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The art of discovering and exploiting unexpected opportunities: The roles of organizational improvisation and serendipity in new venture performance

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ABSTRACT

This study examines a model linking organizational improvisation with new venture performance, via serendipity, at varying levels of resource constraints and informal organizational structure. Results from a national sample of 326 startups, based throughout the United States, indicate that the association of improvisation with serendipity is greatest when resource constraints are high, and—in turn—that serendipity is positively related to new venture performance when informal organizational structure is high. These findings highlight novel pathways and contingencies through which improvisation may prove to be a resourceful means for startups to identify new opportunities and gain performance advantages.

“Serendipity is not the product of patience; it’s the product of action.”

Audrey Moralez

“...Accidental discovery is not a synonym for serendipity... Discoveries occur when you are looking for something—with your eyes wide open...”

Stanley Marcus (Neiman Marcus)

1. Executive summary

Organizational improvisation has long been considered a key form of resourcefulness used by new ventures to make do with what they have on hand in order to quickly ramp up operations to compete with incumbent firms (e.g., Baker et al., 2003). Given the action-orientation inherent to improvisation, it is not surprising that research on the topic within the entrepreneurship literature has primarily focused on its use for exploiting opportunities, as a strategic alternative to the more traditional route of planning before executing (e.g., Hmieleski and Corbett, 2008). In the current research, we attempt to broaden this literature by considering the more

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distal role improvisation can play by encouraging serendipity (i.e., *unexpected discovery of opportunity brought about by purposeful action*). In so doing, we develop a model in which improvisation is indirectly related to new venture performance via serendipity, contingent on a venture's level of resource constraints and informal organizational structure.

Our model is tested using a sample of new ventures based throughout the United States ($N = 326$). Results provide general support for our hypotheses. Organizational improvisation is observed to be positively associated with serendipity and this relationship is enhanced as resource constraints increase. Serendipity—in turn—is positively related to new venture performance, but this relationship is contingent on high levels of informal organizational structure. Taken together, the results of our full model indicate that improvisation is most positively related to performance (via serendipity) when both resource constraints and informal organizational structure are high.

The findings of our study highlight the resourceful role organizational improvisation can play in the entrepreneurial process. Moreover, by introducing serendipity as an intervening mechanism and demonstrating resource constraints and informal organizational structure as important boundary conditions, our study extends the literatures on both organizational improvisation and serendipity by helping to open the black box of *when* and *how* they positively relate to new venture performance. These contributions reassert the importance of viewing the effectiveness of both improvisation and serendipity as being dependent on a range of contextual factors (Vera and Crossan, 2005; Kyriakopoulos, 2011).

2. Introduction

Despite the importance of “opportunity” in entrepreneurship (Stevenson and Jarillo, 1990; Shane and Venkataraman, 2000), we know strikingly little about how resource-constrained new ventures sometimes manage to identify and exploit new opportunities. Opportunity identification and exploitation are often seen as the outcome of systematic search and experimentation (March, 1991; Patel and Fiet, 2009), and substantial investment (Zahra et al., 2006). Accordingly, much entrepreneurship research focuses on high-potential, venture-backed startups with considerable resources (Florin et al., 2003; Hallen and Pahnke, 2016; Kanze et al., 2018). Yet, many new ventures lack the capabilities, time, or slack resources to invest in extensive search, experimentation, and implementation (Grichnik et al., 2014; Welter et al., 2018). At the same time, research on improvisation and bricolage have significantly advanced our understanding of how new ventures sometimes survive and grow despite resource constraints (Baker et al., 2003; Hmieleski and Corbett, 2008; Hmieleski et al., 2013; Baker and Nelson, 2005). Nonetheless, the recognition of new opportunities is often left implicit at best across these literatures. As a result, our understanding of how resource-constrained new ventures manage to both identify and exploit opportunities, and the subsequent impact such opportunities have on their performance, remains limited. Since most new ventures act with high degrees of resource constraints (Aldrich et al., 2020; Powell and Baker, 2014; Yang et al., 2020), the question driving the current research is *how* and *under what conditions* are resource-constrained startups able to identify and exploit new opportunities?

In the present study, we argue that the roles of organizational improvisation in the discovery of opportunities and minimal (or informal) structure in exploiting new opportunities are particularly important among resource-constrained new ventures. Rather than focusing on resource-intensive, systematic search and experimentation, as is common in entrepreneurship research, we present a perspective that views opportunities as discoveries associated with improvisational behavior that startups engage in while navigating daily challenges—often with seemingly inadequate resources. Specifically, we develop and test a model suggesting that organizational improvisation may engender the occurrence of serendipity—*unexpected discovery of opportunity brought about by purposeful action*—and that this relationship may be particularly strong among new ventures facing elevated levels of resource constraints. Our model further suggests that serendipity is *potentially* rather than *necessarily* beneficial, and that informal organizational structure is likely to play a critical role in startups' efforts to leverage serendipity in ways that enhance performance (see Fig. 1).

Our findings are expected to generate important implications for research on resourcefulness in new ventures. While prior studies tend to view improvisation as a resourceful means for exploiting opportunities and directly contributing to venture survival and performance (Baker et al., 2003; Hmieleski and Corbett, 2008; Hughes et al., 2018), we highlight the role improvisation plays in opportunity discovery as well as a mechanism that links improvisation to performance. Specifically, our study positions improvisation as having an indirect association with new venture performance via the serendipitous discovery of opportunities. Further, it is increasingly recognized that improvisation does not inherently generate positive or negative outcomes (Hmieleski and Corbett, 2008; Vera and Crossan, 2005). Thus, we also contribute to a growing research stream exploring the contingent value of improvisation

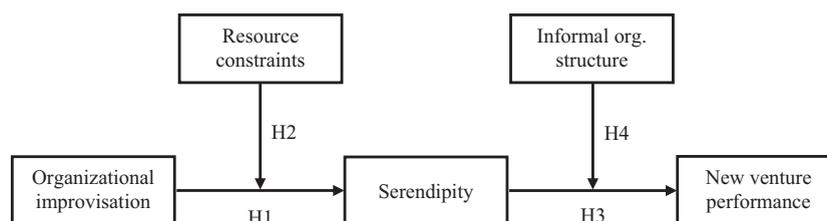


Fig. 1. Conceptual model.

Note. All relationships shown are positive (+).

(Fisher and Barrett, 2019; Kyriakopoulos, 2011) by positioning resource constraints and informal organizational structure as important contingencies affecting the relationship of improvisation (via serendipity) with new venture performance.

The current research also contributes to the nascent literature on serendipity in organizations. Serendipity research is growing across multiple disciplines, but to date has been mostly conceptual (Cunha et al., 2010). As a result, long-standing claims of the role of agency in producing serendipity and the inherent benefits stemming from serendipity remain largely unexamined. We explore both claims by examining improvisational behavior as an antecedent of serendipity and the contingent relationship of serendipity with new venture performance. In so doing, our study positions serendipity as a central phenomenon in the entrepreneurial process, particularly among resource-constrained new ventures.

3. Theoretical development and hypotheses

3.1. Organizational improvisation

Consistent with prior literature, we define organizational improvisation as *the deliberate extemporaneous composition and execution of novel action* (Moorman and Miner, 1998b; Hmieleski and Corbett, 2008). There are four key aspects to understanding the process of improvisation. First, the purposeful or deliberate aspect of improvisation implies that it is goal-directed and aims to address specific challenges or pursue given opportunities (Cunha et al., 1999; Archer et al., 2009). The goal-directed nature of improvisation bounds and directs actions toward achievement of desired outcomes. Second, improvisation occurs when thought and action occur simultaneously. Temporal convergence of design and execution is the most frequently articulated element of improvisation described across most studies (Hadida et al., 2015; Miner et al., 2001; Baker and Nelson, 2005). This point is in contrast to design-precedes-execution processes or modes of action (Baker et al., 2003). Third, improvisation involves structured deviation—it is novel action that departs from given templates or standards (e.g., a novel shift away from a plan or routinized process). Novelty of action distinguishes improvisation from repeated or routinized behaviors (Moorman and Miner, 1998b). Finally, improvisation is not inherently valuable. In contrast with prior studies that link improvisation to beneficial outcomes, recent studies argue compellingly that the degree to which improvisation is linked to performance gains or losses is contingent on a variety of contextual factors (Hmieleski and Corbett, 2008; Hmieleski et al., 2013; Vera and Crossan, 2005). In line with this growing “contingent view of the value of improvisation” (Kyriakopoulos, 2011: 1067), our study positions resource constraints as a key moderating factor of improvisation’s indirect relationship with firm performance.

To clarify the conceptual boundaries of organizational improvisation, it is important to differentiate it from other resourceful behaviors such as bricolage, effectuation, and trial-and-error learning. Improvisation usually implies bricolage, because the temporal convergence of design and execution leaves little or no time for acquiring new resources (Baker, 2007)—as a result, improvisation relies on the recombination of available resources (Cunha et al., 1999; Baker and Nelson, 2005). However, improvisation and bricolage are distinct constructs since bricolage does not require the convergence of planning and execution and because bricolage can occur in the absence of improvisation (Baker et al., 2003). Even though improvisation unfolds as an emergent process, it can be causally planned for use as a strategy for achieving specific goals of the firm or to effectually test what is possible. Finally, organizational improvisation differs from trial-and-error learning in that momentum is always moving forward without being able to go back to an initial state and start again from the beginning (Hmieleski and Corbett, 2006). This point of differentiation highlights the path dependent nature of improvisation. We now present a more in-depth overview of serendipity.

3.2. Serendipity

Referencing the Persian fairy tale *The Three Princes of Serendip*, Horace Walpole described serendipity as “making discoveries, by accident and sagacity, of things they were not in quest of” (quoted in Merton and Barber, 2004). Walpole’s insights have been applied to a wide range of phenomena, but a convergent definition has yet to emerge. We read widely across numerous disciplines to generate a definition of serendipity as *unexpected discovery of opportunity brought about by purposeful action*. This definition incorporates many insights from prior work, drawing heavily on Denrell et al. (2003) and Dew (2009), and reflects the consensus in the literature that unexpected discovery, agency, and chance form the core of serendipity. Further, in a similar vein to early improvisation research, recent studies suggest serendipity is not necessarily beneficial (Dew, 2009; Busch, 2020). Like improvisation, serendipity is typically linked conceptually and empirically to beneficial outcomes, generating the familiar assumption that it is necessarily or inherently valuable. However, the combination of agency and chance at the root of serendipity suggests its value is far from certain and is instead likely contingent on the complex interplay of human effort and contextual contingencies. Serendipity emerges from purposeful action and favorable accidents, followed by the flexibility to pursue unexpected discoveries (Cunha et al., 2010; Dew, 2009; Denrell et al., 2003).

While unexpected discovery, agency, and chance are ubiquitous across prior studies of serendipity, there is some ambiguity concerning whether it is a process, an outcome, or both. Denrell et al. (2003) define serendipity as “effort and luck joined by alertness and flexibility”, framing it as a process that precedes unexpected discovery. Yaqub (2018), in contrast, equates serendipity with unexpected discovery, positioning it as an outcome. Dew (2009: 735) straddles these perspectives by suggesting that serendipity involves “search leading to unintended discovery,” thus positioning it as both process and outcome. Our perspective aligns most closely with Yaqub’s (2018) view that serendipity is an outcome generated in part by human agency. Agency is a necessary antecedent, rather than component, of serendipity. Following prior research, agency is included in our definition of serendipity to clarify that it is an outcome that results partly from purposeful human action and also to distinguish it from unexpected discoveries made via pure luck, which are

beyond the influence of entrepreneurs and their ventures (Ma, 2002).

3.3. The relationship between organizational improvisation and serendipity

Several studies suggest in a general way that improvisation may foster serendipity. Orlikowski (1996: 66) found that a departmental team's in-the-moment responses to new problems—consisting of improvised combinations of prior practices—led to gradual organizational change and “unanticipated outcomes, and innovations”. De Rond (2014: 353-354) suggests firms which allow for improvisation and “controlled sloppiness” can foster unplanned interactions and “prepare themselves for serendipity”. Cunha (2005: 8) argues serendipity emerges from active learning, including through improvisation where “people act in order to learn” (p. 8). Further, because the process of improvisation involves a complex mixture of resources, it is common for results to only partly reflect intentions (McBirnle, 2008). Implicit across these and other studies is that improvisation constitutes a “basal level of action [that] ‘stirs up the pot’, brings in random ideas that will collide and stick together in fresh combinations, lets chance operate” (Austin, 1978: 73). A growing stream of research suggests improvisation can indeed “stir up the pot” in several ways.

First, organizational improvisation increases interactions between firm members. Organizational improvisation is *collective improvisation*—the deliberate and extemporaneous composition and execution of novel action “produced by the joint activities of individuals” (Moorman and Miner, 1998b: 704). By increasing joint activity among individuals, organizational improvisation increases “the number of fortuitous encounters they are likely to experience” because chance opportunities are more likely to occur among highly active people (Bandura, 1998: 98). Such interaction is a key driver of serendipity and emphasizes the “relational nature of serendipity” (McBirnle, 2012: 40). In contrast with the popular imagery of individual flashes of insight, serendipity tends to occur in communities (Copeland, 2019) and is tied less to an individual's experience and more to multiple individuals in interaction (Copeland, 2015). Interactions among individuals can bring to one person's attention discoveries another person considers insignificant, makes it more likely skills needed to exploit a discovery are present, and reduces groupthink (Yaqub, 2018). Several studies indicate that interactions in relaxed or informal work-related environments, where ideas and information flow freely, are particularly likely to generate serendipity (McBirnle, 2008, 2012; McBirnle and Urquhart, 2011; Cunha et al., 2010). Interactions are an important driver of *bisociation*—the novel combination of ideas and “previously unrelated matrices of skills or information”—which underlies serendipity (Cunha et al., 2010: 322–323; Busch and Barkema, 2020). In contrast to individuals improvising alone, improvising groups bring a diversity of ideas, skills, and information into play—they are more likely to recognize serendipitous discoveries “because they have more information to hand” (Yaqub, 2018: 174) and because where one individual fails to recognize the significance of a discovery, another may perceive it as highly significant (Kantorovich, 1993). Therefore, organizational improvisation is likely to foster serendipity by bringing individuals together in a collective effort to solve a problem.

Second, organizational improvisation involves resource recombination. Improvisation draws on existing resources (Cunha et al., 1999; Weick, 1998) and generates new resource combinations (Ciborra, 1996) to solve problems or pursue opportunities. Since improvisation entails the temporal convergence of design and execution (Miner et al., 2001; Moorman and Miner, 1998b), it relies on recombination of existing resources because there is little or no time to acquire new resources (Baker, 2007). Importantly, such resource recombination can trigger serendipity. Serendipity can emerge from combinations of existing resources because firms' familiarity with these resources—compared to newly acquired resources—allows them to generate more complex and nonobvious combinations (Harper, 1987; Denrell et al., 2003). Recombination often follows a “meandering” path of “serendipitous combinations” of existing resources rather than a carefully planned vision (Baker and Nelson, 2005: 335; Garud and Karnoe, 2003). It is often uncertain and can generate unexpected outcomes since “the value of the resources is typically discovered as they are being combined” (Wiklund and Shepherd, 2009: 196). Further, recombining existing resources rather than using resources specifically designed for a task can generate surprises, yet can nevertheless generate surprisingly effective outcomes (Baker, 2007; Senyard et al., 2014). Thus, due to its reliance on resource recombination, improvisation is a form of material bisociation where previously unrelated resources are paired, potentially revealing “unsuspected connections or hidden analogies” (Cunha et al., 2010: 323).

In summary, organizational improvisation's tendency to foster interaction among firm members and reliance on resource recombination jointly make serendipity more likely to occur. In line with the above logic and empirical findings, we argue:

Hypothesis 1. Organizational improvisation will be positively related to serendipity.

3.4. The enhancing effects of resource constraints

We have described why improvisation is likely to encourage serendipitous discovery, yet it is not given that such an outcome will always result from improvisation. In this section, we argue for the role of resource constraints as a moderating factor that can enhance or inhibit the degree to which improvisation results in serendipity. In so doing, we focus on two main points: (1) resource constraints provide an impetus for finding new uses for existing resources while engaged in improvisation, and (2) resource constraints constitute boundaries that guide and focus improvisation by limiting the number of recombination possibilities.

First, resource constraints provide an impetus for startups to find additional uses for their existing resources when improvising. As noted, serendipitous discoveries often emerge from recombination of existing resources, especially complex and nonobvious combinations (Denrell et al., 2003). Further, because resources are “bundle[s] of possible services” and no firm “ever perceives the complete range of services available from any resource” (Penrose, 1959: 76, 86), firms that perceive more uses for existing resources while improvising are even more likely to discover complex, nonobvious combinations. Resource constraints can play an important role in uncovering new uses for existing resources because it necessitates that entrepreneurs look at their current resources differently while

improvising, given their inability to acquire new resources. For example, findings by Baker and Nelson (2005) suggest that firms facing resource constraints can be compelled to find ways to transform objects with little or no prior value into resources of value; what constitutes a resource, as well as how valuable it is, may be relative to a given context. Thus, by impelling entrepreneurs to find nontraditional uses for their existing resources, resource constraints make it more likely entrepreneurs will generate relatively complex and nonobvious combinations of resources while improvising. Importantly, such “deviant” resource combinations are likely to lead to previously undiscovered opportunities that ventures with access to greater resources while improvising might not recognize (Denrell et al., 2003; Dew, 2009).

Second, limited resource availability may act as a boundary condition that focuses the effort of startups while improvising in ways that counterintuitively lead to unique or previously unforeseen solutions. A positive relationship between resource constraints and novel productions has been argued by many authors (e.g., Csikszentmihalyi, 1997). Such arguments are generally based on the logic that the more resources that are available, the greater are the recombination opportunities to produce an original outcome. Yet, having a more limited set of resources available can focus improvisation by providing working boundaries. Further, by limiting the number of possible resource combinations, resource constraints may constitute a flexible structure that diminishes “the degrees of freedom in mistake-prone improvisation” and decrease the chances improvisation will generate harmful mistakes (Davis et al., 2009: 439). Therefore, resource constraints can act as a contextualized guide to improvisational performance by narrowing the range of what is at hand—offering “enough consistency for efficiency but also flexibility to match unique aspects of particular opportunities” (Cunha et al., 2017: 5). Taking these points together, we argue that the nature of the relationship between improvisation and serendipity is partially contingent on resource constraints:

Hypothesis 2. Resource constraints will moderate the relationship between organizational improvisation and serendipity, such that the relationship becomes more positive for startups experiencing higher levels of resource constraints.

3.5. *The relationship between serendipity and new venture performance*

Serendipitous discoveries can provide ventures with a potential source of advantage and basis for improved performance. For example, Honda’s unexpected discovery of latent demand for small motorcycles in the U.S. enabled them to introduce a highly successful product category to a market dominated by large motorcycles (Andel, 1994). Denrell et al. (2003: 986) argue that such strategic opportunities are often serendipitously discovered, because “...If there has been some search for strategic opportunities, the low-hanging fruits are likely to have been picked”. The discovery of such opportunities can play a critical role in new venture performance. Simply seeking opportunities has been shown to contribute to performance by improving a venture’s position relative to its competitors through the generation of strategic knowledge (Sirén et al., 2012). Identifying higher potential opportunities, such as those that can arise from serendipity (Denrell et al., 2003), has been linked to improved performance (Dencker and Gruber, 2015). And finding multiple, rather than single, opportunities at the same time can foster performance because simultaneously considering multiple opportunities improves decision making and increases chances of accessing higher potential markets (Gruber et al., 2008).

The discovery of serendipitous opportunities has been well-chronicled for many innovative new products and services (Roberts, 1989; Andel, 1994; Dew, 2009; Cunha et al., 2010; Fabian, 2010; De Rond, 2014; Yaqub, 2018). Product and service innovation plays an important role in maintaining competitive advantage and supporting firm survival and growth (Chapman and Hyland, 2004). The ability to discover and bring to market new products enables startups to charge higher prices relative to established competitors (Verhees and Meulenbergh, 2004), achieve higher customer satisfaction, reach sales and profit goals, increase product and firm profitability (Lau et al., 2010; Matzler et al., 2008), and grow market share (Wolff and Pett, 2006). In sum, discovering opportunities lays an important foundation for ventures’ survival and performance. While opportunities must be acted on to generate value, we expect as a whole that discovering serendipitous opportunities is likely to enhance new ventures’ performance.

Hypothesis 3. Serendipity will be positively related to new venture performance.

3.6. *The enhancing effects of informal organizational structure*

An informal organizational structure means a firm is flatter, with more lateral communication and cross-department collaboration (Scott, 2002), making it more likely that new ideas and information will flow quickly throughout the organization (Cunha et al., 2010). On average, new ventures are more likely to have informal structures than more established firms, because organizational structure “generally involves new roles, which have to be learned” (Stinchcombe, 1965: 148). Yet, even early in a venture’s life, tasks and roles can become formalized (Aldrich et al., 2020) and substantial variation in structure appears among new ventures (Sine et al., 2006). As a result, organizational structure is importantly shaped by entrepreneurs’ decisions and is more than an artifact of organizational nascence. Consistent with the emphasis on both opportunity identification *and* exploitation in entrepreneurship research, the positive effects of serendipitous discoveries on performance are likely partially contingent on the structure of the organization in which they occur.

Orlikowski (1996) suggests the ability to capitalize on unplanned opportunities largely depends on less hierarchy, less rigid control, more openness to and tolerance for workarounds, less resistance to change, and more openness to flexibility. While more rigid, formal structure fosters efficiency (Scott, 2002), less rigid, more flexible structure fosters openness and ability to embrace new ideas and opportunities, opening “up the organization to the possibility of addressing a wider range of opportunities that serendipitously occur...” (Davis et al., 2009: 437). Ventures are more likely to act on serendipitous opportunities when entrepreneurs do not hold too rigidly to existing plans and allow their employees the autonomy to pursue new ideas (Dew, 2009). Firms that prefer formalized search

processes risk killing serendipitous discoveries “before they acquire organizational traction and proceed to integration in the organizational status quo” (Cunha et al., 2010: 326). In addition to allowing firms to more easily act on new and unexpected opportunities, informal structure makes it more likely new opportunities can and will be exploited. In a study of external knowledge acquisition in opportunity exploitation, Foss et al. (2013) found that recognizing and using external knowledge required a decentralized structure, with delegated decision-making rights, allowing information to flow quickly to organizational members who need it. Their study indicates that the free flow of ideas and information between members, enabled by decentralized structure, is critical for opportunity exploitation. In sum, we suggest that informal organizational structure is likely to enable startups to more easily capitalize on serendipitous discoveries. Thus, we argue:

Hypothesis 4. Informal organizational structure will moderate the relationship between serendipity and new venture performance, such that the relationship becomes more positive for startups that have more informal organizational structures.

4. Methods

4.1. Sample and procedure

Our sample was drawn from *ReferenceUSA*, an organization which actively maintains a comprehensive directory of 58 million U.S. businesses—ranging from sole proprietorships to Fortune 500 companies—and approximately 1.9 million new U.S. businesses. The organization gathers preliminary data by aggregating 4000+ telephone directories and 250+ information sources on new businesses, and crosschecks their data through direct contact with the firms in their database (ReferenceUSA, 2018). The ReferenceUSA database has been used in a number of previous entrepreneurship and general management studies (Baron and Tang, 2011; Desa and Basu, 2013; Tang et al., 2012; Baron et al., 2011; Boivie et al., 2011; Westphal and Shani, 2016). As a starting point for our data collection, we restricted our sample to firms in the early stages of their development—with no more than 5 years having passed since their establishment (Arend, 2014) and no more than 50 employees (Palvia et al., 1994; Hornsby and Kuratko, 1990). In addition, we restricted our sample to new ventures that are privately owned, operate in one of eight major industry sectors,² are located in 22 states in the eastern half of the United States,³ and where we could access the founder, owner, or CEO. Using these criteria generated a sampling frame of approximately 6250 new ventures. A group of one-half of the firms in the sampling frame was randomly selected for inclusion in our study, resulting in approximately 3125 ventures that were invited to participate.

We followed a mixed-mode, web-first survey design (Dillman et al., 2008). First, personalized invitation packets were mailed to the individuals identified by *ReferenceUSA* as being the top executives of their firms. The packets included a description of the research project, a unique access code to the web survey, and a small financial pre-incentive to improve response rates. This was followed by two email reminders, a mailed postcard, and a final packet with a paper survey option and pre-paid return envelope. In total, we received 326 usable responses from individuals who confirmed they were a founder, owner, or other leader involved in strategic decision-making for their firm. This constitutes a 10.4% response rate, which is consistent with prior studies that surveyed leaders of new ventures (Cycyota and Harrison, 2006; Hmieleski et al., 2015). We ran independent sample *t*-tests on firm age, revenue, and number of employees, with the results suggesting non-response bias is not present in our data.

In terms of demographics, the final sample of respondents averaged 47 years old ($SD = 12.56$) and is 37% female. All participants confirmed they are directly involved in the strategic decision-making of their firms and 90.8% indicated that they are founders. The average age of their firms was about 2 years ($SD = 1.43$) at the time of the survey, with mean annual sales of \$1.1 million ($SD = \2.2 million) and median annual sales of \$529,000. The firms averaged approximately 6 employees ($SD = 5.85$), represented 16 different industry sectors (or 141 different industries at the 6-digit level of the North American Industry Classification System), and were dispersed across a broad range of geographical locations—including 21 different states.

4.2. Measurement

Unless otherwise noted, all measures were employed using 5-point Likert-type response scales ranging from low agreement (1) to high agreement (5). For each of the primary variables, participants were instructed to treat their firm as the main referent. The items used to measure each focal variable are listed in Appendix A.

4.2.1. Organizational improvisation ($\alpha = 0.80$)

Improvisation was measured using five items adapted from three established measures (Hmieleski and Corbett, 2006, 2008; Moorman and Miner, 1998a; Vera and Crossan, 2005). Responses were averaged in order to create an overall measure of organizational improvisation, with higher scores indicating greater improvisational behavior displayed by the firm.

² Industry sectors included: 10–14 (Mining), 15–17 (Construction), 20–39 (Manufacturing), 40–49 (Transportation, Communications, Electric, Gas, and Sanitary Services), 50–51 (Wholesale Trade), 52–59 (Retail Trade), 60–67 (Finance, Insurance, and Real Estate), 70–89 (services, excluding educational and social services, as well as public administration, religious organizations, and civic and grantmaking organizations).

³ Following Dillman et al.'s (2008) recommendations on the timing of mailings and reminders to increase response rate, states were chosen based on the predictability of non-profit postal delivery. States included: NY, PA, MD, DE, CT, MA, NH, ME, RI, VT, VA, OH, WV, NC, SC, MI, IN, IL, GA, KY, TN, and AL.

4.2.2. Resource constraints ($\alpha = 0.80$)

This variable was examined using a six-item measure assessing the extent to which firms lacked adequate resources. Prior studies point to numerous areas where startups often experience severe constraints, including: financial, physical, organizational, reputational, social network, and human capital deficits (Aldrich and Fiol, 1994; Baker and Nelson, 2005; Sine et al., 2006). Consistent with this literature, our measure of resource constraints included two items focused on tangible resources and four items focused on intangible resources to capture a range of resources critical to startups' performance. Responses were averaged to create an overall measure of resource constraints, with higher scores indicating greater resource constraints.

4.2.3. Serendipity ($\alpha = 0.78$)

Serendipity was measured using six items developed from prior theoretical work by Yaqub (2018) and Dew (2009). Serendipity involves different types of unexpected discovery, including "Walpolian" serendipity—unexpected discovery of opportunities related to a problem not in view—and "Mertonian" serendipity—unexpected discovery of opportunities related to a problem in hand (Yaqub, 2018; Napier and Hoang Vuong, 2013; Busch and Barkema, 2020). Our measure includes three items for Walpolian serendipity and three items for Mertonian serendipity. Responses were averaged to create an overall measure of serendipity, with higher scores indicating greater levels of serendipity.

4.2.4. Informal organizational structure ($\alpha = 0.82$)

Informal organizational structure was measured using a five-item, semantic differential scale from Covin and Slevin (1988) that assesses firms' informal (versus formal) structural orientation. Responses were averaged to create an overall measure in which high scores represent informal organizational structure and low scores indicate formal organizational structure.

4.2.5. New venture performance ($\alpha = 0.85$)

Consistent with prior research, this variable was assessed relative to a firm's major competitors (McDougall et al., 1994), using seven items from Stam and Elfring (2008) that operationalize a range of growth (e.g., sales and employment growth), financial (e.g., market share, gross profits, and profit margin), and innovation metrics (e.g., product/service innovation and speed in product/service development). Despite potential concerns with subjective performance indicators, empirical evidence has demonstrated such measures to be valid (Wall et al., 2004) and significantly related to objective metrics of new venture performance (Dess and Robinson Jr, 1984; Stam and Elfring, 2008). In addition, prior studies argue subjective measures allow for performance comparisons in cross-industry samples, such as the sample in the present research, and may even be more appropriate than objective measures in such cases (Youndt et al., 1996; Ledwith, 2000; Lau et al., 2010). Responses were averaged to create an overall measure of new venture performance, with higher scores indicating greater performance.

4.2.6. Control variables

We controlled for firm size, firm age, environmental dynamism, and industry sector because each has been linked to the ability to achieve high performance relative to competitors (Schilke, 2014; Zahra et al., 2000; Srivastava et al., 2006). For firm size, we standardized firm revenue and employee totals and then summed them into an overall measure. A five-item measure of environmental dynamism ($\alpha = 0.70$) developed by Miller and Friesen (1982) was used to assess the unpredicted rate of change in the industry environment. Firm age was the number of years since the firm was established. Following previous research (Carr and Hmieleski, 2015; Chrisman et al., 2009), industry dummies were created by collapsing industry sectors into three groups: (1) retail, wholesale, and service, (2) manufacturing, and (3) all other industry sectors.

4.3. Measurement model

Our primary measurement model was examined using a confirmatory factor analysis (CFA) that considered each of the five focal variables as distinct constructs (i.e., organizational improvisation, resource constraints, serendipity, informal organizational structure, and new venture performance). Serendipity (Walpolian and Mertonian items were entered as first-order indicators), resource constraints (items relating to tangible and intangible resource constraints were used as first-order indicators), and new venture performance (growth, financial, and innovation items were used as first-order indicators) were entered into the CFA as second-order factors. Organizational improvisation and informal organizational structure were entered as single-order (unidimensional) constructs. The CFA was conducted using IBM AMOS 26.0 with maximum likelihood estimation and unbiased sample covariances as input. Goodness of fit was determined using the root-mean-square error of approximation (RMSEA) (MacCallum et al., 1996), comparative fit index (CFI) (Bentler, 1990), and standardized root mean square residual (SRMR) (Hu and Bentler, 1999). Commonly used threshold values (i.e., $RMSEA \leq 0.08$, $CFI \geq 0.90$, $SRMR \leq 0.08$) were applied as indicators of acceptable fit (Kline, 2015).

The measurement model demonstrated generally good fit, $\chi^2 = 858.151$, $df = 360$, $RMSEA = 0.065$ and its 90% confidence interval of 0.060 to 0.071, $CFI = 0.863$, and $SRMR = 0.073$. As evidence of the convergent validity for the final measurement model: the average standardized loading for first-order factors is 0.72 and for second-order factors is 0.81, the average composite reliability (CR) for the focal constructs is 0.85, and the mean average variance extracted (AVE) for the focal constructs is 0.65. In support of the discriminant validity of these measures: the average maximum shared variance (MSV) is 0.07, and for each focal construct the $AVE > MSV$. Overall, these statistics provide a wide range of support for the convergent and discriminant validity of our focal variables (Hair et al., 2010; Fornell and Larcker, 1981; Nunnally and Bernstein, 1994). For further details, Appendix A includes all standardized factor loadings, CR statistics, and AVE values estimated from the CFA used to test our primary measurement model.

Based on the request of reviewers, we compared our primary measurement model described above with one that is identical with the exception that all items for improvisation and serendipity were jointly loaded onto a single first-order construct. This comparison model ($\chi^2 = 1319.957$, $df = 366$, $RMSEA = 0.090$ and its 90% confidence interval of 0.084 to 0.095, $CFI = 0.738$, and $SRMR = 0.080$) is significantly worse fitting than our primary measurement model that specifies improvisation and serendipity as distinct constructs ($\Delta\chi^2(6) = 461.806$, $p < .01$).

To further support the distinctiveness of our measures of organizational improvisation and serendipity from related constructs, we collected additional data from a sample of 216 participants using a Qualtrics panel of employed individuals. To examine the degree of such distinctiveness, our measures were contrasted with a 5-item measure of exploratory learning ($\alpha = 0.85$) from [Reyt and Wiesenfeld \(2015\)](#), a 6-item measure of exploratory innovation ($\alpha = 0.84$) from [Jansen et al. \(2006\)](#), and a 4-item measure of organizational learning ($\alpha = 0.74$) from [García-Morales et al. \(2012\)](#). Like our focal measures, the referent used for these contrasting measures was the firm. A series of seven contrasts were examined by conducting CFAs for one-factor versus two-factor models. Chi-square difference tests were used to compare fit between the one- and two-factor models. The two-factor models were significantly better fitting than the one-factor models in each case (see [Table 1](#)). Specifically, improvisation and serendipity were each significantly differentiated ($p < .01$) from engagement in exploratory learning activities, exploratory innovation, and organizational learning. In addition, improvisation was significantly differentiated from serendipity ($p < .01$). In sum, these results provide additional support for the distinctiveness of the focal variables in our model.

4.4. Statistical procedures

All hypotheses were tested using hierarchical multiple regression in IBM SPSS 26.0. Significant two-way interactions were graphed at high (+1 *SD*), medium (*Mean*), and low (−1 *SD*) levels of the moderator ([Jose, 2013](#)).⁴ We took several steps to mitigate and assess common method bias. First, following [Podsakoff et al.'s \(2012\)](#) recommendations, our predictor, mediator, and criterion variables were distanced within the survey to provide “psychological separation”. Second, neither of our primary independent variables (i.e., organizational improvisation and serendipity) was significantly correlated with our outcome variable (i.e., new venture performance). Third, the presence of significant moderating effects alleviates issues relating to common method bias for the conditional effects in our model. Prior simulation studies and mathematical proofs have provided evidence that common method bias is unable to generate significant moderating effects ([Evans, 1985](#); [Siemsen et al., 2010](#)). To this end, [Podsakoff et al. \(2012: 564–565\)](#) suggest that one of the best ways for researchers to avoid concerns of common method bias when relying on cross-sectional single-source survey data is to theorize and examine models in which each conceptual linkage is moderated, as we have done in the present study. Therefore, even though two main effect relationships are hypothesized as parts of our model (*H1* and *H3*), each of these linkages does include moderation in our full model. Fourth, given some conceptual similarities between improvisation and serendipity, we used instrumental variables to assess for potential endogeneity in the relationship between the two, but our results indicated that endogeneity is not biasing the results. Lack of endogeneity further suggests that common method bias, even without a moderator, is not biasing the direct association between improvisation and serendipity ([Podsakoff et al., 2012](#); [Antonakis et al., 2010](#)).

5. Results

[Table 2](#) shows descriptive statistics for our primary sample, including means, standard deviations, and bivariate correlations. [Table 3](#) shows the results of our regression models for serendipity and [Table 4](#) shows the results for new venture performance. The significant two-way interactions are graphed in [Figs. 2 and 3](#). Multicollinearity was assessed using several methods. The highest correlation between any pair of the study's focal independent variables was 0.21, all variance inflation scores for models examined were ≤ 1.25 , and all conditional index scores were ≤ 3.33 . Since each of these statistics is well below commonly adopted threshold levels ([Kline, 2015](#); [Tabachnick and Fidell, 2013](#)), we conclude that multicollinearity does not threaten the validity of our results. In terms of correlations of the controls with our focal outcome variables, environmental dynamism is positively related to serendipity ($r = 0.20$, $p < .01$) and firm size is positively related to new venture performance ($r = 0.16$, $p < .01$). These relationships are in alignment with what we would anticipate in that unexpected or surprise discoveries may be more likely to result in dynamic environments that are characterized by uncertainty. Moreover, startups that have reached a greater size are likely to have made progress down a path of effectively competing against others in their industry. Our hypotheses are now examined.

Hypothesis 1 (H1) predicted that organizational improvisation will be positively related to serendipity. As shown in [Table 2](#), organizational improvisation is positively correlated with serendipity ($r = 0.21$, $p < .01$). Similarly, as shown in [Table 3](#), organizational improvisation is significantly and positively related to serendipity in models both without and with control variables (Model 1: $B = 0.21$, $p < .01$; Model 4: $B = 0.19$, $p < .01$), indicating that higher levels of organizational improvisation are positively linked to the occurrence of serendipity in new ventures. These results provide support for *H1*.

Hypothesis 2 (H2) suggested that resource constraints will moderate the relationship between organizational improvisation and serendipity, such that the relationship will be more positive for startups experiencing higher levels of resource constraints. Consistent with *H2*, [Table 3](#) indicates a positive and significant two-way interaction between improvisation and resource constraints in models both without and with control variables (Model 2: $B = 0.13$, $p < .05$; Model 5: $B = 0.12$, $p < .05$). We probed this interaction via simple

⁴ In response to a reviewer comment, the interactions depicted in [Fig. 2 and 3](#) are based on estimates of models without control variables, but illustrate the same patterns as observed in models that include the controls.

Table 1
CFA model comparisons of organizational improvisation and serendipity with related constructs.

Model	# of Factors	$\chi^2(df)$	CFI	RMSEA	SRMR	Chi-square difference test
1. Org. improvisation with exploratory learning	1	93.491(35)	0.907	0.088	0.072	
	2	42.950(34)	0.986	0.035	0.042	$\Delta\chi^2(1) = 50.541, p < .01$
2. Org. improvisation with exploratory innovation	1	167.137(44)	0.818	0.114	0.094	
	2	81.259(43)	0.943	0.064	0.055	$\Delta\chi^2(1) = 85.878, p < .01$
3. Org. improvisation with org. learning	1	63.548(27)	0.917	0.079	0.057	
	2	48.689(26)	0.948	0.064	0.051	$\Delta\chi^2(1) = 14.859, p < .01$
4. Serendipity with exploratory learning	1	190.990(44)	0.805	0.125	0.092	
	2	99.437(43)	0.925	0.078	0.063	$\Delta\chi^2(1) = 91.553, p < .01$
5. Serendipity with exploratory innovation	1	201.934(54)	0.828	0.113	0.077	
	2	142.695(53)	0.896	0.089	0.065	$\Delta\chi^2(1) = 59.239, p < .01$
6. Serendipity with org. learning	1	124.584(35)	0.833	0.109	0.072	
	2	85.418(34)	0.904	0.084	0.060	$\Delta\chi^2(1) = 39.166, p < .01$
7. Org. improvisation with serendipity	1	151.979 (44)	0.781	0.107	0.077	
	2	110.611 (43)	0.863	0.086	0.063	$\Delta\chi^2(1) = 41.368, p < .01$

$N = 216$.

Table 2
Descriptive statistics and variable intercorrelations.

Variable	Mean	SD	<i>r</i>											
			1	2	3	4	5	6	7	8	9	10		
1. Firm age	1.79	1.43												
2. Firm size	0.00	0.84	.06											
3. Environmental dynamism	2.84	0.81	.03	-.10										
4. Industry sector dummy 1	0.62	0.49	.07	-.15**	.07									
5. Industry sector dummy 2	0.07	0.25	.10	.28**	.01	-.34**								
6. Industry sector dummy 3	0.31	0.46	-.13*	.00	-.02	-.86**	-.18**							
7. Org. improvisation	3.82	0.62	.10	-.01	.21**	-.06	.02	.05						
8. Resource constraints	2.81	0.92	.03	-.12*	.20**	-.05	.08	.01	.10					
9. Serendipity	3.40	0.61	.00	-.06	.20**	.04	-.04	-.02	.21**	.00				
10. Informal org. Structure	3.42	0.86	-.01	-.01	.07	-.08	.06	.05	.10	.06	.01			
11. New venture performance	3.30	0.71	.05	.16**	-.10	-.02	-.02	.02	.02	-.30**	.07	-.02		

$N = 326$.

* $p < .05$.

** $p < .01$.

Table 3
Regression models of serendipity.

Variable	Serendipity (without controls)		Serendipity (with controls)		
	Model 1	Model 2	Model 3	Model 4	Model 5
	<i>B</i> (<i>SE</i>)	<i>B</i> (<i>SE</i>)	<i>B</i> (<i>SE</i>)	<i>B</i> (<i>SE</i>)	<i>B</i> (<i>SE</i>)
Control variables					
Firm age			-.00(.02)	-.01(.02)	-.01(.02)
Firm size			-.03(.04)	-.03(.04)	-.03(.04)
Environmental dynamism			.15(.04)**	.12(.04)**	.11(.04)**
Industry sector dummy 1			.03(.07)	.05(.07)	.05(.07)
Industry sector dummy 2			-.05(.15)	-.05(.15)	-.02(.15)
Main effects					
Org. improvisation (OI)	.21(.05)**	.25(.06)**		.19(.06)**	.22(.06)**
Resource constraints (RC)		-.00(.04)			-.02(.04)
Two-way interaction					
OI × RC		.13(.05)*			.12(.05)*
<i>F</i> -ratio	15.58**	7.21**	2.81*	4.28**	3.92**
<i>R</i> ²	.05	.06	.04	.08	.09
ΔR^2		.01		.04	.01

$N = 326$.

* $p < .05$.

** $p < .01$.

Table 4
Regression models of new venture performance.

Variable	New venture performance (without controls)		New venture performance (with controls)		
	Model 1	Model 2	Model 3	Model 4	Model 5
	B(SE)	B(SE)	B(SE)	B(SE)	B(SE)
Control variables					
Firm age			.03(.03)	.03(.03)	.03(.03)
Firm size			.14(.05)**	.11(.05)*	.12(.05)*
Environmental dynamism			-.07(.05)	-.05(.05)	-.04(.05)
Industry sector dummy 1			-.02(.09)	-.03(.08)	-.03(.08)
Industry sector dummy 2			-.21(.17)	-.13(.17)	-.16(.17)
Main effects					
Org. improvisation	.04(.06)	.03(.06)		.04(.06)	.03(.06)
Resource constraints	-.23(.04)**	-.23(.04)**		-.21(.04)**	-.21(.04)**
Serendipity (S)	.07(.06)	-.07(.06)		.09(.06)	.09(.06)
Informal structure (IS)		-.01(.04)			-.00(.04)
Two-way interaction					
S × IS		.15(.07)*			.15(.07)*
F-ratio	11.34**	7.76**	2.52*	5.31**	4.79**
R ²	.10	.11	.04	.12	.13
Δ R ²		.01		.08	.01

N = 326.

* $p < .05$.

** $p < .01$.

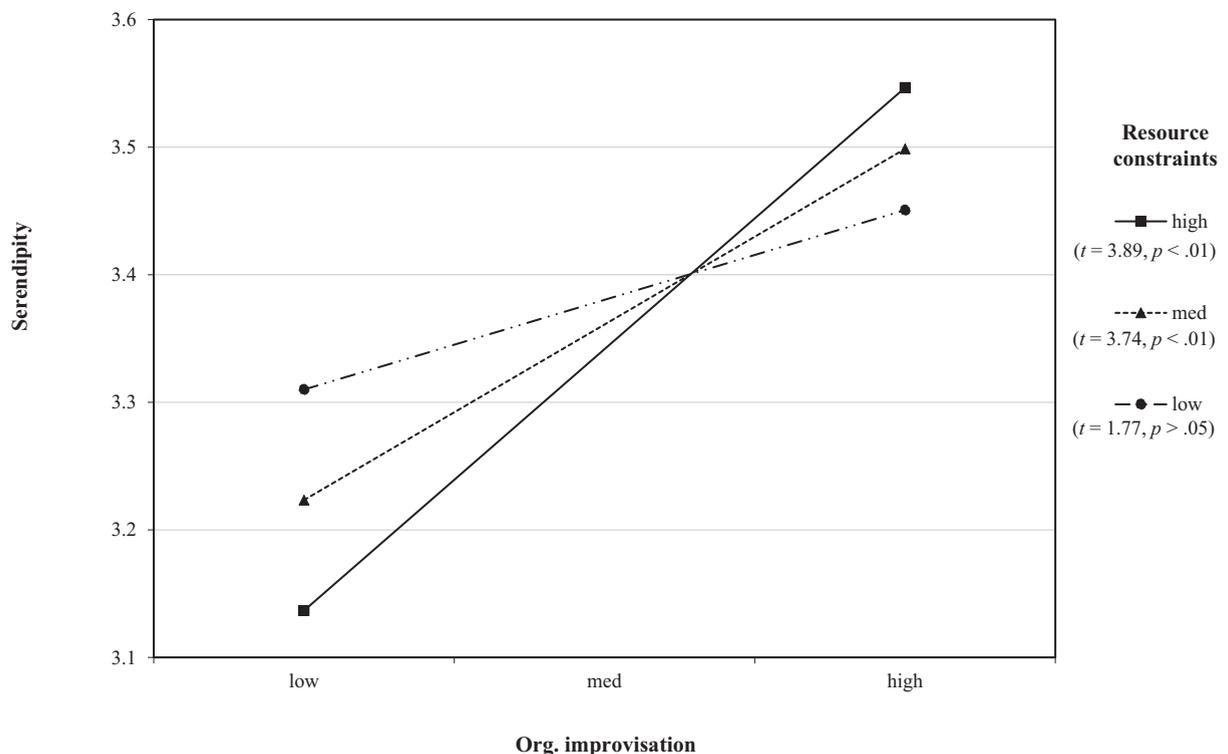


Fig. 2. Interaction of organizational improvisation with resource constraints on serendipity.

slopes analysis. As shown in Fig. 2, the simple slope for organizational improvisation on serendipity is positive and significant at high (+1 SD) ($p < .01$) and medium (Mean) ($p < .01$) levels of resource constraints, but is non-significant at low (-1 SD) ($p > .05$) levels of resource constraints. Therefore, increased levels of resource constraints do appear to enhance the positive relationship between organizational improvisation and serendipity. Thus, support is found for H2.

Hypothesis 3 (H3) predicted that serendipity will be positively related to new venture performance. As shown in Table 2, the

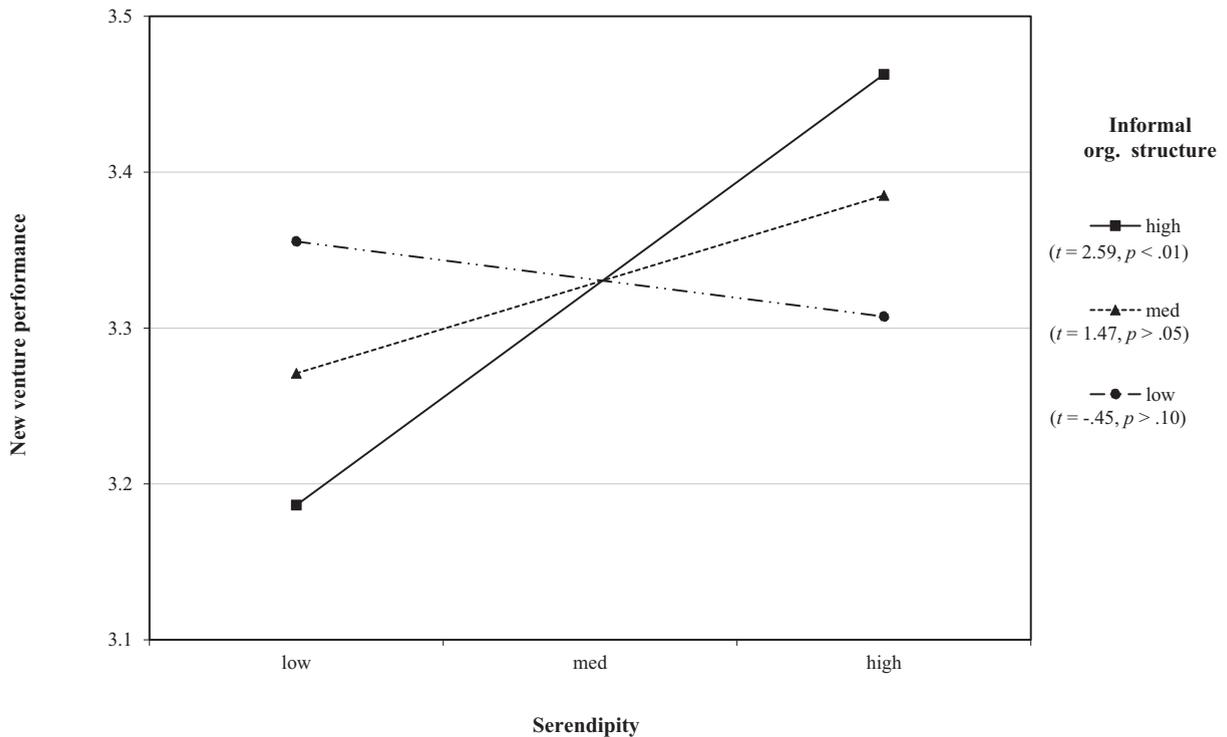


Fig. 3. Interaction of serendipity with informal organizational structure on new venture performance.

correlation between serendipity and new venture performance is non-significant ($r = 0.07, p > .10$). Similarly, as shown in Table 4, this relationship is non-significant in models both without and with control variables (Model 1: $B = 0.07, p > .10$; Model 4: $B = 0.09, p > .10$). Thus, a direct relationship between serendipity and new venture performance was not observed. These results fail to support for H3.

Hypothesis 4 (H4) suggested informal organizational structure will moderate the relationship between serendipity and new venture performance, such that the relationship will be more positive for startups that have more informal organizational structures. As shown in Table 4, the interaction between serendipity and informal organizational structure is positive and significant in models both without and with control variables (Model 2: $B = 0.15, p < .05$; Model 5: $B = 0.15, p < .05$), and the simple slopes analysis shown in Fig. 3 indicates that serendipity is positively and significantly related to performance at high levels (+1 SD) ($p < .01$) of informal organizational structure, and is not significantly related to performance at medium (Mean) ($p > .05$) or low (−1 SD) ($p > .10$) levels of informal organizational structure. Therefore, informal organizational structure does appear to have a positive moderating effect on the relationship between serendipity and new venture performance. Thus, the findings provide support for H4.

5.1. Post hoc analysis: examination of alternative models

Given our conceptualization of organizational improvisation as being associated with the occurrence of serendipity rather than as a means of exploiting unexpected opportunities that can result from serendipity, we also tested the alternative (yet not entirely conflicting) perspective. To this end, we examined organizational improvisation as a moderator of the relationship between serendipity and new venture performance. The interaction was found to be positive but non-significant ($p > .10$). We additionally tested the three-way interaction of organizational improvisation with informal organizational structure and serendipity on new venture performance. This interaction was also found to be non-significant ($p > .10$). Finally, we examined the two-way interactions of serendipity with resource constraints, and with informal structure, on organizational improvisation, and the two-way interactions of organizational improvisation with resource constraints, and with informal structure, on new venture performance. Similarly, none of these interactions were found to be significant ($p > .10$). Thus, no alternative arrangement of the variables in our model appears to operate in a way that is superior to the conceptual model that was examined in our hypothesis testing. These findings lend support to our arguments that organizational improvisation may be an important means for resourcefully identifying new and unexpected opportunities—yet may not be superior to more systematic and fully planned approaches with respect to exploiting such discoveries. More research, however, is needed to further elucidate the most effective mechanisms for exploiting serendipitous discoveries—in addition to what we have identified in the current research regarding the value of informal organizational structure that presumably provides the flexibility necessary for capitalizing on unexpected opportunities (Dew, 2009; Cunha et al., 2010). Moreover, it may be possible that serendipity reciprocally drives improvisation as a means to continually generate more serendipity, although we found no evidence of simultaneity

(e.g., as shown by our tests of endogeneity; Anderson, 2018; Wooldridge, 2010). Thus, future longitudinal work in this area might benefit from evaluating the possibility of feedback loops between organizational improvisation and serendipity.

6. Discussion

Improvisation is often viewed as something to be frowned upon because it runs counter to the command-and-control management styles that are ever-present in large corporations' quests to maximize efficiency and profitability (Cunha et al., 2017; Fisher and Barrett, 2019). In contrast, improvisation is increasingly being adopted as a fashionable form of behavior as startup communities recognize its potential value in terms of creating and running ventures that generate unexpected opportunities without vast resources (Haislip, 2019). Not surprisingly, this has gradually led to increased attention to improvisation by entrepreneurship researchers over time (e.g., Baker et al., 2003; Bingham, 2009; Hmieleski et al., 2013). Despite this fact, the "magic" of what makes improvisation work for some organizations—startups in particular—has largely remained a black box, with scholars calling for greater understanding of the conditions under which improvisation operates effectively (Hadida et al., 2015; Fisher and Barrett, 2019). To help address this gap, we sought to examine both a key mechanism (i.e., serendipity) through which improvisation is likely to generate beneficial outcomes, and contingencies in which the indirect effects of improvisation are likely to be enhanced. We now describe our findings in more detail. In so doing, we articulate contributions to theory and implications for practice. Finally, we review limitations of the study and promising directions for future research.

6.1. Contributions to the literature on entrepreneurial resourcefulness

Prior entrepreneurship research has often argued for a close association between the resourceful behavior of improvisation and new venture performance. For instance, Hughes et al. (2018) found that improvisation contributes directly to new venture performance, Hmieleski and Ensley (2004) and Hmieleski et al. (2013) argue improvisation is an important behavioral strategy in the uncertain, high-speed contexts facing many new ventures, and Hmieleski and Corbett (2008) found that improvisation contributes to performance when entrepreneurs are high in self-efficacy. The thrust of prior studies has been that improvisation is closely related with performance under certain conditions, suggesting the assumption that improvisation is useful for, or perhaps a form of, opportunity exploitation. With a few exceptions (e.g., Moorman and Miner, 1998a; Akgun et al., 2002), however, it remains unclear exactly *how* improvisation contributes to performance. Hence, the mechanisms through which it influences performance remain poorly understood. In contrast to the assumption that improvisation relates directly to venture performance within certain contexts, our study suggests improvisation influences performance indirectly through serendipitous discovery of opportunities. While prior studies have made substantial strides in understanding the contingent value of improvisation, our findings extend prior research by positioning serendipitous discovery as an important mechanism through which improvisation is linked to firm performance.

Related to this previous point, improvisation has commonly been seen as a means for resourcefully exploiting new opportunities and contributing to firm performance in the face of resource constraints. Prior studies suggest resource constraints can trigger improvisation (Cunha et al., 2014) and that improvisation can be "the most reasonable course of action" for tackling novel problems and opportunities with inadequate resources (Hmieleski and Corbett, 2006: 46). In addition, given its reliance on recombination of existing resources, improvisation has been argued as a means for making the most out of currently available resources and to ramp up operations quickly (e.g., Baker et al., 2003). In contrast, the present study suggests that resource constraints may at times play an alternative role as a contextual factor that helps shape the value of improvisation for new ventures. Specifically, our finding that resource constraints can enhance the association between improvisation and serendipity suggests that resource constraints may be an important boundary condition on the operation of improvisation. As a whole, our study may indicate that improvisation's role and operation in new ventures is more complex—and perhaps more distant—than previously thought, though no less important.

6.2. Contributions to the literature on serendipity in organizations

Finally, our study contributes in important ways to growing research on serendipity in organizations (Denrell et al., 2003; Dew, 2009; Cunha et al., 2010). Throughout the literature on serendipity, studies remain heavily focused on defining, describing, and conceptualizing serendipity, enumerating its constituent elements and various aspects, and speculating its origins and outcomes. The focus, however, has remained largely conceptual. Indeed, empirical studies related to serendipity, in any field, are rare (Ma, 2002; McBirnie, 2008; Yaqub, 2018). In contrast, our study provides an initial operationalization of serendipity and explorations of an antecedent, an outcome, and a contingency under which serendipity operates. Further, prior studies often take for granted that serendipity inherently generates beneficial outcomes. Our study examines this assumption by exploring the relationship between serendipity and new venture performance, contingent on the organizational structure of new ventures. The results of our study suggest that a serendipity-performance relationship is neither given nor straightforward. Like improvisation, it appears serendipity is "not inherently good or bad" (Hmieleski and Corbett, 2008: 484); serendipity—with its associated unexpected discoveries—seems to create *potential* value which may be translated to *realized* value if it is flexibly acted upon. Finally, since Walpole's early explanation of serendipity as resulting from "accident and sagacity", scholars continue to claim that serendipity, unlike pure luck (Barney, 1986; Ma, 2002), is amenable to agency (Andel, 1994; Martello, 1994; McBirnie, 2008; Cunha et al., 2010; Yaqub, 2018). Yet, this assumption has also remained largely unexamined (see Busch and Barkema, 2020 for an exception). Our results suggest that resourceful behaviors of improvisation are sometimes associated with the occurrence of serendipity and provide a promising first step in exploring the role of improvisation specifically, and agency generally, in encouraging serendipity and exploring the conditions under which it is likely to

generate positive outcomes.

6.3. Practical implications

Our findings have several implications for the practice of entrepreneurship, especially under resource constrained conditions. These include how organizational improvisation is strategically used and what conditions are most likely to foster the ability of startups to capitalize on unexpected opportunities. First, the majority of research on improvisation within the entrepreneurship context has viewed it as an emergent form of behavior that can be used to exploit entrepreneurial opportunities—especially within dynamic or turbulent environmental conditions (e.g., Akgun et al., 2002; Hmieleski et al., 2013). Our theoretical development and supporting findings suggest that improvisation may be particularly effective at helping to discover opportunities. This points to the potential benefit of strategically employing improvisation during the opportunity recognition process.

Second, our findings suggest that serendipity appears to be more easily capitalized upon by startups operating with informal organizational structures. This point emphasizes the advantages for startups to remain flexible in the design of their organizational structures (e.g., routines, rules, roles, and responsibilities). Such logic is consistent with what seems to be understood in practice through means such as lean startup (Mullins and Komisar, 2009; Ries, 2011). The benefits of informal organizational structures should, however, not be confused with a lack of planning. Informal organizational structures allow for the agility to alter current plans that can then be used to exploit newly discovered opportunities (Davis et al., 2009). In many ways, such structuring within a startup context can be particularly advantageous for resource constrained ventures because there are generally fewer costs associated with maintaining informal organizational structures.

6.4. Limitations and future directions

As with all research, our findings are subject to limitations, some of which provide potentially interesting points for future studies to explore. First, the cross-sectional design of our study may elicit concerns regarding the causal direction of the relationships examined. While acknowledging that a longitudinal data collection would have been ideal, such a design would be difficult to complete when relying upon a diverse sample of founders and business owners as key informants. Moreover, we maintain that the theoretical basis for the order of the variables in our model is internally consistent. This logic was supported by our post hoc analysis examining a range of models with alternative configurations of our focal variables. Nonetheless, the use of controlled experiments in future research could help to provide stronger evidence in terms of establishing causality (Williams et al., 2019).

Second, even though our use of a heterogeneous sample enhances the generalizability of our results, it also limits the degree to which our findings can be contextualized. Therefore, future research may benefit from using larger datasets or a narrower sampling frame, such as one that is industry specific, in order to better situate the roles of improvisation and serendipity in a given context. Future research may also add further insight by examining the constructs examined in our work within the lived experiences in which they unfold in startups; through, for example, the use of experience sampling methods (Uy et al., 2010) and/or inductive studies (e.g., Baker and Nelson, 2005; Miner et al., 2001). It may also be interesting to examine potential differences in the relationships examined in the current research in larger, more established firms to evaluate whether nuanced differences based on the age or size of firms may exist.

Third, even though we examined two variables (resource constraints and informal organizational structure) that were theoretically likely to have meaningful contingent effects on the relationship of improvisation with new venture performance (via serendipity), it is possible that additional moderating variables exist. For example, firms' stock of human capital (Vera and Crossan, 2005) may increase the odds that improvisation results in serendipity (e.g., this is consistent with views regarding the role of sagacity or "the prepared mind" in serendipity), and organizations' absorptive capacity (Hughes et al., 2018) may enhance its ability to convert serendipitous opportunities into improved performance.

Finally, as with all constructs that appear to be positively oriented, it may be possible to have "too much of a good thing" (Pierce and Aguinis, 2013). Even though we did not identify any curvilinear effects for serendipity in the current study, it is certainly logical that too much serendipity could cause firms to become overrun with opportunities that end up clouding their strategic direction and making it difficult to effectively exploit specific opportunities. To this end, it might be interesting for future research to examine the strategic (or targeted) use of improvisation as opposed to employing it as a general operating standard within new ventures.

7. Conclusions

Resourcefulness and the ability to navigate the unknown are keys to any successful entrepreneurial venture, in particular those with severe resource constraints. Therefore, any comprehensive theory of entrepreneurship must include resourceful behavioral repertoires along with factors facilitating the discovery and exploitation of (planned and/or unplanned) opportunities as they arise. In this vein, the results of our research demonstrated important contingencies through which one particularly promising form of resourcefulness, organizational improvisation, along with the serendipitous discovery of opportunities which it can sometimes engender, are likely to most positively relate to new venture performance. Our findings therefore contribute new insights about why some resource constrained new ventures, but not others, manage to beat the odds—both surviving and achieving the success they seek to obtain.

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Appendix A. Measurement items and standardized factor loadings from confirmatory factor analysis

Constructs and items	Standardized factor loading		CR	AVE
	First-order	Second-order		
Organizational improvisation (Hmieleski and Corbett, 2006; Moorman and Miner, 1998a; Vera and Crossan, 2005)			0.79	0.44
1. We improvise solutions to problems.	0.51			
2. We figure out actions as we go along.	0.51			
3. We deal with unanticipated events on the spot.	0.82			
4. We respond in the moment to unexpected problems.	0.83			
5. We develop and execute novel strategies/approaches for our work in the moment.	0.59			
Resource constraints (Baker and Nelson, 2005; Sine et al., 2006; Desa and Basu, 2013)			0.92	0.85
In general, our firm lacks sufficient:				
<i>Tangible</i>		1.12	0.76	0.44
1. Physical resources (examples: equipment, technology, raw materials, physical location, etc.).	0.65			
2. Financial resources.	0.79			
<i>Intangible</i>		0.68	0.68	0.52
3. Reputation resources (e.g., positive firm image, brand loyalty, brand equity, etc.).	0.63			
4. Organizational resources (e.g., quality control systems, formal and informal planning systems, routines, etc.).	0.65			
5. Human resources (e.g., individuals' education, training, experience, skills, etc.).	0.68			
6. Social resources (e.g., useful relationships with other people or firms, etc.).	0.69			
Serendipity (Yaqub, 2018; Dew, 2009)			0.88	0.82
<i>Walpolian</i>		1.18	0.75	0.51
1. As we seek to solve one problem, we often discover the solution to a completely different problem.	0.75			
2. As we go about our normal business operations, we often discover solutions to problems we weren't originally looking for.	0.81			
3. We often stumble on unexpected opportunities for new products or services.	0.54			
<i>Mertonian</i>		0.49	0.73	0.48
4. When we try to solve a particular problem, we usually find a solution that is unexpected.	0.80			
5. When we solve a particular problem, the solution is often unexpected.	0.70			
6. We often develop new products or services in unexpected ways.	0.56			
Informal organizational structure (Covin and Slevin, 1988)			0.82	0.48
1. Loose, informal control; heavy dependence on informal relations and norm of co-operation for getting work done.	Tight formal control of most operations by means of sophisticated control and information systems.	0.54		
2. Strong emphasis on getting things done even if this means disregarding formal procedures.	Strong emphasis on always getting personnel to follow the formally laid down procedures.	0.67		
3. A strong emphasis on adapting freely to changing circumstances without too much concern for past practice.	A strong emphasis on holding fast to tried and true management principles despite any changes in business conditions.	0.73		
4. Managers' operating styles allowed to range freely from the very formal to the very informal.	Strong insistence on a uniform managerial style throughout the firm.	0.78		
5. Strong tendency to let the requirements of the situation and the individual's personality define proper on- job behavior.	Strong emphasis on getting line and staff personnel to adhere closely to formal job description.	0.72		
New venture performance (Stam and Elfring, 2008)			0.79	0.57
Please rate your firm in the following areas relative to its major competitors:				
<i>Growth</i>		0.82	0.72	0.57
1. Sales growth.		0.87		
2. Employment growth.		0.63		
<i>Financial</i>		0.92	0.87	0.69
3. Market share.		0.66		
4. Gross profits.		0.95		
5. Net profit margin.		0.86		
<i>Innovation</i>		0.44	0.87	0.77
6. Innovation in products and services.		0.90		
7. Speed in developing new products and services.		0.84		

Note. Serendipity and resource constraints each have a second-order factor loading above 1.0, which is referred to as a Heywood case and can result when a second-order construct has only two factors (Chen et al., 2001). To avoid potential bias for CR and AVE statistics that are based on such factor

loading estimates, we followed a procedure recommended by Gaskin (2018) that involves constraining both indicator paths. This resulted in more conservative adjusted second-order CR statistics of 0.74 and 0.86 and AVE statistics of 0.59 and 0.76 for serendipity and resource constraints, respectively.

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