HUMAN CAPITAL ACQUISITION AND ORGANIZATIONAL INNOVATION: A TEMPORAL PERSPECTIVE

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Newcomers contribute to organizational innovation by bringing in new knowledge and ideas, on the one hand, and by collaborating and exchanging with incumbents, on the other. We propose that an organization’s ability to use these contributions is influenced by hiring rate, hiring rate change, and hiring rate dispersion, which affect both the flow of new ideas into the organization and the level of collaboration between newcomers and incumbents. Using four years of data from a large, multi-industry sample, we find that hiring rate and hiring rate dispersion increase organizational innovation. We also find that increases in hiring rates from year to year are positively related to innovation for organizations with more collaborative work practices, while the relationship between hiring rate dispersion and innovation is less positive when organizations have more collaborative work practices. This study highlights how temporal patterns of hiring influence human capital acquisition and development.

Hiring is critical for organizational innovation. New hires bring in novel knowledge, perspectives, and abilities, which are essential to creating intellectual capital. March (1991) argued that newcomers’ ideas and information tend not to be redundant with the organization’s existing knowledge base, leading to improvements and changes in organizational processes and outcomes. Dalton and Todor (1979) posited that newcomers’ fresh ideas enable the organization to adapt more adequately to changing environments. Researchers have acknowledged that organizations need new hires to become and remain innovative (Herstad, Sandven, & Ebersberger, 2015; Jain, 2016). However, no theoretical or empirical research has investigated how continuous versus intermittent hiring influences organizational innovation.

Research on hiring has focused largely on how the quantity and quality of new hires affect organizational outcomes. In the strategic human capital literature, context-emergent turnover (CET) theory underscores that the human capital lost via employee turnover needs to be replaced by newcomers (Nyberg & Ployhart, 2013). The more or better knowledge, skills, abilities, and other characteristics (KSAOs) acquired from new hires, the greater the offset of the human capital lost, and the greater the improvement in organizational outcomes (Call, Nyberg, Ployhart, & Weekley, 2015; Reilly, Nyberg, Maltarich, & Weller, 2014). The learning-by-hiring literature has adopted a similar perspective on newcomer quantity and quality, but with a focus on innovation contributions of managerial and professional newcomers, such as executives, inventors, scientists, and academics (Rao & Drazin, 2002; Singh & Agrawal, 2011; Slavova, Fosfuri, & De Castro, 2016; Tzabbar, 2009).

Notwithstanding the importance of hiring quantity and quality, we propose that temporal patterns of hiring also have important implications for the acquisition and integration of new hires’ KSAOs. Singh and Agrawal (2011: 131) pointed out that the idea of learning-by-hiring “effectively assumes that the recruit’s tacit knowledge diffuses internally and becomes part of the firm’s overall knowledge base shortly after the recruit’s arrival.” Yet it takes time to integrate newcomers into organizational processes and tasks. New hires bring in different mental models, and may challenge the power and status of
incumbent employees (Tzabbar, Aharonson, & Amburgey, 2013). Hence, the “newness” that is acquired through hiring may take several years to contribute to organizational outcomes (Singh & Agrawal, 2011).

We suggest that an organization’s hiring patterns, including hiring rate, hiring rate change, and hiring rate dispersion, influence its innovation. Hiring rate captures the ratio of new hires’ intellectual capital to that of incumbent employees. As hiring rates increase, so does the relative newness of the organization’s knowledge and perspectives. However, increases in hiring rates may lead newcomers and incumbents to compete for scarce resources (e.g., promotion opportunities) and/or develop power struggles (Tzabbar, 2009). Because collaboration is critical for innovation (Dougherty, 1992; Nahapet & Ghoshal, 1998; Reagans & McEvily, 2003), we posit that collaborative work practices (CWPs) that promote communication, participation, information sharing, and trust building can enlarge the benefits of increased hiring for organizational innovation.

Additionally, we introduce the concept of hiring rate dispersion, which refers to the extent to which an organization hires continuously and evenly over time. Hiring rate dispersion may affect organizational innovation by providing a continuous supply of new knowledge and perspectives, and does so in such a way that it is easier for the organization to integrate new hires. Fluctuations in newcomers resultant from time-restricted hiring (i.e., low dispersion) create gaps in knowledge acquisition and tensions between newcomers and incumbents, while time-distributed hiring (i.e., high dispersion) minimizes such disruptions and facilitates newcomer integration into the organization (McCain, O’Reilly, & Pfeffer, 1983). To the extent that an organization has adopted more CWPs, however, we expect the benefits of hiring rate dispersion to decrease given that the organization already has mechanisms in place to facilitate knowledge combination and exchange needed for innovation.

This study contributes to the strategic human capital and learning-by-hiring literatures in several ways. First, we demonstrate “time” as an important factor influencing human capital acquisition and development by distinguishing the effects of hiring rate, hiring rate change, and hiring rate dispersion on organizational innovation. Although previous studies have examined “who to hire” and “how to hire” (Brymer, Molloy, & Gilbert, 2014; Rao & Drazin, 2002), little attention has been paid to “when to hire.”

Second, we advance human capital research by illustrating hiring’s strategic importance. Although CET theory views new hires as human capital inflows, hiring has been treated primarily as a way to mitigate the negative impacts of employee turnover on organizational outcomes (Call et al., 2015; Reilly et al., 2014). However, hiring has strategic implications beyond counteracting employee turnover, and deserves further dedicated research. For example, organizations may adopt repeated interorganizational hiring to acquire human capital (Brymer et al., 2014; Rao & Drazin, 2002), which enables them to build and sustain a competitive workforce. Yet, issues related to strategic hiring have received less research attention compared with the extensive literature on the relationship between collective employee turnover and organizational performance.

Finally, we advance research on learning-by-hiring by investigating an important but previously untested assumption that a continuous flow of new hires is needed for product and process innovations. Organizational innovation depends on newness (Eisenhardt & Martin, 2000; Hagedoorn & Duysters, 2002; Teece, Pisano, & Shuen, 1997), suggesting the importance of recruiting for new KSAOs. While researchers have acknowledged that organizations need new hires in order to become and remain innovative (Herstad et al., 2015; Jain, 2016), we advance this line of research by systematically theorizing and testing how continuity and evenness in hiring influence organizational innovation.

THEORY AND HYPOTHESES

Building on the seminal work of Schumpeter (1934), researchers have defined innovation by focusing on the concept of newness (Johannessen, Olsen, & Lumpkin, 2001). For example, Crossan and Apaydin (2010: 1155) argued that organizational innovation includes “a new good or a new quality of a good; a new method of production; a new market; a new source of supply; or a new organizational structure.” The capability to innovate has become a core competence for organizations to operate and succeed in the dynamic marketplace (Eisenhardt & Martin, 2000; Hagedoorn & Duysters, 2002; Teece et al., 1997).

Management scholars have shown increasing interest in the mechanisms through which human resources drive sustainable competitive advantage (Becker & Gerhart, 1996; Huselid, 1995), “a concept that goes far beyond financial performance or efficiency” (Chadwick & Dabu, 2009: 253). Similarly,
innovation researchers have documented the value of hiring managers (Rao & Drazin, 2002), inventors (Singh & Agrawal, 2011), scientists (Tzabbar, 2009; Tzabbar et al., 2013), university researchers (Slavova et al., 2016), research and development employees (Diaz-Diaz & Saa-Perez, 2012), and star performers (Groysberg & Lee, 2009; Groysberg, Lee, & Nanda, 2008). Such experienced and skilled newcomers enable organizational innovation because their novel knowledge and perspectives are an important source of creative ideas and solutions (Dalton & Todor, 1979; March, 1991).

In accord with these studies, we focus on managerial and professional new hires because they play a more important role than other newcomers do in achieving the organization’s strategic objectives, such as technological and operational innovations (Kimberly & Evanisko, 1981). They are also more central to the organization’s operations and resources compared to other new hires, and thus are more likely to influence incumbents’ innovation efforts, processes, and performance (Slavova et al., 2016).

Temporal Patterns of Hiring

Researchers investigating the temporal patterns of employee mobility need to base their observation window on the outcome and job type being studied. For example, Call and colleagues (2015) examined turnover patterns of cashiers, cart handlers, and sales associates on a quarterly basis (over five quarters) in a large retail chain. Because these employees’ turnover can quickly influence sales, one quarter is an appropriate observation window. Similarly, Reilly and colleagues (2014) used monthly data to study the impact of nurse mobility on patient satisfaction, given that a lack of nurses can immediately affect service quality in hospitals. In contrast, Singh and Agrawal (2011) employed a 12-year window to examine how recruitment of patent inventors influences knowledge acquisition and diffusion for organizational innovation.

We use a three-year window to investigate how temporal patterns of managerial and professional hiring affect organizational innovation. People who have joined an organization within three years are often considered newcomers (Rollag, 2007), and knowledge combination and exchange between newcomers and incumbents take time (Singh & Agrawal, 2011). A three-year window captures new hires’ short-term contributions, as well as potential longer-term benefits that can take several years to appear. Prior research has also examined hiring during a three-year window to predict organizational innovation in year four (Tzabbar, 2009).

Table 1 illustrates four hypothetical scenarios where four organizations have the same average hiring rate for managers and professionals over three years (i.e., 15%) but demonstrate different temporal patterns of hiring. On average, Organization A has increased hiring by 5% while Organization B has decreased hiring by 5% for these positions. Organization C has hired continuously and evenly across time, while Organization D has hired in one year only. Adopting temporal terms developed in the employee turnover literature (Call et al., 2015; Hausknecht & Holwerda, 2013), we extract three concepts that help identify the hiring patterns of these organizations: hiring rate, hiring rate change, and hiring rate dispersion.

### Hiring Rate and Organizational Innovation

*Hiring rate*, or the ratio of new hires over incumbent employees, represents the relative amount

<table>
<thead>
<tr>
<th>Year 1 (%)</th>
<th>Year 2 (%)</th>
<th>Year 3 (%)</th>
<th>Average hiring rate (%)</th>
<th>Average hiring rate change (%)</th>
<th>Hiring rate dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization A</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Organization B</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>15</td>
<td>−5</td>
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<tr>
<td>Organization C</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>0</td>
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<tr>
<td>Organization D</td>
<td>0</td>
<td>45</td>
<td>0</td>
<td>15</td>
<td>0</td>
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</tbody>
</table>

**Notes:** The four organizations have hired the same average rate of managers and professionals over the three-year period. Organization A has increased while Organization B has decreased hiring for these positions. Organization C has hired evenly over the three years, while Organization D has hired in one year only. Hiring rate dispersion equals \( \sum_i \left( \frac{P_i \times \ln \left( \frac{P_i}{\bar{P}} \right)}{\ln(3)} \right) \), where \( P_i \) is the ratio of hiring rate in each year over the total hiring rates during the three years.
of new KSAOs brought by newcomers. New managers and professionals contribute to organizational innovation by (1) providing new ideas and perspectives and (2) collaborating with incumbent employees. Innovative products or processes are essentially the outcomes of intellectual capital creation (Smith, Collins, & Clark, 2005), which can be achieved by “combining elements previously unconnected” (i.e., knowledge combination) or “through social interaction and coactivity” (i.e., knowledge exchange) (Nahapiet & Ghoshal, 1998: 248). By combining complementary knowledge and skills from new and incumbent employees (March, 1991), an organization can increase its human capital resources, which in turn enable it to achieve competitive advantages (Ployhart & Moliterno, 2011; Ployhart, Nyberg, Reilly, & Maltarich, 2014). For example, Rao and Drazin (2002) found that organizations can acquire knowledge for product development by recruiting experts from competitors.

New hires and incumbent employees also exchange their differing knowledge and perspectives, through which intellectual capital can be created (Nahapiet & Ghoshal, 1998). This learning-by-hiring mechanism indicates that an organizational member can learn and utilize others’ knowledge and ideas to accomplish important tasks, such as product and process innovations. Singh and Agrawal (2011) found that patent inventors in a hiring organization persistently cite their new colleagues’ patents, suggesting the role of knowledge exchange in enabling innovation. Similarly, Slavova and colleagues (2016) found that the arrival of new researchers in university departments enhances the research performance of incumbent scientists. Overall, hiring rate enhances organizational innovation by directly acquiring new ideas and fusing new knowledge through combination and exchange.

**Hypothesis 1.** Managerial and professional hiring rate is positively related to organizational innovation.

Although newcomers bring in novel KSAOs, their mental maps and perspectives differ from those of incumbents (Dalton & Todor, 1979; March, 1991), making collaboration and communication difficult. Tzabbar (2009) found that when an organization’s innovation productivity is concentrated on one or a few key incumbent scientists, hiring cognitively distant scientists may not enable the organization to reposition its core technologies because the key incumbents may resist changes introduced by newcomers. While experienced new hires (e.g., new managers) can influence incumbent employees toward change (Jain, 2016), they may also threaten incumbents’ job security and promotion opportunities. Intellectual capital creation requires trust and collaboration (Dougherty, 1992; Nahapiet & Ghoshal, 1998; Reagans & McEvily, 2003), suggesting that tensions between new and incumbent employees can impede innovation. Hence, there is a paradox: new hires contribute to organizational innovation in part by disrupting the status quo, but in doing so they may impede knowledge combination and exchange.

We suggest that adopting collaborative work practices, or CWPs, is one way for organizations to overcome this hiring paradox. CWPs are plans and programs used by organizations to engage and facilitate employees’ interaction and cooperation (Herstad et al., 2015; Tzabbar et al., 2013). Examples of CWPs include employee suggestion programs, self-directed work groups, and information-sharing practices. These practices build an organizational climate that encourages innovation initiatives and performance (Dobni, 2008; Oke, Prajogo, & Jayaram, 2013; Slavova et al., 2016).

CWPs enable knowledge combination and exchange in part through cognitive mechanisms (e.g., by overcoming interpretive barriers) (Dougherty, 1992). Employee suggestion programs facilitate product and process innovations by generating and implementing new ideas from employees (Arthur & Aiman-Smith, 2001). Thus, organizations that encourage employee input can increase the likelihood that their newcomers’ knowledge and perspectives will be diffused throughout the organization. Similarly, information sharing and job rotation programs accelerate knowledge combination and exchange among employees across different levels and divisions (Chan, 2014; Ortega, 2001). As a result, employees are more cognizant of their organization’s strategic goals and operational processes that can help them contribute to product and process innovations.

Additionally, CWPs can operate through affective mechanisms (e.g., by building a positive organizational climate) (Nahapiet & Ghoshal, 1998). Ployhart and Moliterno (2011: 140) posited that “cohesion, trust, and affect (or ‘mood’) are affective processes that render the unit task environment open to, and supportive of, knowledge sharing and dissemination.” Through labor-management committees, an organization can enhance trust across organizational levels (Deery & Iverson, 2005). Mutual trust is necessary when employees face uncertain tasks involving product and process innovations, which have high
probabilities of failure and often add job-related stress (Gong, Cheung, Wang, & Huang, 2012; Shatte, Perlman, Smith, & Lynch, 2017). In self-directed workgroups, employees take collective responsibilities by sharing functionally interrelated tasks (Bishop & Scott, 2000). Therefore, an organization can use such groups to align members' goals, thereby improving trust and cohesion, which in turn facilitate knowledge sharing (Reagans & McEvily, 2003).

Hypothesis 2. The relationship between managerial and professional hiring rate and organizational innovation is moderated by CWPs; this relationship is stronger (more positive) when organizations have more CWPs.

Hiring Rate Change and Organizational Innovation

Hiring rate change reflects the relative newness of the KSAOs that the organization has acquired from newcomers. As Table 1 shows, Organizations A and B both have a 15% hiring rate in the second year. However, Organization A has experienced a 5% increase (from 10 to 15%) while Organization B has experienced a 5% decrease in hiring rate (from 20 to 15%). Therefore, in the previous year 90% of employees in Organization A were incumbents, but only 80% of employees in Organization B were incumbents. Put differently, in the second year, the KSAOs of the 15% newcomers in Organization A represent more newness than those of the 15% newcomers in Organization B.

In essence, an increase in hiring rate indicates that the organization has greater access to newness over time, while a decrease suggests that the organization's access to novel knowledge and skills is diminishing. Because newcomers' contributions to organizational innovation may decrease once their knowledge and skills have been diffused across the organization (Singh & Agrawal, 2011), an increasing hiring rate, especially for managerial and professional positions, is needed for organizational innovation.

An increase in hiring rate may also influence social dynamics in the organization, which can affect the innovation efforts and performance of incumbents. As Slavova and colleagues (2016: 75) noted, “inbound mobility might invoke social comparison process among incumbent scientists, motivate them to exert more effort, and improve [innovation] performance.” As a result, an increasing hiring rate may enhance organizational innovation by exposing incumbents to greater influence from newcomers and more opportunities to collaborate with newcomers in innovation tasks (Jain, 2016; Slavova et al., 2016).

Hypothesis 3. After accounting for managerial and professional hiring rate, hiring rate change in these positions is positively related to organizational innovation.

However, an increase in hiring rate can make knowledge combination and exchange between newcomers and incumbents more challenging. Incumbent employees may perceive increasing numbers of managerial and professional newcomers as growing threats to their current positions and promotion opportunities (Paruchuri, Nerkar, & Hambrick, 2006). Increases in new hires also provide an opportunity for them to form cohorts, who often share similar demographic characteristics at the time of entry into the organization (McCain et al., 1983). Newcomer cohorts tend to interact among themselves rather than with other organizational members. By adopting CWPs such as self-directed work groups and information-sharing practices, the organization has built in the necessary structure and environment to encourage collaboration across levels, divisions, and positions. As a result, we expect that CWPs can enhance the effect of hiring rate change on organizational innovation by mitigating tensions between increasing numbers of newcomers and incumbents.

Hypothesis 4. The relationship between managerial and professional hiring rate change and organizational innovation is moderated by CWPs; this relationship is stronger (more positive) when organizations have more CWPs.

Hiring Rate Dispersion and Organizational Innovation

When hiring a set number or ratio of employees, organizations can hire continuously and evenly over time (e.g., Organization C in Table 1) or simultaneously within a short time period (e.g., Organization D in Table 1). We use hiring rate dispersion, defined as the extent to which an organization hires continuously and evenly across time, to study this temporal characteristic of recruitment. Hiring rate dispersion is similar to the concept of turnover dispersion. Just as large spikes in turnover affect organizational performance differently from more even turnover (Call et al., 2015; Hausknecht & Holwerda, 2013), large spikes in hiring may affect
organizational innovation differently from more even hiring.

Time-dispersed hiring of managers and professionals provides a continuous supply of new knowledge and perspectives that is important for organizational innovation. The continuity of newcomers is an effective way for organizations to avoid the development of rigid routines—“a tendency to favor the familiar over the unfamiliar; a tendency to prefer the mature over the nascent; and a tendency to search for solutions that are near to existing solutions rather than search for completely de novo solutions” (Ahuja & Lampert, 2001: 522). Such routines, which develop over time due to the lack of changes in the organization’s knowledge core (Jain, 2016; Tzabbar, 2009), can be counteracted by continuously hiring managers and professionals with new knowledge and perspectives.

Hiring rate dispersion also enables knowledge combination and exchange among new and incumbent employees by mitigating the conflict resultant from time-restricted hiring. Large fluctuations of newcomers can create “cleavages or discontinuities in the organizational unit’s membership that may make communication more difficult and conflict and power struggles more likely to occur, and more severe when they do occur” (McCain et al., 1983: 628). Further, time-restricted hiring is a source of cognitive differences between newcomers and incumbents that can impede their knowledge combination and exchange (Nifadkar & Bauer, 2016). Consider the situation of accounting firms where cohorts of roughly similar numbers of professionals join a firm each year. While each group of newcomers builds camaraderie within their cohort, they also have opportunities to collaborate and build rapport with those hired immediately before and after them. In contrast, a more time-restricted situation, where an organization hires a cohort every other year, will entail more challenges in integrating newcomers and incumbents. Hence, hiring rate dispersion for managers and professionals ensures a continuous supply of new ideas and perspectives and facilitates knowledge combination and exchange by mitigating communication barriers and building mutual trust between newcomers and incumbents.

Hypothesis 5. After accounting for managerial and professional hiring rate and hiring rate change, hiring rate dispersion for these positions is positively related to organizational innovation.

However, the benefits of time-dispersed hiring may be weaker in organizations where CWPs already facilitate knowledge combination and exchange. CWPs provide opportunities for employees to share their knowledge, take on more challenging assignments, and learn from others, all of which can help organizations mitigate the development of rigid routines (Ahuja & Lampert, 2001). Although managerial and professional hiring remains critical for change and renewal (Williams, Chen, & Agarwal, 2017), continuous and even hiring may not be as important when new ideas are generated from internal collaborations. Thus, we predict that CWPs can mitigate the benefits of hiring rate dispersion for organizational innovation.

Hypothesis 6. The relationship between managerial and professional hiring rate dispersion and organizational innovation is moderated by CWPs; this relationship is weaker (less positive) when organizations have more CWPs.

METHODS

Sample

We tested the foregoing hypotheses using the 2003–2006 workplace surveys from the Workplace and Employee Survey (WES) database collected and administered by Statistics Canada (for a more detailed description, please see Statistics Canada, 2007). Statistics Canada drew the WES samples from the Business Register, a list of workplaces that operated in specific locations. This is an appropriate setting for this study because our theoretical arguments center on knowledge combination and exchange, which often occur within a physical boundary that enables interactions among employees. Statistics Canada (2007) established survey weights for all the sampled organizations in the WES to ensure their representativeness of the businesses in the corresponding region, industry, and size strata. We excluded nonprofit enterprises, because they may have different rationales and resources for innovation. We also excluded organizations with fewer than 10 employees, since extremely small workplaces in the WES rarely hired during these years. Applying these filters, we obtained a sample of 1,006 organizations that hired during at least one year of our observation window for newcomers (see more detailed descriptions in the Measures section).

Using telephone and computer-assisted interviews, the WES workplace surveys asked owner-operators or general managers about various facets of their organizations, including hiring and turnover, work practices, and innovation performance.
Response rates to the 2003–2006 workplace surveys were 83.1%, 81.7%, 77.7%, and 74.9%, respectively. Although survey data may be subject to the respondents’ personal bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), several factors mitigated this concern in the WES database. Completion of the workplace surveys over multiple years and the use of objective measures (number of new hires, adoption of specific work practices, and so forth) make it unlikely that a respondent’s mindset influenced our results. Additionally, because of the length and breadth of the WES workplace surveys, about 20% of the units surveyed (mostly larger workplaces) had multiple respondents: the primary respondents (e.g., general managers) completed questions about innovation, strategy, and performance, and assigned functional managers (e.g., human resource managers) to answer questions about their specialized areas (e.g., hiring and workplace practices) (Statistics Canada, 2007). Finally, we used the 2003–2005 workplace surveys to measure the independent variables and the 2006 workplace survey to measure the dependent variable, further mitigating potential issues of common-method bias.

Measures

Organizational innovation. The 2006 workplace survey in the WES asked whether a sampled organization had any of the following innovations: (a) improved processes, (b) improved goods or services, (c) new processes, or (d) new goods or services. The WES defined these innovations as follows: new goods or services differ significantly in character or intended use from previously produced goods or services, and new processes include new methods of goods production or service delivery. Improvements, on the other hand, refer to significant enhancements or upgrades to the performance of existing products or processes.

We formed an innovation index that differentiates new from improved products and processes, as suggested by other researchers (Maurer, Bartsch, & Ebers, 2011). The index ranges between 0 and 4: zero indicates that the organization did not have any innovation (“No” to questions a–d); one means that the organization improved processes or products or services (“Yes” to question a or b); two denotes that the organization improved processes and products or services (“Yes” to questions a and b); three reflects that the organization developed new processes or products or services (“Yes” to question c or d); and four specifies that the organization developed new processes and products or services (“Yes” to questions c and d). This innovation index is ordinal.

The strengths and weaknesses of this innovation index deserve further clarification. It encompasses both product and process innovations and thus can be applied to cross-industry research. Industry-specific innovation measures such as patents (Hsu & Ziedonis, 2013) and publications (Slavova et al., 2016) are not appropriate for this study. This innovation measure also captures newness by differentiating between new and improved products and processes. It is based on self-reported data, thus allowing respondents to form subjective criteria. Specifically, the respondents in our sample might have been less aware of improved than of new products and processes, or might not have considered improvements to be innovative at all. Nevertheless, self-reported innovation measures have been widely used in various fields (e.g., Maurer et al., 2011; Preenen, Vergeer, Kraan, & Dhondt, 2017; Zhou, Dekker, & Kleinknecht, 2011).

Hiring patterns. Our observation window for newcomers is three years. We used the 2003–2005 workplace surveys to collect data for hiring patterns. Our hypotheses focus on managerial and professional new hires. The WES defines managerial employees as including both senior and specialist managers (Statistics Canada, 2007). Senior managers’ responsibilities normally span more than one department (e.g., president of a single-location company). Specialist managers generally report to senior management and are responsible for a single domain or department (e.g., managers of specific product lines). Professional employees’ duties normally require at least an undergraduate university degree or equivalent (e.g., doctors, lawyers, engineers, and science professionals). According to Statistics Canada (2007), other positions (e.g., administrative, sales, technical, and production work) require only community college or lower education.

Regarding hiring rate, the WES asked each sampled organization the number of employees hired in each of the job categories during the surveyed year (i.e., managers, professionals, and other positions). We first calculated hiring rate for managers and professionals by dividing the total number of managerial and professional new hires during 2003, 2004, and 2005 by the total number of managers and professionals in the organization at the beginning of each year, respectively. For example, if an organization had 100 managers and professionals at
the beginning of 2004 and hired 20 managers and professionals during 2004, its hiring rate for these positions in 2004 was 20%. In order to mitigate the influence of extremely high and low hiring rates, we winsorized hiring rates by specifying 1% of observations in each tail (i.e., values higher than the 99th percentile and lower than the 1st percentile were replaced by the next values counting inwards from these extremes) (Gnanadesikan & Kettenring, 1972). Because our observation window is 2003–2005, we used the average score of hiring rates for the three years in all analyses.

We calculated hiring rate change for these positions by the differences in hiring rates between 2003 and 2004, and between 2004 and 2005. For example, if an organization’s hiring rates for 2003 and 2004 were 10% and 20%, respectively, its hiring rate change over 2003–2004 was 10%. Again, because our observation window for newcomers is 2003–2005, we used the average score of hiring rate changes over 2003–2004 and 2004–2005 in all analyses.

As discussed previously, hiring rate dispersion reflects the extent to which which an organization hires evenly during a time period. By using a refined entropy index (Raghunathan, 1995), we calculated hiring rate dispersion for the three-year window (2003–2005) by the following equation:

$$ Hiring \ rate \ dispersion = \frac{3}{\sum_{i} P_i \times \ln \left( \frac{1}{P_i} \right)} / \ln(3) \tag{1} $$

In Equation (1), $P_i$ is the ratio of hiring rate for managers and professionals in each year over the total hiring rates for these positions during 2003–2005. Equation (1) requires a positive $P_i$. For organizations that did not hire in one year ($P_i = 0$), we replaced the corresponding $P_i$ with 0.0001 to calculate their hiring rate dispersion. This entropy index ranges from zero to one. The higher this entropy index is, the more evenly an organization hired during the three years.

**Collaborative work practices.** To measure CWPs, we first created an additive index of six items that assessed an organization’s work practices designed to increase employee participation and collaboration. The 2003 and 2005 workplace surveys used a “yes–no” format to ask the sampled organizations whether the following practices were used: (1) employee suggestion programs, (2) information-sharing programs, (3) problem-solving teams, (4) self-directed teams, (5) labor-management committees, and (6) flexible work design. The six items exhibited adequate reliability in both years (Cronbach’s $\alpha = 0.73$).

We divided the additive index by six to capture the ratio of CWPs in place for 2003 and 2005, and then used the average ratio of the two years in all analyses. For example, if an organization adopted two CWPs in 2003 and four in 2005, its CWP score was 0.50 (i.e., $(2/6 + 4/6)/2)$. To validate this CWP measure, we included a control variable (described below) that captures the extent to which employee involvement was strategically important in the organization. The CWP measure was positively and significantly correlated with this control variable ($r = 0.32, p < 0.001$), suggesting that these CWPs were implemented in part to enhance employee involvement.

**Control variables.** Consistent with our observation window for newcomers over three years, we obtained data for the control variables from the 2003–2005 workplace surveys. We used the average scores of the control variable measures over the three years in all analyses, unless noted otherwise. The sampled organizations operated in 14 industries: (1) primary manufacturing, (2) secondary manufacturing, (3) labor-intensive manufacturing, (4) capital-intensive manufacturing, (5) forestry, mining, oil, and gas extraction, (6) construction, (7) transportation, warehousing, and wholesale, (8) communications and utilities, (9) retail trade and consumer services, (10) finance and insurance, (11) real estate, (12) business services, (13) education and health services, and (14) information and culture industries. We used 13 dummy variables to control for the industry differences.

Although we focused on hiring patterns for managers and professionals, other new hires may also influence onboarding and collaboration dynamics within an organization. In the WES, the other job categories included administrative, sales, technical, and production workers, and were explicitly defined as not requiring a university degree or having any supervisory duties (Statistics Canada, 2007). We controlled for the effects of hiring rate, hiring rate change, and hiring rate dispersion for these other job categories by using Equation (1). We also controlled for employee turnover since it can disrupt innovation routines (Tzabbar & Kehoe, 2014). Using a measure validated in previous studies (e.g., Shaw, Delery, Jenkins, & Gupta, 1998), we calculated turnover rate by dividing the sum of the number of resignations and quits (i.e., voluntary turnover) and the number of dismissals (i.e., involuntary turnover) during 2003, 2004, and 2005, by the number of
total employees at the beginning of each year, respectively.

Organizations of different size and age may differ in their willingness and ability to innovate (Hannan & Freeman, 1989; Stinchcombe, 1965). We controlled for organizational size by the total number of a workplace’s employees (log transformed), and organizational age by its number of years in operation (log transformed). Better financial performance results in more slack resources, which in turn may influence innovation efforts and outcomes (Nohria & Gulati, 1996). Alternatively, poor performers may take risks to seek change through product and process innovations (Greve, 2003). Therefore, we controlled for return on sales, calculated as the difference between an organization’s total revenue and expense divided by its total revenue. Innovation may reflect an organization’s growth strategy, and firms with declining sales may seek innovative ways to grow (McKinley, Latham, & Braun, 2014). We thus controlled for sales growth rate, measured by the difference of an organization’s sales in year \( t \) and year \( t-1 \) divided by its sales in year \( t-1 \).

Unions influence a number of organizational and managerial decisions, including when and how to hire. Meanwhile, unionized employees may be unwilling to participate in innovative tasks that go beyond their job description. Hence, we controlled for union density, the percentage of employees who were covered by collective bargaining agreements (Cowherd & Levine, 1992). Innovative organizations may use high compensation to attract and motivate innovation talent (Balkin, Markman, & Gomez-Mejia, 2000). We thus controlled for pay level, measured by dividing an organization’s total gross payroll by its total number of employees (in thousands, log transformed). Since training may enhance employees’ innovation-related knowledge and perspectives (Sung & Choi, 2014), we also controlled for training intensity, measured by training expenditures per employee (in thousands).

Organizations that view employee involvement to be strategically important are more likely to adopt CWPs and focus on recruiting more collaborative people. The WES asked the sampled organizations about the importance of increasing employee involvement/participation, and enhancing labor-management cooperation. The two items were measured on a five-point Likert scale (1 = not important, 2 = slightly important, 3 = important, 4 = very important, 5 = crucial) in the 2003 and 2005 workplace surveys, and exhibited acceptable reliability in both years (Cronbach’s \( \alpha = 0.71 \)). We averaged the two items to control for the importance of employee involvement. Finally, we included prior innovation as a control for the influence of unobserved organization-specific factors (Hamilton & Nickerson, 2003) that may drive innovation processes and outcomes.

### RESULTS

The descriptive statistics and bivariate correlations of all variables except the 13 industry dummies

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Descriptive Statistics and Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>1. Innovation</td>
<td>1.72</td>
</tr>
<tr>
<td>2. Prior innovation</td>
<td>1.91</td>
</tr>
<tr>
<td>3. Hiring rate M&amp;P</td>
<td>0.15</td>
</tr>
<tr>
<td>4. Hiring rate others</td>
<td>0.37</td>
</tr>
<tr>
<td>5. Hiring rate change M&amp;P</td>
<td>−0.01</td>
</tr>
<tr>
<td>6. Hiring rate change others</td>
<td>−0.03</td>
</tr>
<tr>
<td>7. Hiring rate dispersion M&amp;P</td>
<td>0.41</td>
</tr>
<tr>
<td>8. Hiring rate dispersion others</td>
<td>0.61</td>
</tr>
<tr>
<td>9. CWPs</td>
<td>0.30</td>
</tr>
<tr>
<td>10. Turnover rate</td>
<td>0.33</td>
</tr>
<tr>
<td>11. Firm size</td>
<td>4.00</td>
</tr>
<tr>
<td>12. Firm age</td>
<td>2.84</td>
</tr>
<tr>
<td>13. Return on sales</td>
<td>0.14</td>
</tr>
<tr>
<td>14. Sales growth rate</td>
<td>0.08</td>
</tr>
<tr>
<td>15. Union density</td>
<td>0.10</td>
</tr>
<tr>
<td>16. Training intensity</td>
<td>0.51</td>
</tr>
<tr>
<td>17. Pay level</td>
<td>3.78</td>
</tr>
<tr>
<td>18. Importance of employee involvement</td>
<td>3.02</td>
</tr>
</tbody>
</table>
are presented in Table 2. The correlations among hiring rate, hiring rate change, and hiring rate dispersion for managers and professionals ranged from –0.04 to 0.55. Such low to moderate correlations suggest that these hiring variables represent different concepts.

Because our measure of organizational innovation is ordinal, we used ordinal logistic regression analyses to test our hypotheses. In an ordinal logistic regression, for a one-unit increase in a predictor, the regression coefficient reflects the probability of the dependent variable being in a higher outcome category (Agresti, 2007). Table 3 reports results from the ordinal logistic regressions on organizational innovation.

In Model 1, the coefficient of hiring rate for managers and professionals was positive and significant \( (b = 5.13, p < 0.001) \), thus supporting Hypothesis 1. A one standard deviation increase in hiring rate for these positions (11%) results in a 7% decrease in the probability of the lowest innovation outcome (innovation = 0) and a 10% increase in the probability of the highest innovation outcome (innovation = 4).

In Model 2, the coefficient of the interaction term between hiring rate change for managers and professionals and CWPs was positive \( (b = 4.39, \text{n.s.}) \), which was consistent with the direction of Hypothesis 2 but not statistically significant.

In Model 3, the coefficient of hiring rate change for managers and professionals was positive and nonsignificant \( (b = 0.87, \text{n.s.}) \). Hence, Hypothesis 3 was not supported. In Model 4, the coefficient of the interaction term between hiring rate change for managers and professionals and CWPs was positive and significant \( (b = 6.90, p < 0.05) \), thus supporting Hypothesis 4. To interpret the interaction effect, we used the coefplot function for Stata (Jann, 2014) to graph the effect of hiring rate change on the probability of each innovation outcome by comparing organizations with more and fewer CWPs (one standard deviation above and below the mean). Figure 1 shows a negative relationship between hiring rate change and the probability of the lowest innovation outcome (innovation = 0) for organizations with more CWPs (dashed line), but this relationship was positive for organizations with fewer such practices (solid line). Figure 1 also shows a positive relationship between hiring rate change and the probability of the highest innovation outcome (innovation = 4) for organizations with more CWPs (dashed line), but this relationship was negative for organizations with fewer such practices (solid line).

For organizations with more CWPs, a one standard deviation increase in hiring rate change for managers and professionals (11%) is associated with a 7% decrease in the probability of the lowest innovation outcome and a 7% increase in the probability of the highest innovation outcome. In contrast, for organizations with fewer CWPs, a one standard deviation increase in hiring rate change for managers and professionals...
TABLE 3

Ordinal Logistic Regressions on Organizational Innovation

<table>
<thead>
<tr>
<th>Prior innovation</th>
<th>Turnover rate</th>
<th>Firm size</th>
<th>Firm age</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.59 (0.05)***</td>
<td>0.30 (0.16)†</td>
<td>0.40 (0.09)***</td>
<td>-0.21 (0.09)*</td>
</tr>
<tr>
<td>0.58 (0.05)***</td>
<td>0.31 (0.16)*</td>
<td>0.40 (0.09)***</td>
<td>-0.21 (0.09)*</td>
</tr>
<tr>
<td>0.58 (0.05)***</td>
<td>0.31 (0.16)*</td>
<td>0.40 (0.09)***</td>
<td>-0.21 (0.09)*</td>
</tr>
<tr>
<td>0.56 (0.05)***</td>
<td>0.33 (0.15)*</td>
<td>0.31 (0.10)**</td>
<td>-0.18 (0.09)*</td>
</tr>
<tr>
<td>0.55 (0.05)***</td>
<td>0.27 (0.16)†</td>
<td>0.31 (0.10)**</td>
<td>-0.16 (0.09)†</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sales growth rate</th>
<th>Union density</th>
<th>Training intensity</th>
<th>Pay level</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1.00 (0.46)*</td>
<td>-0.26 (0.25)</td>
<td>-0.01 (0.13)</td>
<td>0.06 (0.18)</td>
</tr>
<tr>
<td>-0.94 (0.46)*</td>
<td>-0.27 (0.25)</td>
<td>-0.03 (0.13)</td>
<td>0.05 (0.18)</td>
</tr>
<tr>
<td>-1.08 (0.47)*</td>
<td>-0.32 (0.25)</td>
<td>-0.03 (0.13)</td>
<td>0.04 (0.18)</td>
</tr>
<tr>
<td>-1.02 (0.47)*</td>
<td>-0.37 (0.26)</td>
<td>-0.03 (0.13)</td>
<td>0.04 (0.18)</td>
</tr>
<tr>
<td>-1.16 (0.47)*</td>
<td>-0.30 (0.25)</td>
<td>-0.08 (0.19)</td>
<td>0.04 (0.18)</td>
</tr>
<tr>
<td>-0.99 (0.47)*</td>
<td>-0.29 (0.25)</td>
<td>-0.11 (0.19)</td>
<td>0.05 (0.18)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Importance of employee involvement</th>
<th>CWPs</th>
<th>Hiring rate others</th>
<th>Hiring rate M&amp;P</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.02 (0.10)</td>
<td>0.57 (0.34)†</td>
<td>-0.66 (0.22)***</td>
<td>5.13 (0.76)***</td>
</tr>
<tr>
<td>0.01 (0.10)</td>
<td>-0.14 (0.56)</td>
<td>-0.68 (0.22)***</td>
<td>4.60 (0.84)***</td>
</tr>
<tr>
<td>0.04 (0.10)</td>
<td>0.56 (0.34)</td>
<td>-0.81 (0.23)***</td>
<td>5.26 (0.77)***</td>
</tr>
<tr>
<td>0.06 (0.10)</td>
<td>0.62 (0.35)†</td>
<td>-0.83 (0.23)***</td>
<td>5.40 (0.77)***</td>
</tr>
<tr>
<td>0.04 (0.10)</td>
<td>0.53 (0.34)</td>
<td>-0.77 (0.23)***</td>
<td>4.05 (0.98)***</td>
</tr>
<tr>
<td>0.05 (0.10)</td>
<td>0.54 (0.34)</td>
<td>-0.78 (0.23)***</td>
<td>4.04 (0.97)***</td>
</tr>
<tr>
<td>0.05 (0.10)</td>
<td>-2.01 (0.70)</td>
<td>-0.85 (0.24)***</td>
<td>2.23 (1.00)*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hiring rate change others</th>
<th>Hiring rate change M&amp;P</th>
<th>Hiring rate dispersion others</th>
<th>Hiring rate dispersion M&amp;P</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.67 (0.32)</td>
<td>0.87 (0.66)</td>
<td>-0.36 (0.30)</td>
<td>0.62 (0.25)†</td>
</tr>
<tr>
<td>-0.69 (0.32)</td>
<td>0.15 (0.73)</td>
<td>-0.36 (0.30)</td>
<td>0.83 (0.27)**</td>
</tr>
<tr>
<td>-0.63 (0.33)†</td>
<td>0.63 (0.66)</td>
<td>-0.36 (0.30)</td>
<td>1.19 (0.28)***</td>
</tr>
<tr>
<td>-0.66 (0.33)</td>
<td>0.56 (0.67)</td>
<td>-0.36 (0.30)</td>
<td>0.55 (0.31)†</td>
</tr>
<tr>
<td>-0.37 (0.75)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CWPs × Hiring rate M&amp;P</th>
<th>4.39 (2.83)</th>
<th>6.90 (3.19)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWPs × Hiring rate change M&amp;P</td>
<td>4.72b</td>
<td></td>
</tr>
<tr>
<td>CWPs × Hiring rate dispersion M&amp;P</td>
<td>4.78 (1.08)***</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LR χ² (DF)</th>
<th>432.85 (26)</th>
<th>435.38 (27)</th>
<th>438.77 (28)</th>
<th>443.49 (29)</th>
<th>446.08 (30)</th>
<th>451.05 (31)</th>
<th>475.21 (33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR χ² change</td>
<td>2.53a</td>
<td>4.72b</td>
<td>4.97c</td>
<td>29.13c</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: M&P = managers and professionals. CWPs = Collaborative work practices. LR = likelihood ratio. Industry dummies were included in all models, and their effects on innovation are available upon request. Unstandardized regression coefficients (numbers in brackets are standard errors).

- a Compared with Model 1.
- b Compared with Model 3.
- c Compared with Model 5.
- † p < 0.10
- * p < 0.05
- ** p < 0.01
- *** p < 0.001, two-tailed tests.
professionals is associated with a 2% increase in the probability of the lowest innovation outcome and a 2% decrease in the probability of the highest innovation outcome. Therefore, hiring rate change for managers and professionals was positively related to innovation for organizations with more CWPs, but not so for organizations with fewer CWPs.

In Model 5, the coefficient of hiring rate dispersion for managers and professionals was positive and significant ($b = 0.62$, $p < 0.05$), thus supporting Hypothesis 5. A one standard deviation increase in hiring rate dispersion for these positions (39%) results in a 5% decrease in the probability of the lowest innovation outcome (innovation = 0) and a 4% increase in the probability of the highest innovation outcome (innovation = 4).

In Model 6, the coefficient of the interaction term between hiring rate dispersion for managers and professionals and CWPs was negative and significant ($b = -1.85$, $p < 0.05$), thus supporting Hypothesis 6. Again, we plotted the interaction effect at each level of innovation by comparing organizations with more and fewer CWPs (one standard deviation above and below the mean). Figure 2 shows a negative relationship between hiring rate dispersion and the probability of the lowest innovation outcome (innovation = 0), but this relationship was less negative for organizations with more CWPs (dashed line) than for those with fewer such practices (solid line). Figure 2 also shows a positive relationship between hiring rate dispersion and the probability of the highest innovation outcome (innovation = 4), but this relationship was less positive for organizations with more CWPs (dashed line) than for those with fewer such practices (solid line).

For organizations with fewer CWPs, a one standard deviation increase in hiring rate dispersion for managers and professionals is associated with a 7% decrease in the probability of the lowest innovation outcome and a 5% increase in the probability of the highest innovation outcome. In comparison, for organizations with more CWPs, a one standard deviation increase in hiring rate dispersion for managers and professionals is associated with a 1% decrease in the lowest innovation outcome and a 1.5% increase in the highest innovation outcome. Therefore, the effects of hiring rate dispersion on innovation were greater for organizations with fewer CWPs.

To explore the collective contributions of the three interaction terms, we included all of them in Model 7. The coefficients of the interaction terms
were larger than those reported in the previous models, while their standard errors did not increase proportionally. The variance inflation factors of the interaction terms in Model 7 were all lower than 3, suggesting that multicollinearity was not an issue. In additional analyses not reported in the paper, we found that the $\chi^2$ of Model 7 was significantly higher than all possible models including two of the three interaction terms. These indicators demonstrate that the interaction terms in Model 7 reinforced each other’s predictability (Smith, Ager, & Williams, 1992). Overall, the results in Model 7 are consistent with and further support our hypotheses.

DISCUSSION

Our findings suggest that a continuous or increasing supply of novel knowledge and perspectives through hiring is critical for organizations to develop new products and processes, and that CWPs enable knowledge combination and exchange among new and incumbent employees. This study contributes to management and innovation research in several ways.

FIGURE 2

Hiring Rate Dispersion and Innovation Probability

Notes: M&P = managers and professionals. CWPs = Collaborative work practices. Out of the 1,006 sampled organizations, 434 (43%), 68 (7%), 39 (4%), 222 (22%), and 243 (24%) had innovation scores of 0, 1, 2, 3, and 4, respectively. We standardized hiring rate dispersion, and then estimated and plotted its marginal effects on the probabilities of these innovation scores. Low and high CWPs were defined as the mean value minus and plus one standard deviation, respectively.

Theoretical Contributions

We advance knowledge about how continuous versus intermittent hiring is related to organizational innovation. Our finding that time-dispersed hiring of managers and professionals is positively related to organizational innovation highlights the dynamic contributions of new hires’ knowledge and perspectives. On the one hand, it takes time to integrate newcomers (Tzabbar et al., 2013), as new and incumbent employees need time to build trust and cohesion before being able to collaborate in knowledge exchange and combination (Nahapiet & Ghoshal, 1998). On the other hand, the relative newness of newcomers’ knowledge and perspectives will decrease over time (Singh & Agrawal, 2011), and thus may become less important to innovation as markets and technology evolve (Eisenhardt & Martin, 2000; Hagedoorn & Duysters, 2002; Teece et al., 1997). The concept of hiring rate dispersion provides an integrated approach to these opposing hiring consequences related to time.

Interestingly, we find that increases in hiring from year to year contribute to innovation, but only for...
organizations with more CWPs. This finding suggests that fluctuations in hiring can impede exchanges between new hires and incumbent employees, an idea that is consistent with the traditional view that temporal gaps in hiring (i.e., cohorts) are dysfunctional for collaboration and cohesion among new and incumbent employees (McCain et al., 1983). By having more CWPs in place, organizations can prepare for large increases in hiring that are often driven by business and operational conditions beyond management’s control.

Another important contribution of our study is to the literature on employee mobility in relation to human capital resources. Research on human capital resources has mainly viewed new hires as replacements for exiting employees (Call et al., 2015; Reilly et al., 2014). Our focus on hiring patterns helps advance this view. We suggest that hiring patterns influence not only the continued acquisition of individual KSAOs from new hires, but also the organization’s ability to integrate them effectively with existing human capital (Ployhart & Moliterno, 2011), especially in complex task environments (e.g., product and process innovations) and for organizations without collaborative capabilities. By introducing time into the hiring process, we raise an important question about whether certain types of KSAOs require more time to diffuse than others. Although we did not have information on specific KSAOs and the time it takes to incorporate them, this issue merits further research.

By introducing the concept of hiring rate dispersion, we posit that time-distributed hiring may improve not only knowledge combination and exchange among employees, but also hiring itself. Hiring is challenging partly because information asymmetry in the job market makes it difficult to evaluate the quality and commitment of job candidates in advance (Spence, 1973). An organization that hires continuously is familiar with the job market and knows the general quality of candidates. Continuous hiring also enables the organization to build stable relationships with hiring agencies, which often possess more comprehensive data about candidates.

Managerial Implications

Findings of this study also provide practical guidance for human capital acquisition and development. Our results suggest that organizations benefit from hiring continuously and evenly over time. By adding new managers and professionals on a regular basis, organizations can ensure a continuous flow of new knowledge and perspectives needed for product and process innovations. CWPs also benefit organizations, especially those that have large increases or fluctuations in hiring from year to year. As more new hires enter, managers need to plan to integrate newcomers with incumbents, and adopting more CWPs enables the integration and utilization of newly acquired KSAOs. Organizations without such practices need to hire continuously and evenly over time to facilitate interactions between newcomers and incumbents.

Limitations and Future Research

This study has several limitations that require further discussion. First, we develop our hypotheses on the assumption that intellectual capital creation requires combining and exchanging different intellectual resources (Dougherty, 1992; Nahapiet & Ghoshal, 1998; Reagans & McEvily, 2003). Although CWPs enable us to examine the boundary conditions of knowledge combination and exchange, the WES data did not include specific measures for us to test the two mechanisms directly.

Second, we focus on managerial and professional newcomers, who typically have higher education and more opportunities to contribute to innovation compared to other new hires. Although this comparison is not the focus of this study, our results suggest that newly hired managers and professionals make greater contributions to innovation than do lower educated new hires in other positions (see Table 3). Still, we acknowledge that finer-grained measures of newcomer quality are desirable. The WES lacked information on specific KSAOs and the time it takes to incorporate them, this issue merits further research.

Third, factors other than CWPs may affect new hires’ innovation contributions. For example, an innovative climate or culture (Dobni, 2008; Oke et al.,
which affects organizations’ decisions on hiring and innovation, may be related to their adoption of CWP$s. An innovative culture not only attracts creative employees who aim to contribute to organizational innovation, but also provides an incentive for them by enhancing the perceived fit between their capabilities and organizational values. Researchers may expand our theoretical framework by exploring the contingent roles of other strategic, organizational, and managerial factors.

Fourth, our innovation measure is an additive index based on improved and new products and processes without information on their ultimate economic benefits. It is possible that the newly hired managers and professionals in our sample had sought change for the sake of change. Figures 1 and 2 suggest that hiring rate change and hiring rate dispersion did not affect the probabilities of improvements in products or processes (i.e., innovation = 1 or innovation = 2). As noted in the Measures section, the survey respondents might not have been aware of product or process improvements or might not have viewed improvements as innovations. Researchers can use other innovation measures, such as sales and profits generated from new products and services (Laursen & Salter, 2006; Zhou et al., 2011), to examine the ultimate economic consequences of hiring patterns.

Finally, organizations that rely specifically on fundamental research and/or practical inventions may place greater priority on innovation tasks in the recruiting process. By contrast, service and retail businesses may aim more at meeting increased job demands in high-turnover contexts (Call et al., 2015; Reilly et al., 2014). There is a need for more research in those industries to see whether and how hiring patterns influence new hires’ contributions to a wider set of outcomes, including, but not limited to, innovation, productivity, and profitability.

CONCLUSION

Hiring is an important strategy for organizations to acquire human capital and develop innovation capabilities. We argue that temporal patterns of hiring have implications beyond the quality and quantity of new hires’ KSAOs. Our findings suggest that organizations benefit from hiring evenly over time, as it ensures a continuous inflow of new knowledge and perspectives and enhances collaboration between new and incumbent employees. Although hiring is often driven by immediate operational demands, understanding how temporal patterns of hiring affect knowledge combination and exchange advances the strategic relevance of hiring research and contributes to nascent theory on human capital flows.

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