Scaling Rapidly While Maintaining Adherence to Operational Routines: Evidence from a Chain Organization

Abstract

Replication of operational routines is an important source of value creation for chain organizations. Once initially adopted, however, routines must be maintained. This creates a potential tension, as attention to replicating operational routines in new outlets may affect the organizational capacity to maintain adherence to those routines at existing outlets. Surprisingly, little is known about how this tension is managed and what types of experience may improve the ability to manage the ensuing dual imperative. Drawing on the replication and organizational learning literatures, and using data from a Fortune 100 franchise chain with thousands of outlets, we examine whether and how replicating operational routines in new outlets influences a chain's ability to maintain adherence to those routines in existing outlets over time. We posit and find evidence of a spatio-temporal trade-off in replication, whereby as speed of scaling in an area increased, adherence to operational routines at existing outlets in that area decreased. Our central finding is that this trade-off is moderated by individual outlets' learning from their own operating experience, as well as by area units' learning from their prior adherence-related failure and rhythm of scaling experience. The findings point to important hitherto neglected learning and attention mechanisms operating at different levels within chain organizations, which shape their capacity to scale rapidly yet healthily, i.e., to replicate operational routines across both space and time.

One of the main benefits of a chain is the economies of scale gained by replicating successful operational routines (Chandler, 1990; Nelson & Winter, 1982). Yet, chains still have a hard time replicating operational routines in new outlets (Kogut & Zander, 1992; Lawrence, 2020; Szulanski, 1996; Winter & Szulanski, 2001) as well as maintaining adherence to those routines at their existing outlets over time (Anand, Gray, & Siemsen, 2012; Epple, Argote, & Devadas, 1991; Knott, 2001). Much of the work on replication of operational routines has focused on their transfer across locations and transfer efficacy in terms of the extent of initial adoption in a new location (Jensen & Szulanski, 2007), or on the performance outcomes associated with the (lack of) adoption (Szulanski & Jensen, 2006; Terwiesch & Xu, 2004; Williams, 2007; Winter, Szulanski, Ringov, & Jensen, 2012). Comparatively less attention has been given to maintaining adherence of those routines over time, once initially adopted. Once initially adopted, however, such routines must be maintained to achieve and preserve the standards of the organization. This creates a tension or dilemma, as increasing attention to replicating operational routines in new outlets (spatial replication) may affect a chain's ability to maintain adherence to those routines at its existing outlets over time (temporal replication). Yet despite this dilemma being discussed anecdotally by the literature on chain organizations (Bradach 1998), little is known about either how chains manage these dual demands or the types of experience that may moderate a chain´s capacity to balance such demands, which are the subject of our study.

Chains typically organize around geographic area units tasked with: 1) scaling the chain in their area by opening new outlets that replicate a standard set of value-creating operational routines; and 2) monitoring that this set of operational routines is continuously adhered to by existing outlets of the chain in that area (Bradach, 1998; Garvin & Levesque, 2008). We argue and demonstrate that competing demands on area unit attention (Ocassio 2011) create a trade-off between an area unit's ability to scale via opening new outlets in which the chain's value-creating set of operational routines are replicated, on one hand, and its ability to monitor the continued adherence to operational routines at existing outlets on the other hand. We then theorize that the relationship is moderated by the experience of the individual outlets, as well as by the experience of the area units that oversee those outlets. Our primary thesis is that the capacity of an area unit to switch attention between competing demands and mitigate the negative impact of the resulting trade-off is a function of focal outlets' learning from their own operating experience (Fernandez-Duque, Baird, & Posner, 2000; Ocasio, 2011; Swets & Kristofferson, 1970), as well as by area units' learning from prior adherence-related failure (Argote, Lee, & Park, 2021; Dahlin, Chuang, & Roulet, 2018; Desai, 2008; Maslach, 2016) and rhythm of scaling experience (Ancona, Goodman, Lawrence, & Tushman, 2001; Kunisch, Bartunek, Mueller, & Huy, 2017; Weick & Sutcliffe, 2006). Using unique proprietary data that track all U.S. outlets of a Fortune 100 non-food franchise chain created over a period of eleven years, we empirically test and find robust support for our predictions.

This study makes three main contributions. First, we contribute to the literature on replication (Nelson & Winter, 1982; Knott, 2001; Szulanski & Jensen, 2006; Williams, 2007; Winter et. al., 2012; Anand et al., 2012; Lawrence, 2020) by specifically examining how the replication of operational routines in new outlets affects a chain organization's ability to maintain adherence to operational routines in existing outlets. Our central contribution lies in showing the existence of a spatio-temporal trade-off in replication, which gives rise to a negative relationship between speed of scaling in *new locations* (spatial replication) and adherence to operational routines at *existing locations* (temporal replication), as well as explicating underlying attention and learning mechanisms that govern it. Second, this paper also contributes to the literature on organizational learning (Argote, Lee, & Park, 2021; Argote & Miron-Spector, 2011), offering novel insights into the types of experience that underpin the organizational capacity to switch attention and dynamically manage the dual attentional demands created by knowledge transfer across space and time. Finally, this study contributes to the nascent literature on scaling by furthering our understanding of the microfoundations and role of the organizational context of scaling (DeSantola & Gulati, 2017; Shepherd & Patzelt, 2020).

Replicating Operational Routines in Chain Organizations

The replication of operational routines across outlets and over time is fundamental to the growth and profitability of chain organizations. Prototypical examples are franchise organizations which have become a major economic phenomenon (Winter & Szulanski, 2001), contributing 7.4 percent of U.S. private nonfarm GDP and 10.1 percent of U.S. private nonfarm employment (International Franchise Association, 2016). Chains are typically subdivided into geographic area units that play an important intermediary or bridging role between the corporate headquarters and the outlets of the chain in a given area (Bradach, 1998; Garvin & Levesque, 2008; Kalnins & Lafontaine, 2013). While headquarters' role is discovering a successful set of operational routines suitable for large scale replication, area units' role is scaling up in an area by opening new outlets in which the set of routines is replicated, as well as monitoring the continued adherence to those routines at all outlets in their area (Nelson & Winter, 1982; Winter & Szulanski, 2001). Both these roles of area units are of vital importance in chain organizations: Scaling up by opening new outlets in which the chain's operational routines are replicated is typically the primary driver of revenue and profit growth, yet those benefits may not materialize if continued adherence to the operational routines in existing outlets cannot be ensured (Ater & Rigbi, 2015; Bradach, 1997; Szulanski & Jensen, 2006).

Scaling: Replicating routines in new outlets

Scaling up by replicating a chain's value-creating set of operational routines in new locations enables a chain to realize economies of scale (Chandler 1990), increase legitimacy (Zimmerman & Zeitz, 2002), defend against or pre-empt would-be imitators (Eisenmann, Parker, & Van Alstyne, 2006), or better compete with more established competitors (Schilling, 2002). Yet, opening new outlets can be expected to involve a significant commitment of organizational attention (Garud, Kumaraswamy, & Karnøe, 2010), and when the allocation of this limited resource (Ocasio, 1997, 2011) is not managed judiciously, it can lead to errors, value destruction, and failure (Joseph & Wilson, 2018). When scaling up the network of outlets of a chain in a given area, its area units involve themselves in selecting and training outlet owners/managers, selecting outlet sites, as well as helping with the design and construction of outlets (Bradach, 1998; Garvin & Levesque, 2008). These are critical decisions and activities that an area unit has to make and perform before an outlet's first day of operation, and they are fundamental to its subsequent success (Kalnins & Mayer, 2004; Salvaneschi, 1996).

Preserving routines at existing outlets

Ensuring continued adherence to routines in existing outlets is fundamental to the operation of a chain organization. Lapses in adherence to routines substantially increase outlets' likelihood of failure (Winter et al., 2012) and can impede both outlet and overall chain performance in multiple ways. For one, lack of adherence to routines exposes an outlet to the risk of being perceived as an illegitimate member of the chain and thus being penalized by customers (Barthélemy, 2008; Hsu & Hannan, 2005; Zuckerman, 1999). Moreover, it makes the outlet incompatible with the common operating, logistics, support, feedback, and control systems of the chain, diminishing its ability to draw support and resources from the rest of the organization (Szulanski & Jensen, 2006). Furthermore, decay in adherence to operational routines has negative externalities for the chain as a whole (El Akremi, Mignonac, & Perrigot, 2011), impairing its brand name and reputation and lowering chain-wide economies of scale (Barthélemy, 2008).

Chains typically task their area units with the important responsibility of ongoing monitoring to ensure continued adherence to routines. Area units perform this role through regular on-site visits and inspections, use of mystery shoppers, field audits, etc. (Bradach, 1997; Garvin & Levesque, 2008), which require ongoing, deliberate allocation of area unit attention. Rich Bachman, a KFC executive, described the challenge of ensuring continued adherence to operational routines in the thousands of geographically dispersed KFC franchise outlets in the following way: "*We are running thousands of identical factories. They need to be the same because customers need to get what they expect… the details of the business are crucial*." (Bradach, 1998: 85).

Dual Demands, Attention, and Replication

Posing dual demands on area units' limited attention creates two problems with attention processing. First, it creates competing claims on attention, which is a limited resource (Ocasio, 1997, 2011). Scholars have documented that while attention benefits the activity of focus (Ocasio, 2011; Ocasio & Joseph, 2014; Rerup, 2009; Weick & Sutcliffe, 2006), it also diverts attention from parallel activities (Huckman and Zinner, 2008; Joseph and Wilson, 2018; Robert Mitchell, Shepherd, & Sharfman, 2011; Yu, Engleman, & Van de Ven, 2005). Second, it requires that managers switch attention between dual demands. Because focus promotes a "deep but relatively narrow awareness of what goes on in a specific context" (Rerup, 2009: 878), it makes it difficult for managers to flexibly switch their attention between different stimuli and activities (Ocasio & Wohlgezogen, 2010).

Thus, other things being equal, allocating more attention to scaling can be expected to adversely affect the level of attention resources available to an area unit for the purpose of monitoring adherence to operational routines in its area. In turn, reduced area unit attention to monitoring adherence to routines, and the difficulty of switching attention between scaling and monitoring, can be expected to result in lower levels of adherence to operational routines in that area. The ensuing difficulties for managers in franchise chains are illustrated by the quote below:

> *"We [at Pizza Hut] added three units to one market … and it simply was too fast; we're still trying to get things settled down there. Opening a new restaurant required a disproportionate amount of management time compared to managing existing units ... Debbie Stewart, a district manager at Hardee's, estimated that over half of her time for several weeks was devoted to opening a single unit. At the same time, she was responsible for the management of several existing units. She personified the Pizza Hut vice-president's worry that excessive growth could cause a firm to lose control of its base. Nugent, CEO of Jack in the Box, put it in even stronger terms: You can kill a company by growing it too fast."*
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> (Bradach, 1998: 66)

Therefore, we hypothesize:

Hypothesis 1 (H1). *The higher the speed of scaling in an area, the lower the level of adherence to operational routines in that area.*

Experience, attention, and balancing dual demands

The degree to which organizations can focus attention on a given activity, as well as deal with disruptions caused by switching attention across multiple activities, may be a function of experience. Experience provides organizations with knowledge needed to alter behavior and improve processes (Argote & Miron-Spektor, 2011; Argote & Ophir, 2002). Experience gets encoded in the organizations' structures, routines, and practices and, thus, can significantly guide attentional processing (Argote, 1999; Haunschild & Sullivan, 2002). Here we examine three important types of experience that may be particularly relevant: operating experience, failure experience, and regular (pace of) experience (Argote, Lee, & Park, 2021). While these dimensions of experience do not exhaust the potential regulators of the attentional trade-off between scaling and monitoring faced by area units in chains, they do reflect key mechanisms that research on learning has pointed to (Argote, Lee, & Park, 2021; Argote & Miron-Spektor, 2011).

The first type of experience that may regulate area units' capacity for effectively switching attention between their scaling and monitoring role is the operating experience of the outlets under their supervision. Area units need to make choices about the basis on which to distribute the limited attention available for their monitoring role across the existing outlets in their area. As the operating experience of a particular outlet increases, the processes and structures associated with running its business become established. Moreover, with greater operating experience, outlets are better able to assess the costs of lapses in adherence to operational routines, and are more likely to consistently and continuously adhere to them (Bradach, 1997; Sutton & Rao, 2014). This, in turn, should reduce and stabilize the amount of attention that area units must direct to a given outlet, effectively increasing attention capacity (Laamanen and Keil, 2008; Sullivan, 2010). Because outlets with greater operating experience require that less area unit attention focus be directed towards their monitoring, area units are better able to attend to the activities associated with scaling up, while still dedicating sufficient attention to monitoring.

Outlets with limited operating experience may require greater allocation of area unit attention towards their supervision. Such units are insufficiently familiar with the knowledge they are receiving; they are more likely to underestimate its value and complexity and be overconfident about their ability to uncover and implement a superior alternative (Winter et al., 2012). Moreover, monitoring compliance at outlets with a more limited operating experience can be expected to consume more area unit attention, as needed processes and routines, such as management information and performance evaluation systems, field auditors, mystery shoppers, etc., need to be set up, fine-tuned, and institutionalized (Bradach, 1997, 1998). Thus, we hypothesize the following:

Hypothesis 2 (H2). *The negative relation between speed of scaling and adherence to operational routines in an area is* ***stronger*** *for outlets with a more limited operating experience.*

The second type of experience that may condition the relationship between speed of scaling and adherence to operational routines is the experience that an area unit has with the costs and consequences of outlet failures associated with decay in adherence to routines. Learning from failure has a long history in the organizational learning literature, and has been shown to improve performance, quality, and efficiency (Desai, 2015; Haunschild, Polidoro, & Chandler, 2015; Madsen & Desai, 2010), as well as limit future failures (Baum & Dahlin, 2007; Haunschild & Sullivan, 2002). Such experience accumulates as area units face problems with decay in adherence to routines at outlets in their area, and are forced to learn how to correct them. Failures provide opportunities, greater motivation, and greater capacity to learn (Dahlin et al., 2018), because they provide area units with a chance to reflect on what has gone wrong and how to improve relevant processes.

Moreover, because the monitoring role of area units is vitally important, attention to the fulfilment of that role becomes more strongly scrutinized by the headquarters of a chain when "unintended events emerge" (Martin, Lopez, Roscigno, & Hodson, 2013), e.g., when outlet failures occur that are associated with lapses in adherence to routines. As area units desire to portray a positive self-image to headquarters, greater scrutiny of their actions by headquarters can be expected to result in more attention to – and learning from – outlet failures related to lack of adherence and, thus, improve the corresponding area unit processes. In addition, failure can be expected to prompt area units to re-examine key assumptions regarding the causes of adherence problems in their area, leading to a deeper understanding of cause-effect linkages (Dahlin et al., 2018; Haunschild & Sullivan, 2002; Morris & Moore, 2000) and enabling them to develop improved response repertoires for dealing with such problems (Gaba & Joseph, 2013; Miller & Chen, 2004). These repertoires could include selecting more effective threats of sanctions for deviant outlets or better assisting outlets to overcome their adherence-related problems. As a result, area units will be better prepared to deal with future adherence issues, and such issues will be less disruptive to their attention allocation patterns. In sum, as experience with outlet failures associated with decay in adherence to operational routines accumulates, area units are likely to learn from the experience and more effectively monitor adherence to routines in their area. Thus, we hypothesize:

Hypothesis 3 (H3). *The higher the past failure experience associated with lapses in adherence to operational routines in an area, the* ***weaker*** *the negative relation between speed of scaling and adherence to operational routines in that area.*

The third type of experience that may regulate an area unit's capacity for (re)allocating attention between its scaling and monitoring goals derives from how the area unit has paced scaling in the past. The diversion of an area unit's attention away from monitoring adherence to operational routines may be affected not only by its current speed of scaling but also by how the area unit has paced scaling in the past (Ancona et al., 2001; Kunisch et al., 2017; Weick & Sutcliffe, 2006), i.e., by an area unit's rhythm of scaling, which captures its temporal pattern of scaling. On one hand, by following a regular rhythm of scaling, an area unit can mitigate the risk of overload caused by activity peaks that an irregular pattern would create (Klarner & Raisch, 2013; Vermeulen & Barkema, 2002). Moreover, by following a more regular rhythm of scaling, an area unit may be better able to learn from its experience and develop helpful supporting processes (Huber, 1991; Levitt & March, 1988). As an area unit routinizes the processes involved in scaling, it may be better able to channel more attention to other demands (Ocasio, 1997, 2011; Weick & Sutcliffe, 2006), such as the effective fulfillment of its monitoring role. Therefore, a more regular rhythm of scaling in an area could help ameliorate the negative relation between speed of scaling and adherence to operational routines at existing outlets in that area. Thus, we hypothesize:

Hypothesis 4a (H4a). *The more regular the rhythm of scaling in an area, the* ***weaker*** *the negative relation between speed of scaling and adherence to operational routines in that area.*

On the other hand, following a more regular rhythm of scaling – achieved through repeated scanning for opportunities to open new outlets in an area – requires greater stability of attention to scaling (Ocasio, 2011; Rerup, 2009). Thus, a more regular rhythm of scaling may limit an area unit's ability to channel attention to tasks that go beyond scaling, such as the continuous monitoring for lapses in adherence to operational routines at outlets in its area. By contrast, an irregular rhythm of scaling, characterized by large peaks and periods of inactivity (Klarner & Raisch, 2013; Vermeulen & Barkema, 2002), may allow an area unit to focus on scaling and monitoring demands on attention sequentially (Cyert & March, 1963; Greve, 2008). As a result, the area unit can focus on one demand at a time, reducing the need for frequent switching of attention and the cognitive effort otherwise needed to weigh the competing goals of scaling and monitoring against each other concurrently. An irregular rhythm of scaling may, thus, help area units balance their scaling and monitoring goals better than a regular one. Thus, we hypothesize:

Hypothesis 4b (H4b). *The more regular the rhythm of scaling in an area, the* ***stronger*** *the negative relation between speed of scaling and adherence to operational routines in that area.*

Data and Methods

Data and Sample

The empirical setting for our study is franchising. Franchise chains create and operate a large number of similar outlets in different geographic locations, based on a standard set of operational routines (Szulanski & Jensen, 2006; Winter & Szulanski, 2001; Winter et al., 2012). The geographic dispersion of outlets, combined with the arms-length interface between the franchisor and franchisees, implies that the franchisor cannot ensure adherence to operational routines across the entire chain (El Akremi et al., 2011; Szulanski & Jensen, 2006; Winter et al., 2012). As a result, virtually all franchise chains create an intermediate layer of area units to institute monitoring procedues, so that the established set of operational routines is continuously adhered to by outlets in their area. At the same time, area units are typically also responsible for scaling the franchise chain by replicating operational routines at new locations in their area. As area units face the dual demands of scaling and monitoring, franchise chains offer an appropriate context to examine how both area unit attention allocation and learning affect adherence to operational routines.

The primary data for this study come from a proprietary dataset obtained from a large, U.S.-based, non-food franchise chain specializing in services for individual consumers and the small-office/home-office (SOHO) market. The services in question span multiple SIC codes, including Business Services (7389), Office Supplies (5112), and Photocopying Services (7334). The dataset comprises monthly updated indicators for all U.S. outlets of the franchise chain collected by the franchisor over the eleven years from 1991 to 2001. All outlets of the chain are franchised rather than company-owned, with franchised outlets being opened and operated in all 50 U.S. states during the period of observation. Figure 1 depicts the distribution of the outlets of the franchise chain across the U.S. at three points in time during the period of observation. To obtain greater insight into the functioning of the franchise chain, we informed our quantitative data gathering and analysis with qualitative data obtained via semi-structured interviews with the top management, area units, and franchisees of the focal chain. The qualitative data were collected during a visit to the headquarters of the franchise organization, attendance at one of its annual conventions, and appointments with several area franchisees (area units) and franchisees (individual outlets). The executives interviewed at the company headquarters and annual convention were in charge of general management, operations, training, and franchisee relations. The average interview lasted about an hour.

The franchise chain was chosen and considered suitable as a research setting for several reasons, including: i) representativeness – structure, operations, and growth patterns representative of a typical established franchise chain[1]; ii) relative age – old enough to have an established business model and a

[1] The focal franchise chain opened 2,444 outlets in the U.S. during our period of observation and had systemwide sales of $1.5 billion as of the year 2000. It is similar in size to Baskin-Robbins. It had 2,524 outlets in

well-defined set of operational routines, yet young enough to still be scaling through the creation of new outlets over the entire period of observation; iii) size and use of area units – large enough to ensure a sufficient number of outlets for the study, as well as large enough to use a formal structure comprised of area units who reported directly to corporate headquarters and were in charge of opening and monitoring outlets in their area; iv) data access and quality – we were able to obtain full access to fine-grained, survival-bias-free longitudinal data that track all variables of interest in all outlets of the organization on a monthly basis over eleven years, offering a rare opportunity to subject our theory and hypotheses to an empirical test.

INSERT FIGURE 1 ABOUT HERE

As in a typical franchise chain, the franchisor was mainly responsible for developing a set of operational routines for doing business and facilitating its transfer to individual franchisees. Since its inception in 1980, the franchisor had been exploring and perfecting its set of operational routines, which was stabilized in the second half of the 1980s and remained unchanged during our entire period of observation (1991 to 2001). The duration of the franchise contract between the franchisor and a franchisee was ten years, with the possibility of contract renewals of the same duration. New franchisees underwent a compulsory two-week training at the company headquarters, half of which consisted of hands-on training at an existing training/pilot center. This training ensured that all franchisees had a good understanding of the franchise, which was especially related to their understanding of operational routines and how to implement them effectively in their franchise outlet. Yet, the franchisor was aware that franchisees could deviate from the chain's operational routines, as documented by prior research (El

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the U.S. and systemwide sales of $615.3 M in 2019. Another franchise chain of similar size is Anytime Fitness, which had 2,200 outlets in the U.S. and systemwide sales of $634 M in 2013. Like the focal franchise chain, these chains also divide the U.S. territory into area units.

Akremi et al., 2011; Szulanski & Jensen, 2006; Winter et al., 2012). Reflecting this concern, a senior executive we interviewed at the chain's headquarters pointed out: *"We have a concept that is sound, but the real power of it is lies in what that individual franchisee does."*

This was a major reason why the franchisor created area units (referred to as "area franchisees") and tasked them with continuously monitoring adherence to operational routines at outlets in their area (temporal replication). As a senior executive at the headquarters of the franchise chain remarked in an interview: "*More control … leads to consistency, which is the greatest challenge in franchising … we have to rely locally on the area franchisees [area units]."* Area units paid attention to the adherence of operational routines by regularly visiting the chain's outlets in the area under their supervision and analyzing their transactions. One of the area units we interviewed explained: *"I tell people [franchisees] … it is you …, it is the image you portray, it is the product that you carry, it is utilizing the vendors that we have made arrangements with… it is utilizing those products."*

In addition, area units were also responsible for scaling the franchise chain through the replication of operational routines at new locations in their area (spatial replication). Explaining the dual demands placed on area unit attention, a senior executive at the headquarters of the franchise chain pointed out that: *"Most of the time and attention is on area franchisees [area units], not directly with center franchisees [individual outlets]. … area franchisees [area units] are focused on selling individual franchises … as well as monitoring existing franchised outlets."*[2] One of the senior executives at the headquarters explained that *"Instead of us … trying to directly franchise out … units across the U.S., we put in an intermediary infrastructure … the area franchisees [area units] have the responsibility of selling franchises [franchised outlets]."* Spatial replication demands area units' attention, as critical decisions are involved that are fundamental to the subsequent success of the new outlets (Kalnins & Mayer, 2004; Salvaneschi, 1996). For instance, another area unit that we interviewed remarked: *"We do significant*

[2] Individual franchisees are part of "areas" supervised by area franchisees. The franchise chain uses the term "area franchisee" to refer to the area units in charge of a given area. Scholars and practitioners have used different terms to refer to the area units of chain organizations - we use the term "area units" consistently throughout this paper.

demographic analysis as a component of our site selection … with the information we can collect within an area on consumers, on businesses, on so many different levels, we can really pinpoint exactly which site is closest to our critical mass of customers within that local area." Over our observation period, area units scaled the chain organization through spatial replication at different rates. For instance, one area unit opened 17 new outlets in a given year, while another area unit opened three outlets in the same year. The franchisor tied area units' incentives to their goals of scaling the chain and monitoring adherence to operational routines by splitting the initial franchisee fee and ongoing franchise royalties paid by each franchisee with area units. The percentage of the initial franchise fee and ongoing royalties that area units were entitled to was the same for all area units, and remained the same for the entire observation period.

In the focal franchise chain, the area units were legally independent agents whose operation was based on long-term (10-year) contracts with the franchisor, which are automatically renewed unless either party objects. Given that they received a fixed percentage of the initial franchise fee and ongoing royalties from each franchisee in their area, the area units had high-powered incentives to remain in the system for the long term. As per our data, no area unit left/joined the chain or transitioned to manage a different area during our observation period. It is worth noting that our observation period followed a decade of growth and consolidation of the franchise chain, a decade during which some areas were consolidated (i.e., brought under the supervision of a single high-performing area unit) and some area units who were underperforming or didn't have a long-term commitment to the chain left the system. Senior executives at the headquarters pointed to that initial decade of exploration, selection, and consolidation, as well as to the substantial commitment and lock-in to the system of their remaining area units (and, correspondingly, the substantial gains they would forfeit if they were to leave the system), as drivers of the lack of turnover during our observation period.

The high (monthly) frequency of the franchise chain data allowed us a rare insight into how operational routines are replicated on an ongoing basis at the outlets of the franchise chain. Outlets need to adhere to the operational routines continuously to meet customers' expectations of the franchise chain's value proposition. A senior executive we interviewed at the headquarters of the franchise organization emphasized: *"Customers expect to get the same type of products and services from all [outlets] around the country or their neighbourhood. Omitting any of those typically causes confusion and dissatisfaction, hurting our brand overall."* Relatedly, another executive at the headquarters added: *"[If] you want to control the brand you want to control consistency…by mandating a consistent approach to service."* Furthermore, the executive pointed out, in response to our interview question, the main reasons for the underperformance of some of their franchise outlets: *"Their [franchise outlet's] financial performance is impeded because they're not following the [chain's] recommended approach."* The presence of area units has been documented by prior research to improve adherence to operational routines as *"... being constantly watched ... contributed to the fear ... they could be in here right now and I could be failing!"* (Bradach, 1998: 89). If outlets are not continuously monitored, lapses in the adherence of standard practices can quickly multiply and grow out of control (Bradach, 1997, 1998; Garvin & Levesque, 2008; Kalnins & Lafontaine, 2013). Likewise, another executive at the headquarters of the franchise chain under study emphasized emphatically: *"What's critically important, in my opinion, is the constant monitoring of the system."*

The internal franchise chain data described above were supplemented with publicly available information on outlets' local geographic markets drawn from the United States Census Bureau's County Business Patterns database (https://www.census.gov) and ESRI Inc.'s annual Sourcebook of America and Sourcebook of Zip Code Demographics. The observation period extended from 1991, the first year for which detailed outlet-level data became available, to 2001, the last year for which outlet-level data was made available. The sample included all 2,444 outlets founded during the observation period. These outlets were observed from inception until the end of the observation period or failure, i.e., until they were permanently closed, as indicated by the franchisor´s internal information system, yielding a final sample of 144,631 outlet-month observations.

Measures

Dependent variable

Our dependent variable is the extent to which individual outlets adhere to the standard set of operational routines of the franchise chain (*Adherence to Operational Routines*). Following prior research (Anand et al., 2012; Nelson & Winter, 1982), we investigated operational routines as established norms and targeted rules for accomplishing day-to-day tasks at outlets of the franchise chain. Adherence to operational routines is critical to achieving consistent offerings of products/services at chain outlets conforming to the standards established by the franchisor. Ideally, in measuring adherence to operational routines, the incidence and quality of all underlying routines would be directly measured across every outlet over time. While such data might be obtainable on a small scale, empirical research based on multi-year panel datasets has relied on product lines to measure adherence to underlying operational routines (Karim & Mitchell, 2000; Mitchell & Shaver, 2003; Parmigiani & Howard-Grenville, 2011; Winter et al., 2012). Although inspecting product lines at chain outlets is a coarse operationalization of the adherence to operational routines established by the franchisor, it provides (to our knowledge) the best broadly available and across-outlet comparable measure of the state of adherence to operational routines.

The franchisor designated the provision of thirteen products and services as standard products/services that all chain outlets should implement. They included products/services targeting the SOHO market, such as mail-box rental, photocopy services, mail services, shipping, shipping supplies, office supplies, packaging materials, printing, etc. The franchisor had worked extensively to develop a set of standard products/services that allow for economies of scale through nationwide customer accounts and partnerships with suppliers such as Xerox, FedEx, and UPS. The standard products and services had been documented to contribute to unit performance across diverse locations. They were thus considered worth implementing in all U.S. locations of the organization. As mentioned during our interview with a top executive of the organization, the objective was that *"a number of different kinds of business services can be provided in an efficient and consistent way across different locations."* Top management deemed the set of standard products/services to be the universal *"core of the business model."* The number and general nature of the standard products/services remained the same during our observation period.

Yet, a persistent challenge that the franchisor faced was that not all franchisees implemented the standard set of products and services in its entirety all the time. While the franchise contract specified that the implementation of such products and services was required, and included provisions that appeared to give the franchisor the right to terminate a franchise contract in the case of violations, in practice, the strict implementation of standard products/services prescribed by the franchise contract was notoriously difficult to enforce through litigation (Bradach, 1997). The franchisor's most potent leverage was the threat to not renew the franchise contract after it expired, which was usually only a distant possibility, given the long-term, multi-year duration of the franchise contract. The most effective way of ensuring that all franchise outlets consistently implemented the entire set of standard products/services was by having area units continuously monitor the adherence to standard practices.

Subsequently, we operationalize *Adherence to Operational Routines* as the extent to which a focal outlet adheres to the set of standard product/services of the franchisor in a given period. Specifically, the measure of *Adherence to Operational Routines* is calculated as the number of standard products/services implemented by a focal outlet in a given period (month, in this case). Monthly data for the implementation of standard product/services are available for all outlets of the franchise system, allowing us to capture all outlets' extent of *Adherence to Operational Routines* in each time period (month) over the entire eleven-year period of observation.

Independent variables

Our main independent variables are: (1) *Speed of Scaling*; (2) *Outlet Operating Experience*; (3) *Adherence-Related Failure Experience*; and (4) *Regular Rhythm of Scaling*. The franchise chain we studied partitions the territory of the United States into areas managed by area units. Aside from achieving adherence to operational routines, another main responsibility of area units is scaling the franchise chain, which requires significant attention (Hashai, Kafouros, & Buckley, 2018; Pacheco-de-Almeida, Hawk, & Yeung, 2015). We measured *Speed of Scaling* as the number of outlets an area unit opened in their area in a given month. To measure *Outlet Operating Experience*, we used the elapsed time since the inception of the focal unit. In particular, we measured *Outlet Operating Experience* as the number of months since the opening of the focal outlet divided by twelve (i.e., expressed in years). To measure *Adherence-Related Failure Experience*, we followed extant literature on learning from failures (Baum & Ingram, 1998; Chuang & Baum, 2003; Kim & Miner, 2007; Madsen & Desai, 2010) and modified the measure used there based on our theory. In the literature on learning from failures, failure experience is typically measured as the cumulative number of failures experienced by a focal entity over its lifetime or within a given period. We followed that approach, yet focused only on outlet failures, i.e., permanent closures of outlets, where the failed outlets had problems with adhering to operational routines of the chain. Specifically, we counted only those outlet failures in which outlets' mean adherence to operational routines over their lifetime was at least one standard deviation lower than the mean adherence to operational routines of all outlets under the supervision of the focal area unit. We measured *Adherence-Related Failure Experience* as the total number of outlet failures experienced by an area unit up to the focal period (month). Since scholars have suggested that the effects of experience decay over time (Argote, Beckman, & Epple, 1990), we also re-estimated our models with alternative measures that discount prior *Adherence-Related Failure Experience*, using common functional forms (Baum & Ingram, 1998; Kim & Miner, 2007), as well as models that consider only recent adherence-related failure experience (Madsen & Desai, 2010). Our results with these alternative measures are essentially the same and are reported as robustness checks in our Robustness Checks section. Consistent with the prior research on rhythm of organizational activities (Vermeulen & Barkema, 2002), we measured *Regular Rhythm of Scaling*, using the kurtosis of the *Speed of Scaling* of an area unit. To obtain a time-varying variable, we constructed *Regular Rhythm of Scaling* as the additive inverse of kurtosis of the *Speed of Scaling* over the period commencing from the start of the period of observation to the focal period (i.e., month). Alternatively, as a robustness check, we also measured area units' *Regular Rhythm of Scaling* as a time-invariant variable, using the additive inverse of the kurtosis for the entire period of observation, which produced qualitatively the same results (see the robustness section for details). Finally, following some prior research (Hashai et al., 2018; Laamanen & Keil, 2008) for both the time-variant and time-invariant measures, we used the additive inverse of the standard deviation (instead of the kurtosis) of area units' *Speed of Scaling*, which again yielded qualitatively identical results (see the Robustness Checks section).

Control variables

We controlled for the impact of factors that may be simultaneously related to outlets' adherence to operational routines and our independent variables. We controlled for the possibility that outlets' past growth might affect their adherence to operational routines. In particular, we measured Outlet Growth as the average monthly revenue growth rate of each outlet over the preceding three months. We also controlled for Outlet Size, measured as the focal outlet's total monthly revenue in tens of thousands of U.S. dollars. Total monthly revenue figures are in real, inflation-adjusted dollars, obtained using the U.S. Consumer Price Index for 1991–2001, as reported by the Bureau of Labor Statistics. If outlets owned by multi-outlet owners exhibit differences in their implementation of operational routines, compared to outlets under single-outlet ownership, multi-outlet ownership might be a potential confounder of the effects of our main explanatory variables. We thus controlled for the impact of multi-outlet ownership. We measured Multi-outlet Owner Size as the total number of outlets owned by the focal outlet's owner in a given period. The proximity of other same-chain outlets has been found to influence focal outlet performance (Kalnins, 2003). We controlled for that impact by including a variable, measured as the natural logarithm of the distance in miles to the closest same-chain outlet (Distance to Closest Same-Chain Outlet). The measure was updated for openings and closings of franchise outlets, i.e., it was time-variant. Prior research has also documented that characteristics of operational routines being replicated, in particular knowledge discreteness (Williams, 2007) and template performance (Lawrence, 2020), can affect adherence to operational routines. Such characteristics of the operational routines being replicated have been controlled for by our research design, as in our analysis they did not vary across outlets or over time. The operational routines of the franchise chain that we studied are the same for all outlets and remained the same over the entire observation period. Moreover, the franchisor partitions the territory of the United States into areas, akin to the territorial groupings present in virtually all large chain organizations. Each area spans a geographic area larger than the combination of a few zip codes or cities, but smaller than a state. Each area unit of the franchise chain is in charge of a specific area. The franchise chain has a total of seventy-two area units and an average of forty-one outlets per area, with the number of outlets per area steadily increasing over time as new outlets have been opened. We controlled for Number of Outlets in the Area, measured as the number of outlets in a given area in a given period. According to the data provided by the franchise chain, the area units and the areas under their supervision did not change over our observation period and, therefore, any stable unobserved area units or area differences that may be correlated with outlet adherence to operational routines would be controlled for in the franchise outlet fixed effects specification that we have used to test our hypotheses. Moreover, to further address any concerns related to potential omitted variables bias, we performed instrumental variable regressions for all models, which yielded identical results (see the Robustness Checks section below). We accounted for differences in local demand conditions by including a control for Per-Capita Income, measured as the average per-capita income (in $10,000s) in a focal outlet's 5-digit zip code in a given year. We also controlled for local population size differences, measured as the population size (in 10,000s) of each outlet's 5-digit zip code in a given year. The data used to construct the population size and per-capita income measures described above were drawn from ESRI Inc.'s annual Sourcebook of America and Sourcebook of Zip Code Demographics. To further account for heterogeneity in the local conditions faced by individual outlets, we added additional control variables that control for local conditions at the zip code level. We have described the process for constructing these control variables below. We collected the complete Census Bureau ZIP Code Industry data, which contain information on local markets. We first created a variable – Number of People Employed – which measures the number of people employed in a given zip code area as a proxy for the potential customers in that zip code area. We further constructed additional controls to better account for the possible effects of differences in local competition across local markets. To do so, we used and aggregated information on direct competitors of the franchise chain, based on the major SIC (or NAICS) codes that the organization operates in: SIC codes Business Services (7389), Office Supplies (5112), and Photocopying Services (7334). We defined a competitor as a business that operates in any of these three SIC codes. For every zip code where an outlet of the chain is located, we gathered data on competitors, as defined above from the United States Census Bureau's County Business Patterns dataset (https://www.census.gov). We created four variables that measured the number of competitors of different sizes in the zip code – Number of Competitors (up to 49 employees), Number of Competitors (from 50 to 99), Number of Competitors (from 100 to 299 employees), and Number of Competitors (more than 250 employees) – and used their natural logarithm as control variables.

Models

We used franchise outlet fixed effects ordinary least squares panel regressions to test our hypotheses. We opted to use franchise outlet fixed effects to account for outlet-related time-invariant unobservable heterogeneity, which could correlate with our error term and our main explanatory variables. We also controlled for time effects by including month and year fixed effects (month dummies and year dummies) in all models. Moreover, we used standard errors clustered at the area unit level to account for a potential serial correlation of observations for franchise outlets under the supervision of the same area unit. To address potential concerns that Adherence to Operational Routines may be endogenous, we further estimated all models, using instrumental variables estimations (Hamilton & Nickerson, 2003; Semadeni, Withers, & Trevis Certo, 2014; Shaver, 1998), as described in our Robustness Checks section. We ruled out using Poisson or Negative binomial models as our main models, because with an outlet fixed effects specification these estimators would exclude outlets for which the dependent variable – in this case, Adherence to Operational Routines – has no within-outlet variation over the observation period (Allison & Waterman, 2002). Employing these models would lead to loss of observations, which could induce sample selection issues in our estimations (Cameron & Trivedi, 2010: 623). Nonetheless, despite these limitations to the use of count models, as an additional robustness check described in our Robustness

Checks section, we also re-estimated all models, using Poisson models that yielded identical results (see the Robustness Checks section)[3].

Results

Table 1 reports descriptive statistics and simple pairwise correlations between the variables used to test our hypotheses. The pairwise correlations and the mean of variance inflation factors (mean VIF: 1.32) associated with our explanatory variables raised no significant concerns regarding multicollinearity.

INSERT TABLE 1 ABOUT HERE

Table 2 reports the results of fixed effects OLS panel regression estimations in five different specifications (Models 1 to 6). Model 1 reports a baseline estimation that includes only control variables. Model 2 tests the effect of area units' Speed of Scaling on Adherence to Operational Routines at outlets under their supervision in order to test Hypothesis 1. The coefficient of Speed of Scaling is negative and significant (-0.0064, $p < 0.01$), providing empirical support for Hypothesis 1 (H1). Models 3 to 5 test hypotheses 2 to 4, which posit moderators of the relationship between Speed of Scaling and Adherence to Operational Routines. In Model 3, to test Hypothesis 2 (H2), we introduce the interaction between the area units' Speed of Scaling and Outlet Operating Experience. Consistent with H2, the coefficient of the above interaction term is positive and significant (0.0037, $p < 0.05$). In Model 3, the coefficient of the interaction between the area units' Speed of Scaling and their Adherence-Related Failure Experience is positive and significant (0.0003, $p < 0.01$), lending empirical support for Hypothesis 3 (H3). Model 5 tests the interaction effect of Speed of Scaling and Regular Rhythm of Speed of Scaling, which is negative and significant (-0.0002, $p < 0.01$), supporting Hypothesis 4b (H4b). Finally, Model 6 reports a

[3] We chose the Poisson and not the Negative binomial estimator because the Negative binomial estimator does not allow the use of robust clustered standard errors in conjunction with fixed effects (Allison & Waterman, 2002).

full model that tests all four hypotheses simultaneously. The estimated coefficients of Speed of Scaling and its interaction terms that test H1 – H4 are similar in sign and significance to the ones reported in Models 2 to 5.

Robustness

Instrumental variable regressions

To identify the effect of Speed of Scaling on Adherence to Operational Routines, we conducted instrumental variable regressions, a standard approach for dealing with endogeneity concerns (Hamilton & Nickerson, 2003; Semadeni, Withers, & Trevis Certo, 2014; Shaver, 1998). Appropriate instruments must fulfill the conditions of relevance and exogeneity (Semadeni et al., 2014), i.e., they should correlate with the endogenous variable and affect the dependent variable of interest only through their effect on the endogenous variable. A common approach followed by previous research has been to use system-level averages of the endogenous variable of interest (excluding the focal entity from the average) as an instrument for the endogenous variable (e.g., Autor, Dorn, & Hanson, 2013; Campa & Kedia, 2002; Cheng, Ioannou, & Serafeim, 2014). Accordingly, we generated our instrument for a focal area unit's Speed of Scaling by calculating the average Speed of Scaling of all area units in a given time period (excluding the contribution of the focal area unit). The rationale behind the construction of the instrument is that a focal area unit's Speed of Scaling in a given period is likely to be correlated with the franchise-wide average levels of speed of scaling of area units in that period. In addition, there was no reason to expect that the average Speed of Scaling of the area units in the chain organization (excluding the focal area unit) would differentially predict Adherence to Operational Routines at a given individual unit in the area of the focal area unit. To account for for the interaction terms between an area unit's Speed of Scaling and other independent variables, we interacted the instrument for the focal area unit's Speed of Scaling, measured as described above, with the corresponding independent variables. Table 3 reports the results of first-stage instrumental variables' estimations. Each first-stage regression model includes all control variables included in the main models reported in Table 2. Our instruments in the first-stage regression models are positively and significantly related to the variables they instrument for. The F-statistics for the instruments in the first stage regression reject under-identification at 95%. They are greater than the required F-statistic of 10 in Staiger & Stock (1997) and the adjusted threshold F-statistic in Stock & Yogo (2005), suggesting that the instruments are not weak. The F-statistics corresponding to the test where the first stage models are compared to models without the instruments also indicate that the instruments are not weak. Next, in the second stage models reported In Table 4, we used the instrumented/predicted values of Speed of Scaling and its interactions with Outlet Operating Experience, Adherence-Related Failure Experience, and Regular Rhythm of Scaling, respectively, to estimate the effect of these variables on Adherence to Operational Routines (see Models 11-15 in Table 4). All coefficient estimates on the independent variables tested by H1-H4 have the same sign and similar significance levels to the ones reported in Table 2. The results of our hypotheses tests are thus robust to accounting for the potential endogeneity of area units spatial replication via a 2SLS instrumental variables estimation.

INSERT TABLES 3 & 4 ABOUT HERE

Alternate model specifications: Poisson regressions

Despite the limitations of count models (discussed in the "Empirical Models" subsection above), as an additional robustness test, we also tested the robustness of our results to alternative model specifications by estimating Poisson outlet fixed effect regressions (Blevins, Tsang, & Spain, 2015) [4]. Table 5 reports the results of Poisson unit fixed effect regression estimations. The estimated coefficients on our

[4] We do not use binomial regression models because this estimator does not allow the use of robust clustered standard errors in conjunction with fixed effects (Allison & Waterman, 2002).

independent variables have the same signs and similar significance levels to the main results reported in Table 2. The results of our hypotheses tests are thus robust to using a count-based model specification.

INSERT TABLE 5 ABOUT HERE

Alternate measurements

We further checked the robustness of our results to alternative measures of our independent and dependent variables. First, we tested the robustness of our results using alternative measures of Regular Rhythm of Scaling. We measured Regular Rhythm of Scaling in two different ways. First, we measured Regular Rhythm of Scaling as a time-invariant, rather than a time-variant, variable by using the additive inverse of the kurtosis of Speed of Scaling for a given area unit for our entire observation period (Vermeulen & Barkema, 2002). With this alternative measurement, the results are consistent with the predictions of H4b, and the coefficient for the interaction of Speed of Scaling and Regular Rhythm of Scaling remains negative and significant (-0.0001, $p < 0.01$). Second, since some scholars (Hashai et al., 2018; Laamanen & Keil, 2008) have used standard deviation instead of kurtosis to measure the rhythm of specific organizational activities, we measured Regular Rhythm of Scaling by using the additive inverse of the standard deviation of the speed of scaling over the period commencing from the start of the period of observation to the focal period (i.e., month). We obtained virtually identical results in terms of the sign and significance of the estimated coefficient for the interaction of Speed of Scaling and Regular Rhythm of Scaling, i.e., negative and significant (-0.0056, $p < 0.01$). Prior research on learning from failure experience suggests that learning from failure can depreciate over time (Argote et al., 1990). As there is no theoretical basis to use a specific functional form for the decay of experience (Argote, 1999), we used commonly-used functional forms to depreciate the learning from failure experience (e.g., Baum & Ingram, 1998; Kim & Miner, 2007) and thereby examine the robustness of our results against alternative measures of adherence-related failure experience. First, we set the discount equal to the age of a failure, which assumes a linear depreciation in the value of adherence-related failure experience. Next, we set the discount equal to the age of a failure squared, which assumes that the value of past adherence-related failures depreciates more rapidly than linear. Third, we set the discount equal to the square root of the age of an adherence-related failure, which assumes that the depreciation of the value of past adherence-related failures is slower than linear. Our results are robust to the use of these three different discounting approaches, as the coefficient for the interaction between Speed of Scaling and Adherence-Related Failure Experience is positive and significant in all three cases. Additionally, as organizations might learn more from recent failures than from more distant ones (Madsen & Desai, 2010), we examined how area units' recent adherence-related failure experience affects the adherence to operational routines of outlets in their portfolio. We re-estimated our models on the interaction effect of Adherence-Related Failure Experience by using recent time windows (past 24, 30, and 36 months) for failure experience. Our results are robust to the use of these alternative measures and consistent for all of the above time windows. Next, we examined whether the effect of the interaction term between Speed of Scaling and Adherence-Related Failure Experience may be affected by a high correlation between Adherence-Related Failure Experience and Number of Outlets in the Area, by using different measures of Failure Experience. First, we computed a Failure Dummy variable, which takes a value of 1 if the Adherence-Related Failure Experience of an area unit at a given time is greater than zero, and 0 otherwise. Second, we computed Ratio of Adherence-Related Failures by dividing the Adherence-Related Failure Experience of an area unit by the total Number of Outlets in the Area in each given period. We re-estimated the models by using Adherence-Related Failure Dummy and Ratio of Adherence-Related Failures respectively, instead of Adherence-Related Failure Experience. Our results are robust to this alternative measurement of Adherence-Related Failure Experience. In line with H3, the coefficients on the interaction terms between Speed of Scaling and Adherence-Related Failure Dummy (0.0029, $p < 0.01$), and between Speed of Scaling and Ratio of Adherence-Related Failures, are positive and significant (0.0592, $p < 0.01$). Furthermore, we examined the robustness of our results to measuring Per-Capita Income, Population

Size, Number of People Employed, Number of Competitors (up to 49 employees), Number of Competitors (from 50 to 99), Number of Competitors (from 100 to 299 employees), and Number of Competitors (more than 250 employees) at the metropolitan statistical area (MSA) or county level, instead of the zip code area level. Estimating our models with those alternative measures at the MSA or county level produced essentially the same results in sign, magnitude, and significance of the estimated coefficients on our independent variables. Finally, we tested the robustness of our results to an alternative measure of our dependent variable (and an alternative empirical model specification) by using a dummy variable as our measure of Adherence to Operational Routines and estimating fixed-effects logistic regressions. To do so, we generated a new dummy dependent variable that takes a value of 1 if the focal franchise unit accurately replicates all required practices in a given period, and 0 otherwise. We re-estimated Models 1–5 with this alternative dependent variable, using fixed-effects logistic regression estimations (Hoetker, 2007) and the same independent and control variables as those reported in Table 2, and obtained qualitatively identical results. As a final robustness check, we transformed our dependent, independent, and control variables from outlet-monthly to outlet-quarterly observations and re-estimated Models 1-5 in Table 2. The results obtained were qualitatively the same and quantitatively nearly identical. In sum, the results of our hypotheses tests are robust to all of the above additional robustness checks, lending further empirical support to our findings.

Discussion

Although chains have much to gain by replicating successful operational routines across their geographically dispersed outlets (Chandler, 1990; Nelson & Winter, 1982), they still face substantial challenges in replicating routines internally in new outlets (Lawrence, 2020; Szulanski, 1996; Winter & Szulanski, 2001; Zander & Kogut, 1995) and maintaining adherence to those routines in existing outlets over time (Anand et al., 2012; Epple et al., 1991; Knott, 2001). Using data from a Fortune 100 franchise chain with thousands of outlets, we examine whether and how replicating operational routines in new outlets influences a chain's ability to maintain adherence to those routines in existing outlets over time. We theorize and find evidence that as speed of scaling in an area increases, adherence to operational routines at outlets in that area decreases. The effect is moderated by individual outlets' learning from their own operating experience, as well as by area units' learning from their prior adherence-related failure and rhythm of scaling experience.

This study contributes to research on replication (Nelson & Winter, 1982; Knott, 2001; Szulanski & Jensen, 2006; Williams, 2007; Winter et. al. 2012; Anand et al., 2012; Lawrence, 2020). While early foundational work on replication (Nelson & Winter, 1982) examined the benefits and challenges associated with both transferring operational routines to new locations (spatial replication) and maintaining said routines in existing locations over time (temporal replication), subsequent work has focused primarily on the former, while giving rather limited attention to the latter (e.g., Anand et al., 2012; Winter et al., 2012; Knott 2001). What is more, to our knowledge, no prior work on replication has examined the possible relation between the two. Our central contribution lies in showing the existence of a spatio-temporal trade-off in replication, which gives rise to a negative relationship between speed of scaling in *new locations* (spatial replication) and adherence to operational routines at *existing locations* (temporal replication), and explicating underlying attention and learning mechanisms that govern it. Specifically, we show that organizations' capacity to dynamically attend to both types of replication, ameliorating the trade-off, is shaped by experiential learning in the form of individual outlets' learning from their own operating experience, as well as by area units' learning from their prior adherence-related failure and rhythm of scaling experience.

Second, this paper also contributes to research on organizational learning (Argote et al., 2020; Dahlin et al., 2018; Szulanski, 1996). While prior research has examined in depth how the nature of the routines being replicated and the knowledge embedded in them (Szulanski, 1996) – or characteristics of the recipients or source of knowledge and their relationship (Knott, 2001, 2003; Postrel & Rumelt, 1992; Szulanski, 1996; Szulanski, Ringov, & Jensen, 2016) – affect knowledge transfer, prior work has offered little in linking learning and attention mechanisms or identifying how they may vary across organizational levels (Ocasio, Rhee, & Milner, 2020). Our paper addresses this gap. Overall, our theory and findings point to the need for organizations to simultaneously and dynamically manage knowledge transfer across space and time, the implications for the attentional processing needed to manage the resulting dual demands on attention (Ocasio, 2011), and the specific learning mechanisms that can enable them to do so more effectively.

Third, this paper also contributes to the nascent, yet rapidly growing, literature on scaling (Busch & Barkema, 2020; DeSantola & Gulati, 2017; Reuber, Tippmann, & Monaghan, 2021; Shepherd & Patzelt, 2020).The scaling literature has highlighted the important role of the middle layer of an organization in relieving overload at the top of organizations that scale rapidly. However, it has sidestepped the issue that attention at that middle level of the organization may itself be a capacity-constrained, scarce resource (Ocasio, 2011), thus creating opportunity costs for organizations that scale rapidly (Pierce & Aguinis, 2013; Sterman, Henderson, Beinhocker, & Newman, 2007; Levinthal & Wu, 2013). By examining how attention (Ocasio, 1997, 2011) and learning (Argote et al., 2021) mechanisms at the middle level of the hierarchy govern decay in adherence to operational routines in organizations in the process of scaling, this paper furthers our understanding of the microfoundations and role of the organizational context of scaling (DeSantola & Gulati, 2017; Eisenmann & Wagonfeld, 2012).

This study also raises implications for research on franchise organizations and chain organizations more broadly. While early work has hinted at the important monitoring role of geographic area units in chain organizations (Garvin & Levesque, 2008; Greve & Baum, 2001; Winter & Szulanski, 2001), we show that the mere existence of such area units does not ensure consistent adherence to operational routines in franchise chains. Instead, our findings suggest that investments in deliberate, experiential learning at the individual outlet and area unit level is what develops a chain’s capacity to dynamically balance competing demands on scarce attention, enabling it to scale faster while preserving adherence to operational routines.

Limitations and future research

This study has limitations that future research could address. First, the empirical setting for our study is a single U.S.-based franchise organization. While our setting provides an appropriate context to test our hypotheses, future research could examine the generalizability of our findings across a diverse set of organizations and sectors. Moreover, future research can explore additional (experiential or vicarious) learning mechanisms that help chains simultaneously scale rapidly and avoid lapses in adherence to operational routines. Moreover, future research could shed more light on questions of fundamental theoretical and managerial interest, such as how to balance the costs of scaling too fast with the costs of scaling too slow, or whether and how the trade-off between speed of scaling and adherence to operational routines depends on the nature of an organization's business model. What is more, future research could extend our knowledge by examining the relationship between speed of scaling and adherence to operational routines in the context of MNCs (see, e.g., Belderbos, Du, & Goerzen, 2017; Desai, 2009). Finally, future research could benefit from a deeper conversation between the scaling, replication, organization design, and (dynamic) capabilities literatures.

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FIGURE 1

Snapshots of Outlets' Geographic Distribution Over Time

Outlets at the end of 1993 | Outlets at the end of 1997 | Outlets at the end of 2000

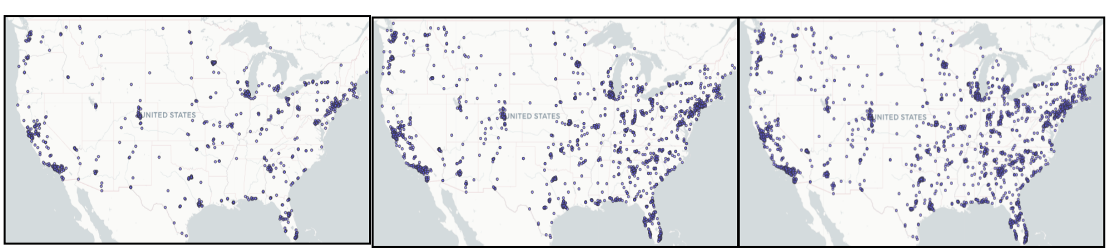

TABLE 1
Descriptive Statistics and Correlation Matrix

		Mean	S.D.	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
[1]	Adherence to Operational Routines	12.0230	1.0524									
[2]	Speed of Scaling	0.6758	1.4664	**0.0159**								
[3]	Regular Rhythm of Scaling	-9.6401	13.1090	**0.0460**	**0.0954**							
[4]	Adherence-Related Failure Experience	6.1721	10.6415	**0.0641**	**0.1199**	**0.3522**						
[5]	Outlet Operating Experience	3.2209	2.2528	**0.0306**	**-0.0797**	**0.1126**	**0.1573**					
[6]	Outlet Size	2.9683	3.5921	**0.1159**	**-0.0303**	**0.0062**	**0.0202**	**0.2362**				
[7]	Distance to Closest Same-Chain Outlet	1.5751	1.1609	**-0.0091**	**-0.0111**	**-0.0863**	**-0.1329**	**-0.0729**	**-0.0414**			
[8]	Number of Outlets in the Area	88.4773	86.7275	**0.0572**	**0.3492**	**0.2968**	**0.6649**	**0.1084**	**-0.0366**	**-0.0913**		
[9]	Outlet Growth	0.1851	1.6488	**-0.0354**	**0.0478**	**-0.0216**	**-0.0219**	**-0.1020**	**-0.0281**	**0.0245**	**-0.0213**	
[10]	Multi-outlet Owner Size	1.3230	0.7770	**0.0084**	**-0.0063**	**0.0349**	**0.0250**	**0.0206**	**0.0342**	**-0.0897**	**0.0288**	**-0.0082**
[11]	Per-Capita Income	2.3601	0.9979	**0.0118**	**-0.0085**	**0.1152**	**0.2007**	**0.1772**	**-0.0098**	**-0.3441**	**0.1335**	**-0.0274**
[12]	Population Size	2.8705	1.4744	**-0.0416**	**-0.0057**	**0.0413**	**0.0387**	**0.0694**	**0.0962**	**-0.2353**	**0.0111**	**-0.0082**
[13]	Number of People Employed	9.1137	1.2254	**-0.0496**	**0.0254**	**0.0330**	**0.0263**	**0.0454**	0.0051	**-0.1906**	**0.0407**	0.0000
[14]	Number of Competitors (up to 49 employees)	2.0229	0.8089	**-0.0315**	**0.0515**	**-0.0595**	**0.0152**	**-0.0615**	-0.0048	**-0.3530**	**0.0169**	0.0029
[15]	Number of Competitors (50 to 99 employees)	0.1337	0.3116	**-0.0314**	**0.0125**	**-0.0267**	**-0.0193**	**-0.0451**	-0.0031	**-0.2125**	**-0.0188**	0.0021
[16]	Number of Competitors (100 to 249 employees)	0.0684	0.2234	**-0.0283**	**0.0239**	**-0.0335**	**0.0111**	**-0.0375**	**-0.0122**	**-0.1259**	**0.0106**	0.0024
[17]	Number of Competitors (more than 250 employees)	0.0266	0.1404	**-0.0345**	**-0.0077**	**-0.0170**	**-0.0205**	**-0.0222**	-0.0015	**-0.0698**	**-0.0324**	-0.0004

		Mean	S.D.	[10]	[11]	[12]	[13]	[14]	[15]	[16]
[10]	Multi-outlet Owner Size	1.3230	0.7770							
[11]	Per-Capita Income	2.3601	0.9979	**0.0756**						
[12]	Population Size	2.8705	1.4744	**-0.0172**	**-0.0800**					
[13]	Number of People Employed	9.1137	1.2254	**-0.0060**	**0.0641**	**0.3040**				
[14]	Number of Competitors (up to 49 employees)	2.0229	0.8089	**-0.0301**	**0.1570**	**0.3902**	**0.4544**			
[15]	Number of Competitors (50 to 99 employees)	0.1337	0.3116	**-0.0343**	**0.0795**	**0.0940**	**0.2355**	**0.3665**		
[16]	Number of Competitors (100 to 249 employees)	0.0684	0.2234	**-0.0307**	**0.0230**	**0.0722**	**0.1740**	**0.2760**	**0.2332**	
[17]	Number of Competitors (more than 250 employees)	0.0266	0.1404	**-0.0134**	**0.0542**	**0.0229**	**0.1247**	**0.1745**	**0.1465**	**0.1266**

Note:Correlation coeffcient in bold indicate significance at the 0.05 level. Sample size N = 144,631

TABLE 2
Fixed Effects Panel Regression Models of Adherence to Operational Routines

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Speed of Scaling		-0.0064***	-0.0162**	-0.0073***	-0.0110***	-0.0210***
		(0.002)	(0.006)	(0.003)	(0.003)	(0.005)
Speed of Scaling X Outlet Operating Experience			0.0037**			0.0034*
			(0.002)			(0.002)
Speed of Scaling X Adherence-Related Failure Experience				0.0003***		0.0003***
				(0.000)		(0.000)
Speed of Scaling X Regular Rhythm of Scaling					-0.0002***	-0.0002***
					(0.000)	(0.000)
Regular Rhythm of Scaling		-0.0001	-0.0001	-0.0001	-0.0000	-0.0001
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Adherence-Related Failure Experience		0.0052***	0.0052***	0.0053***	0.0053***	0.0054***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Outlet Operating Experience		0.0361	0.0366	0.0361	0.0361	0.0365
		(0.068)	(0.067)	(0.068)	(0.068)	(0.067)
Outlet Size		0.0274***	0.0273***	0.0274***	0.0274***	0.0273***
		(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Number of Outlets in the Area	-0.0011**	-0.0014***	-0.0017***	-0.0014***	-0.0014***	-0.0017***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Outlet Growth	-0.0198***	-0.0187***	-0.0184***	-0.0186***	-0.0186***	-0.0183***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Multi-outlet Owner Size	0.0473*	0.0485*	0.0487*	0.0485*	0.0486*	0.0488*
	(0.028)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
Population Size	0.0002	-0.0034	-0.0035	-0.0032	-0.0032	-0.0032
	(0.033)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)
Per-Capita Income	-0.0454*	-0.0399*	-0.0399*	-0.0398*	-0.0396*	-0.0395*
	(0.025)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Distance to Closest Same-Chain Outlet	0.0215	0.0142	0.0139	0.0141	0.0141	0.0138
	(0.023)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Number of People Employed	0.0020	0.0016	0.0016	0.0016	0.0016	0.0016
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Number of Competitors (up to 49 employees)	0.0484**	0.0420*	0.0417*	0.0418*	0.0421*	0.0417*
	(0.022)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
Number of Competitors (50 to 99 employees)	0.0656***	0.0631***	0.0629***	0.0630***	0.0631***	0.0628***
	(0.023)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Number of Competitors (100 to 249 employees)	0.0100	0.0090	0.0088	0.0092	0.0092	0.0091
	(0.041)	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)
Number of Competitors (more than 250 employees)	-0.1060*	-0.1125*	-0.1122*	-0.1126*	-0.1128*	-0.1126*
	(0.060)	(0.059)	(0.059)	(0.059)	(0.059)	(0.059)
Constant	11.2755***	11.5001***	11.5444***	11.2306***	11.7936***	11.5569***
	(0.140)	(0.293)	(0.290)	(0.291)	(0.298)	(0.291)
Observations	144,631	144,631	144,631	144,631	144,631	144,631
Number of outlets	2,444	2,444	2,444	2,444	2,444	2,444
Outlet FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 3
First Stage Instrumental Variable Regressions of Adherence to Operational Routines

VARIABLES	Model 7	Model 8	Model 9	Model 10
	Dependent Variables			
	Speed of Scaling	Speed of Scaling X Outlet Operating Experience	Speed of Scaling X Adherence-Related Failure Experience	Speed of Scaling X Regular Rhythm of Scaling
Instrument	0.7638***	-3.0448***	2.4788***	34.8668***
	(0.042)	(0.213)	(0.447)	(2.386)
Instrument X Outlet Operating Experience		1.5824***		
		(0.091)		
Instrument X Adherence-Related Failure Experience			3.0056***	
			(0.073)	
Instrument X Regular Rhythm of Scaling				10.2404***
				(0.385)
Regular Rhythm of Scaling	0.0179***	0.0368***	0.0808***	1.2814***
	(0.001)	(0.003)	(0.008)	(0.048)
Adherence Related Failure Experience	-0.0021*	-0.0038	0.0992***	-0.5174***
	(0.001)	(0.004)	(0.022)	(0.035)
Outlet Operating Experience	-0.0081	-0.0657	0.0545	-0.4041
	(0.026)	(0.086)	(0.201)	(0.990)
Outlet Size	-0.0037**	0.0061	0.0215	-0.0442
	(0.002)	(0.006)	(0.025)	(0.069)
Number of Outlets in the Area	-0.0112***	0.0456***	0.1275***	0.0051
	(0.001)	(0.001)	(0.003)	(0.011)
Outlet Growth	0.0190***	-0.0068**	-0.0655***	0.0575
	(0.007)	(0.003)	(0.020)	(0.044)
Multi-outlet Owner Size	0.0089	-0.0465	0.0815	-0.1883
	(0.011)	(0.046)	(0.133)	(0.302)
Population Size	0.0003	0.0269	-0.3896**	-0.4856*
	(0.011)	(0.037)	(0.154)	(0.275)
Per-Capita Income	-0.0204	-0.0274	-0.1738	-1.3310***
	(0.013)	(0.046)	(0.166)	(0.483)
Distance to Closest Same-Chain Outlet	-0.0245*	-0.0098	0.1185	0.0789
	(0.013)	(0.041)	(0.126)	(0.315)
Number of People Employed	0.0074***	0.0280***	-0.0677**	0.2403***
	(0.003)	(0.010)	(0.028)	(0.064)
Number of Competitors (up to 49 employees)	-0.0145	0.0239	0.3369**	-0.5170
	(0.012)	(0.039)	(0.156)	(0.337)
Number of Competitors (50 to 99 employees)	-0.0312*	-0.0283	0.4111	-0.1524
	(0.018)	(0.064)	(0.257)	(0.424)
Number of Competitors (100 to 249 employees)	0.0443**	0.1955**	-0.3782	-0.0913
	(0.022)	(0.080)	(0.347)	(0.509)
Number of Competitors (more than 250 employees)	-0.0042	-0.0904	0.2531	1.2826
	(0.036)	(0.111)	(0.779)	(0.893)
Constant	1.3258***	1.3149***	0.7176	-7.3104*
	(0.145)	(0.374)	(1.238)	(3.921)
Observations	144,631	144,631	144,631	144,631
Number of outlets	2,444	2,444	2,444	2,444
Outlet FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Month FE	YES	YES	YES	YES

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 4
Second Stage Instrumental Variable Regressions of Adherence to Operational Routines

VARIABLES	Model 11	Model 12	Model 13	Model 14	Model 15
Speed of Scaling	-0.1097***	-0.1313***	-0.1057***	-0.1631***	-0.1626***
	(0.022)	(0.019)	(0.022)	(0.032)	(0.026)
Speed of Scaling X Outlet Operating		0.0112***			0.0089**
Experience		(0.003)			(0.004)
Speed of Scaling X Adherence-Related			0.0032***		0.0026***
Failure Experience			(0.001)		(0.001)
Speed of Scaling X Regular Rhythm of				-0.0033***	-0.0026***
Scaling				(0.001)	(0.001)
Regular Rhythm of Scaling	-0.0019*	-0.0019*	-0.0020*	-0.0005	-0.0009
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Adherence-Related Failure Experience	0.0050*	0.0050*	0.0056**	0.0061**	0.0048*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Outlet Operating Experience	0.0352	0.0368	0.0348	0.0349	0.0406
	(0.059)	(0.059)	(0.059)	(0.059)	(0.059)
Outlet Size	0.0270***	0.0267***	0.0270***	0.0268***	0.0267***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Number of Outlets in the Area	-0.0025***	-0.0033***	-0.0029***	-0.0029***	-0.0033***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Outlet Growth	-0.0167***	-0.0159***	-0.0164***	-0.0155***	-0.0139***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Multi-outlet Owner Size	0.0494*	0.0500**	0.0489*	0.0501**	0.0534**
	(0.025)	(0.025)	(0.026)	(0.025)	(0.026)
Population Size	-0.0034	-0.0036	-0.0018	-0.0013	-0.0030
	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
Per-Capita Income	-0.0415*	-0.0413*	-0.0402*	-0.0359*	-0.0343*
	(0.022)	(0.022)	(0.022)	(0.021)	(0.020)
Distance to Closest Same-Chain Outlet	0.0116	0.0111	0.0113	0.0103	0.0093
	(0.020)	(0.020)	(0.020)	(0.020)	(0.021)
Number of People Employed	0.0024	0.0022	0.0025	0.0016	0.0020
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Number of Competitors (up to 49	0.0405*	0.0399*	0.0393*	0.0427**	0.0413*
employees)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Number of Competitors (50 to 99	0.0599**	0.0597**	0.0592**	0.0598**	0.0561*
employees)	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
Number of Competitors (100 to 249	0.0136	0.0123	0.0144	0.0153	0.0147
employees)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Number of Competitors (more than 250	-0.1128*	-0.1119*	-0.1137*	-0.1182*	-0.1121*
employees)	(0.062)	(0.062)	(0.062)	(0.062)	(0.062)
Constant	11.4852***	11.4585***	11.3925***	12.0549***	11.9788***
	(0.250)	(0.247)	(0.248)	(0.246)	(0.242)
Observations	144,631	144,631	144,631	144,631	144,631
Number of outlets	2,444	2,444	2,444	2,444	2,444
Outlet FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 5
Poisson Regression Models of Adherence to Operational Routines

VARIABLES	Model 16	Model 17	Model 18	Model 19	Model 20
Speed of Scaling	-0.0005***	-0.0013**	-0.0006**	-0.0009***	-0.0017***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Speed of Scaling X Outlet Operating Experience		0.0003**			0.0003*
		(0.000)			(0.000)
Speed of Scaling X Adherence-Related Failure Experience			0.0003***		0.0002**
			(0.000)		(0.000)
Speed of Scaling X Regular Rhythm of Scaling				-0.0002***	-0.0001***
				(0.000)	(0.000)
Regular Rhythm of Scaling	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Adherence-Related Failure Experience	0.0003**	0.0003**	0.0030**	0.0003**	0.0030**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Outlet Operating Experience	0.0018	0.0017	0.0018	0.0016	0.0015
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Outlet Size	0.0023***	0.0023***	0.0023***	0.0023***	0.0023***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of Outlets in the Area	-0.0001**	-0.0001**	-0.0001**	-0.0001**	-0.0001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Outlet Growth	-0.0016***	-0.0016***	-0.0016***	-0.0016***	-0.0016***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Multi-outlet Owner Size	0.0043*	0.0043*	0.0043*	0.0043*	0.0043*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Population Size	-0.0005	-0.0005	-0.0005	-0.0005	-0.0005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Per-Capita Income	-0.0032	-0.0032	-0.0032	-0.0031	-0.0031
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Distance to Closest Same-Chain Outlet	0.0013	0.0013	0.0013	0.0013	0.0013
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Number of People Employed	0.0001	0.0001	0.0001	0.0001	0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of Competitors (up to 49 employees)	0.0034*	0.0034*	0.0034*	0.0034*	0.0034*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Number of Competitors (50 to 99 employees)	0.0050***	0.0050***	0.0050***	0.0050***	0.0050***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Number of Competitors (100 to 249 employees)	0.0007	0.0007	0.0007	0.0007	0.0007
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Number of Competitors (more than 250 employees)	-0.0091*	-0.0091*	-0.0091*	-0.0091*	-0.0091*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Observations	144,620	144,620	144,620	144,620	144,620
Number of outlets	2,433	2,433	2,433	2,433	2,433
Outlet FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Note: The variables Regular Rhythm of Scaling and Adherence-Related Failure Experience were divided by 10 for ease of presentation. The results should be interpreted accordingly. Eleven observations were dropped by the estimation procedure due to eleven outlets having only one observation.