

THE IMPACT OF GENERALIZATION AND TECHNOLOGY  
ON TRADE PUBLISHER MORTALITY

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THE IMPACT OF AGE, SIZE, GENERALIZATION AND TECHNOLOGY  
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**Abstract**

The trade publishing industry has long been stable. Recently this stability has given way to struggle. In light of these struggles this paper sheds light on the industry by utilizing organizational ecology's theoretical framework. Out of these many theory fragments, this study focuses on the impacts of age, size, generalization, and environmental factors. The established understanding of these theory fragments indicates that each fragment, particularly age and size, has a complicated relationship with mortality. By discovering the impact of each of these theory fragments on trade publisher mortality this study adds to the discourse of both organizational ecology and trade publishing. This study finds no conclusive connection between age or size and trade publisher mortality. This disconnect between these factors and mortality indicates that the relationship cannot be grasped by linear terms. There was, however, a strong connection between both specific environmental factors and generalization and trade publisher mortality. These connections indicate that a broader scope of operations increases trade publisher survivability and that there is a direct relationship between technological availability and trade publisher mortality.

KEYWORDS: (Trade Publishing, Organizational Ecology, Organizational Mortality, Age Dependence, Generalization)

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## CHAPTER I

### INTRODUCTION

The rapid growth of technology over the past century has led to drastic changes in nearly every industry. One of the last industries to face massive changes within its industrial environment has been publishing. While all types of publishers are currently facing an environment that is constantly in flux, this paper focuses primarily on the issues that are facing trade publishers. In order to minimize the damage that these changes will cause this paper uses several theory fragments of organizational ecology in an attempt to answer the question ‘to what extent do specific organizational characteristics impact trade publisher mortality?’ This study aims to utilize the extensive theoretical framework that has been established in the realm of organizational ecology.

The tradition of story-telling dates back to the caveman, and the printed word dates back to the dawn of civilized man. It wasn’t until the rise of printing houses in the 15<sup>th</sup> century that books began being published for mass production. As the global population skyrocketed between the 18<sup>th</sup> and 21<sup>st</sup> centuries, literacy rates similarly increasing during the 20<sup>th</sup> century, trade publishers experienced sustained growth in sales (“History of Publishing”, 2010). Throughout these years of growth the environment of the trade publishing industry remained, for the most part, relatively stable until the 1990’s (Owen, 2013).

In 1994, Jeff Bezos founded Amazon.com, one of the first online book retailers. Amazon grew in popularity quickly as consumers were drawn to its lower prices, which were made possible by certain tax loopholes that are not entirely relevant to this study, convenience, and wider selection of titles (Jopson, 2011). As Amazon continued to grow it began to force traditional brick-and-mortar book stores, both large and small, out of business. This diversion of sales to internet retail did not, in and of itself, cause the trade publishing industry. However, shortly after the turn of the millennium, a plurality percentage of many major trade publishers' sales were through Amazon, which gave Amazon the power to strong-arm trade publishers down to lower prices (Sherman, 2010). The trade publishers who resisted these strong-arm tactics were dropped by Amazon, resulting in decreases in sales across the board for major trade publishers (Johnson, 2012).

In the mid-2000's e-book readers brought the second major change to the industrial environment in a decade. Although e-book readers had existed, in one form or another, for over half a century they did not gain significant commercial success until the release of the Amazon Kindle in 2007. By 2009 e-book sales topped \$300 million within the U.S. alone (Miller, 2010). While e-book sales have continued to grow at a tremendous rate since then, this growth has come at the cost of print book sales, and represents the single largest change to the environment of the trade publishing industry in centuries.

In 2011 the trade publishing industry accounted for 1.2% of the United States' GDP. E-book sales increased 117%, while paperback sales, which have traditionally been the breadbasket of the trade publishing industry, fell 51.6%, and hardcover sales fell 17.5% ("AAP Estimates", 2012). Overall, the trade publishing industry saw no change in

revenue in 2011, despite this enormous growth in e-book sales. As a result there has been a significant increase in the mortality rate of trade publishers in recent years as publishers have gone out of business or engaged in defensive mergers and acquisitions (Schiffren, 2012; Milliot, 2013). However, these recent struggles raise some interesting questions, particularly regarding what factors are playing into these struggles, how can those factors be controlled, and what can be done to alleviate the problem, such as: 1. Are larger firms or smaller firms exhibiting higher mortality rates?; 2. Are older or younger firms exhibiting higher mortality rates? and; 3. How strong is the relationship between the availability of technology for consumers and trade publisher mortality?'

Throughout this paper, I look at the trade publishing industry through the lens of organizational ecology in an attempt to answer some of these questions. The depth of organizational ecology's theoretical framework provides an understanding of the complex relationship between the various factors that play into mortality (Carroll, 1989). However, aside from its application to a select few industries, this framework remains largely theoretical. While largely theoretical, this framework, when applied, can provide an industrial level analysis.

Organizational ecology identifies various factors that play into mortality rates in a changing environment, these are: niche-width and realized niche-width (Hannan, Carroll, and Polos, 2003; Baum and Singh, 1994; Freeman and Hannan, 1983), population density (Peterson and Koput, 1991; Swaminathan and Wiedenmayer, 1991; McKelvey and Aldrich, 1983; Hannan and Freeman, 1988), generalization and specialization (Baum and Oliver, 1991), organizational size (Moore, 1997), organizational age (Hannan, 1998; Freeman, Carroll, and Hannan, 1983). Niche-width and population density, while



relevant, must be studied within a specific market and are immeasurable given that the data set used in this study is a cross section of trade publishers across international markets (Petersen, 1991; Baum and Singh, 1994).

This study focuses on the remaining theory fragments (size, age, and generalization) and their corresponding theory sub-fragments, particularly structural inertia, the liability of newness, and the liability of adolescence. These three theory fragments, combined with a measure of the environment, are used to understand the struggles of trade publishing industry for several reasons. By understanding the impact of age and size it then becomes possible to determine whether the issues are ones that affect the mortality rate all members of the industry equally or affect some portions of the industry more than others independent of strategic and operational factors (Carroll, 1984). Generalization, on the other hand, focuses on the strategic and operational factors and, as such, provides an idea of the how to optimize structure and strategy (Bruggeman and Nualláin, 2000). These theory fragments are, however, largely meaningless when being applied to an industry without a measure of the environment (Ruef and Scott, 1998). This measure of the environment provides a context for the behavior of each theory fragment (Ruef and Scott, 1998).

This study focuses on a cross section of trade publishers in the time period between 1990 to the start of 2013 in order to identify the scale of the impact of the relevant organizational ecology theory fragments. It then proposes a simplified model based on the literature of organizational ecology. While this simplified model does not embody a complete use of the findings of recent advances in the literature of organizational ecology, particularly regarding age and size, it subsequently avoids the

complications and uncertainties associated with these advancements and allows for a better understanding of other theory fragments. By focusing on these theory fragments, this study engages in an industrial level analysis of the trade publishing industry that is able to identify the specific impact of each fragment on the industry and thus move past the theoretical nature of the framework. Without such analysis it is impossible to completely understand the issues that are playing into the struggles of the trade publishing industry (Freeman and Hannan, 1989).

Chapter 2 will provide a more in depth look at each theory fragment that this study is focusing on, and the points at which they intersect. Chapter 3 outlines the formalizations made in this study, and describes the nature of the data used. Chapter 4 covers the analysis of the formalizations made, while Chapter 5 discusses the meaning of the results.

## CHAPTER II

### LITERATURE REVIEW

Any study of industrial mortality rates can develop a model in an attempt to understand which factors are playing into that industry's mortality and the scale of the impact of each of these factors. However any model is only as strong as the theoretical framework that is the basis of that model. To this end, the theoretical framework of organizational ecology and its respective theory fragments are both deep and extensive, having been studied for over half a century. This theoretical framework serves as a fitting guide for this study of the trade publishing industry by focusing on factors that have specific relationships with mortality that can be extrapolated beyond industrial boundaries while having unique characteristics within specific industries (Carroll, 1984).

#### **Age Dependence**

Despite the sheer quantity of research done on the various theory fragments there is still much disagreement across the literature. Perhaps one of the most contested theory fragments is the literature on age dependence, which varies greatly in its conclusions regarding the impact that age has on mortality rates. Hannan (1989) argues that there is a negative monotonic relationship between age and mortality rates, whereas Peterson and Koput (1991) provide evidence that age has a positive monotonic relationship with mortality rates. These early studies relied on the Gompertz and Gompertz-Makeham

models, which had proven robust in the broader study of population ecology quickly drew criticism due to the differences between organizations and organisms. This led to an approach to age dependence that began to incorporate other theory fragments and sub-fragments such as structural inertia, environmental change, and organizational size. These later studies, particularly the work done by Tushman and Anderson (1986), point to a non-monotonic relationship between age and mortality dependent on its relation to these other organizational theory fragments.

The more recent studies of age dependence (Hannan, 1998; Moore, 1997; Carroll and Hannan et al., 1998) have begun to aggregate these various positions on age dependence, incorporating both monotonic and non-monotonic measures of age into their models in a way similar to the combination of the liability of newness and adolescence approach. As the models used for age dependence moved further away from the formalizations behind the Gompertz-Makeham approach, age, once again, became more of a tool to track the progression of other theory fragments, particularly in terms of age and the environmental differences between the current environment and the environment of founding, rather than a determining factor of its own right (Amburgey, Kelly, and Barnett, 1993). However, despite this drawback, by using a log-quadratic age term, it was able to account for any monotonic age effect as it would “accelerate, decelerate, or remain constant, depending on whether  $\alpha_1$  is greater than 1, less than 1, or equal to 1 respectively,” where  $\alpha_1$  is the coefficient for the first of the two age terms. It also utilized the square of the linear age term to capture non-monotonicity as it is more sensitive to nonlinear effects (Moore, 1997).

Additional controversy on the topic of age dependence surrounds the theory sub-fragment of the liability of newness. The liability of newness argument (Stinchcombe, 1965; Freeman, Carroll, and Hannan, 1983; Carroll and Delacroix, 1982; Bruderl and Schussler, 1990) states that firms have a higher rate of mortality at very early stages of development due to a lack of stability and experience. This argument, however, is in direct conflict with the argument set forth by Baron, West, and Hannan (1994) stating that young firms, due to their lack of structural inertia and an ability to adapt to the conditions of the environment at the time of their founding. This approach lead to an argument for a liability of adolescence where, as the environment drifts from its position at an organization's founding, mortality rates increase due to structural inertia. Following the logic of both the liability of newness and the liability of adolescence arguments Baum (1989) and Henderson (1999) find that the two formalizations are not mutually exclusive; rather they can be used in conjunction with one another. This approach enabled a more complete understanding of the correlation of age and mortality, but shied away from a study on age dependence, as the two formalizations each became reliant on other factors, such as size and market density. As organizations were normalized with respect to size a stabilization of mortality rates between founding and adolescence was witnessed, implying a liability of smallness rather than a liability of newness (Baum and Shiplov, 2006).

This inconclusivity poses problems for studies not exclusively focused on the behavior of the age term. As such, any formulations regarding the impact of age on mortality with regards to a specific industry is subject to shortcomings. The ambiguity of the recent theoretical framework that is still being explored, however, can be avoided

through the utilization of the older, better understood approach to age that treats it as having monotonic, linear relationship with mortality (Amburgey, Kelly, and Barnett, 1993). This is the approach taken in this study; as the age range of the cross-section of trade publishers used in this study exceeds 300 years, these inconsistencies within the study of age would be amplified greatly if left uncontrolled.

### **Structural Inertia**

Tied into the study of age dependence is the study of structural inertia, which is an organization's ability, or inability, to adapt to changes in an environment. As an organization ages it develops higher levels of reproducible reliability and accountability (Hannan and Freeman, 1984). This increase in reproducibility causes higher levels of structural inertia; while this structural inertia is harmless in a stable environment, under changing environmental conditions it is problematic as it is connected to decreased adaptability (Baum and Shiplov, 2006). This is related to the idea of imprinting (Hannan and Carroll et al., 1998), where events that occur during key points in an organization have a lasting impact on the organization's structure/strategy/etc. This provides a positional and organizational advantage under the environmental conditions at the time of imprinting, but loses its value once the environment changes. These imprints are inert and either force the organization to be out of sync with the environment or adapt to the changes. However Miller and Friesen (1980) argued that structural and/or strategic changes, in and of themselves, can be either advantageous or detrimental to an organization. While a large separation between strategy/structure increases mortality rate, changes to these aspects of an organization decrease the reproducibility of the organizations reliability and accountability, making the organization less efficient and

putting it at a higher risk of failure. This decrease in reproducibility has a positive monotonic relationship with structural inertia. Therefore, structural inertia has a positive monotonic relationship with mortality rates in a changing environment and a negative monotonic relationship with mortality rates in a stable environment.

This relationship between environmental change and mortality, with respect to structural inertia, is particularly dangerous for the trade publishing industry due to the length of environment consistency in its past. The length of this period of environmental tranquility abetted in the development of high levels of structural inertia in many of the well-established trade publishers. While the reliability and accountability of these established trade publishers benefited them in the past, this structural inertia inherently puts them more at risk as the industry enters a period of environmental flux.

### **Size Dependence**

While structural inertia is related to the above-mentioned age dependent reproducibility, it is also related to size, which complicates the relationship between size and mortality. Size was originally believed to have a negative monotonic relationship with mortality rates, resulting in a liability of newness (Hannan et al. 1998). This negative relationship was attributed to the depth of resources that larger organizations had, which gave them resilience against environmental changes. An organization with a large endowment is able to survive in adverse environments by sustaining its structure and members even when it is operationally impaired. This benefit from size is, however, short term, and mortality rates increase greatly if the endowment runs out before the organization is able to adapt to the adverse environment. However, Hannan and Freeman (1984) showed that there is a positive relationship between size and structural inertia, as

it is more difficult for larger organization to change its internal structure than it is for a smaller firm. Additionally, Swaminathan (1996) found that mortality is also affected by the relationship of amount of change relative to size.

### **Generalization and Specialization**

Where the study of age and size dependence appeared simple at the outset, the study of generalization versus specialization was understood to be a highly complex issue from the start. Hannan and Freeman (1984) formalized that, as organizations are inherently inert with respect to environmental changes, an organization's survivability in a changing environment is thus reliant on its ability to continue operations in an adverse environment. This sustainability is thus dependent on the nature of an organization's operations, be that generalized or specialized. Generalized organizations, which are organizations that operate within several individual markets, are more capable of maintaining operations in an environment that has changed from its point of origin. Specialized organizations, which are those organizations that operate within a specific market, thrive in stable environmental conditions but are ill-suited for periods of environmental fluctuation. However, the scale of these characteristics is directly related to the size of the organization. Complications arise, however, when an organization is backed by another, larger, organization (Baum and Oliver, 1991) When backed by another organization, a specialized organization becomes, to an extent, temporarily immune to environmental changes as they can tap into resources unavailable to organizations without backing.

Within the trade publishing industry there are many of both types of organizations. However, the larger trade publishers tend to be more specialized than



smaller trade publishers. Although the majority of these larger trade publishers' operations are focused within one market, these larger organizations also generally operate in a wider set of markets. In spite of having a wider scope of operations than their smaller counterparts, this proportional specialization causes these larger trade publishers to be less suited for a changing environment.

### CHAPTER III

#### THEORY AND DATA

This study focuses on identifying the extent to which specific theory fragments of organizational ecology impact trade publisher mortality. Following the findings of Moore (1997), I hypothesize that age, size, and modernization will have a positive correlation with mortality while generalized operations will have a negative correlation with mortality.

In order to understand the impact of age, size, generalization, and environment on mortality rates in the trade publishing industry this study uses the following probit model, which is based on the hazard function model used by Moore (1997):

$$Y = \alpha age + \beta s + \lambda g + \theta d + e \quad (3.1)$$

$Y$  is a categorical dependent variable representing life or death,  $s$  denotes asset size,  $g$  is a categorical variable representing whether operations are generalized or specialized,  $d$  is a categorical variable representing whether a firm is based in a developed nation or not, and  $e$  is the error term. An expanded explanation of these variables is shown in Table 3.1.

While Moore (1997) uses a hazard function, this study uses a probit model instead. From the outset, the purpose of this study was to measure the impact of factors on trade publisher survivability, rather than discerning the instantaneous failure rate

within the industry. By focusing on the probability of failure rather than the rate of failure it thus becomes possible to accomplish this in a more succinct manner.

TABLE 3.1  
 DESCRIPTIONS AND SOURCES OF INDEPENDENT VARIABLES

Variable	Description	Source
Age	Years since founding	Mergent Online *
Total Assets	Measured in thousands (USD) and adjusted for inflation	Mergent Online*/BLS#
Generalization	1 = operates outside of trade publishing; otherwise 0	Mergent Online*
Modernized	1 = modernized; otherwise 0	OECD**

\* [mergentonline.com](http://mergentonline.com)  
 # [http://www.bls.gov/data/inflation\\_calculator.htm](http://www.bls.gov/data/inflation_calculator.htm)  
 \*\* <http://www.oecd.org/about/membersandpartners/>

Recent findings in the literature of organizational ecology have shown that linear age terms do not adequately represent the nuances of the relationship between age and mortality. The debate regarding the best way to succinctly represent these nuances has failed to reach any conclusion beyond the sensitive nature of this term. This paper uses a linear age term in the hopes that understanding the limitations of the term will allow for a better understanding of the impact of the other terms, whereas a misrepresentation of the age term based on highly contested formulations might prevent accurate analysis of the other terms.

## Data

As the data used for this study include both firms that have exited the industry as well as firms that are still active, the age term is defined by the year of founding to the most recent year of operation within the industry. This specification of age is somewhat divergent from the approach taken in a majority of the literature, which limits the organizations included in a study to those who both enter and exit the industry during the timeframe set by the study. While this facilitates an understanding of theory fragments over the course of firms' lifespan, it simultaneously pigeon-holes the study in several ways. The first is in respect to the industry/timeframe relationship of the study.

A study that aims to focus on mortality over a short period of time is forced to study an industry with short life-spans, such as restaurants (Hannan, Carroll, and Pólos, 2003) or newspaper publishers (Carroll and Delacroix, 1982). While the focused nature of the timeframe enables a succinct analysis of theory fragments given specific environmental factors, it is inherently biased by the limited pool of available industries that fit the criteria of the timeframe. Conversely, if a study wishes to focus on an industry with longer life-spans, the timeframe of the study is subsequently forced to facilitate this, as seen in the study of American breweries (Carroll and Swaminthan, 1991) where the timeframe is 355 years, life insurance companies (Moore, 1997) where the timeframe is 200 years, and the study of credit unions (Barron, West, and Hannan, 1994) with an 80 year timeframe.

While the specification of age used in this study varies from that used in the literature, the definition of when a firm exits the market does not. Following the precedent set by the literature of organizational ecology, a firm that has been acquired by

another firm is considered as having exited the market, while a firm that acquires another firm remains.

Additionally the members of the Organization for Economic Cooperation and Development (OECD) were considered to be developed nations. While there are certainly some nations whose status as ‘developed’ could be contested who are not members of the OECD, as an indicator of nations with significant implementation of, access to, and use of state-of-the-art technological developments at the consumer level to the extent that it would might affect markets at an industrial level, the list of OECD members is a more-or-less comprehensive list that represents the vast majority of developed nations.

The designation of trade publishers was determined by firms with a primary industry code of 511130 (NAICS) or 2731 (SIC). These industry codes imply that the primary operations of the listed firms is trade publishing, however it includes both firms that are exclusively engaged in trade publishing as well as firms who have branched out to operations outside the scope of trade publishing.

These firms that have branched out beyond their primary operations are listed as generalized, while firms whose operations are confined to trade publishing are considered specialized. Finally the data for asset size is shown in terms of thousands and has been converted from its reported currency to USD and then standardized against inflation using information from the US Bureau of Labor Statistics. This list of trade publishers is a cross-section of firms that have existed in the past two decades was obtained through MergentOnline, and then subsequently reduced to fit the necessary specifications.

## CHAPTER IV

### RESULTS AND ANALYSIS

The data used in this study, in and of itself, provides an interesting cross-sectional view of the trade publishing industry. The age of these 57 trade publishers ranges from 5 years old to 330 years old. Similarly their assets range in size from 610 thousand USD to 23.959 billion USD. The complete summary statistics can be found in Table 4.1. These two aspects of the data, in particular, show the huge disparity among trade publishers in the past two decades.

That being said, there are some outliers in each of these categories. Koninklijke Brill NV is both an outlier in terms of age and size and has the highest value in both categories; the next oldest trade publisher is 121 years younger and the next largest trade publisher's total assets are 5.821 billion USD smaller. At 204 and 209 years old, respectively, Wiley (John) & Sons, Inc. and Bonnier AB are also outliers in terms of age. All three of these outliers are still active within the industry, though both Koninklijke Brill NV and Bonnier AB sales dropped over 2 million USD between 2009 and 2011. Excluding these three outliers, those older than the median age of 43 have an 8% higher mortality rate than those younger than the median. Excluding the outlier Koninklijke Brill NV, trade publishers with total assets larger than the median average size of 208,487.4 USD have a 6% lower mortality rate than those with assets smaller than the median.

TABLE 4.1  
SUMMARY STATISTICS OF DATA

Variable	Mean	Standard Deviation	Min	Max
Age	66.5892	64.5058	5	330
Total Assets*	1,729,091	4,594,024	610.69	23,959,343
Generalization	0.4821	0.5042	0	1
Modernized	0.6964	0.4639	0	1

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\*measured in thousands

While this implies that larger trade publishers have a higher mortality rate than smaller publishers, both the 10 largest and 10 smallest publishers have a mere 10% mortality rate, while the 10 trade publishers in the very middle of the size spectrum have a 40% mortality rate; this mortality rate remains constant when this is expanded to the 20 trade publishers at the center of the size spectrum. The implication of this relationship between size and mortality among trade publishers is consistent with the theoretical framework of organizational ecology: smaller firms are more able to respond to the changing environment, while the endowments of the larger firms allow them to continue operations in spite of these changes.

The results of the probit model are shown in Table 4.2. With a  $\chi^2$  score of 15.92, the cumulative results are significant at the 0.01 level. With a pseudo  $R^2$  of 0.2624 these results, while significant, do not represent a majority explanation of the factors that have

played into trade publisher mortality in the past two decades. Although the results do not completely explain trade publisher mortality, it is likely that this reflects the limitations of the data set rather than a theoretical failure. Similarly the wide range in the significance of each variable indicates the limitations of the data rather than the theory. Age and asset size are each statistically insignificant at the 0.1 level while environmental modernization is significant at the 0.05 level and generalization is significant at the 0.01 level.

I checked for major errors by testing for non-normality of error terms, heteroskedasticity, and multi-collinearity. The results of the test for multi-collinearity indicated that each independent variable was, in fact, independent, but the tests for non-normality of error terms and heteroskedasticity were more complex. The test for non-normality of error terms showed that the error is present, which was far from a surprise given the limitations of data. However, due to the on-going debate within the literature of organizational ecology regarding the impact of monotonic transformations, particularly on age, this study was unable to fix the error of non-normality. The test for heteroskedasticity did not indicate that the error was present.

Supporting both the study's hypothesis stated in Chapter 3 and the previous findings of existing literature, the results indicate that more generalized operations have a negative correlation with mortality rates in the trade publishing industry. With a coefficient of 0.3249, the findings of this study imply that generalization has an enormous impact on a firm's survivability in a changing environment. Due to the limitations of the data set, there is a good chance that actual size of the impact that generalization has is, in fact, much smaller than the results of this study imply. In spite of this addendum, these findings still serve to reinforce the findings of existing literature.



TABLE 4.2  
PROBIT MODEL RESULTS

Variable	Coefficient	z-score	P >  z
Age	0.0007	0.92	0.356
Asset Size	0.0001*	0.94	0.347
Generalization	0.3249	2.92	0.004
Developed	-0.2648	-2.38	0.017

\* Actual value is 0.00000000991

Also supporting the hypothesis stated in the previous chapter are the results regarding the correlation between the technological advancement, represented by the developed world, and the probability of fatality. With a coefficient of -0.2648, these results show that, over the past two decades, a trade publisher in a developed nation has a higher probability of failure than if that same trade publisher was based in a developing nation. Once again the limitations of the data necessitate caution regarding the precision of these results, particularly in terms of scale. However, this provides interesting insight into the trade publishing industry, particularly given the connection that this implies to the impact of the proliferation of e-books and e-book readers in developed nation.

The literature of organizational ecology has shown fairly conclusively that industrial level environmental changes increases the mortality rate within that industry. This data set uses trade publishers from many different markets, all of which are undergoing different environmental changes. This market spread, combined with the

range of time covered in the data, allows for the assumption of an even distribution of environmental changes in terms of frequency and scale relative to market size. The one facet of the environment where this is not the case is technological availability for the general populace. There is far greater availability in developed nations than developing nations, which subsequently allows for the study of the direct impact of this one facet of environmental change on the trade publishing industry, and the results of that study show that higher levels of the availability of technology is directly correlated with trade publisher mortality. Additionally it reveals a potentially strong inverse correlation between the use of technology and how many books are being read, however this is speculation and is ultimately outside the scope of this study.

## CHAPTER V

### CONCLUSION

Once a stable and prosperous industry, trade publishing now faces a changing environment that could, depending on organizations' responses, could make or break the industry. These environmental changes, as shown in this study, are predominantly based in the technological developments of the past two decades. By using organizational ecology to identify how certain factors play into trade publisher mortality, however, the necessary responses to these changes have begun to appear.

It is clear that, given the correlation between the availability of technology to consumers and mortality, trade publishers in modernized nations face higher risk than those in developing or undeveloped nations. As such these publishers, further following the findings of this study, should attempt to generalize operations. This study, however, does not detail the optimal scale of generalization trade publishers should aim for. Future research on the topic could identify this optimal generalization, but, in light of this limitation, a certain degree of caution is advisable.

While trade publishers in developing and undeveloped nations are at lower risk than their counterparts in modernized nations, it would be wise to attend to the woes of said counterparts. While individual nations will each reach the level of technological availability seen in modernized nations at a different point in time, it is a relatively safe to assume that once this technological availability has been achieved the trade publishers in

these nations will be facing similar struggles to the ones currently being faced by their counterparts. In light of these findings, it would be advisable for these trade publishers to take precautionary steps to prepare for these foreseeable environmental changes.

The findings of this study also highlighted a lack of correlation, within the trade publishing industry, between size and mortality. Despite the assumed relationship between the limitations of the data and the statistical insignificance of age and size, these findings still serve as an interesting addition to the literature of organizational ecology. Although inconclusive, the results show that, for trade publishers, a linear age term may be less effective than previously thought. While the results regarding size displayed decidedly low statistical significance, they imply that maneuvers by trade publishers to manipulate size bear a risk that results in very little payoff. This is particularly relevant in light of the recent defensive mergers-and-acquisitions (M&A's) that many larger trade publishers have undergone in recent years. Outside of the trade publishing industry, M&A's have a ~50% failure rate (Lubatkin et al, 2001). As M&A's are, in and of themselves, high risk maneuvers, these results imply that they are not worth this risk. However, empirical analysis of this specific subject is outside of the scope of this study.

This study serves as a starting point for discourse regarding the application of organizational ecology's theory fragments to the trade publishing industry. Future research can easily build upon the results of this study in many ways. First and foremost among these would be the utilization of the more recent theoretical developments surrounding age and size dependence. As this study has established that linear measurements of both of these fragments do not capture their relationship in this industry this would thus be a logical continuation within this realm of study. Similarly, the

generalization term could be expanded to determine an optimal degree of generalization for trade publishers in a changing environment, as this study makes no attempt to do so. Additionally, the theory fragments that have been excluded from this study can also be incorporated into future research so as to provide a more complete understanding of the industry.

## CHAPTER VI

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