Chain Affiliation and the Failure of Manhattan Hotels, 1898–1980

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This study of chain affiliation in the Manhattan hotel industry examines the benefits and drawbacks of affiliation with a chain, which can be a source of operating knowledge and economies of scale for components but also a potential source of strategic constraint. Our analysis demonstrates the effects of chain affiliation on the failure of component organizations and competitive dynamics in the Manhattan hotel industry from 1898 to 1980. Under most circumstances, chain affiliation improves the survival chances of component hotels in Manhattan. All chain memberships are not equal, however, and the survival benefits to components vary systematically with the nature of the operating experience and the number and distribution of components of hotel chains. Our findings show how understanding the role of chains can inform both learning and ecological models of organization.•

In the automotive section of a Sunday newspaper, a journalist says of the British car manufacturer Lotus (which was recently divested by General Motors), "Free of the constraints, and resources of General Motors, Lotus soldiers on alone" (Swan, 1994: K1). That statement reflects two insights that deserve the critical attention of organization theorists. First, the statement recognizes that some large organizations (such as General Motors) encompass numerous smaller components (such as Lotus) that are themselves organizations. Second, the statement recognizes that the relationship to the large organization can mean both good and bad things to the component organization. Understanding what these pros and cons are is the focus of this paper.

Here we consider the implications for the fate of component organizations of affiliations to chains. The component organizations we focus on are hotels affiliated with hotel chains. While a chain affiliation may be a source of operating knowledge for a component, we also identify potential sources of strategic constraint. Further, a chain can affect the fate of its components by giving them resources, reputation, and market power. By altering the competitive strengths of their components, chains may also influence the competitive dynamics of industries. Therefore, we also consider the implications of chain affiliations for industry evolution. We examine these effects of chain affiliation on the fates of component organizations and competitive dynamics in an analysis of organizational failure in the Manhattan hotel industry.

Chains are collections of service organizations, doing substantially the same thing (often the only differentiation is in physical space), that are linked together into a larger organization. The relationships between the components of a chain are horizontal, although typically there are centralized parts of the chain, such as a distribution facility, that have vertical relationships to the components. There are a number of types of linkage between component and chain, including ownership, franchise agreement, or other types of contracts or agreements. Although analogous horizontal linkages between nonservice organizations exist, these are not typically categorized as chains. The relationship between Lotus and GM is an example. Both chains and nonservice

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collections of horizontally linked organizations could be described by the term "superorganizations."

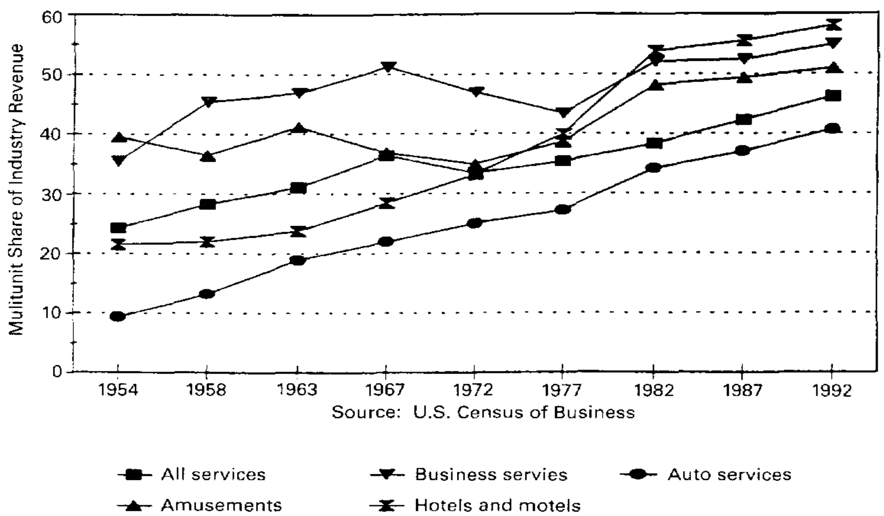
There are many compelling implications of the structure of interdependencies among the components of a chain. First, the components of a chain are almost always capable of operating without the chain. It is not surprising to see an independent hotel, but it is surprising to see an independent finance or marketing unit. This easy separability of chain components invites the question of what the component gets from being part of the chain, which we try to answer here. The chain presumably imposes mutualistic relationships between organizations of the same type and is therefore the source of some unique advantages, especially in twentieth-century North America, where interorganizational linkages between similar organizations are often viewed as illegitimate because they restrict competition.

Second, the chain suggests an intriguing wrinkle for interorganizational competition. It is at the level of the component that the chain meets its competitors. As the president of what was then the largest hotel chain said in a 1937 advertisement, "the success of any group enterprise in the long run, is predicated on the success of each individual unit in the group." Chains are too diverse to be seen as rivals by independent organizations in the same industry, and independent organizations are too narrow to be seen as rivals by chains, but, according to definitions of competition based on the overlap of required resources (McPherson, 1983; Baum and Singh, 1994a, 1994b), the two organizational forms seem to compete. This tension between the competitive implications of component and chain motivated us to examine the effects of chain affiliations on the competitive dynamics of a population composed of component and independent organizations.

Third, the study of chains and other superorganizations promises to inform theories of organizational evolution and adaptation. While organizational ecology has focused on the replacement of inertial organizations as the principle mechanism by which populations respond to their environments (see Hannan and Freeman, 1989; Baum, 1996), even casual observation indicates that organizations are sometimes able to adapt to changes in their environments. An important step in reconciling the selection and adaption perspectives may be recognizing that sometimes selection works at the suborganizational level, which allows a persisting organization or superorganization to adapt (Aldrich, 1979; McKelvey, 1982; Nelson and Winter, 1982). By adding or dropping parts, organizations change. In this paper, we examine this phenomenon by studying the failure of chain components.

Finally, the study of chains is dictated by their increasing importance as an organizational form. The trend over the last century suggests that chains will eventually come to dominate every service industry that is characterized by some direct contact between customer and organization. Starting with retailing, chains have made significant advances in industries such as food service, hospitality, banking, insurance, amusements, business services and auto services. Even the professions are not immune—accountants, lawyers, and doctors are increasingly likely to be part of a chain. According to the U.S. Census of Business, multiunit establishments (defined as a service organization operating in two or more locations) accounted for 25 percent of all service revenue in 1955. By 1987 their share was more than 40 percent, and it continues to grow. Figure 1 shows the share of the market held by multiunit firms in a selected group of services.

Figure 1. Revenue share of multiunit firms in selected service industries.



Source: U.S. Census of Business

There is some existing research on chains or broadly applicable to them. Chandler (1977) argued that chains, like other mass marketers, produce economies of scale that advantage their components. Ingram (1996b) found support for economies of scale in the hospitality industry in the form of lower failure rates for larger and more spatially compact hotel chains. We are aware of no evidence, however, that shows that the components of chains benefit from economies of scale. Below, we examine whether Manhattan components enjoy local economies of scale and test the possibility that chains help benefit their components with nonlocal economies of scale as well.

There is also a literature in economics and marketing on franchising, one type of chain linkage. The franchising literature focuses on whether chains should own or franchise units and typically builds explanations for the decision to own or franchise using the cost of monitoring, which increases franchising because employee managers require more monitoring than franchisees, and the presence of brand-name capital and firm-specific assets (e.g., the Golden Arches), which decrease franchising because franchisees may be tempted to free-ride on these things (Brickley and Dark, 1987; Martin, 1988; Hadfield, 1991; Bergen, Dutta, and Walker, 1992). Since the franchising literature takes the existence of the chain as given and always considers the benefits from the position of the franchisor, rather than the component, it does not address the question of how chains affect components.

Certainly, franchising is important in the recent growth of chains and has a role in a theory of chains, but the literature on franchising says almost nothing about the issues we identify above and deals with only a subsection of chains. Interesting with respect to this study, only 3 percent of the U.S. hotel chains from 1898 to 1980 were franchisors, and franchises were rare among Manhattan hotels. Only 396 of 20,344 (2 percent) hotel-years in our data were associated with a franchisor or franchisee, and the 396 likely includes many company-owned hotels of franchisors and nonfranchised hotels of franchisees. The low occurrence of franchising in Manhattan would be predicted by the franchising literature, where authors have argued that franchising is less likely in urban areas because of lower costs of monitoring and lower economic risk (Brickley and Dark, 1987; Martin, 1988).

CHAIN AFFILIATION AND HOTEL FAILURE

The hospitality industry is a promising one for studying the implications of chain affiliation. As Figure 1 indicates, chains have quickly gained prominence in this industry and by 1987 account for more than half of its $28 billion U.S. revenue. Still, independent hotels have a strong presence in the hospitality industry and provide a comparison group to identify the implications of chain affiliation. Within hospitality, the Manhattan hotel market has features that make it appropriate for our purposes. Chains have operated in Manhattan, almost since the first hotel chain was founded, but as a local market, Manhattan is not ideal for chains, which serve highway-oriented, small-to-medium-sized city markets most effectively. The usefulness of a chain affiliation is the applicability of the chain's experience and global strategy to the local market. Unlike some other hotel markets, in Manhattan we expect significant variance on these dimensions, allowing us to investigate both the benefits and the costs of chain affiliation. Chain affiliation exposes the component hotel to the experience of a larger set of organizations, which affects the component hotel's operating knowledge and strategic responses to the environment.

Local Experience: Knowledge Transfer and Learning

Although it is widely recognized that organizations can learn from other organizations, such vicarious learning is typically seen as involving the imitation of high-profile organizations or using corporate intelligence to learn from competitors (Levitt and March, 1988; Huber, 1991; Miner and Haunschild, 1995). One recent study, however, focuses on relationships with a chain as a means of interorganizational learning. Darr, Argote, and Epple (1995) studied organizational learning and the transfer of knowledge among pizza stores, some of which were parts of chains. Their dependent variable was average production cost, and they included historical production at the level of the component organization, chain, and industry as independent variables. They found that experience at the component and chain levels translated into lower production costs, but experience at the industry level did not. This finding demonstrates a transfer of knowledge among components of a service chain. In a related study, Greve (1996) examined patterns of new market position adoption among radio broadcasters, some of which shared a common corporate owner. Greve argued that opportunities for communication and competence sharing among corporate units would result in self-imitation within the corporation. Supporting this idea, Greve found that adoption by a corporate contact (i.e., unit of the same corporation) significantly increases the chances of adoption beyond the influence of any other adopter. Thus a new market position is an innovation that spreads contagiously through corporate contacts.

The transfer of knowledge via affiliation with a chain should be important to hotels. As the president of the American Hotels Corporation said of chains: "The mistakes developing in one hotel, through cooperation can be prevented in all the others. The success achieved by one can likewise be passed on to the others" (*Hotel Redbook,* 1937: 513). Hotels are complicated organizations to operate, as evidenced by the more than 200 four-year degree programs in hotel management in the United States. An example of the type of knowledge chains could transfer to component hotels is accounting practices. Accounting, both for financial reporting and cost control, is complicated in hotels. There are many income producing activities, transactions often take months to complete, and there is no physical trace of productive activity. Early in this century, hotel accounting was so unsophisticated that most hotel managers could not determine if their organizations were profitable (Ingram, 1996a). Chains were the first organizations in the hotel industry to develop sophisticated accounting and control systems, and they continue to be the major source of innovative accounting procedures and equipment (Ingram, 1996a).

The value of the experience of a chain to a component probably depends on the similarity between the environment of the component and the environments in which the chain accumulated its experience. Affiliation with a chain should result in a significant and valuable transfer of knowledge to component organizations to the extent the chain has experience in the component's local environment. There should also be a dynamic relationship between chain affiliation and learning. Darr, Argote, and Epple's (1995) results suggest that hotels within a chain should learn faster than independent hotels because component hotels have ongoing exposure to the experience of the chain. Access to the local experience of the chain should also help the component over time through ongoing learning:

Hypothesis 1: Upon joining a chain, a hotel's failure rate will drop proportionate to the local experience of the chain, because of the initial knowledge transfer the chain can provide, and will fall further with additional incremental local experience of the chain during the life of the affiliation.

Non-local Experience: The Risk of Strategic Constraint

The strategy of hotel chains can be described with one word, standardization. This strategy probably generates benefits for the chain (e.g., economies of scale and reputation), but it creates a liability for component hotels. Fitting into the global strategy designed for the chain reduces the degrees of freedom that managers of component hotels have to respond to their local environments. The chain strategy may be designed to optimize the success of its components in their local environments, but because those local environments are not all the same, some components may have to do things as part of the chain that they would not do if they were independent organizations. A rich illustration of the mismatch of a chain strategy and a local environment was provided to us by an experienced manager of chain hotels. This manager's first assignment with a large motel chain was in a unit in the downtown of a large city (not Manhattan). When the unit was established it was on the edge of the business district. But the area had changed, and when our informant arrived there, the unit was in the middle of a red-light district. Hotels can and have adjusted to changes like this, but this component organization did not have the freedom to make the necessary changes. Its late night restaurant crowd was greeted with children's menus and bottomless cups of coffee. Prostitutes and their clients were offered a room-rate structure designed for traveling salesmen and families on holiday. Perhaps more problematic were the families on holiday who were occasionally drawn in by the colorful sign that they had learned to trust.

At best, strategic constraint may have no negative effect on a component, for example, if the chain's strategy was designed to satisfy an environment like the component's local environment. If the component's environment is different from that in which the chain is experienced and the chain's strategy is designed to satisfy, the component will suffer. Strategic constraint may also affect the prospects of a component organization as a result of organizational change imposed on it when a chain affiliation is formed. Changes that render an organization's accumulated skills, roles, and routines obsolete or upset its exchange relationships with the environment can rob its history of survival value and reduce its reliability of performance to that of a new organization (Hannan and Freeman, 1984; Amburgey, Kelly, and Barnett, 1993). Changing to fit a chain's strategy may produce not only a strategic gap between the component and its local competitive environment, but also a renewed liability of newness (Stinchcombe, 1965).

Since the nonlocal experience of a chain will sometimes be from similar and sometimes from dissimilar environments to the one occupied by a focal component, it is impossible to make a blanket statement about the effect of nonlocal experience. In the population we study here, however, we expect that most nonlocal chain experience will be from environments dissimilar to Manhattan and that strategic constraint will be problematic for Manhattan components. Hotel chains grew up with automotive travel in the United States (Belasco, 1979). The ideal local environment for most hotel chains is a medium-sized city on a busy highway. Chains' standard products thrive in markets where consumers are highly uncertain about the quality of independent hotels' rooms and service. The environment for Manhattan hotels is very different: The Manhattan market is large enough for independent hotels to be professionally managed; it is a sufficiently central travel destination to allow travelers to develop enduring relationships with independent hotels; and it is a stronghold of prestigious, world-class hotels. So some component hotels in Manhattan will likely be forced to follow chain strategies that do not fit the Manhattan market.

As with local experience, we predict both an immediate and an incremental effect of nonlocal experience. When an affiliation is formed, a hotel will suffer an immediate negative effect from strategic constraint, and this effect will be a function of the chain's experience in nonlocal environments. There should also be a dynamic effect of strategic constraint. The longer a hotel is part of a chain, the greater the negative effect of the chain's strategy. While a chain may choose a hotel or location initially for congruence with its strategy, the chain's strategy does not adjust as the local environment changes over time because its strategy is influenced by its nonlocal experience. Nonlocal experience may also lead the chain to impose practices learned elsewhere that are dysfunctional in the local environment.

Hypothesis 2: Upon joining a chain, a hotel's failure rate will increase proportionate to the initial nonlocal experience of the chain and increase further with subsequent incremental increases in the chain's nonlocal experience during the life of the affiliation.

Economies of Scale and Access to Resources

Although we expect the standardization strategy pursued by chains to create a strategic constraint for some component hotels, we expect that there is also a range of benefits accruing to component hotels. By standardizing services, advertising, reservations, operating procedures, equipment, and even buildings, hotel chains generate economies of scale. These advantages of scale at the chain level should translate into lower costs for component hotels (Lebhar, 1959; Chandler, 1977). Moreover, when organizations establish ties to chains, they may enhance their access to resources as well as knowledge. Consistent with this idea, recent studies suggest that relationships to superordinate organizations may often serve as buffers that protect organizations from environmental uncertainty and competitive threats to survival (Singh, Tucker, and House, 1986; Freeman, 1990; Miner, Amburgey, and Stearns, 1990; Baum and Oliver, 1991).

Chains may also benefit their components by distributing risk. Chains may acquire geographically distributed units to implement a portfolio strategy. It is likely that when a component in a given market is facing a scarce environment, another component will be facing a more munificent environment. If components enjoying good times distribute resources to components experiencing hard times, the chain can act as a form of insurance against economic fluctuation. Although there are alternative ways to implement a portfolio strategy, the fact that most hotels are privately held suggests that those alternatives have not been exploited.

Hypothesis 3: Ceteris paribus, failure rates of component hotels will be lower than independent hotels.

Economies of scale of potential benefit to components may increase with the size of the chain. Below, we discuss the possibility of economies of scale based on the chain's size in Manhattan. There may also be a more general benefit of economies of scale from the size of the chain outside of Manhattan. Our models include a control variable, the number of hotels in the chain outside Manhattan, to test for nonlocal economies of scale that are greater for larger chains.

Local Market Power and Power Dilution

Another feature of chain affiliation is that it associates the component hotel with other hotels in its local market. This creates the possibility of pursuing collective action. There are a number of ways a chain's component Manhattan hotels could benefit from collective action. Most importantly, large chains are more powerful in the market for inputs, and this is a local source of economies of scale. Chains with a strong presence in Manhattan should be able to buy advertising, food, subcontracted labor (e.g., security staff), and other inputs cheaper and might be able to collude successfully on prices. No chain (or independent hotel) was ever sufficiently powerful in the Manhattan hotel industry that it could have dominated the whole market (the largest Manhattan chain controlled 8,937 hotel rooms when there were about 70,000 hotel rooms in Manhattan), but, as Jacquemin (1987: 68–77) showed, groups of large firms can exercise a degree of monopolistic power, forcing smaller firms to the "competitive fringe." Components of a chain in the same city also refer patrons to each other. Additionally, powerful chains may be able to manipulate local laws. Rich hoteliers from the northeast, particularly the early chain entrepreneurs, were particularly effective at influencing laws pertaining to hospitality (Ingram, 1996a).

All of these advantages of market power should be a function of how many rooms a chain controls in Manhattan, but market power may be a negative function of the number of units over which the chain's rooms in Manhattan are spread. If the market power is divided among many component hotels, it will be diluted. Most obviously, a chain that gets economies of scale by purchasing in bulk will lose some of those economies if it has to distribute the purchases over many components. Further, because component hotels are operated like independent organizations, and their managers are held accountable for the performance of their hotels, component hotels may actually compete with hotels from the same chain. When a chain has many units in one location (i.e., Manhattan), there will be many managers pursuing their own interests and therefore less likelihood of coordination. Finally, collective action is more costly when more actors have to be coordinated (Olson, 1965).

Hypothesis 4: The failure rate of a component hotel will fall as the number of rooms controlled by its chain in Manhattan increases.

Hypothesis 5: The failure rate of a component hotel will increase as the number of hotels controlled by its chain in Manhattan increases.

Reputation

Not all chains try to develop reputations, but affiliation with those that do should benefit components. Standardization should allow component hotels to benefit from the reputation of the chain they are a part of because it reduces consumers' uncertainty about the quality of a component hotel's rooms and service. This idea is consistent with Hannan and Freeman's (1984) contention that selection pressures favor organizations that are able to demonstrate their reliability and accountability. In the minds of consumers, reliability, the capacity to produce products or services of a given quality repeatedly, is more likely to characterize organizations with chain affiliations than independent organizations. Similarly, accountability is higher for organizations with chain affiliations because the interdependence of these organizations creates pressure on each component to maintain and enhance the reputation of the chain (Ingram, 1996b). This reputation, in turn, enhances the survival prospects of component organizations (Rao, 1994). We can differentiate between chains that provide a reputation benefit to their Manhattan components and those that do not by looking at whether the chain gives other components names that link them with the Manhattan component, which is a necessary condition for building a reputation that benefits the Manhattan component.

Hypothesis 6: The failure rate of a component hotel will fall as the proportion of hotels in its chain with names linking them to the component increases.

Competitive Dynamics

Although an array of evidence has been assembled by organizational ecologists linking models of competition to the evolutionary trajectories of industries (e.g., Hannan and Carroll, 1992; Baum, 1996), past research has not examined how the presence of chains and their affiliates affects competitive dynamics. The arguments set out above suggest two possibilities. If advantages of knowledge transfer, scale economies, access to resources, market power, and reputation predominate, then component organizations should be more potent competitors than independent organizations, and their increasing prevalence will displace independent hotels. By comparison, if strategic constraint effects predominate and if the market power of chains is diluted, then the competitive capabilities of component organizations should be impaired relative to independent organizations, and chain expansion will be thwarted by competition. We see the implications of chains for the competitive dynamics of a population as contingent on the suitability of the environment for chains (environments in which chains can apply nonlocal experience would be suitable), the structure of the chain population (the size of chains and their strategies for naming their units), and even the history of the chain population (the level of local and nonlocal experience). Our prediction on competitive dynamics is therefore specific to the Manhattan hotel market. Because Manhattan is not the ideal environment for chain components, we expect the nonlocal experience of chains to have very little applicability in Manhattan, and the strategic constraint from fitting into the chain's global strategy should be particularly damaging to Manhattan components. Although our previous hypotheses indicate that there are a number of benefits of chain affiliation in any environment, the idiosyncrasies of the Manhattan market are sufficiently challenging to chains that we predict that independent hotels will have a stronger competitive impact on components than vice versa:

Hypothesis 7: Independent hotels are strong competitors in the Manhattan hotel market, and so their presence will raise the failure rate of component hotels more strongly than vice versa.

METHOD

Data

The data used in this study include life history information on all 558 transient hotels that operated in Manhattan at any time between 1898 and 1980. Transient hotels cater to short-term visitors and differ from residential hotels, which serve long-term or permanent guests and are excluded from the sample. Our examination of the effects of chain linkages on the failure of Manhattan hotels is theoretically different from Baum and Mezias (1992) and Baum (1995), which also examined the failure of Manhattan hotels. In those papers, the authors were concerned with localized competition and the temporal dynamics of competition. Our focus here is on the implications for hotel failure of a type of interorganizational relationship, the chain linkage. Additionally, we have added new information on chain linkages to create a dataset that combines rich information on the Manhattan hotel industry with detailed data on interorganizational relationships over an extended period. As we discuss below, the effects of chain affiliation, localized competition, and temporal dynamics of competition are distinct influences on the failure rate of Manhattan hotels.

We used four archival sources to construct the life histories of Manhattan hotels. The *Hotel Redbook,* published annually since 1887, contains detailed information on the name, number of rooms, location, and room rates of hotels. It is the most comprehensive historical listing of Manhattan hotels in existence. The information contained in the *Redbook* was cross-referenced and supplemented using three additional archival sources: (1) the *Manhattan Classified Directory/Yellow Pages,* published since 1929; (2) the *Annual Directory of the Hotel Association of New York City,* published since 1940; and (3) the *Hotel and Travel Index,* published since 1951. Although a period of rapid growth in the late 1920s coincides roughly with the addition of the *Yellow Pages* data source, it is not attributable to the addition of this source. This growth, which accompanied the rapid expansion of Manhattan during this time, is reflected in the *Redbook* as well. Because detailed organizational data are missing for many hotels prior to 1898, the observation period for this study begins in 1898, even though the archival sources begin in 1887.

During the study period, 425 transient hotels were founded in Manhattan. We recorded a hotel as founded in the year it first appeared in any archival source. Three hundred and fifteen (70 percent) of the hotels founded in Manhattan since 1898 had ceased operations by the end of 1980. We defined failure as the cessation of hotel services for short-term visitors and did not include changes in name or ownership as failures because the organization itself continued to provide transient-hotel services. The date of failure was recorded as the year a hotel was permanently delisted from the *Redbook*. If *Redbook* listings differed from those in the other archival sources, we recorded a hotel as failed in the first year it was permanently delisted from two or more of the archival sources.

In 1898, 133 of the hotels in the sample were already in operation; thus, the life histories for these hotels were left-censored (i.e., founded before the study period). To include as much of the data on hotels from the 1898–1980 period in the study as possible, we attempted to find founding dates for hotels existing in 1898. With available archival information, we were able to confirm founding dates for 112 (84.2 percent) of the left-censored hotels. Because their ages were not known, the 21 hotels with unknown founding dates could not be included in the analysis, although information on these hotels was included in computations for the variables described below. The final sample for the analysis included 537 hotels, of which 350 (65.2 percent) failed.

To identify all component hotels in Manhattan, we first had to identify all hotel chains in the United States and generate lists of their component hotels. We defined chains as any organization operating three or more hotels or motels, which is the standard definition the industry uses (*Directory of Hotel and Motel Systems,* 1931–1980). The lower limit of three hotels represents the necessary degree of separability implied by our definition of chains—historically, many two-hotel "chains" were adjacent properties operated by a unified organization. Of course, a chain can operate three or more hotels in different ways. Hotel chains in our data consisted of chains that owned and operated their hotels (85 percent of all U.S. chains), chains that franchised at least one of their hotels (11 percent of all chains, increasingly more common from about 1960), franchisors (less than 3 percent of all chains), and referral systems, which were coordinated marketing efforts between hotels that maintained individual ownership (about 1 percent of all chains). These four alternatives for operating multiple components could be considered different types of chains. We expected that there would be implications for the component of the type of chain it was affiliated with, and in preliminary analysis we looked for such effects. Franchising was rare in Manhattan, however, and referral systems were almost nonexistent, and we found no effects for the type of operating arrangement. We thus treat all operating arrangements as the same here.

We used two archival sources to generate data on chains. The primary source was the *Directory of Hotel and Motel Systems,* which has been published by the AHMA since 1931 and claims to list all hotel chains and each chain's member hotels. There has never been a fee for inclusion in the directory. The secondary data source (and the primary source for 1898–1930) was the *Hotel Redbook*. For the period from 1898 to 1930 we identified chains by reading all advertisements in the *Redbook* and scanning the listed owners of the hotels. After 1930 we used the *Redbook* to verify listings and delistings in the *Directory of Hotel and*

Chain Affiliation

Motel Systems. Left-censoring is not a problem for the hotel chain data. In 1898, one hotel chain operated a single hotel in Manhattan; the first hotel chain entered Manhattan in 1896. During the observation period, 103 different hotel chains operated one or more components in Manhattan.

Between 1898 and 1980 the Manhattan hotel industry gradually transformed from one dominated by entrepreneurial, independent operators to one dominated by professionally managed hotels. After a period of slow growth in the decades preceding and following the turn of the century, the Manhattan hotel industry grew rapidly with the expansion of Manhattan during the Roaring Twenties, reaching a maximum of 353 hotels in 1931. Since then, the industry has become more concentrated, a trend that accelerated after 1960 as smaller and medium-sized hotels were replaced by fewer, larger, and—with increasing frequency—chain establishments. The numbers of independent and component hotels and hotel chains and independent and component hotel rooms in Manhattan in each year are shown in Figures 2 and 3, respectively.

Figure 2. Manhattan hotels.

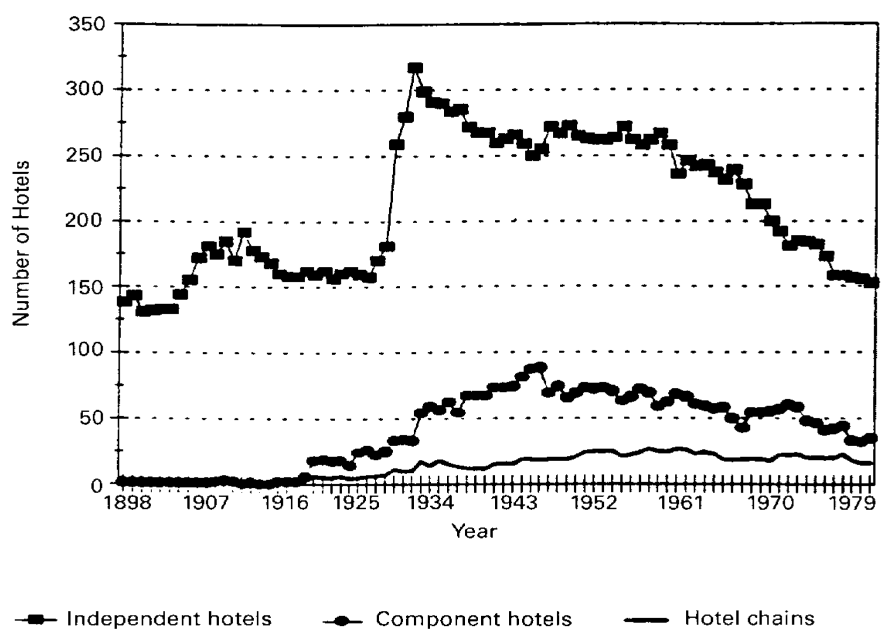
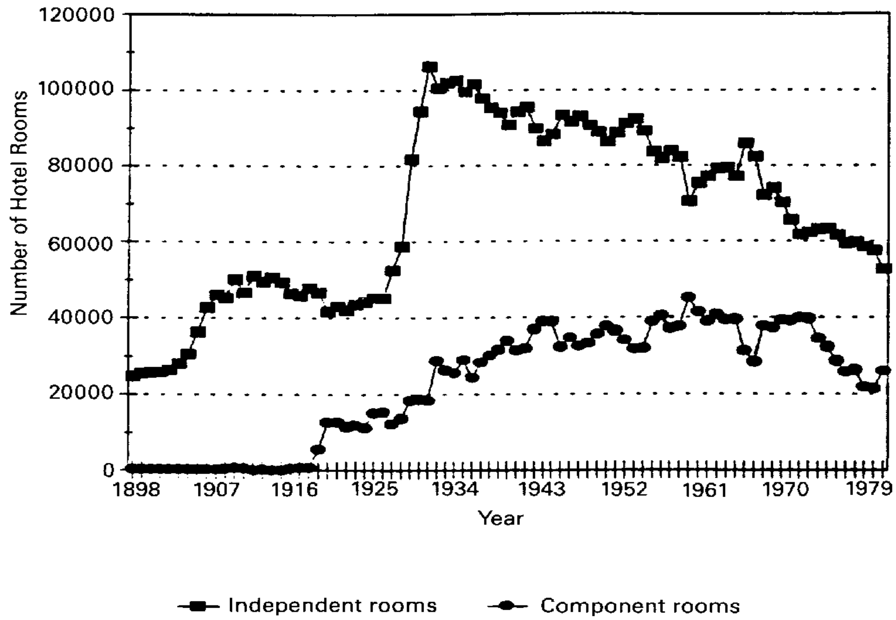


Table 1 summarizes the chain affiliations. A total of 189 hotels (35.2 percent of the hotels in the sample) were at one point part of a chain. Seventeen hotels had two chain affiliations over their lives, and five hotels had three affiliations, resulting in a total of 216 chain affiliations. Twenty-six of the affiliations resulted from a chain founding a hotel and 190 from a preexisting hotel joining a chain. There is substantial variance in both the duration of chain affiliations and the duration of ex-component status. Most (111) chain affiliations lasted less than 10 years, but 71 lasted 20 years, and some lasted more than 60 years. Seventy-one components failed, and there were 110 instances in which a component left a chain. Ten years after leaving the chain, 85

Figure 3. Manhattan hotel rooms.



hotels remained in the ex-component state. One hotel persisted as an ex-component for 80 years.

Independent Variables

Local and nonlocal experience. To test hypotheses 1 and 2, we developed variables to capture the different operating experiences of the chains to which component hotels were affiliated. Benefits of knowledge transfer obtain when a component's environment is comparable to the environment in which the chain is experienced and which the chain's strategy is designed to satisfy. In contrast, strategic constraint occurs when the component's environment is different from the environment in which the chain typically operates and which the chain's strategy is designed to satisfy. To measure the initial and ongoing knowledge transfer from a chain to its components, we created variables based on chains' accumulation of operating experience in Manhattan, which corresponds to the cumulative output measure of experience used in the organizational learning literature (Epple, Argote, and Devadas, 1991). As in the learning curve estimation, the fact that the marginal value of experience decreases as knowledge grows (i.e., there is not as much learning in the 100th unit of experience as there was in the first) is accounted for by the exponential form of the models we estimate.

To measure the strategic constraint imposed by a chain on its components, we created variables based on chains' accumulation of operating experience outside Manhattan. Although some non-Manhattan experience may benefit a Manhattan component, for example, if it is obtained in a comparable urban setting, hypothesis 2 predicted that chains' non-Manhattan operating experience should typically result in more strategic constraint being imposed on component hotels.

Table 1

Number of Components and Ex-components as a Function of Time since Joining or Leaving a Chain*

Years since joining or leaving	Number of components	Number of ex-components
1	216	110
2	206	110
3	183	100
4	162	99
5	146	97
6	137	95
7	126	87
8	117	87
9	111	86
10	105	85
15	95	83
20	71	67
25	57	56
30	45	45
35	33	43
40	21	37
45	17	23
50	10	15
55	7	9
60	4	6
65	na	5
70	na	3
75	na	1
80	na	1

* Sample includes 26 hotels founded by chains and 190 independent hotels that joined chains. There were 71 failures of hotels affiliated with chains.

We defined a hotel chain's operating experience in Manhattan to be a function of the number of component hotel-years it operated in Manhattan during its past history. Analogously, we defined a hotel chain's operating experience outside Manhattan as a function of the number of component hotel-years it operated outside Manhattan during its past history. More formally, we defined the local and nonlocal experience of chain *i* for its component *j* at time *t* as

$$\mathit{Local\ experience}_{ijt} = \sum_{t_{founding}}^{t-1} \frac{Nc_{Manhattan}}{Discount} \qquad (1)$$

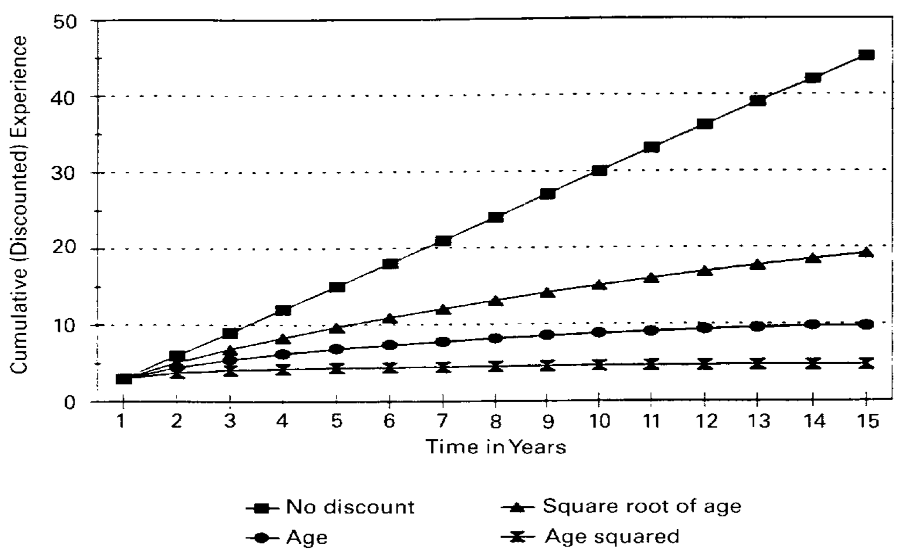
$$\mathit{Nonlocal\ experience}_{ijt} = \sum_{t_{founding}}^{t-1} \frac{Nc_{Non-Manhattan}}{Discount}, \qquad (2)$$

where t_{founding} is the first year of the chain's existence, $t-1$ is the year before the current year, $Nc_{\text{Manhattan}}$ is the number of components operated in Manhattan by chain *i* in a year, $Nc_{\text{Non-Manhattan}}$ is the number of components operated in Manhattan by chain *i* in a year, and *discount,* which we specify in detail below, is a weight that depreciates values of $Nc_{\text{Manhattan}}$ and $Nc_{\text{Non-Manhattan}}$ as a function of their age. We discount the experience to account for possible antiquation (due to environmental change) or decay (due to forgetting) of knowledge gained from experiences in the past (Argote, Beckman, and Epple, 1990).

The local experience variables, initial local experience and incremental local experience, were set equal to zero until a chain affiliation was established. Thereafter, initial local experience was set, using equation 1, equal to the affiliated chain's cumulative operating experience in Manhattan at the time the relationship was established. Using equation 1, we set incremental local experience equal to the affiliated chain's cumulative operating experience in Manhattan at the start of each year minus appropriately discounted initial experience. Both variables were reset to zero if the affiliation was subsequently severed. When a component changed from affiliation with one chain to affiliation with another (this occurred 17 times), we reset both values to the experience of the new chain. Initial nonlocal experience and incremental nonlocal experience were computed in the same way using equation 2.

We computed and analyzed four sets of these variables based on different specifications of the discount factor. First, we set the discount equal to 1, which assumes no depreciation of knowledge gained from past experience. Second, we set the discount equal to the age of the experience, which assumes a linear depreciation of prior knowledge. Third, we set the discount equal to the age of the experience squared, which assumes that knowledge gained from past experience depreciates rapidly at first and more quickly with time. Finally, we set the discount equal to the square root of the age of the experience, which assumes that depreciation of knowledge is initially slow and slows further with time. The knowledge decay implied by these different specifications of the discount factor for a hotel chain that operated three components in each year are illustrated in Figure 4.

Figure 4. Discount factors.



Chain affiliation and loss dynamics. To test hypothesis 3 and explore the dynamic implications of chain affiliation and loss on rates of Manhattan hotel failure, we followed a procedure based on Amburgey, Kelly, and Barnett (1993). First, we created two dummy variables. For each hotel, the first dummy variable, component hotel, was set equal to zero until the occurrence (if any) of a chain affiliation. Thereafter, the variable was set equal to one and reset to zero if the affiliation was subsequently lost.[1] The second

1
To examine whether the effect of second and third chain affiliations on component survival differed from the effect of a first affiliation, we estimated models that included a dummy variable coded 1 for components that were in a second or third affiliation and 0 otherwise. The coefficients for this variable were insignificant, and coefficients for other variables were unchanged.

dummy variable, ex-component hotel, was constructed analogously based on the occurrence of a loss of chain affiliation. In addition, we created two time-clock variables to track the elapsed time since a hotel either last acquired or lost a chain affiliation. The time-clock variables were set equal to zero until an event of either type occurred. Following the establishment of a chain affiliation, the component time clock measured the natural logarithm of the number of years since the affiliation began. The counter was reset to zero if the affiliation was subsequently severed. The ex-component time clock was derived in the same manner based on the loss of chain affiliations. In combination, the dummy and time-clock variables capture, respectively, the main and time-varying effects of chain affiliation and loss on the risk of hotel failure, permitting the short and longer-term consequences of the affiliations to be different.

Market power and market power diffusion. To test hypotheses 4 and 5, we used, respectively, the natural logarithm of the number of Manhattan rooms a chain operated at the start of each year and the number of Manhattan hotels a chain operated at the start of each year.

Reputation. To test hypothesis 6, we computed the name concentration for each chain at the start of each year as the percentage of a hotel chain's components that had the same name as the focal component. This is a slight modification on the name concentration measure from Ingram (1996b), who examined the effect of name concentration on the chain and based the measure on the most common name in the chain. Here, we examine the effect of name concentration on the component, so the sharing of the component's name is more relevant than the most common name in the chain, although the results are comparable with either measure.

Competitive dynamics. To test hypothesis 7, we operationalized both density-dependent (Hannan and Carroll, 1992) and mass-dependent (Barnett and Amburgey, 1990) forms of competition between independent and component hotels. We first created density and mass measures separately for independent and chain hotels. We measured independent hotel density and component hotel density, respectively, as the total numbers of independent and component hotels existing in Manhattan at the start of each year. Analogously, we measured independent hotel mass and component hotel mass, respectively, as the total number of rooms in independent and component hotels (i.e., the total productive capacities of the independent and chain segments of the industry) existing in Manhattan at the start of each year.[2] Following Barnett and Amburgey (1990), we subtracted each independent or component hotel's number of rooms from the total independent or component hotel mass, so the mass variables reflected the number of rooms operated by other hotels, and we used a natural logarithm transformation of mass.

To estimate the effects of density and mass among and between independent and component hotels in a single model, we used the independent and component hotel density and mass variables to construct own-type and

2
This is a departure from Barnett and Amburgey's (1990) measure of population mass, the total number of telephones, which, as Winter (1990) pointed out, is arguably a measure of the demand served rather than organizational size.

other-type density and mass variables. Own-type for a component is the density or mass of all component hotels and, for an independent, the density or mass of all independent hotels. Other-type for a component is the density or mass of all independent hotels and, for an independent, the density or mass of all component hotels. Finally, to test for the predicted differences in competitive strengths of independent and component hotels, as well as permit differences in their own-type density and mass effects, we interacted the own- and other-type density and mass variables with the component dummy variable. Density-dependent competition implies positive effects of the density variables on the failure rate. Mass-dependent competition implies a positive effect of the mass variables on the failure rate. With own- and other-type density controlled, the effects of changes in the mass variables capture the effects of changes in the average size of other hotels (Barnett and Amburgey, 1990: 92).[3]

Control Variables

Hotel characteristics. We defined hotel age as the number of years since the date of a hotel's founding. Hotel size and hotel price were measured, respectively, as the number of rooms operated by a hotel and the average daily room rate (in constant dollars) advertised by a hotel in each year of its existence. The number of rooms a hotel operates is the standard measure of size used in the hotel industry (Wyckoff and Sasser, 1981) and captures the "total productive capacity installed," which Winter (1990: 288) suggested reflects the differential competitive strength of larger organizations. We constructed these variables from information in the archival sources described above. For a small number of hotels for which size or price data were unavailable for a given year, we used linear interpolation to determine the values. The natural logarithms of size and price were used to reduce the variables' skewness. Founded by chain is a dichotomous variable, coded 1 for hotels that were affiliated with a chain at the time they were founded. It may be that chains help the components they found overcome the liability of newness that affects fledgling organizations (Stinchcombe, 1965; Hannan and Freeman, 1984). Alternatively, chains may imprint the components they found so severely with the chain strategy that the components suffer an increased level of strategic constraint. Lastly, a left-censored variable, coded 1 for hotels founded before 1898 and zero otherwise was also included to examine whether the hotels founded prior to 1898 had systematically different failure rates.

Hotel chain characteristics. We controlled for two additional characteristics of chains that may affect the fates of component hotels. First, we controlled for hotel chain age, measured as the age in years of the chain to which a component hotel was affiliated at the start of each year. Second, since larger chains are likely to possess greater scale advantages (Bain, 1956), as well as more slack resources (Haveman, 1993), we controlled for the size of the chains to which component hotels were affiliated, which we measured as the total number of hotels the chain operated at the beginning of each year. We used the number of hotels because

3
Carroll and Hannan (1989) suggested that failure to incorporate data on the early period of a population's history may obscure the legitimacy effects of organizational density. Consequently, because data on the Manhattan hotel industry are missing prior to 1898, the competitive effects of density may be expected to dominate the estimates for independent hotels (see Baum, 1995). Since component hotels were introduced to Manhattan at the start of the observation period, however, we tested for possible curvilinear effects by including both own-type density and own-type density squared in a preliminary analysis. We found no evidence of curvilinear own-type density dependence effects for either independent or component hotels. Therefore, we report only linear effects of own-type density below.

the number of hotel rooms was unavailable for many hotels outside Manhattan. Because we include the number of hotels a chain operates in Manhattan in the model, we subtracted the number of Manhattan hotels from the total to compute the number of non-Manhattan hotels a chain operates, to ensure mutually exclusive variables and simplify interpretation.

Environmental characteristics. We also controlled for several factors influencing the environmental carrying capacity for transient-hotel services in Manhattan. The potential demand for hotel services was measured as the number of visitors to New York City (divided by 1,000,000 for rescaling) in the prior year. This variable includes arrivals by sea, rail, and air. Because the hotel industry is vulnerable to the state of the American economy (Wyckoff and Sasser, 1981), annual gross national product (GNP) growth was included as a control.[4] Because the number of hotel chains (as well as the number of component hotels they operate) may influence the fates of component and independent hotels, we included chain operator density, defined as the number of hotel chains that operated hotels in Manhattan at the start of each year, as a control variable in the analysis. To examine whether the effects of hotel chain crowding were stronger for component hotels than independent hotels, we also included a chain-operator-density x chain-member interaction. To examine whether the effects of the theoretical variables were simply the result of the passage of time, we included a time-trend variable, calendar time, in the analysis.

Table 2 presents basic statistics and a correlation matrix for the variables. The highest bivariate correlation, .753, is between the component-hotel dummy variable and the ln(component-hotel time clock) variable. For the ex-component-hotel dummy variable and the ex-component-hotel time clock variable, the correlation is .614. The correlations among the different functional forms of the initial and incremental experience variables are higher, but these variables are not included in the same models; thus, these correlations do not affect our estimation. Although some correlations are high, in general, correlations among our study variables are in the low to moderate range (.1 to .4). Such levels of multicollinearity among explanatory variables can result in less precise parameter estimates (i.e., larger standard errors) for these explanatory variables but will not bias parameter estimates (Kennedy, 1992). While this does not pose a serious estimation problem, it can make it difficult to draw inferences about the effects of adding particular variables to our models. Therefore, when generating the results we present below, we estimate and test the significance of groups of variables in comparisons of a series of hierarchically nested regression models and examine coefficients and their standard errors for inflation to check that multicollinearity is not causing parameter estimates to be less precise (Kmenta, 1971: 371).

Analysis

The failure rate of Manhattan hotels was estimated using $r(t)$, the instantaneous rate of failure. The hazard rate of a hotel failing is defined as:

4
These variables were constructed using information contained in the *Historical Statistics of the United States, Colonial Times to 1970* (U.S. Department of Commerce, Bureau of the Census, 1975), *Historical Abstracts of the United States* (U.S. Department of Commerce, Bureau of the Census, 1970–1980), and *Port of New York and New Jersey Authority Annual Reports* (1930–1980).

Table 2

Means, Standard Deviations, Minimums, Maximums, and Bivariate Correlations for All Study Variables*

Variable	Mean	S.D.	Min.	Max.	1	2	3	4	5	6
1. Hotel age	28.37	19.59	1.00	131.01	—					
2. ln (Hotel size)	5.61	.74	2.30	7.82	.059	—				
3. ln (Hotel price)	1.52	.57	−.39	3.57	.041	.294	—			
4. Left-censored	.05	.23	.00	1.00	.331	−.005	−.111	—		
5. Component hotel	.17	.37	.00	1.00	.018	.266	.142	−.056	—	
6. ln (Component time clock)	.35	.93	.00	4.13	.108	.271	.160	−.051	.753	—
7. Ex-component hotel	.20	.38	.00	1.00	.060	.159	.027	−.073	−.346	−.295
8. ln (Ex-component time clock)	.45	1.14	.00	4.43	.377	.117	.061	−.058	−.212	−.181
9. Hotel founded by chain†	.12	.33	.00	1.00	−.064	.092	.057	−.048	.190	.181
10. Name concentration†	.18	.18	.00	1.20	.001	.217	.113	−.047	.673	.582
11. ln (Chain Manhattan rooms)†	7.61	.92	.00	9.10	.015	.269	.145	−.055	.691	.549
12. Chain Manhattan hotels†	5.97	5.34	.00	25.00	−.030	.105	.036	−.024	.648	.498
13. Chain age†	15.09	12.32	1.00	59.03	.091	.239	.187	−.051	.623	.675
14. Chain non-Manhattan hotels†	29.23	136.28	1.00	1659.0	.009	.059	.110	−.010	.192	.172
15. Visitors to NYC/1,000,000	50.93	14.06	14.73	79.16	.514	.089	.118	−.214	.145	.193
16. GNP growth	3.35	6.40	−14.80	16.60	.029	.003	−.000	.016	.020	.024
17. Calendar time	149.50	20.67	104.00	186.00	.608	.108	.253	−.221	.155	.215
18. Own-type hotel density	194.05	80.27	.00	313.00	−.024	−.193	−.212	−.090	−.676	−.656
19. ln (Own-type hotel mass) × 100	977.21	317.42	.00	1157.4	−.003	−.261	−.151	.029	−.687	−.636
20. Other-type hotel density	78.59	76.80	.00	313.00	.071	.233	.070	−.119	.625	.674
21. ln (Other-type hotel mass) × 100	968.73	219.63	.00	1157.4	.279	.105	.010	−.228	.323	.275
22. Chain operator density	15.67	7.98	.00	27.00	.452	.081	.052	−.219	.175	.207
23. Incremental nonlocal experience†	240.81	831.50	.00	18915	.026	.081	.112	−.012	.256	.292
24. Incremental nonlocal experience/age†	73.34	279.38	.00	4799.6	.013	.069	.109	−.010	.233	.241
25. Incremental nonlocal exper./age^2	60.95	232.27	.00	4856.8	.020	.073	.114	−.012	.233	.247
26. Incremental nonlocal exper./$\sqrt{}$age†	121.85	440.74	.00	8773.9	.018	.075	.111	−.011	.245	.236
27. Incremental local experience†	70.07	96.45	.00	548.00	.048	.129	.075	−.034	.553	.534
28. Incremental local experience/age†	16.69	18.49	.00	78.01	.015	.127	.056	−.029	.536	.536
29. Incremental local experience/age^2†	8.57	9.06	.00	37.32	−.004	.123	.048	−.026	.554	.510
30. Incremental local experience/$\sqrt{}$age†	31.44	37.80	.00	168.77	.032	.130	.066	−.033	.505	.542
31. Initial nonlocal experience†	64.76	223.31	.00	2406.0	−.002	.069	.111	−.024	.256	.135
32. Initial nonlocal experience/age†	21.62	101.94	.00	1807.5	−.012	.051	.090	−.017	.190	.094
33. Initial nonlocal experience/age^2†	17.37	82.78	.00	1508.3	−.003	.054	.092	−.017	.188	.094
34. Initial nonlocal experience/$\sqrt{}$age†	33.15	133.56	.00	2055.4	−.010	.059	.100	−.020	.221	.113
35. Initial local experience†	26.05	85.82	.00	652.00	.016	.044	.042	−.021	.267	.163
36. Initial local experience/age†	6.05	15.63	.00	75.09	−.004	.052	.026	−.017	.233	.206
37. Initial local experience/age^2†	3.37	8.40	.00	37.32	−.017	.050	.017	−.011	.244	.209
38. Initial local experience/$\sqrt{}$age†	10.99	31.05	.00	168.77	.006	.050	.034	−.020	.208	.190

Variable	7	8	9	10	11	12	13	14	15	16
7. Ex-component hotel	—									
8. ln (Ex-component time clock)	.614	—								
9. Hotel founded by chain	.046	.130	—							
10. Name concentration	−.232	−.144	.108	—						
11. ln (Chain Manhattan rooms)	−.343	−.210	.194	.537	—					
12. Chain Manhattan hotels	−.224	−.138	.127	.206	.671	—				
13. Chain age	−.250	−.154	.145	.462	.532	.413	—			
14. Chain non-Manhattan hotels	−.067	−.041	.042	.033	.172	.043	.201	—		
15. Visitors to NYC/1,000,000	.054	.315	.081	.108	.138	.015	.175	.088	—	
16. GNP growth	−.018	.007	−.004	.009	.020	.020	.014	−.003	−.099	—
17. Calendar time	.060	.374	.088	.107	.149	.022	.207	.104	.671	.015
18. Own-type hotel density	.308	.177	−.138	−.422	−.671	−.411	−.461	−.158	.095	−.069
19. ln (Own-type hotel mass) × 100	.350	.219	−.190	−.543	−.793	−.601	−.620	−.174	−.087	−.025
20. Other-type hotel density	−.296	−.138	.186	.505	.721	.548	.543	.126	.292	.036
21. ln (Other-type hotel mass) × 100	−.018	.142	.102	.214	.321	.219	.231	.055	.517	.037
22. Chain operator density	.031	.279	.078	.114	.171	.071	.181	.039	.589	.015
23. Incremental nonlocal experience	−.089	−.054	.071	.064	.245	.129	.348	.596	.104	−.001
24. Incremental nonlocal experience/age	−.081	−.050	.058	.041	.220	.108	.277	.707	.094	−.001
25. Incremental nonlocal exper./age^2	−.081	−.050	.060	.040	.222	.114	.303	.666	.100	−.001
26. Incremental nonlocal exper./$\sqrt{}$age	−.085	−.052	.064	.051	.232	.119	.312	.665	.099	−.001
27. Incremental local experience	−.191	−.117	.137	.228	.490	.523	.622	.051	.110	.024
28. Incremental local experience/age	−.220	−.135	.134	.243	.586	.640	.580	.060	.080	.036
29. Incremental local experience/age^2	−.226	−.139	.135	.249	.606	.694	.499	.060	.054	.038
30. Incremental local experience/$\sqrt{}$age	−.209	−.129	.131	.237	.549	.559	.531	.057	.099	.031
31. Initial nonlocal experience	−.089	−.054	.059	.091	.249	.170	.392	.431	.079	.003
32. Initial nonlocal experience/age	−.066	−.040	.050	.041	.177	.109	.216	.580	.064	.001
33. Initial nonlocal experience/age^2	−.065	−.040	.041	.042	.177	.102	.229	.582	.067	.001
34. Initial nonlocal experience/$\sqrt{}$age	−.077	−.047	.058	.060	.210	.137	.286	.541	.071	.002
35. Initial local experience	−.095	−.057	−.010	.088	.284	.338	.387	.027	.049	.008
36. Initial local experience/age	−.115	−.071	.008	.096	.364	.407	.391	.035	.040	.013
37. Initial local experience/age^2	−.119	−.073	.023	.096	.378	.457	.352	.035	.031	.015
38. Initial local experience/$\sqrt{}$age	−.106	−.065	−.003	.093	.332	.334	.402	.032	.046	.011

Table 2 (*continued*)

Variable	17	18	19	20	21	22	23	24	25	26
17. Calendar time	—									
18. Own-type hotel density	.074	—								
19. ln (Own-type hotel mass) × 100	–.095	.731	—							
20. Other-type hotel density	.305	–.455	–.786	—						
21. ln (Other-type hotel mass) × 100	.555	.104	–.257	.436	—					
22. Chain operator density	.646	.243	–.095	.329	.642	—				
23. Incremental nonlocal experience	.114	–.206	–.244	.191	.077	.056	—			
24. Incremental nonlocal experience/age	.107	–.190	–.220	.168	.069	.047	.953	—		
25. Incremental nonlocal exper./age^2	.110	–.190	–.223	.166	.069	.047	.963	.974	—	
26. Incremental nonlocal exper./$\sqrt{}$age	.110	–.198	–.232	.180	.073	.051	.985	.990	.980	—
27. Incremental local experience	.104	–.327	–.476	.430	.183	.128	.226	.141	.158	.177
28. Incremental local experience/age	.076	–.394	–.573	.521	.212	.112	.201	.152	.165	.177
29. Incremental local experience/age^2	.054	–.411	–.596	.541	.219	.094	.177	.146	.154	.162
30. Incremental local experience/$\sqrt{}$age	.094	–.368	–.536	.486	.201	.125	.217	.152	.168	.183
31. Initial nonlocal experience	.101	–.204	–.246	.206	.079	.063	.424	.483	.459	.479
32. Initial nonlocal experience/age	.079	–.153	–.177	.146	.058	.039	.488	.565	.521	.545
33. Initial nonlocal experience/age^2	.082	–.152	–.177	.142	.057	.040	.466	.548	.510	.525
34. Initial nonlocal experience/$\sqrt{}$age	.089	–.177	–.209	.174	.068	.049	.483	.554	.516	.539
35. Initial local experience	.060	–.208	–.276	.255	.088	.071	.060	.058	.076	.073
36. Initial local experience/age	.047	–.260	–.355	.332	.113	.072	.076	.073	.092	.087
37. Initial local experience/age^2	.036	–.289	–.370	.348	.117	.066	.077	.073	.090	.085
38. Initial local experience/$\sqrt{}$age	.055	–.240	–.323	.301	.103	.074	.070	.068	.087	.083

Variable	27	28	29	30	31	32	33	34	35	36	37
27. Incremental local experience	—										
28. Incremental local experience/age	.897	—									
29. Incremental local experience/age^2	.793	.971	—								
30. Incremental local experience/$\sqrt{}$age	.958	.978	.902	—							
31. Initial nonlocal experience	.113	.193	.163	.203	—						
32. Initial nonlocal experience/age	.067	.110	.101	.108	.868	—					
33. Initial nonlocal experience/age^2	.065	.109	.098	.110	.856	.986	—				
34. Initial nonlocal experience/$\sqrt{}$age	.087	.146	.129	.148	.947	.980	.956	—			
35. Initial local experience	.228	.363	.305	.385	.564	.223	.248	.351	—		
36. Initial local experience/age	.317	.477	.435	.476	.493	.243	.256	.344	.887	—	
37. Initial local experience/age^2	.335	.491	.464	.478	.413	.231	.235	.308	.750	.965	—
38. Initial local experience/$\sqrt{}$age	.281	.434	.381	.445	.542	.240	.260	.358	.969	.973	.882

* Note: Coefficients >.014 are significant at $p < .05$. The sample contained 20,344 yearly spell observations.
† Means and standard deviations (but not correlations) for chain characteristics and experience variables are based on 3,349 yearly spells of component hotels.

$$r(t) = \lim_{\Delta t \to 0} [Pr(t, t + \Delta t/t)/\Delta t], \tag{3}$$

where $Pr(t, t+\Delta t|t)$, is the probability of failure in the interval t, $t+\Delta t$, given the hotel was still alive at time t. Parametric estimates of the hazard rate require assumptions about the effect of time (in these models, age) on failure. There is debate about the appropriate parameterizations of age dependence in organizational mortality, so we used a piecewise exponential model, which allows the rate of failure to vary in an unconstrained way over preselected age ranges (Barron, West, and Hannan, 1994; Blossfeld and Rohwer, 1995). In these models, the age range is divided at k points (a_1, a_2, . . . a_k), which with $a_{k+1} = \infty$, creates k age periods: $I_l = \{t | a_l \leq t < a_{l+1}\}$, $l = 1, \ldots k$. Constants (baseline mortality rates) are estimated for each age period. So, the piecewise exponential model we estimate is of the form:

$$r(t) = e^{\beta X} e^{\alpha_l}, \text{ if } t \in I_l, \tag{4}$$

where X represents the vector of covariates, β the associated vector of coefficients, and α_l is a constant coefficient associated with the lth age period. To include time variation in the covariates, we used a multiple-spells formulation. In this formulation of the model, each hotel's history is broken down into one-year spells in which the hotel is at risk of failing. Each spell is considered right-censored unless the hotel fails. This allows the time-varying independent variables to be updated annually. We used TDA (Rohwer, 1993) to estimate parameter estimates by the method of maximum likelihood. We tested the implication of our assumption of piecewise age dependence by estimating the semiparametric Cox model (not presented), which generated results for the covariates that were comparable to those we present from the piecewise exponential model.

RESULTS

Table 3 reports maximum-likelihood estimates for the analysis of Manhattan hotel failure rates. Tests of significance shown in the table are one-tailed for directional predictions for the variables and two-tailed otherwise. Model 1 provides a baseline that includes hotel characteristics and the environmental control variables. Models 2–5 each add local and nonlocal experience variables based on one of the four discount factor specifications. The coefficients for each specification of the local and nonlocal experience variables are broadly comparable. Clearly, however, the specification in model 2, which assumes no depreciation of knowledge gained from past experience over time, is weakest (likelihood ratio test = 7.74, 4 d.f., n.s.). By comparison, the specification in model 3 based on the $\sqrt{Age}$ discount factor, which assumes that depreciation of knowledge is initially slow and slows further with time, is strongest, providing the largest improvement in fit over the baseline model (likelihood ratio test = 31.12, 4 d.f., $p<.001$). Thus our findings suggest that operating knowledge becomes antiquated and decays with time. Given these initial estimates, in the remainder of the analysis, we used variables based on the $\sqrt{Age}$ discount factor. To examine the robustness of estimates for the nonlocal experience variables to the observations for six very large chains (Holiday Inn, Best Western, Ramada, Howard Johnson, Quality Inn, Travelodge), we reestimated models 2–5 after excluding 101 spells for components of these chains. The reestimation (not shown) produced coefficients for the nonlocal experience variables comparable to those in Table 3.

The estimates in model 3 support the knowledge transfer and learning hypothesis 1, but support is more mixed for hypothesis 2, on strategic constraint. As predicted by hypothesis 1, the coefficients for initial and incremental local experience are both significant and negative. These estimates indicate that greater cumulative (discounted) Manhattan operating experience by a chain at the time a component hotel joins it increases the survival advantage gained by the component. Moreover, the incremental local experience coefficient indicates that additions to a chain's Manhattan operating experience during the course of the relationship lowered failure rates of the chain's Manhattan components further.

The coefficient for initial nonlocal experience is significant and negative. Thus, contrary to hypothesis 2, greater cumulative (discounted) non-Manhattan operating experience

Table 3

Maximum Likelihood Estimates of Manhattan Hotel Mortality, 1898–1980*

Variable	1	2	3	4	5
Age 0–2 years	−1.819 (.779)	−2.044 (.786)	−2.116 (.787)	−2.187 (.787)	−2.190 (.788)
Age 2–5 years	−.932 (.771)	−1.160 (.779)	−1.230 (.779)	−1.297 (.779)	−1.296 (.779)
Age 5–10 years	−1.107 (.773)	−1.330 (.780)	−1.395 (.780)	−1.458 (.780)	−1.457 (.780)
Age 10–20 years	−1.386 (.774)	−1.605 (.781)	−1.667 (.781)	−1.727 (.781)	−1.724 (.782)
Age 20–40 years	−1.083 (.818)	−1.300 (.825)	−1.362 (.825)	−1.423 (.826)	−1.423 (.827)
Age 40–60 years	−.322 (.863)	−.553 (.871)	−.622 (.871)	−.691 (.871)	−.698 (.872)
Age >60 years	−.063 (.915)	−.312 (.923)	−.389 (.924)	−.466 (.924)	−.477 (.925)
ln (Hotel size)	−.520• (.080)	−.495• (.081)	−.486• (.081)	−.476• (.081)	−.475• (.081)
ln (Hotel price)	−.189 (.106)	−.171 (.106)	−.171 (.106)	−.171 (.106)	−.174 (.106)
Left-censored	−.043 (.247)	−.027 (.247)	−.023 (.248)	−.018 (.248)	−.013 (.248)
Visitors to NYC/1,000,000	−.040• (.009)	−.039• (.009)	−.039• (.009)	−.039• (.009)	−.040• (.009)
GNP growth	−.022• (.009)	−.022• (.009)	−.021• (.009)	−.021• (.009)	−.022• (.009)
Calendar time	.013 (.007)	.014• (.007)	.014• (.007)	.014• (.007)	.014• (.007)
Initial local experience		−.031 (.027)			
Incremental local experience		−.010• (.005)			
Initial local experience/$\sqrt{Age}$			−.098• (.053)		
Incremental local experience/$\sqrt{Age}$			−.037• (.011)		
Initial local experience/Age				−.117• (.069)	
Incremental local experience/Age				−.050• (.021)	
Initial local experience/Age^2					−.102 (.071)
Incremental local experience/Age^2					−.126• (.043)
Initial nonlocal experience		−.025 (.022)			
Incremental nonlocal experience		.001 (.001)			
Initial nonlocal experience/$\sqrt{Age}$			−.070• (.040)		
Incremental nonlocal experience/$\sqrt{Age}$			.016• (.003)		
Initial nonlocal experience/Age				−.088• (.052)	
Incremental nonlocal experience/Age				.009 (.007)	
Initial nonlocal experience/Age^2					−.038 (.063)
Incremental nonlocal experience/Age^2					.036 (.024)
Log-likelihood	−1698.24	−1694.37	−1682.68	−1686.64	−1690.69

• $p < .05$.
* The sample included 20,344 yearly spells and 350 hotel failures. Standard errors are in parentheses.

by a chain at the time a component hotel joins it increases the survival advantage of the component. In contrast, the positive incremental nonlocal experience coefficient indicates that increases in non-Manhattan operating experience during the life of the affiliation increased the failure rates of chains' Manhattan components, as predicted by hypothesis 2. The implications of these opposing effects of chains' incremental experience within and outside of Manhattan on Manhattan component hotel failure are illustrated graphically in Figure 5, which compares the failure rate of a component of a hotel chain with no experience (i.e., both local and nonlocal experience equal zero) with the failure rates of components of more experienced hotel chains. A multiplier of greater than 1 indicates that the failure rate is increased relative to the hotel that joined the inexperienced chain by a factor equal to the multiplier; a multiplier less than 1 indicates that it decreased. As the figure shows, components of hotel chains that gain only non-Manhattan operating experience have the highest failure rates, but the hazard rate drops off sharply as hotel chains increase their Manhattan operating experience. Thus components gain from their chains' incremental Manhattan operating experience and suffer from their chains' increasing experience elsewhere.

To provide more rigorous tests of hypotheses 1 and 2 and test our remaining hypotheses, we examined more fully specified models in Table 4. Model 6, which adds the component and ex-component dummy and time-clock variables, improves the fit of model 6 significantly (likelihood ratio test = 77.68, 4 d.f., $p<.001$). The coefficient for the component hotel dummy variable is significant and negative, and the coefficient for the component time clock is significant and positive. Combined, these coefficients indicate that immediately after becoming a component, a hotel's risk of failure dropped, as predicted by hypothesis 3, but then increased over time toward that of an independent hotel. The coefficients for the ex-component dummy and time-clock variables are broadly similar. Together, the significant negative ex-component coefficient and the significant positive ex-component time-clock coefficient indicate that after a chain affiliation was severed, an ex-component hotel's failure rate remained lower than independent hotels—and even dropped below component hotels whose chain affiliations lasted longer than ten years—but the failure rate subsequently increased toward that of an independent hotel.

Figure 6 graphically illustrates the implications of these main and time-lapse effects of chain membership and loss on hotel failure. This figure compares the failure rate of an independent hotel to the failure rates of (1) a hotel that became and remained a component and (2) a hotel that became a component but subsequently became an ex-component after 20 years. A multiplier of greater than 1 indicates that the failure rate is increased relative to an independent hotel by a factor equal to the multiplier; a multiplier of less than 1 indicates that it decreased. The multiplier for the hotel that became and remained a component shows that, immediately after becoming a component, the failure rate drops to less than one-tenth that of an independent hotel but subsequently increases over the life of the affiliation. Even after 40 years, however, the component hotel still enjoys a failure rate less than one-half that of an independent hotel. Thus, although component hotels derived a significant advantage from chain affiliation, ceteris paribus, the value of the relationship depreciates somewhat over time. The multiplier for the hotel that acquires chain affiliation but becomes an ex-component after 20 years shows that immediately after becoming an ex-component, the hotel's failure rate drops below that of the hotel that remained a component but then increases toward that of an independent hotel more rapidly. Yet only after 20 years is the ex-component hotel's failure rate equal to that of an independent hotel. When interpreting extreme values for the component and ex-component time clocks, the temporal pattern presented in Table 1 should be kept in mind: only 10 components actually had affiliations that lasted as long as 50 years.

In model 7, we introduce the chain characteristics variables to test hypotheses 4, 5, and 6. Adding these variables improves on the fit of model 6 significantly (likelihood ratio test = 29.72, 6 d.f., $p<.01$). Supporting hypothesis 4, hotels that were components of chains operating a large number of rooms in Manhattan have significantly lower failure rates than comparable hotels affiliated with chains with a smaller number of rooms in Manhattan. Supporting hypothesis 5, the significant positive coefficient for the number of component hotels a chain operates in Manhattan indicates that increasing the number of units a chain operates in a market dilutes the chain's market power, reducing the advantage of the chain affiliation to the component hotel. Not surprisingly, there is a positive correlation (.671) between the number of Manhattan rooms the chain operates and the number of Manhattan components the chain operates, so we conducted further analysis to rule out the possibility of multicolinearity. We estimated model 7 with the Manhattan rooms and Manhattan components variables included separately (not shown) and found that the results were

Figure 5. Incremental effects of knowledge transfer and constraint.

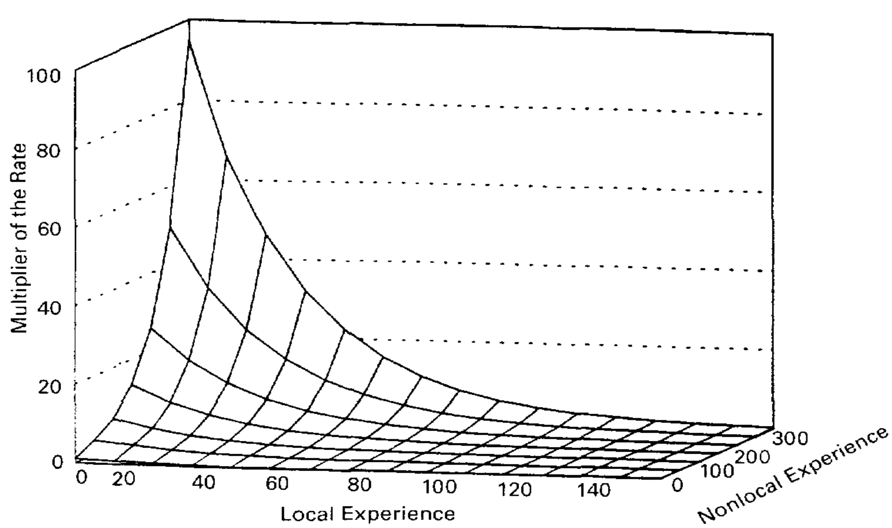


Table 4

Maximum Likelihood Estimates of Manhattan Hotel Mortality, 1898–1980*

Variable	6	7	8	9
Age 0–2 years	−2.490	−2.462	12.903	4.468
	(.807)	(.819)	(9.897)	(6.190)
Age 2–5 years	−1.546	−1.517	14.003	5.528
	(.797)	(.809)	(9.925)	(6.204)
Age 5–10 years	−1.714	−1.685	13.844	5.381
	(.797)	(.809)	(9.918)	(6.201)
Age 10–20 years	−1.998	−1.963	13.633	5.157
	(.798)	(.811)	(9.925)	(6.202)
Age 20–40 years	−1.821	−1.772	13.718	5.263
	(.842)	(.855)	(9.907)	(6.193)
Age 40–60 years	−1.245	−1.165	14.070	5.605
	(.881)	(.896)	(9.918)	(6.204)
Age >60 years	−1.109	−.992	14.112	5.642
	(.932)	(.947)	(9.924)	(6.210)
ln (Hotel size)	−.313•	−.313•	−.279•	−.284•
	(.085)	(.086)	(.088)	(.088)
ln (Hotel price)	−.187	−.178	−.475•	−.466•
	(.105)	(.106)	(.116)	(.116)
Left-censored	.019	−.022	.023	.046
	(.247)	(.249)	(.247)	(.247)
Visitors to NYC/1,000,000	−.038•	−.037•	−.041•	−.041•
	(.009)	(.009)	(.010)	(.010)
GNP growth	−.024•	−.023•	−.014	−.016
	(.009)	(.009)	(.010)	(.010)
Industry age	.013	.012	.058•	.047•
	(.007)	(.007)	(.013)	(.011)
Initial local experience/√Age	−.133•	−.119•	−.116•	−.110•
	(.063)	(.062)	(.062)	(.063)
Incremental local experience/√Age	−.039•	−.041•	−.039•	−.038•
	(.013)	(.014)	(.015)	(.015)
Initial nonlocal experience/√Age	−.085•	−.085•	−.083•	−.079•
	(.044)	(.045)	(.045)	(.045)
Incremental nonlocal experience/√Age	.016•	.016•	.015•	.016•
	(.005)	(.005)	(.005)	(.005)
Component hotel	−3.127•	1.378	−147.94•	−107.78•
	(.890)	(2.581)	(75.58)	(31.19)
ln (Component time clock)	.672•	.351	−.127	.080
	(.307)	(.388)	(.408)	(.408)
Ex-component hotel	−1.811•	−1.812•	−1.689•	−1.693•
	(.260)	(.259)	(.257)	(.256)
ln (Ex-component time clock)	.566•	.542•	.474•	.476•
	(.091)	(.092)	(.091)	(.091)
Hotel founded by chain		.648•	.651•	.654•
		(.302)	(.305)	(.305)
Name concentration		−3.634•	−4.206•	−4.114•
		(1.271)	(1.525)	(1.476)
ln (Chain Manhattan rooms)		−.645•	−.917	−1.613•
		(.362)	(1.820)	(.767)
Chain Manhattan hotels		.151•	.162•	.165•
		(.086)	(.092)	(.093)
Chain age		.058•	−.004	.013
		(.034)	(.038)	(.037)
Chain non-Manhattan hotels		−.041	−.073	−.063
		(.060)	(.071)	(.068)
Own-type hotel density			.021•	.012•
			(.007)	(.005)
ln (Own-type hotel mass)			−.026•	−.012•
			(.011)	(.007)
Other-type hotel density			−.036•	−.039•
			(.008)	(.008)
ln (Other-type hotel mass)			−.0007•	−.0006•
			(.0003)	(.0003)
Chain operator density			−.010	.016
			(.032)	(.028)

Table 4 (*continued*)

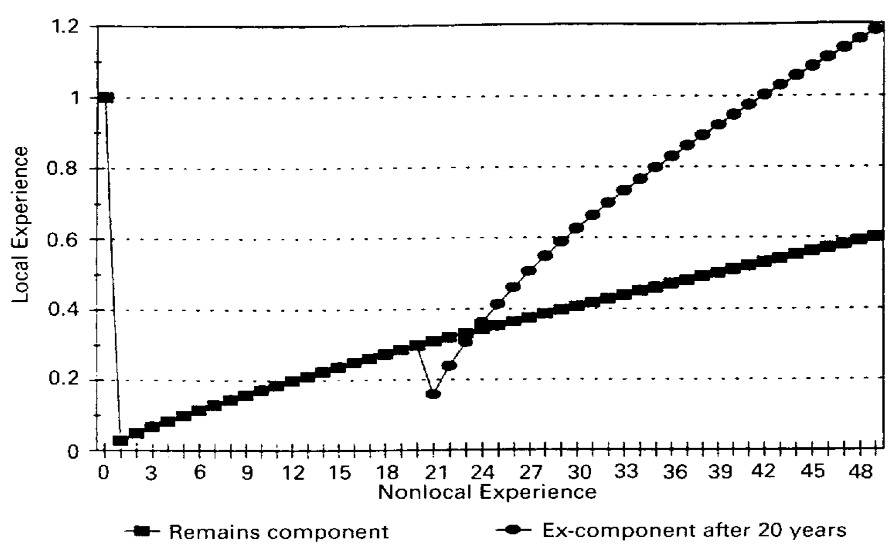
Variable	6	7	8	9
Own-type hotel density × Component			−.111• (.048)	−.086• (.041)
ln (Own-type hotel mass) × Component			.028 (.021)	—
Other-type hotel density × Component			−.013 (.034)	—
ln (Other-type hotel mass) × Component			.0012• (.0007)	.0011• (.0003)
Chain operator density × Component			.159 (.115)	.192• (.115)
Log-likelihood	−1643.84	−1628.98	−1591.55	−1593.38

• $p < .05$.
* The sample included 20,344 yearly spells and 350 hotel failures. Standard errors are in parentheses.

robust, and multicolinearity was not an issue. As predicted by hypothesis 6, the significant negative coefficient for name concentration indicates that component hotels had lower failure rates in chains in which a high proportion of components had names that linked them with the chain. Being founded by a chain significantly increased the failure rate, suggesting that components founded by chains suffered a more severe strategic constraint.

To test hypothesis 7, the hotel density and mass variables and their interactions with the component hotel dummy variable were introduced in model 8. In model 8, several of the interactions are insignificant. To ensure that this was not a result of high correlations among the interaction variables, we removed the two insignificant (p>.10) interactions in model 9. With these terms removed, the fit of the model is not significantly reduced (likelihood ratio test = 3.66, 2 d.f., n.s.), and the reduced model provides a significant improvement over model 7 (likelihood ratio test = 71.2, 8 d.f., p<.01). Therefore, we interpret model 9. In this fully specified model, the coefficients for our theoretical variables are

Figure 6. Chain affiliation dynamics.



substantively unchanged from the earlier estimates, providing more robust support for hypotheses 1 to 6.[5]

In model 9, the main effect of other-type density is significant and negative, and its interaction with chain membership has no effect. This means that rather than density-dependent competition between independent and component hotels, there was density-dependent mutualism: Increases in the number of either type lowered the failure rate of the other type, and the mutualistic cross-effect was of equal magnitude for independent and component hotels. The main effect of other-type mass is also significant and negative, but its interaction with chain membership is significant and positive. With other-type density controlled, this means that increasing average size of component hotels had a mutualistic effect that lowered failure rates of independent hotels. In contrast, the relative magnitudes of the main effect ($\beta=-.0006$) and interaction ($\beta=.0011$) terms indicate that increasing average size of independent hotels had an overall competitive effect ($\beta=-.0006+.0011=.0005$) that increased failure rates of component hotels. So neither hypothesis 7 nor the alternative we considered, of component hotels generating competition for independent hotels, holds. Rather, independent and component hotels have a mainly symbiotic relationship. Large independent hotels did, however, generate significant competition for component hotels.

Several of the control variables also significantly influenced hotel failure. Larger and higher-priced hotels have significantly lower failure rates. Increases in the number of visitors to New York City and the U.S. GNP both lower the hotel failure rate. The main effect of own-type density is significant and positive, and its interaction with chain membership is significant and negative. This means that density-dependent competition was more intense among independent than component hotels. The relative magnitudes of the main effect ($\beta=.012$) and interaction ($\beta=-.086$) terms indicate that increasing hotel density had competitive effects only among independent hotels; for components, the overall effect of density increases ($.012-.086=-.074$) was mutualistic. The main effect of own-type mass is significant and negative, and its interaction with chain membership is insignificant. With own-type density controlled, this means that increases in the average size of other hotels of the same type lowered failure rates, and the effect was of equal magnitude for independent and component hotels. The insignificant main effect for chain operator density and the significant positive coefficient for the chain-operator-density × chain-member interaction indicates that although component hotels affected each other's fates mutualistically, competition from crowding of hotel chains in Manhattan increased the failure rate of component hotels but did not influence the survival of independent hotels. Finally, any significant differences between the coefficients of the dummy variables for the age categories reveal the pattern of age dependence in a piecewise exponential model. In model 9 there are no such differences, indicating that the failure rate for Manhattan hotels does not vary with age.

5
The component hotel dummy variable coefficients increase markedly in size in models 8–9. This is a result of adding the component hotel interactions. Although the component hotel coefficients jump notably, the predictions do not, because the larger coefficients are counterbalanced by the interaction coefficients, which must be considered simultaneously.

Chain Affiliation

We performed additional analyses to determine whether or not our findings were related to other variables known to affect the failure rate of Manhattan hotels but not included in our models. In particular, Baum and Mezias (1992) found that the failure rate of Manhattan hotels was affected by size-, price-, and geographically localized competition, and Baum (1995) found that the failure rate was affected by interactions between industry age and various measures of competition (i.e., density, mass, industry concentration, size-localized competition). We reestimated our models after including the variables from these two papers, and the results reported above are robust. Further, the findings from Baum and Mezias (1992) and Baum (1995) hold up in the models that include the chain-affiliation variables. Thus the results we focus on in this paper are empirically distinct from those considered in earlier papers. We will provide tables showing the results of these additional analyses on request.

DISCUSSION

Given trends over the last century suggesting that chains will eventually come to dominate most service industries, understanding how chains affect the evolution of industries over time is an extremely important topic for organization theorists. This research was motivated in part by the scarcity of research examining the implications of chains. We began to address the role of chains by modeling the influences of chain affiliation for the fates of component organizations and competitive dynamics in the Manhattan hotel industry. The findings reveal that the effects of chain affiliation are both substantive and complex.

Consistent with claims of the advantages of the chain form (Lebhar, 1959; Chandler, 1977) and arguments about the implications of interorganizational relations as resource buffers (Singh, Tucker, and House, 1986; Freeman, 1990; Miner, Amburgey, and Stearns, 1990; Baum and Oliver, 1991), in Manhattan, chain affiliation, under most circumstances, improves the survival chances of component hotels. All chain memberships are not equal, however, and the survival benefits to components vary systematically with the operating experience and the number and distribution of components of hotel chains.

Manhattan component hotels derive the greatest benefit when the chains to which they belong (1) provide a large initial transfer of knowledge based on past accumulated operating experience both in and outside Manhattan, and (2) the chain continues to accumulate operating knowledge in Manhattan that can be transferred to its components. Since we control separately for the potential resource implications of being a component by including contemporaneous measures of the chain's size, we interpret this as evidence of a less tangible benefit from chain affiliation, in the form of transferred knowledge. That components have lower failure rates even after the chain affiliation is severed also indicates that the chain affiliation provides more than just material resources. Chain affiliation, however, is not an unmixed blessing. Hotels founded by chains have higher rates of failure, and the rate of component failure increases with the accumulation of non-Manhattan operating experience during the affiliation. These effects of strategic constraint are the costs of being an instrumental part of a strategy designed to derive maximum benefit for the collective, without special regard to any particular component.

We were surprised by the finding that non-Manhattan operating experience at the time the chain affiliation was created decreased the mortality rate. We had predicted that such experience would be a source of strategic constraint. Two things may explain the finding. First, there are some elements of non-Manhattan experience that are applicable to the Manhattan market. For example, the chain-wide level of experience would contribute to the ability to operate a reservation system, which would benefit a Manhattan component of the chain. Second, there is probably a self-selection by chains that enter the Manhattan market. If their past experience was such that they were ignorant about operating a hotel in Manhattan, they were probably less likely to start or acquire a Manhattan component. Therefore, the chains that entered the Manhattan market were likely those with past non-Manhattan experience most applicable there. After the Manhattan component joins the chain, however, the chain may "drift." There is no guarantee that a group of organizations in similar environments at one time will still be in similar environments at a later time. If a chain with a history of non-Manhattan experience useful in Manhattan "drifted" after acquiring a Manhattan component, we would expect the observed result that preaffiliation non-Manhattan experience helps the component, while postaffiliation non-Manhattan experience harms the component.

It may seem that the advantages and disadvantages of chain affiliation are separable: What about a hotel that joined a chain and then quickly severed the relationship, perhaps to join another chain? Wouldn't such a hotel reap the advantage of transferred knowledge without the disadvantage of strategic constraint? Our results suggest that it might, but unfortunately, such a "promiscuous" strategy is impossible. The owners and managers of a hotel can be strategic about the decision to join a chain, but once they join, it is the chain that decides whether or not they will stay. This is the duality of component organizations. To the people within them they may seem like any other organization, yet ultimately their fate is not their own. Component organizations are like independent organizations in routine operations but essentially different, in that authority for all of the important decisions concerning a component rests at the chain level.

The dynamic effects of chain affiliation are also informative. The effect for ex-component hotel and ex-component time clock seem easy to interpret. When a component leaves a chain, it has a lower failure rate than independent hotels, but over time this advantage disappears. This is consistent with what we would expect given the arguments we have made about chain affiliation being a source of operating knowledge. When the affiliation is severed, the ex-component is still left with some of the knowledge it acquired from the chain, but over time that knowledge or its usefulness decays. The significant negative coefficient for component hotel is as we predicted and can be explained by the resource and operating implications of chain affiliation not captured by the other variables. The positive coefficient for the component time clock (which was not significant in models 8 and 9) suggests that the advantage of a chain affiliation decreases with its duration. This could be explained by the fact that, since capital budgeting decisions are usually made at the chain level, needed maintenance is delayed for components, causing them over time to fall into disrepair. It may also be that the chain is a source of inertia. Operating within the chain, with its standardization and decision-making authority, may inhibit the component's capacity to respond to its local environment.

An alternative explanation for the negative coefficient for component is that chains select the best components for chain membership. The negative coefficient may represent the fact that components are simply better than independents in some unobserved way, rather than that the residual benefits of chain membership are not captured by our other variables. It is credible that chains select high-performing hotels, but we have attempted to control for as much hotel-level variance as possible by including the size and price variables, which do significantly influence the hotel's failure rate. Future research on which independent organizations are likely to be chosen by chains would be useful in identifying the importance of selection in explaining differential outcomes for components and independents.

Reputation also appears to be a significant advantage for some component hotels. According to model 9, a component of a large chain that pursues a reputation strategy (a chain that names all of its units the same way) would have a failure rate about 0.016 ($e^{-4.114}$) times that of a component in a chain that does not pursue a reputation strategy or an independent hotel. This is evidence at the component level for the advantage of common names that Ingram (1996b) found at the chain level. Clearly, reputation is important in the hospitality industry because often customers must interact with unfamiliar hotels. Reputation as a means of generating credible commitment is also important in hospitality and other industries in which chains thrive. Because of the interdependence of components in a chain, they are better able than independent organizations to say "you can trust us because we have so much to lose if you are dissatisfied with our behavior." As an illustration, consider the recent scandal over the cheating of customers at Sears' Automotive Centers. Cheating in the automobile service industry is nothing new. Why then were we shocked to hear that Sears also cheats? It is because Sears has a national network of interdependent operations, and we expect that the cost of scandal, and therefore the incentive to resist malfeasance, would be so much higher for Sears than for independents.

Another result of the relationships between components of the same chain is the advantage of the chain's market power. Consistent with this, we found that component hotels that are part of chains that control more rooms in Manhattan have lower rates of failure. But the failure rate increases with the number of Manhattan hotels that are part of a component's chain, again demonstrating the tension between the component and the collective. It is advantageous to be part of a chain that has a high degree of market power, but disadvantageous to have to share that power with other components.

The implications of chains for the competitive dynamics of the Manhattan hotel industry are fascinating when we consider the relationship between independent and component organizations of all types over the last century. In industries such as retailing there was an explicit battle between chains and independent establishments that resulted in most states passing legislation to inhibit the growth of chains (Lebhar, 1959). In hospitality there was resistance from old-style "hotelmen" to the chain form of organization (Ingram, 1996a). The resistance expressed itself in public statements and in the politics of the industry's trade associations. Yet we found that the relationships between component and independent hotels were generally mutualistic. Component hotels competed only with large independent hotels. This suggests that there are two niches in the hospitality industry and that component hotels and smaller independent hotels can peacefully coexist. The public conflict between the two organizational forms is not inconsistent with this explanation, because it was generally the owners of large independent hotels, which do compete with chains, that had the time and resources to be active in the arena of public opinion (Ingram, 1996a).

An interesting non-result concerns economies of scale, which were the basis for the economic explanation for the success of chains (Chandler, 1977). We hypothesized and found evidence of local economies of scale in the form of a lower failure rate for components of chains with more Manhattan rooms. The size of the chain outside Manhattan, however, had no effect on the component's likelihood of failure. This finding is compelling in light of findings elsewhere that larger and more geographically compact hotel chains have lower failure rates (Ingram, 1996b). The advantage of compactness at the chain level is consistent with the finding here of local economies of scale, but the advantage of large size at the chain level is not reflected at the component level. It may be that general economies of scale do exist for hotel chains, but they are not reflected in the Manhattan market. It could also be that existing economies of scale are exploited at the chain level and do not benefit components. In any case, our finding gives reason to reconsider the assumption that chain components benefit from economies of scale beyond those generated in their local market. When generalizing from our result, however, it should be remembered that in industries such as retailing, economies of scale may be more important and more of a benefit to the component than in hospitality.

In drawing conclusions about the success of the chain form of organization from this study, it is important to remember that Manhattan is different from many of the markets in which hotel chains thrive. The Manhattan market is large enough for independent hotels to be professionally managed; it is a sufficiently central travel destination to allow travelers to develop enduring relationships with independent hotels; and it is a stronghold of luxury hotels. These features suggest that Manhattan should be a difficult market for chains. When we interviewed Manhattan hotel managers, they voiced the same opinion. This makes our finding that chain affiliation (under most circumstances) lowers the failure rate of component hotels all the more striking.

CONCLUSION

Returning to the problem we introduced this paper with, we can now say much more about the success of the chain form. Usually, the net effect of chain affiliation is to lower the failure rate of components. Our results are compatible with what Miner, Amburgey, and Stearns (1990) referred to as partial selection resulting from organizational buffers. Rather than competing directly with independent hotels, component hotels become more numerous because, as a function of their chain affiliations, they have lower rates of failure. In this sense, our findings are broadly consistent with other research on the effect of interorganizational linkages on organizational failure (Singh, Tucker, and House, 1986; Freeman, 1990; Miner, Amburgey, and Stearns, 1990; Baum and Oliver, 1991). Our detailed relational data allowed us to dimensionalize the interorganizational relationship, however, and we discovered some disadvantages, such as an increasing failure risk associated with incremental strategic constraint and a higher risk for affiliation with chains that operate many Manhattan hotels. Knowing more about when and what type of interorganizational linkages are beneficial or harmful would be valuable for managers and designers of organizations.

This paper differs in another important way from past work on interorganizational linkages and organizational failure. Past work has looked at linkages between population members and regulatory agencies, community organizations, and political parties (Singh, Tucker, and House, 1986; Miner, Amburgey, and Stearns, 1990; Baum and Oliver, 1991), which are important but nondefinitive connections between organizations and their environment.[6] In contrast, the linkages between component hotels and chains create a distinct organizational form, for which we have suggested the term superorganization. For us, the critical feature of a superorganization is that it is created by horizontal linkages between similar subunits. The superorganization is therefore commensalistic, while past analysis of multiunit organizational forms has mostly been on synergistic relations such as vertical integration (e.g., Chandler, 1977). We believe that the findings here are useful for understanding the implications of the linkages to the many types of superorganizations, both chain and non-chain. For example, the sharing of certain types of experience may be an important benefit to an organization that operates similar production plants in different geographic areas. Further, the superorganization form is representative of what Daft and Lewin (1993) called the "new" organizational forms, although it is certainly not new. Superorganizations use relatively autonomous subunits to respond to local conditions and avoid the pitfalls of hierarchy, were initially considered radical but are now familiar, and have been innovators in developing and apply-

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An exception is Freeman's (1990) analysis of subsidiary semiconductor producers.

ing technology and management techniques to operate a diffuse organization. As such, superorganizations seem like an excellent model to study the "new" organizational forms, all the better because they have been evolving for more than a century.

This research highlights a potential linkage between organizational ecology and theories of organizational learning. Many formal organizational activities are intended to acquire information or knowledge. Typically, such learning by organizations is viewed as an organization-level phenomenon (e.g., Levitt and March, 1988; Huber, 1991). Recently, however, work by network theorists shows that learning may often be produced by interactions among organizations, rather than by isolated organizations (e.g., Davis, 1991; Burns and Wholey, 1993; Haunschild, 1993). Consequently, learning by organizations may commonly unfold in organizational populations and communities as well as individual organizations (Miner and Haunschild, 1995). Here we emphasize not learning processes present at the population level in the form of interorganizational imitative behavior but, building on Darr, Argote, and Epple (1995), those resulting from intraorganizational learning communities made up of multiunit chains. We showed that operating experience at the hotel-chain level translates into a survival advantage at the component level, contributing greatly to success of the chain form in the Manhattan hotel industry. Given the prevalence of the chain organizational form across service industries, future research combining ideas on interorganizational learning at the population level and intraorganizational learning within superorganizations could provide new insights into industry dynamics and evolution.

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