These gaps are significant and justify further study.

Population ecology theory has undergone a metamorphosis since its conception in 1977. In the mid-1990s, researchers stopped referring to population ecology as (only) PE and began also referencing it as Organizational Ecology (OE). There were two reasons for this shift: (1) It mitigated the confusion that existed for the use of the term Population Ecology in both biological and sociological studies, and (2) The use of PE for the study of organizational life cycles had evolved past the narrow, macro environmental view initially proposed by Hannan and Freeman (1977) and was now a synthesized framework embracing an organization's entire environment. The chronology of this metamorphosis is not well defined in the existing literature and needs to be further researched.

Based upon these identified gaps in the literature, future study is warranted. PE/OE should be particularly well suited to this micro through macro environmental study. The current generation of OE needs to be better defined for use by researchers. This theory has evolved since 1977 and because of these changes, researchers desiring to use a PE framework for the study of an industry's ecology might not realize the descriptive power available to them using a more contemporary translation of the theory. This paper is a starting point for future study to develop a more precise definition of PE/OE as both a theory and a framework.

7. Summary and Conclusions

Hannan and Freeman's (1977) seminal work laid the foundation for understanding environmental influences on organizational survival. They likened business organizations to biological organisms, proposing that organizations undergo a full life cycle—birth, growth, maturity, decline, and death. This analogy was central to the original Population Ecology (PE) theory. Soon after its introduction, PE began evolving through scholarly debates concerning its theoretical rigor and general applicability.

A key advancement occurred with Carroll's (1984) contribution, which significantly expanded the scope of PE beyond its initial macro-environmental focus. Carroll proposed a broader view that incorporated micro and meso-level dynamics, marking a shift toward a more comprehensive theoretical framework. If the theory's development were evaluated using its own biological metaphor, it would now be considered in its "mature" phase. Currently, PE is more commonly referred to as Organizational Ecology (OE), reflecting its evolution into a well-rounded toolset capable of analyzing organizations across micro, meso, and macro environmental levels.

The biological parallels within PE attracted many researchers, who sought to apply its principles to non-biological organizational studies. These early adopters faced a theoretical challenge: they could either rely on multiple theories to address issues at various levels or expand PE's framework to encompass the entire organizational environment. By building upon Carroll's (1984) expanded

approach and subsequent developments by Hannan and Freeman (1984), PE evolved into a comprehensive framework. OE now provides an integrated lens through which both individual organizations and entire industries can be studied without the need for additional theories.

Despite OE's theoretical maturity, significant gaps remain. Notably, there is no well-documented account of the theory's progression from 1977 to the present. Miles (2012) acknowledged this issue in his discussion of organizational theories, dedicating a chapter to it. Nevertheless, questions persist, such as: "What is the difference between PE and OE?" and, more importantly, "Why is a robust, overarching theory not more widely used to study the survival of industries and their components?"

There remains substantial opportunity for empirical research. Given OE's expanded scope and versatility, it is now well suited to serve as a standalone framework for research that previously required multiple theoretical approaches. OE is particularly applicable to industries, such as health care—that span several environmental levels, from micro to super-macro.

In summary, PE has transformed significantly since its narrow beginnings in 1977. It has developed into a flexible and robust theory with broad applicability across industries. This evolution mirrors the biological processes that inspired the theory in the first place—further affirming the relevance and adaptability of Organizational Ecology.

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