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Why Restaurants Fail? Part II - The Impact of Affiliation, Location, and Size on Restaurant Failures: Results from a Survival Analysis

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It has been suggested that changes in organizational populations are shaped by a natural (biological) selection process. Industries and businesses evolve through standard and identifiable phases throughout their lifespan. This study analyzed organizational mortality in the restaurant sector based on restaurant location, affiliation (presence/no presence of multi-unit locations of restaurants in a given geographical area), and size. Objectives of this study are to understand organizational failure from a population ecology perspective and, specifically, to identify the influences of location, competitive density, and organizational size on restaurant failure. The analyses indicated all three variables—location, affiliation, and size—are significant influences on restaurants' mortality. Chain restaurants were found to have significantly lower failure rates than independently owned restaurants. Restaurants that are smaller in size had higher failure

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rates than large sized restaurants. There is a significant effect of location, as measured by U.S. postal zip codes, on restaurant failures.

KEYWORDS organizational mortality, population ecology, restaurants, business failure, multi-unit restaurants

INTRODUCTION

Research on organizational mortality has been studied from different perspectives. Organizational psychology and organization studies' researchers that have analyzed organization mortality by studying managerial variables, such as managerial cognitions, top management team composition, discretion, and tenure, suggest that managerial actions reign over environmental factors (Eisenhardt & Bourgeois, 1988; Hambrick, 2007; Hambrick & Mason, 1984). Industrial organization and organization (population) ecology scholars, on the other hand, assert that failure is the result of a natural selection process of industry life cycles, organization age, size, and a population's competitive density (Freeman, Carroll, & Hannan, 1983; Hannan & Freeman, 1989; Schumpeter, 1942). The appeal of each of these perspectives as factors contributing to organization decline and failure is compelling. Each of these perspectives try to explain why some firms can thrive in environmental turbulence, while other firms' fail even in relative environmental calm.

A framework that embraces both of these perspectives has yet to emerge, although effort to do so has begun (Mellahi & Wilkinson, 2004). This article attempts to bridge this gap by introducing an organization ecology framework to analyze restaurant failure. In particular, organizational ecology assumes that other organizations influence the probability of success and/or failure of all other firms (Mellahi & Wilkinson, 2004).

In addition, this article includes three variables in the research: (1) density, the number of firms in an organization's population, affects organizational founding and mortality rates (Carroll & Hannan, 1989a, 1989b); (2) the firm's age and size as determinants of organizational mortality (Rumelt, 1991); and (3) a firm's affiliation, whether a firm is affiliated with a multiple ownership entity (Kalnins & Mayer, 2004).

Organizational ecology theories strive to project the death of firms (firm mortality or vital), as well as organizational growth (Singh, 1993; Singh & Lumsden, 1990), partly as a consequence of the number of organizations in the market (density dependency). Hopefully, introducing population ecology analytics to study restaurant events will invite scholars to consider restaurant events from managerial and environmental perspectives.

This study analyzes organizational mortality in the restaurant sector based on restaurant location, affiliation (presence/no presence of multi-unit locations of restaurants in a given geographical area), and size. The specific objectives of this study are to understand organizational failure from a population ecology perspective and, specifically, to identify the influences of location, affiliation, and organizational size on restaurant failure.

LITERATURE REVIEW

Organizational Ecology and Firm Failure

Hannan and Freeman (1977) suggested that changes in organizational populations are shaped by a natural (biological) selection process. The notion is that industries and businesses evolve through standard and identifiable phases throughout their lifespan, during which they are transformed (Anderson & Tushman, 1990). Organizational ecological researchers specify population dynamics, which identifies the effect of new firm entrants as a function of prior entries and exits; and density, which examines the total number of firms in a population and their effect on entrants, exits, and survivors in order to help understand firm survival and exit. This transformation process happens due to changes, or environmental responses, that alter the sources of industry competitive advantage, entry barriers, and survival.

Competitive Population Density

The standard restaurant site selection process involves, among other factors, location analyses, a survey of economic conditions, current competitive analyses, population counts, and projected population growth of the region (Park & Khan, 2005). Because these particular factors are considered highly relevant to future sales projections, any likely influences on the population density of a potential site (mall openings and closings, for example) are considered for their impact on the projected performance of a site (Mason, Mayer, & Ezell, 1988; Powers, 1997).

Density is measured at the competitive market level, and competitive rivalry in the restaurant sector is such that all competition is local (Baum & Mezias, 1992), making a sub-sector ideal for studies of organization ecology (Hjalager, 2000). Competitive density has been found to have significant organizational life-cycle effects, such that organizations founded during periods of high density may be persistently predisposed to higher mortality rates (Hannan & Freeman, 1989). Organizations are subject to both institutional and ecological processes that result in entry and vital rates. The restaurant sector is frequently associated with low entry barriers and high entry rates, leading some researchers to propose that the Schumpeter-like (institutional processes) market corrections often observed (as evidenced by high vital rates) are to be expected as the market weeds out the most ineffective performers (Schumpeter, 1934). High vital rates may also be explained, in part, by ecological processes, such as high density and competitive influences (Singh, 1993).

Restaurant Failure (Mortality) Perspectives

Restaurant mortality studies can be found readily in marketing, managerial, economics, institutional ownership, entrepreneurial, and organizational ecology literatures. The marketing and managerial perspectives for firm mortality typically highlights errors in marketing mix strategies (Bertagnoli, 2005; Shriber, Muller & Inman, 1995) and levels of marketing expenditures, product, and services offered (O'Neil & Duker, 1986). Some researchers suggest the direct effect of low entry barriers in the restaurant industry that permit inefficient operators to commence venture initiation. Parsa, Self, Njite, and King (2005, pp. 304–322) suggested a ". . . strategic choice of repositioning, adapting to changing demographics, accommodating the unrealized demand for new services and products, market consolidation to gain market share in selected regions, and realignment of the product portfolio that requires selected unit closures." Observing managerial failure criteria, they noted that restaurant failures may be the result of ". . . managerial limitations and incompetence. Examples of this group include loss of motivation by owners; management or owner burnout as a result of stress arising from operational problems; issues and concerns of human resources; changes in the personal life of the manager or owner; changes in the stages of the manager or owner's personal life cycle; and legal, technological, and environmental changes that demand operational modifications" (p. 305).

Economic measures highlight bankruptcy rates (Kwansa & Cho, 1995); access to capital (Holtz-Eakin, Joulfaian, & Rosen, 1994); and financial measures, such as profitability measures and capital market restrictions, that may induce high insolvency rates and insufficient liquidity (Canina & Carvell, 2007; Kwansa & Parsa, 1990; Stroutmann, 2007). Institutional ownership, such as that found in franchisor systems, suggests that firm performance may be enhanced by managerial monitoring and that institutional ownership has a significant and positive impact on firm performance; that restaurants that are part of a system of multi-unit owners benefit from local experience and support of the franchisor and, hence, enjoy reduced failure rates as a result (Kalnis & Mayer, 2004); and that membership in franchise systems creates competitive advantage through the gain of scale economies via collective purchasing and the use of trade names, resulting in increases in economic rents (Litz & Stewart, 1998).

Entrepreneurial perspectives attempt to investigate and confirm or disconfirm that appropriate entrepreneurial strategic postures, coupled with effective implementation efforts, lead to enhanced firm performance

(Jogaratnam, Tse, & Olsen, 1999); that founders' characteristics and motivations influence venture creation and performance (Stroutmann, 2007); and that entrepreneurial top management styles affect firm performance (Covin & Slevin, 1988).

Ecological Perspectives of Restaurant Failure (Mortality)

Hjalager (2000), in her study of restaurants in Denmark, found multi-unit restaurant affiliation increased restaurant survival but only in the presence of three or more affiliated restaurants. Managerial factors (managerial capacity and staff competence) insufficiently contributed to variance explained. Younger and smaller restaurants were less viable than larger and older restaurants.

Comparing 15 years of demographic data (Shriber, Muller, & Inman, 1995) and contrasting it to regional population growth patterns (census information) yielded restaurant entry and exit patterns that varied according to region. During the study's period, while the nation experienced a 17.1% surge in growth, restaurant category sales evidenced a non-linear relationship, with some region's sales dramatically outpacing comparable population growth increases (for example, the mid-atlantic region). Parsa et al. (2005) also found competitive benchmarks insufficient to describe survival. Proximity was a blessing and a curse; while close proximity might benefit a restaurant, they suggested that finding oneself in a cluster of restaurants without sufficient differentiation might invite competitive disadvantage.

It seems reasonable to suggest that a restaurant's location is critical to patronage. If the restaurant is located in a remote location and hard to find, accessibility is compromised. If, on the other hand, a restaurant is located in an area that is easily found and within proximity to potential guests, its availability for potential selection of dining choices is enhanced. In their interest in identifying site selection factors for U.S. franchise restaurants, Park and Khan's (2005) factor analysis of 56 variables concluded general location as being the primary factor necessary for the success or failure of franchise restaurants. Location advantages/disadvantages may be temporal, in that conditions surrounding a given franchise may change over time. For example, a market that would not be characterized as dense 5 years ago may be considered competitively dense 5 years later due to shifts in demographics.

There is considerable support for the tendency of multiple affiliated ownership restaurants to enjoy market-based superiority due to the transfer of knowledge possibilities from one location to another (Kalnins & Mayer, 2004). For example, Ingram and Baum's (1997) study of chain hotels found lower failure rates in hotels affiliated with chains than in unaffiliated hotels. Knowledge transfer is not limited to multi-unit, one-owner circumstances, and it has been evidenced in franchised pizza restaurants as well (Darr & Kurtzberg, 2000).

METHODOLOGY

Data for determining the impact of affiliation, location, and size was obtained from the Cobb County Board of Health, Georgia, USA. Information was collected annually on restaurant openings, closings, and other information, including zip code, size, etc. Firms in the dataset were restaurants located in Cobb County, Georgia (1982–2007) that had gone through the formal and required process of obtaining business permits and health inspections. Cobb County is part of the metropolitan Atlanta area and, according to the U.S. Census (2000), had a population of over 600,000 and an annual household income of over $70,000.

Local health departments inspect all establishments that are involved in foodservice in any form, even those foodservice establishments that are not commercial restaurants. As a result, some of the establishments that were not restaurants were deleted from the database. Examples of deleted establishments included employee and educational (school) cafeterias; bars, lounges, taverns, and pubs; hotels/motels/lodges; grocers; bowling alleys and lanes; newsstands; country clubs; social clubs; retirement homes; gyms, recreational, and healthcare organizations (hospitals, nursing homes, hospice organizations, medical buildings); fraternal clubs (American Legion, Veteran of Foreign Wars-VFW, etc); churches; movie theater concessions; and caterers. After this process of elimination of the non-restaurant foodservice operations from the data, a total of 3,128 restaurants were used for further analysis.

Survival Analysis

Survival analysis was originally developed in bio-medical sciences, especially in the field of epidemiology. It was originally used to estimate the survival rate of patients with various diseases, thus the name "survival analysis." According to Miller, Gong, and Munoz (1981), "survival analysis reports proportion of patients alive at fixed time points." For example, when 30 patients out of 45 survived after 1 year, then the survival rate is 66.67% with a failure rate of 33.33%. Then the analysis continues for years 2, 3, 4, and so on. Thus, the survival curves are downward in nature, with high survival rates in the beginning and gradually decreasing with time. This holds true because patients die gradually over an extended time. The opposite happens when results are reported as failure rates. In case of failure rates, the obtained curves will be upward in nature, with rates being low initially and gradually increasing over time as patients die.

In social sciences, survival analysis is often used in economics and financial management to estimate the long-term economic impact of an event. In his scholarly review paper, Kiefer (1988) stated that traditional regression models do not account for the exogenous variables that confound the results in longitudinal studies, which can create not only methodological but also conceptual problems. To address these issues, economists have borrowed statistical techniques from such fields as engineering, where survival analyses were used to estimate the life expectancy of machinery, building structures, and material models, and bio-medical sciences, where patient survival rates, treatment effects, organ transplant holding rates, etc., were estimated.

According to Jacobs, Meyer, Kiefer, Hankinson, Rabinowitz, and Barr (2011, p. 388), potential applications of survival analysis in social sciences include ". . . duration of marriages, time to adoption of new technologies, time between trades in financial markets, lifetime of firms, payback periods for overseas loans, . . . spacing of purchasing of durable goods, time from initiation and resolution of legal cases, time in rank, and length of stay in graduate school." Thus, survival analysis techniques have an extensive application in social sciences where longitudinal data is available and there is a need to estimate long-term effects of a population variable. Some of the earlier research where survival analysis was used include Mavri, Angelis, Ionnou, Gaki, and Koufodontis (2008); Yi, Gu, and Land (2007); Fritsch, Brixy, and Falck (2006); Yao, Partington, and Stevenson (2005); and Honjo (2000). For more examples and discussion of use of survival analysis in social and bio-medical sciences, the reader is referred to Maller and Zhou (1996, pp. 12–28).

In the hospitality–tourism literature, with notable exceptions, few studies have been reported recently using survival analysis. Peister (2007) used survival analysis and the Cox data reduction method in developing a table game revenue management (TGRM) model. In that work, he demonstrated that revenue management for casinos can be developed using the metric of win per available seating hour. Hong and Jang (2008) used survival analysis to estimate the factors influencing purchase time of a new casino product in Korea. In their study, cognitive, sensation seeking, and impulsiveness were found to be most important determinants in visiting a casino. Earlier, Gokovali, Bahar, and Kozak (2007) used survival analysis to determine the length of stay of tourists at a destination in Turkey.

As is apparent here, even though the survival analysis technique has been established as a useful technique elsewhere, its usage has been limited in the field of hospitality–tourism. In addition, most of the above-cited research in social sciences used only Cox data reduction techniques for estimating survival rates. Though, the Kaplan-Meier (K-M) technique is one of the oldest and soundes techniques to estimate survival rates, it has not yet been applied in this field.

As reported by Miller et al. (1981), the K-M technique was introduced in 1958 by Kaplan and Meier in their seminal article published in the *Journal of American Statistical Association*. The K-M survival analysis was conducted to test the equality of the survival distributions for the different levels of the factor. The purpose of the K-M analysis is to estimate the survival rate at each point in time based on taking conditional probabilities at each time point when an event occurs (Hosmer & Lemeshow, 1999). Thus, this method would provide the expected survival rate (time) for different levels of the factors under consideration. An extensive search has revealed no indication of usage of K-M analysis in the hospitality–tourism field. To the best knowledge of the authors, this article is the first attempt to introduce the K-M survival analysis in hospitality–tourism field

According to Miller et al. (1981 p. 1), "[s]urvival analysis is a loosely defined statistical term that encompasses a variety of statistical techniques for analyzing positive-valued random variables."

In the present case, restaurant closings are the events that occurred continually over an extended period, and these events have occurred randomly with positive values. In addition, there is a definite relationship between time and the occurrence of restaurant failures. According to Kleinbaum (1996, p. 15) survival analysis has three basic goals: (1) "[t]o estimate and interpret survivor and hazard functions from survival data; (2) [t]o compare survivor and/or hazard functions; and (3) [t]o assess the relationship of explanatory variable to survival time." Thus, survival analysis was determined to be the most appropriate method to investigate restaurant failure events. The current data provides clear opening and closing points for a series of restaurants along the time line. Currently, open restaurants in the data were considered as censored data (versus missing data), since there is the potential that these restaurants could close later even if they are functionally open at the time of the analysis (Therneau & Grambsch, 2000).

The survivor function $S(t)$ gives the probability that a restaurant survives longer than a specified time t (say first year, second year, etc.). Another term that is important in survival analysis is the hazard function. According to Kleinbaum and Klein (2005, p. 11), "the *hazard function h(t)* gives the instantaneous potential per unit time for the event to occur, given that the individual has survived up to that point." In the current case, the hazard function gives an estimate of restaurant failure at a point.

To test the failure rate, the hazard function $h(t)$ must be calculated, which is defined as "the probability per time unit that a case that has survived to the beginning of the respective interval will fail in that interval" (Jacobs et al., 2011, p. 388). The hazard rate is computed as the number of failures per time unit in the respective interval divided by the average number of surviving cases at the mid-point of the interval. Thus, it gives the risk of failure per unit time during the aging process.

The Cox proportional hazard model, as used in this study, is one of the techniques for investigating the relationship between independent variables and survival time. Cox's proportional hazard model is similar to a multiple regression model, but it does not require any assumptions about the probabilities distribution of the hazard, which was made in the general regression model. Thus, it is considered as the non-parametric method. However, it is assumed that the hazard ratio does not depend on time. According to Kleinbaum and Klein (2005, p. 111), ". . . one of the key features of the Cox model is that there is not an assumed distribution for the outcome variables" and "[t]he construction of Cox likelihood is based on observed order of events rather than the joint distribution of events." As a result, the Cox likelihood is described as partial likelihood.

In Cox's proportional hazard model, the dependent variable is the "hazard." As defined, the hazard is the probability of the risk for death at that moment. In the present case, it is the failure of a restaurant. This equation can be linearized by dividing both sides of the equation by $h_0(t)$ and then taking the natural logarithm of both sides. Thus, equations can be obtained as in a linear regression, and it more easily explains the results of Cox's proportional hazard model. Therefore, K-M analyses and the Cox proportional hazard model were conducted based on the above formula. This study also includes Cox proportional hazard regression analysis, the most general regression due to no assumptions (Hosmer & Lemeshow, 1999). The proportional hazard model estimates hazard ratios with standard errors, which is a function of the independent variables. The Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL) statistical program was used to perform survival analysis.

Restaurant Failures

The dependent variable of interest was restaurant viability (the closing of a restaurant). Survival time was measured in months, beginning with the opening date of the restaurant. The mean of viability values was 51.5 months (Standard Error [S.E.] = 53.9), ranging from 0 to 266 months. Three major independent variables used in this study were zip code, density, and category membership.

Location (Zip Codes)

Of the 27 zip codes in Cobb County, 12 were selected for analysis, premised on the fact that they have at least 100 restaurants per zip code. The average number of restaurants in each zip code was 260, ranging from 100 to 432.

Affiliation

Another influential variable is affiliation (multiple-unit presence), determined by the number of stores (5+) identifiable by branded name, and size (category), which was developed by the Cobb County Health Department for the purposes of fee determination. If there are more than five restaurants under the same restaurants' name, it was coded as 1; otherwise, it was coded as 0. Thirty-four percent of restaurants included in the analysis have multiple locations (chain restaurants) with the others being independently owned.

Size (Category)

The health department groups foodservice operations into four categories—0 through 3—ranging from fewest to greatest number of seats, meals prepared, customers served, number of employees, and duration of food production and storage. This categorization was adapted from the classification guidelines developed by Cobb County, Georgia, for the purpose of inspecting the foodservice operation. After filtering the data, Category 0 had the fewest restaurants in the research, with only 0.3% of the total number. This category had the fewest number of seats, least number of employees, and the least amount of food production and storage overnight; the majority was populated by convenience stores, kiosks, and retails outlets. Category 1 included quick-service restaurants, with 48% of the restaurants; Category 2 included most full-service restaurants with 43%; and Category 3 9% of the restaurants and included large-scale commercial operations, such as commissaries and food production centers.

RESULTS

Expected Survival Time by K-M Analysis

To investigate the time to close of restaurants, K-M analysis was conducted separately by each independent variable. The results indicated that the estimated mean time to close a restaurant located in zip code A was 5 years 6 months and 7 years for restaurants in zip code C. Table 1 shows the mean time to close a restaurant in all other zip code areas. The numbers for actual zip codes in Cobb County were replaced by letters to aid in grouping.

It is expected that 37% of restaurants in zip code A would close within 1 year. In the same time period, the expected restaurant failure percentage

TABLE 1 Estimated Mean Time to Close a Restaurant by Zip Code[a]

Zip code	Mean (S.E.)	Zip code	Mean (S.E.)
A	66 months (4.65)	G	74 months (4.62)
B	83 months (5.88)	H	102 months (10.37)
C	84 months (6.14)	I	103 months (11.02)
D	99 months (7.16)	J	78 months (12.10)
E	71 months (4.21)	K	89 months (5.15)
F	114 months (11.39)	L	74 months (4.59)

[a]Actual U.S. postal zip codes are replaced by letter codes.

TABLE 2 Percentage of Closed Restaurants During the First Year by Zip Code

Zip code	Percent failed	Zip code	Percent failed
A	37	G	40
B	31	H	30
C	30	I	26
D	29	J	49
E	31	K	33
F	25	L	33

was from 26% (zip code I) to 49% (zip code J). As is apparent from this data, restaurant failures significantly differ among various zip codes (Table 2). This is an important and also useful finding for the industry. Independent and chain restaurants may want to know this type of information as they plan for business expansions and new unit openings.

According to the analysis, the estimated mean time to close a restaurant is 5 years and 8 months (S.E. = 2.13) for non-multiple location group (independent restaurants), while it is 9 years (S.E. = 3.34) for multiple locations group (chain restaurants). Moreover, it would be expected that 25% of the independent restaurant group would close a restaurant within 1 year. In the same time period, 10% of chain restaurants would close. A cumulative curve is represented in Figure 1. Thus, it is clear that chain restaurants have much higher survival rates compared to independent restaurants. This supports earlier findings showing a higher survival rate for chain restaurants (Kalnins & Mayer, 2004). Independent restaurants are experiencing 2.5 times higher failures rates compared to chain restaurants.

In the next step, we analyzed the survival rate by category (size). The K-M analysis by category variable shows that the expected mean time for a restaurant closing would be 2 years and 3 months (S.E. = 6.07) for Category 0, 5 years and 3 months (S.E. = 2.37) for Category 1, 7 years and 10 months

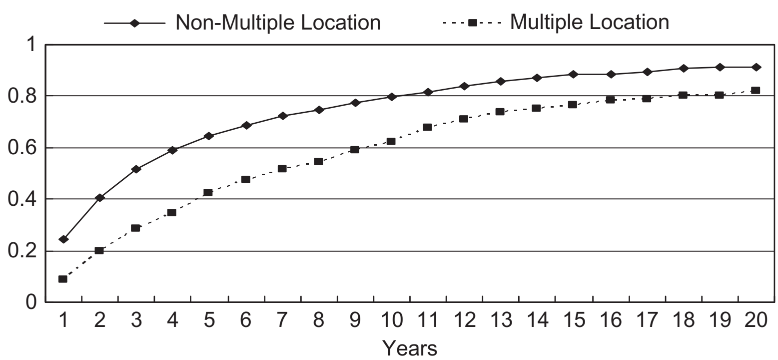

FIGURE 1 Cumulative closed restaurants curve for multiple locations.

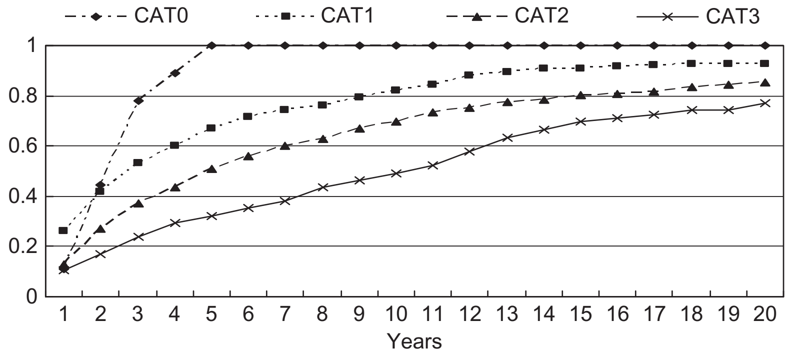

FIGURE 2 Cumulative closed restaurants curve by category.

(S.E. = 2.92) for Category 2, and 10 years and 9 months (S.E. = 6.77) for Category 3. Within 2 years, it would be expected that 44% of restaurants in Category 0 and 42% of restaurants in Category 1 would close. In comparison, it would be expected that 27% and 17% of restaurants in Categories 2 and 3, respectively, would close within 2 years. Figure 2 shows the cumulative curve of time to close a restaurant. These results clearly indicate that there is a significant effect of the size of a restaurant on the failure rates. In this study, the category of a foodservice as set by the Cobb County health department was chosen as the proxy for the restaurant size. This decision is supported by the fact that foodservice categories set by the Cobb County health department are based on rising complexity and size, such as the number of seats, number of employees, and complexity of food production. These results indicate that survival rate increases as size and complexity increase. Lower category restaurants (Categories 0 and 1) experienced higher failure rates compared to the upper category restaurants (Categories 2 and 3). In other words, smaller size restaurants experience higher failure rates.

Estimated Effects of Location, Affiliation, and Size

To explore the influence of location, affiliation, and size in the prediction of restaurants' closing over time, data was analyzed using Cox proportional hazard regression models. Zip code I, having the lowest rate of restaurant closures, was considered a reference group in the analysis, and Table 3 shows only statistically significant hazard ratios among all possible comparisons of zip codes.

Location Effects

According to the results of hazard ratios, a restaurant located in zip code I had the lowest possibility of closing than a restaurant in other areas. Thus,

TABLE 3 Hazard Ratios and Standard Errors of Variables to Closing Restaurants

Zip code (only significant hazard ratios were reported)			
A versus I[a]	1.500 (0.16)*	E versus D[b]	1.391 (0.10)**
E versus I[a]	1.523 (0.16)**	G versus D[b]	1.417 (0.10)***
G versus I[a]	1.551 (0.16)**	J versus D[b]	1.399 (0.15)*
J versus I[a]	1.531 (0.19)*	L versus D[b]	1.354 (0.10)**
L versus I[a]	1.482 (0.16)*	F versus E[b]	0.584 (0.14)***
C versus A[b]	0.780 (0.11)*	H versus E[b]	0.668 (013)**
D versus A[b]	0.730 (0.10)**	K versus E[b]	0.837 (0.09)*
F versus A[b]	0.593 (0.15)***	G versus F[b]	1.743 (0.14)***
H versus A[b]	0.678 (0.13)**	L versus F[b]	1.666 (0.14)***
F versus B[b]	0.697 (0.14)*	J versus F[b]	1.721 (0.18)**
G versus B[b]	1.215 (0.09)*	K versus F[b]	1.433 (0.14)*
E versus C[b]	1.302 (011)*	H versus G[b]	0.656 (0.13)***
G versus C[b]	1.326 (0.11)**	K versus G[b]	0.822 (0.08)*
L versus C[b]	1.267 (0.11)*	L versus H[b]	1.457 (0.13)**
		J versus H[b]	1.505 (0.17)*
Category			
Category 0 versus Category 3[a]	3.964 (0.34)***	Category 1 versus Category 2[b]	1.475 (0.05)***
Category 1 versus Category 3[a]	2.265 (0.09)***	Category 0 versus Category 1[b]	1.750 (0.33)
Category 2 versus Category 3[a]	1.535 (0.09)***	Category 0 versus Category 2[b]	2.580 (0.08)***
Multiple location[c]		1.598 (0.05)***	
Sample size		3,128	
−2 log likelihood		28,815.42	
χ^2 (*df*)		309.78*** (15)	

[a]The second group serves as a reference group.
[b]Hazard rate and standard errors were calculated separately based on dummy coding with the reference group in a.
[c]Multiple locations group serves as a reference group compared to non-multiple location group.
$^{*}p \leq 0.05$, $^{**}p \leq 0.01$, $^{***}p \leq 0.001$.

the rest of the zip codes were compared to zip code I. For example, the hazard ratio (1.50) indicated that a restaurant located in zip code A would have a 50% greater rate of closing in comparison to a restaurant in zip code I. A restaurant located in zip code D had a 27% less rate of closing compared to a restaurant in zip code A. A restaurant in zip code F had a 31% less closing rate, while a restaurant in zip code G had a 21% greater rate of closing in comparison to a restaurant in zip code B. A restaurant in zip code C, D, or F had lower rates of closing versus other areas, such as E, G, and L. For instance, the hazard ratio (1.42) of G compared to D indicated that a restaurant in zip code G had 42% greater rate of closing in comparison to a restaurant in zip code D. Therefore, a restaurant located in zip code A, E, G, J, or L had a greater possibility of closing relative to a restaurant in areas zip code B, C, D, F, H, or K.

Size Effects (Category)

Category 3 was considered a reference group in the analysis because of its standing as possessing the lowest closure rate compared to other category groups. Comparing the significant hazard ratios of the first year for Category 3 with the other category groups, restaurants in Category 0 had a 296% hazard rate; restaurants in Category 1 had a 126% hazard rate; and restaurants in Category 2 had a 53% greater hazard rate of closing. Also, when compared to restaurants in Category 2, the restaurants in Category 0 had a 158% hazard rate; restaurants in Category 1 had a 47% greater hazard rate of closing than those in Category 2. Hence, these results suggest that size has a significant effect on survival rates. Smaller restaurants (Categories 0, 1, and 2) had higher hazard rates compared to larger ones (Category 3) . No significant differences relative to survival rates were observed between Categories 0 and 1.

Affiliation Effects (Chain Versus Independent)

Independent restaurants are more likely to fail than chain restaurants. Hazard analyses were conducted for restaurants that were independently owned and chain affiliated, indicating that independent restaurants resulted in a 59% greater propensity of closure compared to chain-affiliated restaurants. These results are consistent with earlier studies in the literature (English, Josiam, Upchurch, & Williams, 1996; Kalnins & Mayer, 2004; Parsa et al., 2005).

DISCUSSION

Reasons for restaurant mortality and survival are complex. This research supports the framework of organizational ecology, which brings together both managerial and environmental perspectives. This case has not been proven and no reference to managerial effects has been made in the empirical research. Evidence has also been presented that affiliation, location, and size each have significant impacts on restaurant failure.

The present research suggests that population ecology gives credence to the managerial perspective that internal factors, such as the decisions that management makes, does influence restaurant survival. However, it was also found that external factors, such as location, density, and affiliation, affects restaurant survival as well. This is evidenced by the K-M analyses, in which restaurants close over time, regardless of the machinations of management. This determination cannot be made based on the present research; none of the independent variables measure managerial discretion.

This study shows that multi-unit group affiliation produces significant results. Independent restaurants demonstrated greater closing rates than multiple location groupings.

The current data shows that location influences failure rates. Estimated survival times ranged from a low of 66 months to a high of 114 months. The current results, unfortunately, cannot be compared to the earlier studies on this topic, where the main interest was in predicting restaurant failures using financial ratios (Gu, 2002; Gu & Gao, 2000; Kim & Gu, 2006; Olsen, Bellas, & Kish, 1983). Earlier studies primarily focused on using secondary data from financial sources for publicly held companies and attempted to predict restaurant failures. Gu (2002) reported that low earnings and high total liabilities are good predictors of restaurant failures. This conclusion may not be excitingly revealing, but it is consistent with the intuitive logic and the common industry knowledge; thus, credit must be given for providing methodological rigor and greater credibility to the obtained conclusions. Earlier, Olsen et al. (1983) noted that financial ratios can be used effectively to predict restaurant failures, as has commonly been done in the banking industry while analyzing the restaurant firms.

Restaurant failures are affected by size and operational complexity. Regarding size, this research demonstrates that as size and operational complexity increase, so does longevity. It is likely that organizational growth brings about more sales, which brings about the necessity of more staff, more food and beverages, and more systems and controls. The four categories of this study found that restaurants with the smallest size and least complexity experienced the shortest period to close (2.3 years); this period lengthened as size and complexity grew (as evidenced by 5.3, 7.1, and 10.9 years for the most complex and the largest size).

Restaurants have relatively low entry barriers. The present research suggests that as restaurants get larger and more complex, more resources are likely to be used (financial and human), and there is a greater chance of survival. Relatively small and simple operations, requiring fewer resources and managerial expertise, appear to be more vulnerable to failure. In other words, low entry barriers could be partly responsible for the higher failure rates observed in the smaller size restaurants (Categories 1 and 2) and lower survival rates in the larger size restaurants (Categories 2 and 3). These findings are the major and original contributions of this study.

This research found that restaurants with multiple footprints in a market location lengthened the likelihood of survival and that they experienced significantly lower failure rates than independent restaurants. This suggests that it is not enough to simply have a representative unit of a multi-unit group to have a positive effect on survival. Rather, there must be a significant corporate presence to have a sustainable advantage of survival over non-multi-unit affiliation. These results are consistent with Hjalager's study (2000) that found multi-unit affiliation increased restaurant survival but only with the condition of the presence of three or more affiliated restaurants. Kalnins and Mayer (2004) noted that chain affiliation has a positive effect on restaurant failures. Their study was conducted with the pizza segment in Texas using secondary data obtained from the government sources. They also concluded that knowledge gained by the franchisors is very helpful in preventing failures in the restaurant industry. This is true for franchised and corporate-owned restaurants as well. Franchisees have benefited from local congenital knowledge of the franchisor but not distant congenital knowledge (Kalnins & Mayer, 2004).

Results from the current study have significant importance to the restaurant industry. Most franchised and independent restaurants may benefit from the findings from the current study, especially when considering restaurant categories by size.

IMPLICATIONS

The simultaneous and triple impact of density, location, and size and complexity suggest a new response to planned survival in the restaurant industry. First, there appears to be a tipping point relative to density, such that multi-unit affiliated units should be of a sufficient number in order to leverage density effects (research suggests a minimum of five units in a local market area). The industry may want to reexamine their expansion strategy. The current research suggests that simply having a representative of a multi-unit restaurant in a given geographical area is not enough; there must be some combination of density of restaurants and proximity of restaurants to achieve a true advantage. In other words, it may be a wiser strategy to go into a specific location with more restaurants rather than spread those same restaurants out geographically. For restaurants whose location and density appear to indicate survival vulnerability, the findings of this research may be useful in developing strategies that could help increase their chances for survival. Relative to location, research suggests that zip code mortality should be considered a significant factor, along with the more common factor of its ability to generate future sales when considering a particular location. Finally, for those single entity restaurants (67% of the present sample) that choose constrained or minimal growth, a thorough understanding and execution of sustainable competitive advantages should be undertaken in order to implement strategies that mitigate the ill effects of low density.

LIMITATIONS

Inherent error may be included in the analysis due to data constraints. For example, the business permit date and the last inspection date may not be perfectly correlated with opening and closing dates. The data were collected from a specific region only (Cobb County) within the state of Georgia. The results may not be generalizable outside Cobb County, where the demographic and geographic differences could be significant.

A potentially more egregious limitation is in the interpretation of restaurant failure. While this study's results lend support to an affiliation, location, and size contribution to restaurant closure, the unanswered question concerns whether closures are voluntary (an owner executing a planned exit strategy or succession plan, for example) or involuntary (closure due to market or management factors). This question requires further investigation. Unfortunately, current data sources do not provide answers to these questions.

FUTURE RESEARCH

It is proposed that future research should be designed and conducted to replicate results of this and further explore three complementary areas. There is a need for further development of the size/complexity relationship to explore whether this is a true causal or circumstantial relationship. In addition, there is a need to investigate further the affiliation variable, in particular, the relationship between the concentration/density of a chain within a certain geographic region with restaurant mortality versus just the presence of a single unit with a chain affiliation. It would be exciting if one could use the demographic data from Cobb County and analyze the current restaurant failure data to understand the affects of demographics on business failures. Furthermore, demographic data collected over a long period could be used effectively to understand the affects of changes in demographics on business failures. Finally, there is a need for further research in zip-code-specific restaurant failures to better understand the part that site location contributes to restaurant failures.

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