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From Organizational Resilience Capability to Firm Performance: A Time-Lagged Investigation

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ABSTRACT

An organizational resilience capability is essential for firms to adapt in an ever-changing world characterized by diverse crises and adversities. However, the mechanisms and contingencies needed to harness and channel organizational resilience capability remain uncertain. This article argues that this resilience capability, proactively developed in calmer times, only becomes apparent in a crisis, but its effectiveness relies on additional organizational capabilities around innovation and human resources. Using data from a sample of large Taiwanese firms collected in two waves during and after a crisis, we show how incremental and radical innovative capabilities mediate the relationship between a proactively developed organizational resilience capability and firm performance. Furthermore, we demonstrate the role of strategic human resource management practices in fostering and regulating this relationship and the functioning of innovative capabilities. Based on these findings, we provide implications for theory and practice.

1 | Introduction

Organizational resilience (Duchek 2020; Lengnick-Hall et al. 2011) and continuous innovation (Cooper 2021; Dayan and Elbanna 2011) are essential requirements for organizations to successfully adapt to crises or adversities of various kinds (Pal et al. 2014; Ortiz-Villajos and Sotoca 2018; Purnomo et al. 2021). There is an increasing body of innovation management research to this effect, but discussion in this field is far more recent than in other management fields (Todt et al. 2018). What seems apparent is that organizational resilience is vital

for sustaining firm performance (Lengnick-Hall et al. 2011; Akgün and Keskin 2014; Ortiz-de-Mandojana and Bansal 2016). Organizations face various types of crises and adversities that continually threaten their viability (Williams et al. 2017). For this reason, calls for resilience and flexibility as notions of adaptability in innovation activities abound. However, left unanswered in this debate about organizational resilience and innovation activity is the question, “What conditions must organizations have in place to ensure their firm performance adapts positively to crises?” This question is at the heart of a burning strategic problem: understanding which organizations thrive

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Managerial Summary

Organizational resilience is not something a firm discovers in a crisis. Instead, organizational resilience is something managers must build long before a crisis arrives. The article shows that organizations perform better in turbulent times when they have proactively developed resilience and paired it with strong innovative capabilities. Both incremental improvements and more radical innovations play a crucial role, giving firms a wider set of response options when crises differ in nature and intensity. The findings also highlight that resilience alone is not enough. Its impact depends on strategic human resource practices that build agility, learning capacity, and rapid decision-making. Firms with employees who can quickly learn, unlearn, and apply new knowledge are better positioned to turn resilience into real performance gains. Managers should invest early in resilience routines—communication, readiness planning, and post-crisis learning—and maintain a balanced innovation portfolio. Managers should strengthen HR systems that support flexibility, skill development, and coordinated action. Finally, managers should conduct regular resilience health checks to assess preparedness and ensure that existing measures genuinely work. Together, these actions help organizations not only withstand crises but also emerge from them stronger and more competitive.

in times of crisis and adversity and which falter (Jia et al. 2020; Williams et al. 2017).

Our study defines organizational resilience as the capability of organizations to bounce back from adversity, recover, and thrive in complex, uncertain environments (Lengnick-Hall et al. 2011). In line with previous research (Lengnick-Hall and Beck 2005), it is assumed that this capability is developed over time. In times of crisis, companies are exposed to above-average stress, and distractions and urgent matters are therefore unavoidable (Grewal and Tansuhaj 2001). We posit that the proactively developing this capability in calmer periods is especially beneficial against a reactive organizational resilience capability, as this advanced and forward-looking investment (Van Der Vegt et al. 2015) can generate resistance or isolation from adversity (Williams et al. 2017), thereby increasing its potential (Duchek 2020) and enhancing preparedness (Jia et al. 2020). However, these normative arguments omit the resource-based framework required to ensure its effectiveness. The effectiveness of a proactively developed resilience capability, expressed in terms of firm performance, can only be determined when a firm is affected by a crisis. Moreover, a proactively developed organizational resilience capability that emerged in the past may not, on its own, affect firm performance, as the related resources and routines were developed in a different time and context than those of a future crisis. The available organizational resilience literature is underdeveloped on this core issue of adaptability efforts because it lacks insight into the concurrent investment in adjacent capabilities needed to realize the value of a proactively developed organizational resilience capability. In this regard, existing resource–capability frameworks for organizational resilience do not adequately explain when and under what circumstances the promise of proactively developed

organizational resilience capacity can be realized. Instead, we argue that the organizational resilience capability–firm performance relationship is conditional, relying on subsequent capabilities and practices that channel and orchestrate the resources and routines made possible by the proactively developed organizational resilience capability.

Prior research asserts the importance of innovative capabilities for adaptation, surviving crises, and securing firm performance (Lisboa et al. 2011; Rajapathirana and Hui 2018; Ahmed et al. 2020), but our knowledge about how different types of innovative capabilities influence the organizational resilience capability–firm performance relationship is limited. We believe that a more complete resource-based theory of how a proactively developed organizational resilience capability affects firm performance should discuss in greater detail how different types of innovative capabilities impact this relationship (Slater et al. 2014). An absence of innovative capabilities suggests that efforts to build a proactively developed organizational resilience capability to cope with adversity will have a positive, albeit limited, effect on firm performance because the firm would lack the essential mechanisms needed to channel its resilience resources and routines effectively in response to change. We anticipate that radical and incremental innovative capabilities act as distinct intermediate mechanisms in this proactively developed organizational resilience capability–firm performance relationship. Furthermore, a variety of organizational capabilities are essential for enabling adaptation. Above all, human resources are crucial, raising the question of the role of human resource management (HRM) practices in developing and managing the necessary skills and behaviors of organizational members to achieve adaptation. Although research indicates that strategic HRM practices play a crucial role in fostering innovation (Laursen and Foss 2003; Botelho 2020) and building organizational resilience (Lengnick-Hall et al. 2011), the impact of these practices on the relationships among a proactively developed organizational resilience capability, firm performance, and various innovative capabilities remains unanswered.

We ask the following research questions: (i) *What role do large companies' innovative capabilities play in the relationship between proactively developed organizational resilience capability and firm performance?*, and (ii) *How do strategic versus traditional HRM practices influence this potential effect?* Data from a sample of large Taiwanese companies collected in two waves across different phases of a crisis reveal that innovative capabilities serve as intermediate mechanisms in the proactively developed organizational resilience capability–firm performance relationship. By revealing these relationships, we contribute to resource-based and capability-based explanations of organizational resilience in general and the ability, expressed by organizational resilience capability, to adapt profitably to crises and adversities. First, by considering innovative capabilities separately in the proactively developed organizational resilience capability–firm performance relationship, firms can better decide which innovative capability to focus on in a crisis. Against the backdrop of increasing uncertainty and efforts fraught with causal ambiguity, these insights advance debates on what organizations must do regarding the proactively developed organizational resilience capability–firm performance relationship and the outcomes

of these activities (Linnenluecke 2017; Duchek 2020). As a result, decisions on the allocation of scarce resources can be made in a more informed way, explaining how a proactively developed organizational resilience capability contributes to sustained adaptability in the face of new crises. Second, the inclusion of strategic HRM practices and their impact on different innovative capabilities, and thus on the organizational resilience capability–firm performance relationship, provides a basis for understanding how a proactively developed organizational resilience capability not only enables recovery but also serves as a continuous driver of adaptive capacity. Our study reveals the importance of strategic (rather than traditional) HRM practices in generating returns from a proactively developed organizational resilience capability before subsequent crises hit. Our study moves the discussion beyond viewing traditional HRM practices as merely reactive efforts to develop organizational resilience during a crisis focused on channeling human capital to respond to immediate adversities (e.g., Duchek 2020; Jia et al. 2020) where individuals and teams often struggle to understand the unfolding crisis (Williams et al. 2017). Instead, it emphasizes a proactive investment strategy (Van Der Vegt et al. 2015) combined with strategic HRM practices as ongoing drivers of adaptability.

2 | Theoretical Development and Hypotheses

We adopt the resource-based view (RBV) as our theoretical perspective. The RBV implies that an organization's unique resources and capabilities determine its long-term competitive advantage (Barney et al. 2001). In the face of adversity, resilient organizations mobilize resources to adapt to change and deliver effective, desired responses (Parker and Ameen 2018). This occurs through the proactive development of resilience potential in advance or reactively through confidence in the impact of measures taken in the moment. However, an organizational resilience capability cannot be built instantly. Unlike a proactive strategy, a reactive approach relies on the hope that the organization's quick response during a crisis will suffice for adaptation, rather than preparing in advance (e.g., Madni and Jackson 2009).

2.1 | Proactively Developed Organizational Resilience Capability

We conceptualize a proactively developed organizational resilience as a capability—an ability that enables firms to manage change and adapt successfully in the wake of crises and adversities. It is dynamic and can be developed in advance to account for the interaction between the firm and its environment (Williams et al. 2017). It contributes to “the maintenance of positive adjustment under challenging conditions, such as the organization emerges from those conditions strengthened and more resourceful” (Vogus and Sutcliffe 2007, 3418); underlining that it goes beyond mere survival (Lengnick-Hall and Beck 2005) and corresponds with the idea of the capability to cope with change when overwhelmed by crisis or adversity. According to Williams et al. (2017), several capabilities can enable organizations to adapt to a crisis, including financial, cognitive, behavioral, emotion-regulation, and relational capabilities. These

capabilities increase the possibility that firms and their people can adjust positively to adversity.

Given the many internal and external adversities facing today's organizations, a proactive approach to developing an organizational resilience capability is essential (Barton and Sutcliffe 2023; Jia et al. 2020; Williams et al. 2017). Therefore, organizations should actively work in this regard as a preparatory effort to build an organizational endowment of resources and routines that positively adjust the firm to adversity (Williams et al. 2017), reduce the immediate impact of future adversity (Van Der Vegt et al. 2015), and recover from disruption (Duchek 2020). In Williams et al. (2017) parlance, a proactive organizational resilience capability is a behavioral capability.

A proactive organizational resilience capability begins with past experiences and is cultivated through ongoing, focused efforts and initiatives (Lengnick-Hall et al. 2011; Duchek 2020). The effectiveness of what organizations have developed and learned only becomes apparent in a subsequent crisis. It is only then that it becomes clear whether the proactively developed organizational resilience capability and the associated resources and routines are useful for meeting the acute challenges at hand and exploiting the opportunities they present (Ortiz-de-Mandojana and Bansal 2016).

2.2 | Innovative Capabilities

The importance of innovation is well known (Clauss et al. 2022), and this applies to all types of organizations (Lee, Lee, and Garrett 2019), regardless of their business activity or geographical location (Durst and Leyer 2022). Organizational innovativeness shows itself in many forms (Ellonen et al. 2008). We use the traditional classification of innovation, dividing it into incremental and radical. Incremental innovations are characterized by minor changes to existing products using current technologies, whereas radical innovations entail fundamental changes to new products enabled by revolutionary technological changes (Song and Thieme 2009). Consequently, incremental innovative capability describes an organization's capability to develop innovations that refine and reinforce existing products. Radical innovative capability, in contrast, is the capability to develop innovations that significantly change existing products (Subramaniam and Youndt 2005). An innovative capability is especially crucial during a crisis (Durst et al. 2023) because crises often require new solutions or approaches to survive and emerge stronger. Each innovative capability allows for different responses to a crisis. From the perspectives of adaptability and crisis management, an incremental innovative capability carries less risk and requires less investment. In contrast, a radical innovative capability is riskier but offers the potential for significant breakthroughs and solutions that can shape a new future. For example, while incremental innovations mainly build on existing knowledge and use it to “do things better,” radical innovations depend on combining pockets of unrelated knowledge and exploring new knowledge bundles to create new things (Popadiuk and Choo 2006). During normal crises, such as workplace accidents or machine breakdowns, focusing

on exploitation by applying measures to keep the firm operational may be advisable. But in severe, sudden crises like explosions or earthquakes, a different, more spontaneous approach is needed. In this case, the firm would need to rely on exploration because few of its existing activities or resources may readily apply to the unforeseen, sudden, or severe crisis. Moreover, a one-sided focus on an incremental innovative capability could be detrimental in the long term as it reinforces the past without fostering truly new innovation for the future (Hughes et al. 2021; Roth et al. 2024).

2.3 | HRM Practices

The importance of HRM for firm performance (Huselid 1995; Bowen and Ostroff 2004) and innovative capabilities is frequently emphasized (Donate et al. 2016; Chaudhry et al. 2019). HRM practices are the routines through which firms attempt to influence and shape the skills and behavior of their organizational members to achieve organizational goals (Chen and Huang 2009). They motivate skilled organizational members to perform to their best (Huselid 1995). However, until recently, HRM literature has mainly focused on firms operating in relatively stable environments. In many cases, the underlying assumptions include permanent growth and prosperity; therefore, efforts related to resilience were rarely considered (Cook et al. 2016). Nevertheless, HRM practices can regulate how effectively organizational capabilities are enacted in practice by governing and directing human and social capital among organizational members (e.g., Donate et al. 2016).

2.4 | Hypotheses

2.4.1 | Proactively Developed Organizational Resilience Capability and Firm Performance: A Baseline

A proactively developed organizational capability covers resources, routines, accumulated knowledge, and wisdom that generate “resilience potential” (Duchek 2020), “resilience that is not presently evident or realized” (Somers 2009, 13). It is anticipatory in focus and content, building the foundation for an effective response to critical situations (Duchek 2020). Moreover, it enables organizations to mobilize their available resources and routines to capture opportunities inherent in adversities while mitigating their threats (Barton et al. 2015; Sutcliffe and Vogus 2003). The preparatory aspects of a proactively developed organizational resilience capability suggest that it should benefit firm performance even at low levels. Consequently, we expect as a baseline hypothesis:

H1. *A proactively developed organizational resilience capability has a positive effect on firm performance.*

2.4.2 | The Mediating Role of Innovative Capabilities

Innovation is the lifeblood of firms. We theorize that the innovative capability of firms contributes to their total organizational resilience. Researchers generally argue that organizations can gain a competitive advantage by allocating

resources and practices to developing innovative capabilities (Ferreira et al. 2020). In our study, we go further and anticipate that a proactively developed organizational resilience capability influences firm performance via innovative capabilities. First, from a resource-based view, innovative capabilities should translate the practices and activities associated with a proactively developed organizational resilience capability into firm performance by organizing and orchestrating the responses produced by the firm. Although the capability drives the emergent phase of performance recovery in a crisis, innovative capabilities provide the necessary framework for accomplishing that recovery. Previous research has shown how innovation can help organizations overcome crises or adversity. For example, Wang and Sun (2024) demonstrated how digital innovations can help smaller organizations better survive crises such as a pandemic. Innovation also enables firms to diversify their risks and capitalize on opportunities that exist within crises. For example, construction industry manufacturers embraced new materials, technologies, and maintenance solutions to develop built environment innovations that improved air circulation, hygiene, sanitation, and site services for the housing sector during the COVID-19 pandemic and beyond.

Second, innovative capabilities channel a proactively developed organizational resilience capability in ways that manifest different responses to crisis and adversity. Firms possess different types of innovative capabilities depending on their radicalness. The greater the radicalness of an innovative capability, the greater the degree to which innovations are groundbreaking and disruptive, initiating “fundamental changes in the outputs or internal activities of the organization” (Damanpour and Aravind 2011, 436).

A proactively developed organizational resilience capability can help organizations quickly refine short-term, incremental, innovative activity and sustain firm performance during a crisis. This is achieved by channeling the knowledge resources accumulated from past crises as a ready (albeit limited and short-term) set of actions, adjustments, and decisions to cope with the onset of a new crisis. Concurrently, such a capability may also attenuate and adjust a firm's middle-to-long-term strategy by eliciting radical innovations that improve the long-term earning power of the business (Hamel and Valikangas 2003; Wong et al. 2021). This is achieved through a proactively developed organizational resilience capability, which provides a set of resources and experience that enables root causes to be identified more effectively and recovery to be initiated (Williams et al. 2017). Those firms with only reactive capabilities would be denied both types of breathing space, leaving them vulnerable to mistakes in crisis sensemaking and paralysis in developing recovery measures (Williams et al. 2017). Although both types of innovative capability are expected to mediate the positive effect of a proactively developed organizational resilience capability on firm performance, existing theory is ambivalent about which has the greater effect. Thus:

H2. *A firm's incremental innovative capability positively mediates the positive effect of a proactively developed organizational resilience capability on firm performance.*

H3. *A firm's radical innovative capability positively mediates the positive effect of a proactively developed organizational resilience capability on firm performance.*

2.4.3 | Moderating Role of HRM Practices, Positively Developed Organizational Resilience Capability, and Innovative Capabilities

HRM practices can be either strategic or traditional. In resource-based terms, effective HRM practices and routines resemble capabilities that orchestrate human resources and channel employee behavior to support the firm's other capabilities, thereby enabling sustained competitive advantage. Strategic HRM practices are best suited to this endeavor as they align employee skills, organizational structures, and employee motivation with long-term strategic objectives. Such strategic HRM practices typically resemble high-performance systems and work practices (Huselid 1995).

Strategic HRM systems, like high-performance work practices, establish routines that communicate expectations to employees about a high-performing workplace. For example, these routines inform them on how to interact with colleagues, which efforts to prioritize or avoid, which behaviors are rewarded, and the standards for work and performance (Bowen and Ostroff 2004; Haggerty and Wright 2009). These signals can vary in their distinctiveness, consistency, and the extent to which they are agreed upon. A strong HRM system establishes routines that ensure employees correctly understand and interpret the messages intended by the firm's leadership, thereby guiding their individual behaviors. In contrast, a weak HRM system lacks these routines, leading to wide variation in how messages intended by the firm's leadership are interpreted and acted upon. Huselid (1995) found strong support for the superiority of strategic HRM practices over traditional ones in affecting corporate financial performance. This is partly because strategic HRM practices influence employee productivity.

Appropriate strategic HRM practices are also important for organizational innovation (Chen and Huang 2009; Laursen and Foss 2013). These practices should create an environment in which employees feel strongly supported in their innovative efforts and are encouraged to behave innovatively (Liu et al. 2019). This is a collective precursor to an innovative capability where strategic HRM practices matter (Lu et al. 2015). Strategic HRM practices also support the process of exploring and using knowledge resources important to innovative capability (Lee, Pak, et al. 2019). Thus, drawing on resource-based theory, we anticipate that strategic HRM practices are relevant to how proactive investments in organizational resilience capability promote the development of innovative capabilities. However, Gahan et al. (2021) hypothesized that strategic HRM practices benefit innovative outcomes but did not distinguish between radical and incremental innovation, instead using only an aggregate of the two. This is problematic because strategic HRM practices must be salient to the behaviors each type of innovative capability requires to achieve its desired contribution (Donate et al. 2016). We expect strategic HRM practices to foster radical innovative capability but discourage incremental innovative capabilities. First, strategic HRM practices

encourage innovative behavior, reinforcing an emphasis on creativity and entrepreneurial action commensurate with a culture of excellence (Mazzei et al. 2016). Traditional HRM practices, such as internal job ladders with seniority-based advancement (Godard 2009), are likely to promote incremental innovative capability consistent with a culture that values tried-and-true, low-risk work methods. As firms progress, they develop skills, capabilities, and resources that are unique to them, reflecting their historical path (Barney 1995). Firms using strategic HRM practices develop individual employees' knowledge, skills, abilities, and other attributes in ways that evoke the corresponding sets of capabilities, such as radical innovative capability, in the long term (Lengnick-Hall et al. 2011). Instead, traditional HRM practices should be more effective in developing and promoting incremental innovative capabilities. Therefore:

H4. *A firm's strategic HRM practices negatively moderate the effect of a proactively developed organizational resilience capability on incremental innovative capability.*

H5. *A firm's strategic HRM practices positively moderate the effect of a proactively developed organizational resilience capability on radical innovative capability.*

Given that our resource-based approach to strategic versus traditional HRM practices within the framework of organizational resilience suggests these practices have varying effects on different types of innovative capabilities, we also anticipate that a firm's HRM practices moderate how innovative capabilities mediate the relationship between a proactively developed organizational resilience capability and firm performance. Studies indicate that variations in the extent and intensity of HRM practices affect innovativeness and, thus, its contribution to organizational performance (e.g., Cao et al. 2022; Huselid 1995). As strategic HRM practices are more closely aligned with radical innovative capability, and traditional (non-strategic) HRM practices are more closely aligned with incremental innovative capability, we expect that the indirect effect on firm performance will be more positive when firms are channeling radical innovative capability and more negative when they are channeling incremental innovative capability:

H6. *Strategic HRM practices negatively moderate the indirect effect of incremental innovative capability on firm performance.*

H7. *Strategic HRM practices positively moderate the indirect effect of radical innovative capability on firm performance.*

Figure 1 summarizes our framework.

3 | Methods

3.1 | Sample

The conceptual model was tested on a sample of large Taiwanese firms, comprising 750 firms from the manufacturing sector (50%) and 750 from the service sector (50%). The Ministry of Economic Affairs of Taiwan provided a database from which the firms were randomly selected. The firms must have been listed and operational for at least 5 years. This sample was chosen to

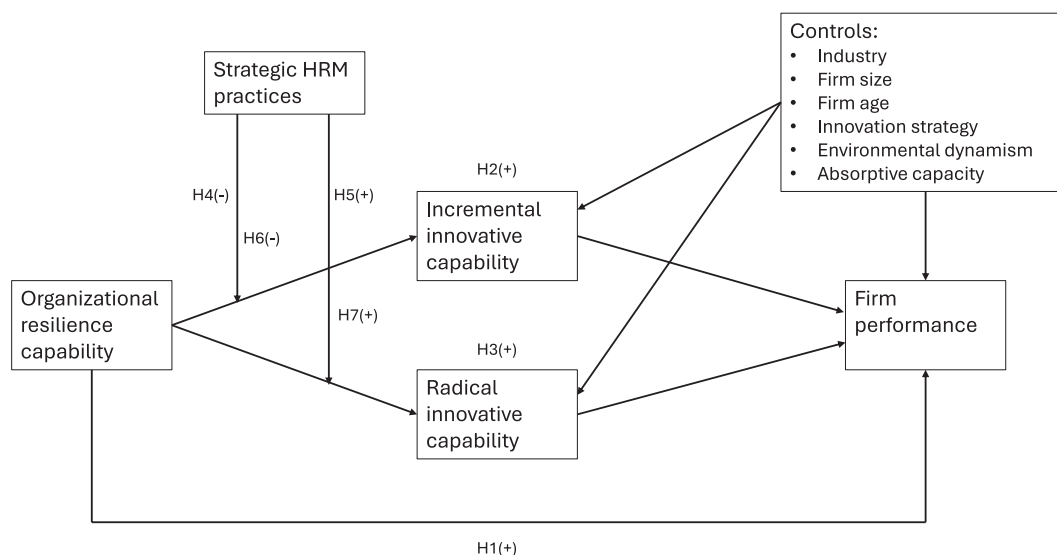


FIGURE 1 | Conceptual framework.

represent an East Asian economy where innovative capability and HRM practices are emphasized by government legislation, and large firms have more resources to engage in such practices. Moreover, these large firms account for a significant proportion of total overseas investment (Ministry of Economic Affairs 2022).

The manufacturing and service industries were selected based on their relevance to the variables of interest and considering Taiwan's dynamic, export-driven economy, dominated by large firms. The manufacturing and service industries in this study include automotive and component parts; building materials and related products; cement, concrete products, ceramics, and tiles; chemicals, chemical and plastic products; electrical and electronics products; food, beverages, and tobacco; furniture and wood-related products; household appliances; industrial and engineering products; iron and steel products; laboratory equipment; packaging, labelling, and printing; pharmaceutical, medical equipment, cosmetics, toiletries, and household products; and rubber products.

With the help of the university alumni association, the research team gained access to the firms' chief executive officers (CEOs). These CEOs designated the HR manager as the primary contact to distribute our surveys to senior managers within their firms. Data were collected from the senior managers of these firms because they were presumed to possess the essential knowledge and expertise regarding our study constructs.

The hypothesized model was tested through a two-phase data collection process conducted in 2021. In time 1, from May 2021 to June 2021, data about organizational resilience capability and HRM practices were collected. In time 2, 2 months later, from July 2021 to August 2021, data about incremental and radical innovative capabilities were collected. For post hoc analysis, we conducted a further two-phase round of data collection in 2022. Data about organizational resilience capability and HRM practices were collected from May 2022 to June 2022. Further data about incremental and radical innovative capabilities were collected from July 2022 to August 2022.

A multi-respondent approach was used to collect data from the headquarters (HQ) of the 1500 selected firms in Taiwan. The survey instrument was developed in English, translated into Chinese by a native speaker, then back-translated to ensure accuracy (Usunier 1998). With the aid of the HR manager at each firm, the surveys were sent by postal delivery, pre-coded with identification numbers, and accompanied by a cover letter explaining the purpose of the research and materials on research ethics, confidentiality, and anonymity. As an incentive, each firm received a report. The research team assured the confidentiality of responses by asking each respondent to seal their completed questionnaire in a pre-addressed envelope and return it directly to the research team. This study received support from the university's alumni association to further encourage response. Through alumni activities (e.g., career, training, and consultation sessions, class reunions, and networking events), emails, and phone calls, the research team first communicated the importance and benefits of this research project to EMBA/MBA alumni, who were top executives (e.g., CEOs, board directors) at the 750 listed manufacturing and 750 listed service firms. Following established procedures to enhance response rates (Podsakoff et al. 2003), the key informants (i.e., senior managers) received a full survey questionnaire pack, along with a first reminder (2 weeks later) and a second reminder (2 weeks after the first reminder). These reminders consisted of a complete questionnaire pack and telephone contact with non-respondents.

The survey questionnaire was administered to 10 senior managers, randomly selected from each firm's HQ, across the 1500 HQs in the sample. After excluding 658 incomplete responses, 1764 responses were obtained from 494 manufacturing firms and 1259 responses from 387 service firms (see Table 1). Among the respondent firms, 24.631% had been operational for over 15 years, and 71.169% employed a minimum of 500 employees. The average firm age was 9.359 years, and the average number of employees was 649. To assess non-response bias, we compared early (first 10%) and late (last 10%) respondents and found no significant differences in terms of firm age ($t = -0.119$, $p = 0.906$) or firm size ($t = 0.367$, $p = 0.714$) (Armstrong and Overton 1977).

TABLE 1 | Data collection and respondents.

Distributed sample		Returned sample	Invalid	Valid respondents	Valid response rate (valid respondents/ distributed respondents)
Manufacturing firms	7500	2204	440	1764	23.520%
Service firms	7500	1477	218	1259	16.787%
Respondents	15,000	3681	658	3023	20.153%
Firms	1500	995	114	881	58.733%
Manufacturing firms	750	551	57	494	65.867%
Service firms	750	444	57	387	51.600%

3.2 | Measures

The measurement items in this study were derived from prior research. All items used a five-point Likert scale (1 = strongly disagree and 5 = strongly agree). To ensure the validity of the measurement items, a board comprised of five scholars and five managers was convened to pre-test the questionnaire. All constructs, items and their psychometric properties are recorded in Appendix A.

The items measuring a *proactively developed organizational resilience capability* were adapted from previous studies. A total of 12 items (Bode and Macdonald 2017; Jia et al. 2020; Pettit et al. 2013) were used ($\alpha = 0.964$). The 12 items were evenly combined from these three sources. We adapted the previous studies' scales to reflect how firms are ready to respond proactively to tackle critical business issues by using a communication strategy, leveraging key personnel, and identifying, formulating, and evaluating a set of possible responses to a crisis or adversity (in our case, the pandemic). There were several reasons why we adapted the organizational resilience capability measure. First, previous studies (e.g., Bode and Macdonald 2017; Pettit et al. 2013) indicated that decision-makers at the firm level have to either proactively tackle potential disruptions with efforts designed to reduce the possibility of the occurrence and/or mitigate their damage (Tomlin 2006), or to reactively cope with the adverse effects of a materialized risk with a wait-and-see method (Craighead et al. 2007). We theorize that firms must be ready to act proactively to determine a mix of responses to address potential risks, in line with their risk preferences and strategies (Bode and Macdonald 2017; Hofmann et al. 2014). Second, firms need to develop the capability to use the available time to plan proactively and take into account the preferences of various operational decision-makers (Bode and Macdonald 2017; Pettit et al. 2013). Third, the more managers have been exposed to crises in the past, the greater the organization's resilience capability (Mena et al. 2020). That is, firms demonstrate greater resilience capability by proactively engaging in "anticipatory action that employees take to impact themselves and/or their environments" (Grant and Ashford 2008, 8).

The items used to evaluate *strategic HRM practices* were adapted from Huselid (1995). This measure captures the adoption of effective systems of HRM practices that are critical

to helping firms exploit the complementarities among their routines and processes for sustained competitive advantage. Seven items were used to measure strategic HRM practices ($\alpha = 0.932$). These strategic HRM practices resemble high-performance systems and work practices and capture two main dimensions: (1) employee skills and organizational structures, and (2) employee motivation. Employee skills and organizational structures include a wide range of practices intended to develop employees' knowledge, skills, and abilities, providing employees with an instrument to use those elements in performing their tasks. For instance, these practices can enhance employees' skills by developing their human capital. Recruiting procedures can help firms acquire a large pool of qualified candidates through a reliable and valid selection process. Providing formal and informal training experiences, such as skills training, on-the-job experience, coaching, mentoring, and management development, can further impact employees' development (Huselid 1995).

The items used to measure *incremental innovative capability* were adapted from Subramaniam and Youndt (2005). These authors' measure captures the firm's ability to reinforce and extend its current expertise and product/service lines. Three items were used ($\alpha = 0.742$). The items used to measure *radical innovative capability* were also adapted from Subramaniam and Youndt (2005). The measure captures the firm's ability to render current product/service lines obsolete. Three items were used to measure this construct ($\alpha = 0.811$).

The *firm performance* data used in this study (i.e., return on investment and return on equity) were obtained from the publicly available database of the Taiwan Economic Journal (TEJ). TEJ is a leading credit analysis research agency in Taiwan, akin to Standard & Poor's, Moody's, and Fitch Group in the United States. It is a comprehensive financial services provider in Taiwan and a reliable source of financial information for Taiwan-listed firms.

We included several control variables in our analysis to control for potential confounding variables. We controlled for *firm age* (i.e., the length of time since its establishment), *firm size* (i.e., number of employees), different *industry sectors*, and *innovation strategy*. Previous studies (e.g., Jansen et al. 2006) indicated the importance of distinguishing between exploration innovation ($\alpha = 0.867$) and exploitation innovation

($\alpha = 0.772$) strategies. We also controlled for *absorptive capacity* ($\alpha = 0.896$) to exclude the impact of the ability to acquire, assimilate, transform, and exploit potential knowledge on organization resilience capability and HRM practices (e.g., Jansen et al. 2005). Finally, we controlled for *environmental dynamism* ($\alpha = 0.700$) to exclude the influence of a firm's external environment on organizational resilience capability (e.g., Anwar et al. 2021).

3.3 | Common Method Bias

To mitigate potential common method bias (CMB), several procedures were followed based on the recommendations of Podsakoff et al. (2003) and Spector and Brannick (1995). First, the measurement scales were randomly organized to avoid order effects. Second, all items were neutrally worded to reduce response bias. Third, the questionnaire was shortened to minimize respondent fatigue. Fourth, clear instructions for completing the survey instrument were provided to enhance response accuracy. Fifth, we collected data at three different time points. Finally, confidentiality and anonymity were ensured for all respondents to reduce social desirability bias.

To test for CMB (Podsakoff et al. 2003), we conducted a confirmatory factor analysis (CFA) loading all the items onto a single construct. The results rejected the potential for CMB, as evidenced by the poor model fit ($\chi^2 = 1903.438$, $df = 54$, $\chi^2/df = 35.249$, $p = 0.001$, $RMSEA = 0.106 > 0.08$, $CFI = 0.814 < 0.90$, $TLI = 0.772 < 0.90$). The anticipated model had the best fit ($\chi^2 = 967.664$, $df = 48$, $p < 0.001$, $RMSEA = 0.080 \leq 0.08$, $CFI = 0.949 \geq 0.90$, $TLI = 0.930 \geq 0.90$), further validating the absence of CMB in this study.

To further test against the potential effect of any CMB, however remote, a partial correlation procedure was used after hypothesis testing using an appropriate marker variable (achievement of work-life balance). The procedure involved removing the correlations of theoretically unrelated and uncorrelated variables from the study variables. The results showed no differences between the original findings and those obtained after using the partial correlation procedure. The paths retained their statistical significance, the direction remained unchanged, and there was negligible deviation in regression coefficients or t-values. These results further suggest that CMB was absent or negligible and unlikely to explain the study's findings, providing further confidence in the results. Robustness checks and full PROCESS results are provided in Appendix B.

3.4 | Analytical Approach

Multiple regression analysis was conducted to test the hypotheses. Multiplicative interaction terms were computed to examine moderation effects. The constructs in the interaction terms were mean-centered to avoid potential multicollinearity. We used the PROCESS approach (Hayes 2013) to test for mediation and moderation effects. SPSS version 25 was used with bootstrapping (5000 times). Table 2 reports the correlation between all variables.

4 | Results

4.1 | Main Analysis

As our baseline hypothesis, H1 expected a positive relationship between a proactively developed organizational resilience capability and firm performance. Regression results in Table 3 indicate a significant relationship ($\beta = 0.061$, $p < 0.001$, 2021 ROI, Model 5; $\beta = 0.304$, $p < 0.001$, 2021 ROE, Model 7), supporting H1.

H2 proposed that firm incremental innovative capability mediates the positive effect of a proactively developed organizational resilience capability on firm performance. Regression results in Table 3 indicate a significant relationship ($\beta = 0.057$, $p < 0.001$, 2021 ROI, Model 6; $\beta = 0.132$, $p < 0.001$, 2021 ROE, Model 8), supporting H2. Further examination of the PROCESS mediation statistics for the proactively developed organizational resilience capability revealed significant effect coefficients for the total, direct, and indirect effects, with no zero values in the bootstrapped 95% confidence interval range, indicating a significant mediation effect. Therefore, H2 is further supported by this test. H3 predicted that a firm's radical innovative capability mediates the positive effect of a proactively developed organizational resilience capability on firm performance. The regression results in Table 3 report a significant relationship ($\beta = 0.036$, $p < 0.01$, 2021 ROI, Model 6; $\beta = 0.113$, $p < 0.05$, 2021 ROE, Model 8), supporting H3. Further examination of the PROCESS mediation statistics for the proactively developed organizational resilience capability revealed significant effect coefficients for the total, direct, and indirect effects, with no zero values in the bootstrapped 95% confidence interval range, indicating a significant mediation effect. Therefore, H3 also receives further support from the PROCESS test outcomes.

H4 predicted that strategic HRM practices would negatively moderate the effect of a proactively developed organizational resilience capability on incremental innovative capability. The regression results in Table 3 ($\beta = 0.112$, $p < 0.05$, Model 2) did not support H4 because the effect was positive rather than negative, contrary to the original hypothesis. H5 posited that strategic HRM practices positively moderate the relationship between a proactively developed organizational resilience capability and radical innovative capability. The regression results in Table 3 support H5 ($\beta = 0.126$, $p < 0.001$, Model 4).

H6 proposed that strategic HRM practices negatively moderate the indirect effect of incremental innovative capability on firm performance. The regression results of Table 4 show that H6 is not supported because the effect is positive, but the hypothesis predicted a negative moderating effect ($\beta = 0.006$, $p < 0.05$, Table 4, 2021 ROI; $\beta = 0.015$, $p < 0.05$, Table 4, 2021 ROE). H7 proposed that strategic HRM practices would positively moderate the indirect effect of radical innovative capability on firm performance. The regression results of Table 4 support this hypothesis ($\beta = 0.005$, $p < 0.05$, Table 4, 2021 ROI; $\beta = 0.014$, $p < 0.01$, Table 4, 2021 ROE).

Table 5 summarizes the results of the hypothesis tests.

TABLE 2 | Correlation matrix and descriptive statistics.

	Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Manufacturing	0.561	0.497	—														
2	Firm age	9.359	3.889	−0.455***	—													
3	Firm size	648.695	326.215	−0.010	0.077*	—												
4	Exploration	3.925	0.334	−0.019	−0.030	−0.198***	—											
5	Exploitation	3.799	0.369	−0.031	−0.066	−0.184***	0.496***	—										
6	Environmental dynamism	3.903	0.391	0.015	−0.022	−0.067*	0.405***	0.230***	—									
7	Absorptive capacity	3.859	0.312	0.041	0.026	0.149***	−0.040	−0.009	−0.025	—								
8	Proactively developed organizational resilience capability	3.912	0.482	0.092**	−0.006	−0.042	0.046	0.109**	−0.028	−0.068*	—							
9	Strategic HRM practices	3.962	0.501	0.115***	−0.016	−0.036	0.049	0.067*	0.034	−0.009	0.463***	—						
10	Incremental innovative capability	4.291	0.397	0.074*	0.009	0.039	−0.050	−0.092**	0.023	−0.045	0.170***	0.118***	—					
11	Radical innovative capability	3.991	0.257	0.055	−0.056	−0.125***	0.394***	0.419***	0.171***	−0.028	0.171***	0.125***	0.461***	—				
12	ROI (2021)	−0.013	0.084	0.072*	−0.050	−0.039	0.033	−0.010	0.017	0.007	0.344***	0.098**	0.368***	0.262***	—			
13	ROE (2021)	0.390	0.348	0.129**	−0.020	0.033	0.053	0.068*	0.013	−0.023	0.432***	0.315***	0.261***	0.227***	0.135***	—		
14	ROI (2022)	3.318	1.917	0.081*	−0.042	−0.053	0.045	0.042	−0.012	−0.119***	0.646***	0.282***	0.377***	0.299***	0.471***	0.287***	—	
15	ROE (2022)	5.225	3.094	0.101**	−0.013	−0.027	0.068*	0.077*	0.002	−0.101**	0.546***	0.274***	0.400***	0.339***	0.440***	0.224***	0.649***	—

Note: N=881.
Abbreviation: SD, standard deviation.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

TABLE 3 | Process results: Firm performance.

Variables	Model 1 incremental innovative capability	Model 2 incremental innovative capability	Model 3 radical innovative capability	Model 4 radical innovative capability	Model 5 ROI (2021)	Model 6 ROI (2021)	Model 7 ROE (2021)	Model 8 ROE (2021)	Model 9 ROI (2022)	Model 10 ROI (2022)	Model 11 ROE (2022)	Model 12 ROE (2022)
Control and industry dummy variables												
Manufacturing	0.028 (1.910) [−0.001, 0.058]	0.028 (1.844) [−0.002, 0.057]	0.014 (1.648) [−0.003, 0.031]	0.014 (1.637) [−0.003, 0.031]	0.001 (0.445) [−0.005, 0.007]	−0.001 (−0.271) [−0.006, 0.005]	0.036 (3.034)** [0.013, 0.060]	0.031 (2.643)** [0.008, 0.054]	0.015 (0.265) [−0.095, 0.124]	−0.027 (−0.526) [−0.129, 0.075]	0.204 (2.057)* [0.009, 0.398]	0.124 (1.360) [−0.055, 0.303]
Firm age	0.014 (0.949) [−0.015, 0.043]	0.013 (0.844) [−0.017, 0.042]	−0.001 (−0.086) [−0.018, 0.016]	−0.002 (−0.264) [−0.019, 0.014]	−0.004 (−1.195) [−0.010, 0.002]	−0.004 (−1.542) [−0.010, 0.001]	0.010 (0.802) [−0.014, 0.033]	0.008 (0.668) [−0.015, 0.031]	−0.065 (−1.173) [−0.175, 0.044]	−0.080 (−1.538) [−0.181, 0.022]	0.068 (0.689) [−0.126, 0.262]	0.042 (0.462) [−0.137, 0.221]
Firm size	0.012 (0.903) [−0.014, 0.039]	0.012 (0.884) [−0.015, 0.039]	−0.005 (−0.590) [−0.020, 0.011]	−0.005 (−0.660) [−0.020, 0.010]	−0.003 (−0.969) [−0.008, 0.003]	−0.003 (−1.232) [−0.008, 0.002]	0.022 (1.972)* [0.001, 0.043]	0.021 (1.914) [−0.001, 0.042]	−0.029 (−0.576) [−0.130, 0.071]	−0.039 (−0.810) [−0.132, 0.055]	0.043 (0.470) [−0.135, 0.220]	0.027 (0.320) [−0.137, 0.191]
Exploration	−0.010 (−0.644) [−0.042, 0.021]	−0.010 (−0.636) [−0.042, 0.021]	0.062 (6.624)*** [0.044, 0.081]	0.062 (6.725)*** [0.044, 0.081]	0.003 (1.041) [−0.003, 0.010]	0.002 (0.550) [−0.005, 0.008]	0.013 (0.968) [−0.013, 0.038]	0.007 (0.527) [−0.019, 0.033]	0.062 (1.023) [−0.057, 0.182]	0.021 (0.353) [−0.095, 0.136]	0.142 (1.317) [−0.070, 0.354]	0.056 (0.538) [−0.147, 0.258]
Exploitation	−0.041 (−2.664)** [−0.071, −0.011]	−0.041 (−2.683)** [−0.071, −0.011]	0.073 (8.181)*** [0.055, 0.090]	0.072 (8.252)*** [0.055, 0.090]	−0.007 (−2.221)* [−0.013, −0.001]	−0.007 (−2.293)* [−0.013, −0.001]	0.006 (0.523) [−0.018, 0.031]	0.004 (0.279) [−0.022, 0.029]	−0.096 (−1.663) [−0.208, 0.017]	−0.114 (−1.971)* [−0.227, −0.001]	0.008 (0.082) [−0.192, 0.208]	−0.037 (−0.367) [−0.236, 0.161]
Environmental dynamism	0.025 (1.744) [−0.003, 0.053]	0.023 (1.578) [−0.006, 0.051]	0.002 (0.294) [−0.014, 0.019]	0.000 (0.022) [−0.016, 0.016]	0.002 (0.788) [−0.003, 0.008]	0.001 (0.292) [−0.005, 0.006]	0.003 (0.265) [−0.020, 0.026]	−0.001 (−0.046) [−0.023, 0.022]	0.002 (0.042) [−0.104, 0.108]	−0.026 (−0.525) [−0.125, 0.072]	−0.012 (−1.22) [−0.199, 0.176]	−0.064 (−0.731) [−0.238, 0.109]
Absorptive capacity	−0.016 (−1.234) [−0.043, 0.010]	−0.018 (−1.316) [−0.044, 0.009]	−0.002 (−0.219) [−0.017, 0.013]	−0.003 (−0.347) [−0.018, 0.012]	0.003 (1.172) [−0.002, 0.009]	0.004 (1.634) [−0.001, 0.009]	−0.002 (−0.211) [−0.023, 0.019]	0.000 (0.010) [−0.020, 0.021]	−0.137 (−2.746)** [−0.235, −0.039]	−0.118 (−2.546)* [−0.210, −0.027]	−0.212 (−2.387)* [−0.386, −0.038]	−0.177 (−2.166)* [−0.337, −0.017]

(Continues)

TABLE 3 | (Continued)

Variables	Model 1 incremental innovative capability	Model 2 incremental innovative capability	Model 3 radical innovative capability	Model 4 radical innovative capability	Model 5 ROI (2021)	Model 6 ROI (2021)	Model 7 ROE (2021)	Model 8 ROE (2021)	Model 9 ROI (2022)	Model 10 ROI (2022)	Model 11 ROE (2022)	Model 12 ROE (2022)
Direct effects												
Proactively developed organizational resilience capability	0.145 (5.244)*** [0.091, 0.199]	0.129 (4.160)*** [0.068, 0.189]	0.066 (4.121)*** [0.035, 0.097]	0.058 (3.245)** [0.023, 0.093]	0.061 (10.925)*** [0.050, 0.073]	0.051 (9.470)*** [0.040, 0.061]	0.304 (13.682)*** [0.260, 0.348]	0.277 (12.575)*** [0.234, 0.321]	2.561 (24.701)*** [2.358, 2.765]	2.352 (23.999)*** [2.159, 2.544]	3.424 (18.617)*** [3.063, 3.785]	3.030 (17.614)*** [2.693, 3.368]
Strategic HRM practices		0.031 (1.027) [−0.028, 0.089]		0.013 (0.777) [−0.020, 0.047]								
Incremental innovative capability						0.057 (7.230)*** [0.041, 0.072]		0.132 (4.108)*** [0.069, 0.195]		1.060 (7.445)*** [0.781, 1.340]		1.939 (7.756)*** [1.449, 2.430]
Radical innovative capability						0.036 (2.683)** [0.010, 0.063]		0.113 (2.037)* [0.004, 0.222]		0.845 (3.434)*** [0.362, 1.328]		1.718 (3.978)*** [0.870, 2.566]
Interaction effects												
Proactively developed organizational resilience capability × Strategic HRM practices		0.112 (2.273)* [0.015, 0.209]		0.126 (4.467)*** [0.071, 0.182]								
Regression model statistics												
R ²	0.051	0.058	0.242	0.260	0.128	0.232	0.200	0.239	0.427	0.506	0.308	0.416
F-value	5.833***	5.355***	34.754***	30.541***	16.029***	26.332***	27.318***	27.328***	81.198***	89.123***	48.405***	61.835***
Mediation analysis												
Effect coefficient												
Standard error												
t-value												
(X = Proactively developed organizational resilience capability; Y1 = ROI (2021); M1 = Incremental innovative capability; M2 = Radical innovative capability; 5000 bootstraps)												
Direct effect of X on Y1					0.051***	[0.040, 0.061]			0.005			9.470

(Continues)

TABLE 3 | (Continued)

Mediation analysis			
	Effect coefficient	Standard error	t-value
Indirect effect of X on Y1 by M1	0.008*** [0.0043, 0.0126]	0.002	
Indirect effect of X on Y1 by M2	0.002* [0.0001, 0.006]	0.001	
Different effects of X on Y1 by M1-M2	0.006* [0.0004, 0.011]	0.003	
Total effect of X on Y1	0.061*** [0.050, 0.073]	0.006	10.925
Direct effect of X on M1	0.145*** [0.091, 0.199]	0.028	5.244
Direct effect of X on M2	0.066*** [0.035, 0.097]	0.016	4.121
Standardized indirect effect b1	0.047*** [0.027, 0.068]	0.011	
Standardized indirect effect b2	0.014* [0.001, 0.033]	0.008	
Different effects of Standardized indirect effect b1–b2	0.033* [0.002, 0.062]	0.015	
Conclusion of PROCESS test		M1 Mediation effect: Confirmed M2 Mediation effect: Confirmed	
(X = Proactively developed organizational resilience capability; Y2 = ROE (2021); M1 = Incremental innovative capability; M2 = Radical innovative capability; 5000 bootstraps)			
Direct effect of X on Y2	0.277*** [0.234, 0.321]	0.022	12.575
Indirect effect of X on Y2 by M1	0.019** [0.008, 0.035]	0.007	
Indirect effect of X on Y2 by M2	0.007** [0.003, 0.013]	0.003	
Different effects of X on Y2 by M1-M2	0.012* [0.001, 0.027]	0.007	
Total effect of X on Y2	0.304*** [0.260, 0.348]	0.022	13.682
Direct effect of X on M1	0.145*** [0.091, 0.199]	0.028	5.244
Direct effect of X on M2	0.066*** [0.035, 0.097]	0.016	4.121
Standardized indirect effect b1	0.027*** [0.015, 0.040]	0.007	
Standardized indirect effect b2	0.010** [0.004, 0.020]	0.004	
Different effects of Standardized indirect effect b1–b2	0.016** [0.001, 0.031]	0.007	
Conclusion of PROCESS test		M1 Mediation effect: Confirmed M2 Mediation effect: Confirmed	
(X = Proactively developed organizational resilience capability; Y3 = ROI (2022); M1 = Incremental innovative capability; M2 = Radical innovative capability; 5000 bootstraps)			
Direct effect of X on Y3	2.352*** [2.159, 2.544]	0.098	23.999
Indirect effect of X on Y3 by M1	0.154*** [0.081, 0.239]	0.040	

(Continues)

TABLE 3 | (Continued)

Mediation analysis			
	Effect coefficient	Standard error	t-value
Indirect effect of X on Y3 by M2	0.056* [0.009, 0.114]	0.026	
Different effects of X on Y3 by M1-M2	0.098* [0.002, 0.203]	0.051	
Total effect of X on Y3	2.561*** [2.358, 2.765]	0.104	24.701
Direct effect of X on M1	0.145*** [0.091, 0.199]	0.028	5.244
Direct effect of X on M2	0.066*** [0.035, 0.097]	0.016	4.121
Standardized indirect effect b1	0.039*** [0.021, 0.059]	0.010	
Standardized indirect effect b2	0.014* [0.002, 0.028]	0.006	
Different effects of Standardized indirect effect b1–b2	0.025* [0.001, 0.051]	0.013	
Conclusion of PROCESS test		M1 Mediation effect: Confirmed M2 Mediation effect: Confirmed	
(X = Proactively developed organizational resilience capability; Y4 = ROE (2022); M1 = Incremental innovative capability; M2 = Radical innovative capability; 5000 bootstraps)			
Direct effect of X on Y4	3.030*** [2.693, 3.368]	0.172	17.614
Indirect effect of X on Y4 by M1	0.281*** [0.153, 0.427]	0.070	
Indirect effect of X on Y4 by M2	0.113** [0.040, 0.202]	0.042	
Different effects of X on Y4 by M1-M2	0.168* [0.015, 0.331]	0.081	
Total effect of X on Y4	3.4244*** [3.063, 3.785]	0.184	18.617
Direct effect of X on M1	0.145*** [0.091, 0.199]	0.028	5.244
Direct effect of X on M2	0.066*** [0.035, 0.097]	0.016	4.121
Standardized indirect effect b1	0.044*** [0.025, 0.064]	0.010	
Standardized indirect effect b2	0.018** [0.006, 0.032]	0.007	
Different effects of Standardized indirect effect b1–b2	0.026* [0.003, 0.049]	0.012	
Conclusion of PROCESS test		M1 Mediation effect: Confirmed M2 Mediation effect: Confirmed	

Note: We report standardized regression coefficients with t-values in parentheses. Values in square brackets represent bootstrapped 95% Confidence Interval values (unstandardized coefficients) [LL, UL].

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

TABLE 4 | Moderated mediation model test: Conditional indirect effects of proactively developed organizational resilience capability and firm performance.

Moderator: HRM practices ^a	Effect coefficient	Standard error	95% CI [LL, UL]
Conditional indirect effect: Proactively developed organizational resilience capability → incremental innovative capability → firm performance			
<i>ROI (2021)</i>			
Index of moderated mediation	0.006*	0.004	[0.001, 0.015]
−0.501	0.004	0.003	[−0.001, 0.009]
0.000	0.007***	0.002	[0.003, 0.012]
0.501	0.010***	0.003	[0.005, 0.017]
<i>ROE (2021)</i>			
Index of moderated mediation	0.015*	0.010	[0.001, 0.039]
−0.501	0.010	0.006	[−0.002, 0.023]
0.000	0.017*	0.007	[0.006, 0.032]
0.501	0.024*	0.010	[0.009, 0.048]
<i>ROI (2022)</i>			
Index of moderated mediation	0.119*	0.069	[0.012, 0.280]
−0.501	0.077	0.046	[−0.018, 0.162]
0.000	0.136***	0.041	[0.063, 0.220]
0.501	0.196***	0.061	[0.093, 0.331]
<i>ROE (2022)</i>			
Index of moderated mediation	0.217*	0.121	[0.016, 0.489]
−0.501	0.141	0.086	[−0.045, 0.303]
0.000	0.250***	0.072	[0.114, 0.392]
0.501	0.358***	0.101	[0.179, 0.572]
Conditional indirect effect: Proactively developed organizational resilience capability → Radical innovative capability → Firm performance			
<i>ROI (2021)</i>			
Index of moderated mediation	0.005*	0.003	[0.0003, 0.010]
−0.501	−0.000	0.001	[−0.002, 0.002]
0.000	0.002*	0.001	[0.0001, 0.005]
0.501	0.004*	0.003	[0.0003, 0.010]
<i>ROE (2021)</i>			
Index of moderated mediation	0.014**	0.005	[0.006, 0.024]
−0.501	−0.000	0.003	[−0.006, 0.004]
0.000	0.007*	0.003	[0.002, 0.013]
0.501	0.014***	0.005	[0.006, 0.024]
<i>ROI (2022)</i>			
Index of moderated mediation	0.107*	0.051	[0.020, 0.219]
−0.501	−0.005	0.019	[−0.050, 0.030]
0.000	0.049*	0.025	[0.007, 0.102]
0.501	0.102*	0.047	[0.019, 0.202]

(Continues)

TABLE 4 | (Continued)

Moderator: HRM practices ^a	Effect coefficient	Standard error	95% CI [LL, UL]
ROE (2022)			
Index of moderated mediation	0.217**	0.081	[0.074, 0.392]
−0.501	−0.010	0.038	[−0.095, 0.060]
0.000	0.099*	0.043	[0.024, 0.189]
0.501	0.208**	0.074	[0.071, 0.359]

^aValues are presented in order −1 standard deviation, mean, +1 standard deviation.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

4.2 | Post Hoc Analysis

To assess the robustness of the model, the PROCESS approach was used to analyze post-pandemic firm performance using the 2022 data. Regression results in Models 9–12 in Table 3 provide further support for H1–H7 outcomes when using 2022 ROI and 2022 ROE performance as the dependent variable. Moreover, analyzing the conditional values under PROCESS for low (−1 standard deviation), mean, and high (+1 standard deviation) values of strategic HRM practices provides additional insights into this interaction effect (Table 4). We found that during the pandemic (2021 ROI and 2021 ROE) and in the post-pandemic year (2022 ROI and 2022 ROE), the mediating effect of incremental innovative capability between positively developed organizational resilience capability and firm performance was higher than the mediating effect of radical innovative capability.

5 | Discussion and Conclusions

5.1 | Implications for Theory and Scholarship

In an ever-changing and increasingly complex world fraught with crises, adaptability is now the new normal for innovation management. Various concepts of adaptability exist, and resilience is an essential feature (Todt et al. 2018) in understanding how innovation activities help firms convert their resilience-building efforts into future positive outcomes when crises occur (Kim 2021). As a capability, organizational resilience—positive adaptation despite facing adversity (Sutcliffe and Vogus 2003)—can be proactively or reactively developed (Jia et al. 2020; Williams et al. 2017). However, theory remains fragmented regarding how firms leverage a proactively developed organizational resilience capability to adapt to crises and attain positive outcomes, as demonstrated by firm results (Van Der Vegt et al. 2015; Jia et al. 2020). In our study, we address the implementation, application, and consequences of resilience as an adaptability concept, focusing on when, why, and what is needed for a proactively developed organizational resilience capability to yield beneficial outcomes. Our findings point to two key themes: (1) how a proactively developed organizational resilience capability is directed to promote adaptability; and (2) how this proactively developed organizational resilience capability not only facilitates recovery but also continuously drives

adaptive capacity. Next, we discuss each point in turn, along with the contributions related to our findings.

First, as shown by our main and post hoc test results, the effectiveness of the capability is evident in both the immediacy of a crisis and in its aftermath (or later phases). By focusing on two types of innovative capabilities, our study reveals new mechanisms and nuances in the relationship between organizational resilience capability and firm performance (Duchek 2020). Incremental and radical innovative capabilities represent key mechanisms in this relationship. These two types of innovative capabilities uniquely channel the resources and routines made available by a proactively developed organizational resilience capability, providing distinct paths to firm performance. This allows for a more accurate explanation of how firms perform during a crisis or across its different phases. The latter is particularly important because it recognizes that the course of a crisis places different demands on companies. Since crises often unfold unpredictably and dynamically, adaptability is essential (Jong 2025). This is supported by innovative capabilities according to our theoretical framework and empirical findings.

Furthermore, our additional tests in this context show that the magnitude of the effect is stronger for incremental innovative capability than for radical innovative capability. This suggests that the applications achieved by each innovative capability in channeling a firm's proactively developed organizational resilience capability differ not only in content, but also in how their outcomes change the firm's performance limits. It indicates that activities related to incremental innovative capabilities are somewhat more effective than those related to radical innovative capabilities in the short term, particularly in a crisis. During a crisis, it may be desirable to leverage the firm's existing knowledge base. This is an important new insight because it explains which firms are best equipped to make quick and decisive decisions in a crisis. It also highlights the benefit of preparing for crises (Pearson and Clair 1998). Although the literature on organizational resilience tends to equate this preparedness with crisis management, our study shows that investment in innovative capabilities is also necessary to realize the value of proactively developed organizational resilience.

However, we caution against pursuing a single innovative capability strategy or a one-size-fits-all strategy. Radical innovative capability is also necessary and invaluable in the long term,

TABLE 5 | Hypotheses test results.

Hypothesis	Outcome
H1: A proactively developed organizational resilience capability has a positive effect on firm performance.	Supported
H2: A firm's incremental innovative capability positively mediates the positive effect of a proactively developed organizational resilience capability on firm performance.	Supported
H3: A firm's radical innovative capability positively mediates the positive effect of a proactively developed organizational resilience capability on firm performance.	Supported
H4: A firm's strategic HRM practices negatively moderate the effect of a proactively developed organizational resilience capability on incremental innovative capability.	Not supported
H5: A firm's strategic HRM practices positively moderate the effect of a proactively developed organizational resilience capability on radical innovative capability.	Supported
H6: Strategic HRM practices negatively moderate the indirect effect of incremental innovative capability on firm performance.	Not supported
H7: Strategic HRM practices positively moderate the indirect effect of radical innovative capability on firm performance.	Supported

as it channels a proactively developed organizational resilience capability in a way that improves firm performance. This is because severe crises and adversities can render existing products, services, or business models obsolete (Clauss et al. 2022; Saebi et al. 2017). Therefore, our results emphasize the importance of developing both types of innovative capability to prepare for a “new normal” world characterized by constant uncertainty (Krammer 2022). These insights advance debates on the relationship between organizational resilience capability and firm performance, as well as the outcomes of these activities (Linnenluecke 2017; Duchek 2020). As a result, decisions about allocating scarce resources to strengthen organizational resilience can be made more effectively, showing how a proactively developed organizational resilience capability fosters sustained adaptability during new crises through innovative capabilities.

Second, our examination of strategic HRM practices and their impact on different innovative capabilities and, thus, on the organizational resilience capability–firm performance relationship provides a relevant basis for understanding not only how a proactively developed organizational resilience capability enables recovery but also serves as a continuous driver of adaptive capacity in organizations. Our findings expand the literature on organizational resilience (Lengnick-Hall et al. 2011) by demonstrating that more strategic HRM efforts strengthen

the link between organizational resilience capability and firm performance, whereas also enhancing and amplifying the intermediate effects of each innovative capability. Although traditional HRM practices support an organization's efforts to deploy its human resources efficiently and effectively, strategic HRM practices focus on recruitment, compensation, job, task, and development programs that are critical to strategy implementation and strategic change (Huselid 1995). Essentially, organizational resilience involves proactively initiating and handling change during a crisis or adversity. This includes mobilizing resilience resources and routines to not only address the threats posed by the crisis but also to view it as an opportunity for long-term organizational growth (Vogus and Sutcliffe 2007). However, our theoretical framework and empirical findings show that the value and benefits of investing in proactively developing organizational resilience capability for future crises depend on strategic HRM practices that effectively influence and shape the skills and behavior of employees, or their human capital. In turn, we contribute a human perspective to the literature on organizational resilience and crisis management, complementing the resource–capability perspective and moving beyond the focus on types of capabilities as the sole solution (Williams et al. 2017).

We show that the effectiveness with which the organization channels its human capital resources through strategic HRM practices affects the overall organizational resilience capability–innovative capability–firm performance linkage, suggesting that strategic HRM practices play a far more significant role in theory and practice than addressed in the literature to date (Lengnick-Hall et al. 2011; Donate et al. 2016). By focusing attention on employees and the strategic HRM practices that shape and channel their behavior, we reveal a new perspective on how firms can continuously benefit from investing in the development of proactive organizational resilience capability before the next crisis strikes.

Reactive organizational resilience capability developed in the middle of a crisis channels human capital to firefight adversities in the moment (e.g., Duchek 2020; Jia et al. 2020). In these instances, HRM practices are likely more generic (more traditional) and may explain why individuals and teams struggle to make sense of the crisis when they rely on a reactive approach (Williams et al. 2017). Our study advances theorizing by revealing contingent relationships between a proactive investment orientation in organizational resilience (Van Der Vegt et al. 2015) and strategic HRM practices, which serve as a continuous driver of adaptability in organizations.

5.2 | Managerial Implications

The results show that, in times of crisis, the firm and its members learn abruptly whether it is ready to cope with a crisis and has the necessary organizational resilience capability to survive and the associated capabilities to thrive. Because crises are heterogeneous, the response options available to the firm depend on its innovative capabilities. Consequently, managers must undertake two immediate actions to set up their businesses to survive and thrive in future crises. First, managers must act proactively to build and nurture a post-crisis organizational resilience capability and invest in it with foresight. Learning lessons from past

crises is only one part of this solution. Concurrently, managers should establish communication, personnel, and readiness routines to ensure the firm has the necessary processes in place to enact responses and achieve recovery.

Second, managers should invest in dual innovative capabilities to ensure that the organization has in place more response option-generating routines and processes to enable adjustments in the face of crisis and adversity. It is advised that managers proactively develop and maintain a comprehensive innovative capability that encompasses both types of innovative capabilities (incremental and radical), as they cannot know in advance which of them will be most important to use or when. Without investing in either or both innovative capabilities, the knowledge and expertise generated from past crises will be less effective. The organization will lack the more advanced innovative capabilities needed to initiate transformation and actively progress out of the crisis or adversity at hand. The organization would thus only react and not proactively act.

The recognition that different types of innovative capability contribute differently to the organizational resilience capability–firm performance relationship can help decision-makers develop and maintain improved strategies for proactive investment in the organization and human resources. For example, investing in the agility and flexibility needed to make decisions and mobilize existing innovative capabilities at short notice is necessary to ensure a proactively developed organizational resilience capability is channeled quickly to secure the firm's performance. Organizations should actively support ongoing investments in behavioral and cognitive skills that facilitate situational responses during crises. Especially concerning organizational members, a human capital that learns and unlearns quickly will recognize and understand the relevance of existing knowledge and the value of completely new knowledge. In close coordination with the organization's leadership, the HRM function plays a crucial role. Managers should prioritize developing and implementing strategic HRM practices to support these initiatives.

To gather relevant information on the firm's current readiness for adversity and the state of its organizational resilience capability, resilience-oriented health checks should be conducted. This can be achieved through surveys or interviews with members of the organization to understand the organization's resilience in general and its capability to cope with crises and adversity in particular. In this context, managers need to audit what measures are in place and determine whether they are effective. If so, it would be useful to understand what these measures entail and who initiates and controls them. The firm's ability to assess and adapt to changing situations would also require an assessment alongside this audit.

5.3 | Limitations and Future Research

Several limitations provide opportunities for future research. First, data collection took place at a specific time, which may limit the transferability of our findings to other adversities and crises. Survival may have been the main objective for many firms during this period. Future research could examine the post-crisis period to determine whether and how firms changed

their behavior. Second, building and maintaining organizational resilience capability and innovative capabilities are dynamic processes. Future research could investigate what firms experience in crises and how those experiences subsequently impact relevant organizational processes. For example, have companies' strategic HRM practices changed because of the financial adversity caused by a crisis? Our results suggest that adjustments in this area can affect various innovative capabilities, crisis recovery, and subsequent levels of firm performance. Third, the strength and magnitude of the studied relationships could only be determined at two different points in the pandemic. However, these relationships might change over time. Further longitudinal studies would help deepen our understanding of mechanisms and contingencies in the relationship between proactively developed organizational resilience capability and firm performance. Such studies would also provide information on the long-term results of developing this capability.

6 | Conclusion

The relationship between proactively developed organizational resilience capability and firm performance has received increasing attention. Yet, our understanding of its intermediate mechanisms and contingencies is thin. By collecting data at different points in time around a crisis, we reveal a series of important effects that strengthen the building blocks for a capability-based theory of organizational resilience. Understanding the intermediate mechanisms linking proactively developed organizational resilience capability to firm performance enables firms to better respond to threatening events. Developing and maintaining a comprehensive innovative capability, comprising incremental and radical innovative capabilities, is an essential toolbox of response options and measures that helps firms make more informed decisions and supports them in flexible problem intervention. Considering innovative capabilities in the organizational resilience capability–firm performance relationship thus represents a valuable extension of the current discussion in this regard. Understanding the role of strategic versus traditional HRM practices in this context allows us to draw conclusions about why some organizations perform better than others, even in times of crisis.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** Appendix.

Appendix A

Measurement Assessment

Construct	Measurement item	Standardized factor loadings	CR	AVE
Proactively developed organizational resilience capability	This organization has worked on creating awareness of the pandemic and the consequences of the pandemic on the business.	0.834	0.968	0.717
	This organization analyzes and assesses the impact of the pandemic on the business.	0.856		
	Since the beginning of the pandemic, this organization is trying to improve its disruption prevention capabilities.	0.842		
	This organization is currently engaged in contingency planning to prepare for potential future disruptions due to the pandemic.	0.795		
	This organization was able to quickly recognize that there is a threatening situation due to the pandemic.	0.889		
	This organization is able to gather and interpret information cues to gauge the magnitude, location, and cause of the pandemic.	0.855		
	This organization is able to quickly identify, formulate, and evaluate a set of possible responses to the pandemic.	0.878		
	This organization is able to quickly implement responses and restore business standards to minimize business impact of the pandemic.	0.868		
	This organization can quickly organize a formal response team of key personnel to find solutions to business issues caused by the pandemic.	0.824		
	This organization has an effective communication strategy internally and externally for managing the impacts of the pandemic.	0.842		
	This organization is very successful at dealing with crises, including addressing public relations issues that can arise from this pandemic.	0.806		
	This organization has taken immediate action to mitigate the effects of the pandemic despite the short-term costs.	0.865		

Construct	Measurement item	Standardized factor loadings	CR	AVE
Strategic HRM practices			0.945	0.713
	Match the characteristics of managers to the strategic plan of the firm.	0.854		
	Identify managerial characteristics necessary to run the firm in the long term.	0.816		
	Modify the compensation system to encourage managers to achieve long-term strategic objectives.	0.733		
	Change staffing patterns to help implement business or corporate strategies.	0.894		
	Evaluate key personnel based on their potential for carrying out strategic goals.	0.896		
	Conduct job analyses based on what the job may entail in the future.	0.836		
	Conduct development programs designed to support strategic changes.	0.869		
Incremental innovative capability			0.855	0.664
	Innovations that reinforce your prevailing product/ service lines.	0.909		
	Innovations that reinforce your existing expertise in prevailing products/services.	0.741		
	Innovations that reinforce how you currently compete.	0.786		
Radical innovative capability			0.889	0.729
	Innovations that make your prevailing product/ service lines obsolete.	0.901		
	Innovations that fundamentally change your prevailing products/services.	0.906		
	Innovations that make your existing expertise in prevailing products/services obsolete.	0.745		
Innovative capability				
Exploration			0.899	0.562
	Our firm accepts demands that go beyond existing products and services.	0.674		
	We invent new products and services.	0.811		
	We experiment with new products and services in our local market.	0.804		
	We commercialize products and services that are completely new to our firm.	0.761		
	We frequently utilize new opportunities in new markets.	0.818		
	Our firm regularly uses new distribution channels.	0.751		
	We regularly search for and approach new clients in new markets.	0.604		
Exploitation			0.840	0.432
	We frequently refine the provision of existing products and services.	0.647		
	We regularly implement small adaptations to existing products and services.	0.689		

Construct	Measurement item	Standardized factor loadings	CR	AVE
Environmental dynamism	We introduce improved, but existing products and services for our local market.	0.728	0.807	0.457
	We improve our provision's efficiency of products and services.	0.529		
	We increase economies of scales in existing markets.	0.724		
	Our firm expands services for existing clients.	0.665		
	Lowering costs of internal processes is an important objective.	0.595		
	Environmental changes in our local market are intense.	0.749		
	Our clients regularly ask for new products and services.	0.672		
Absorptive capacity	In our local market, changes are taking place continuously.	0.701	0.965	0.570
	In a year, nothing has changed in our market.	0.639		
	In our market, the volumes of products and services to be delivered change fast and often.	0.610		
	Our firm has frequent interactions with corporate headquarters to acquire new knowledge.	0.793		
	Employees of our firm regularly visit other branches.	0.713		
	We collect industry information through informal means (e.g., lunch with industry friends, talks with trade partners).	0.731		
	Other divisions of our company are hardly visited.	0.669		
	Our firm periodically organizes special meetings with customers or third parties to acquire new knowledge.	0.742		
	Employees regularly approach third parties such as accountants, consultants, or tax consultants.	0.509		
	We are slow to recognize shifts in our market (e.g., competition, regulation, demography).	0.800		
	New opportunities to serve our clients are quickly understood.	0.751		
	We quickly analyze and interpret changing market demands.	0.652		
	Our firm regularly considers the consequences of changing market demands in terms of new products and services.	0.821		
	Employees record and store newly acquired knowledge for future reference.	0.829		
	Our firm quickly recognizes the usefulness of new external knowledge to existing knowledge.	0.806		
	Employees hardly share practical experiences.	0.879		
	We laboriously grasp the opportunities for our firm from new external knowledge.	0.827		
	Our firm periodically meets to discuss consequences of market trends and new product development.	0.616		

Construct	Measurement item	Standardized factor loadings	CR	AVE
	It is clearly known how activities within our firm should be performed.	0.724		
	Client complaints fall on deaf ears in our firm.	0.751		
	Our firm has a clear division of roles and responsibilities.	0.838		
	We constantly consider how to better exploit knowledge.	0.852		
	Our firm has difficulty implementing new products and services.	0.815		
	Employees have a common language regarding our products and services.	0.628		

Appendix B

Robustness Check: CMV

Variables	Model 1 incremental innovative capability	Model 2 incremental innovative capability	Model 3 radical innovative capability	Model 4 radical innovative capability	Model 5 ROI (2021)	Model 6 ROI (2021)	Model 7 ROE (2021)	Model 8 ROE (2021)	Model 9 ROI (2022)	Model 10 ROI (2022)	Model 11 ROE (2022)	Model 12 ROE (2022)
Control and industry dummy variables												
Manufacturing	0.028 (1.869) [−0.001, 0.057]	0.027 (1.803) [−0.002, 0.056]	0.014 (1.644) [−0.003, 0.031]	0.014 (1.633) [−0.003, 0.031]	0.002 (0.490) [−0.005, 0.007]	−0.001 (−0.215) [−0.006, 0.005]	0.036 (3.035)** [0.013, 0.060]	0.031 (2.651)** [0.008, 0.054]	0.017 (0.299) [−0.093, 0.126]	−0.025 (−0.480) [−0.127, 0.077]	0.207 (2.090)* [0.013, 0.401]	0.128 (1.407) [−0.051, 0.307]
Firm age	0.015 (0.992) [−0.014, 0.044]	0.013 (0.887) [−0.016, 0.042]	−0.001 (−0.084) [−0.018, 0.016]	−0.002 (−0.261) [−0.019, 0.015]	−0.004 (−1.243) [−0.010, 0.002]	−0.005 (−1.612) [−0.010, 0.001]	0.010 (0.797) [−0.014, 0.033]	0.008 (0.655) [−0.015, 0.031]	−0.067 (−1.210) [−0.177, 0.042]	−0.083 (−1.595) [−0.184, 0.019]	0.065 (0.653) [−0.129, 0.259]	0.037 (0.406) [−0.142, 0.215]
Firm size	0.012 (0.911) [−0.014, 0.039]	0.012 (0.891) [−0.015, 0.039]	−0.005 (−0.590) [−0.020, 0.011]	−0.005 (−0.659) [−0.021, 0.010]	−0.003 (−0.978) [−0.008, 0.003]	−0.003 (−1.250) [−0.008, 0.002]	0.022 (1.971)* [0.0001, 0.043]	0.021 (1.910) [−0.001, 0.042]	−0.030 (−0.582) [−0.130, 0.071]	−0.039 (−0.824) [−0.132, 0.054]	0.042 (0.464) [−0.136, 0.220]	0.026 (0.308) [−0.138, 0.189]
Exploration	−0.011 (−0.687) [−0.043, 0.021]	−0.011 (−0.680) [−0.043, 0.021]	0.062 (6.615)** [0.044, 0.081]	0.062 (6.715)** [0.044, 0.081]	0.004 (1.089) [−0.003, 0.010]	0.002 (0.631) [−0.004, 0.008]	0.013 (0.970) [−0.013, 0.038]	0.007 (0.540) [−0.019, 0.033]	0.064 (1.060) [−0.055, 0.184]	0.025 (0.420) [−0.091, 0.140]	0.146 (1.352) [−0.066, 0.358]	0.062 (0.604) [−0.140, 0.265]
Exploitation	−0.040 (−2.633)** [−0.070, −0.010]	−0.041 (−2.652)** [−0.071, −0.011]	0.073 (8.175)** [0.055, 0.090]	0.072 (8.247)** [0.055, 0.090]	−0.007 (−2.256)* [−0.013, −0.001]	−0.007 (−2.311)* [−0.014, −0.001]	0.006 (0.519) [−0.018, 0.031]	0.004 (0.277) [−0.022, 0.029]	−0.097 (−1.690) [−0.210, 0.016]	−0.114 (−1.985)* [−0.227, −0.001]	0.006 (0.056) [−0.194, 0.206]	−0.038 (−0.379) [−0.237, 0.160]
Environmental dynamism	0.026 (1.803) [−0.002, 0.054]	0.024 (1.638) [−0.005, 0.052]	0.003 (0.296) [−0.014, 0.019]	0.000 (0.025) [−0.016, 0.016]	0.002 (0.721) [−0.004, 0.008]	0.001 (0.195) [−0.005, 0.006]	0.003 (0.259) [−0.020, 0.026]	−0.001 (−0.063) [−0.023, 0.022]	−0.001 (−0.010) [−0.107, 0.105]	−0.030 (−0.606) [−0.129, 0.068]	−0.016 (−0.171) [−0.204, 0.172]	−0.072 (−0.810) [−0.245, 0.102]
Absorptive capacity	−0.015 (−1.101) [−0.041, 0.012]	−0.016 (−1.182) [−0.042, 0.010]	−0.002 (−0.212) [−0.017, 0.014]	−0.003 (−0.338) [−0.018, 0.013]	0.003 (1.026) [−0.003, 0.008]	0.004 (1.445) [−0.001, 0.009]	−0.002 (−0.221) [−0.024, 0.019]	0.000 (−0.023) [−0.021, 0.020]	−0.143 (−2.844)** [−0.241, −0.044]	−0.126 (−2.692)** [−0.217, −0.034]	−0.221 (−2.482)* [−0.396, −0.046]	−0.189 (−2.312)* [−0.350, −0.029]
Work life balance	−0.018 (−1.371) [−0.044, 0.008]	−0.018 (−1.382) [−0.044, 0.008]	−0.001 (−0.061) [−0.016, 0.015]	−0.001 (−0.077) [−0.015, 0.014]	0.004 (1.514) [−0.001, 0.009]	0.005 (2.029)* [0.0002, 0.010]	0.001 (0.120) [−0.020, 0.022]	0.004 (0.358) [−0.017, 0.024]	0.058 (1.169) [−0.039, 0.155]	0.078 (1.687) [−0.013, 0.168]	0.099 (1.127) [−0.074, 0.272]	0.135 (1.673) [−0.024, 0.294]
Direct effects												
Proactively developed organizational resilience capability	0.147 (5.312)** [0.093, 0.201]	0.131 (4.223)** [0.070, 0.192]	0.066 (4.116)** [0.035, 0.097]	0.058 (3.243)** [0.023, 0.093]	0.061 (10.838)** [0.050, 0.072]	0.050 (9.351)** [0.040, 0.061]	0.304 (13.648)** [0.260, 0.347]	0.277 (12.526)** [0.234, 0.320]	2.555 (24.609)** [2.351, 2.758]	2.342 (23.884)** [2.150, 2.534]	3.413 (18.535)** [3.052, 3.775]	3.013 (17.503)** [2.675, 3.351]
HRM practices	0.031 (1.026) [−0.028, 0.089]	0.031 (1.026) [−0.028, 0.089]	0.013 (0.776) [−0.020, 0.047]	0.013 (0.776) [−0.020, 0.047]								
Incremental innovative capability						0.057 (7.343)** [0.042, 0.073]	0.132 (4.119)** [0.069, 0.195]			1.074 (7.534)** [0.794, 1.353]		1.962 (7.844)** [1.471, 2.453]

Variables	Model 1 incremental innovative capability	Model 2 incremental innovative capability	Model 3 radical innovative capability	Model 4 radical innovative capability	Model 5 ROI (2021)	Model 6 ROI (2021)	Model 7 ROE (2021)	Model 8 ROE (2021)	Model 9 ROI (2022)	Model 10 ROI (2022)	Model 11 ROE (2022)	Model 12 ROE (2022)
Radical innovative capability						0.035 (2.629)** [0.009, 0.062]		0.112 (2.025)* [0.003, 0.221]		0.833 (3.388)*** [0.350, 1.316]		1.698 (3.932)*** [0.850, 2.545]
Interaction effects												
Proactively developed organizational resilience capability × HRM practices		0.112 (2.279)* [0.016, 0.209]		0.126 (4.464)*** [0.071, 0.182]								
Regression model statistics												
R ²	0.053	0.060	0.242	0.260	0.131	0.236	0.200	0.239	0.428	0.508	0.309	0.417
F-Value	5.399***	5.046***	30.858***	27.734***	14.524***	24.398***	24.257***	24.831***	72.358***	81.452***	43.181***	56.584***
Mediation analysis												
Effect coefficient												
Standard error												
t-value												
(X = Proactively developed organizational resilience capability; Y1 = ROI (2021); M1 = Incremental innovative capability; M2 = Radical innovative capability; 5000 bootstraps)												
Direct effect of X on Y1					0.050*** [0.040, 0.061]				0.005			9.351
Indirect effect of X on Y1 by M1					0.008*** [0.005, 0.013]				0.002			
Indirect effect of X on Y1 by M2					0.002* [0.0001, 0.006]				0.001			
Different effects of X on Y1 by M1-M2					0.006* [0.001, 0.011]				0.003			
Total effect of X on Y1					0.061*** [0.050, 0.072]				0.006			10.838
Direct effect of X on M1					0.147*** [0.093, 0.201]				0.028			5.312
Direct effect of X on M2					0.066*** [0.035, 0.097]				0.016			4.116
Standardized indirect effect b1					0.048*** [0.028, 0.070]				0.011			
Standardized indirect effect b2					0.013* [0.001, 0.033]				0.008			
Different effects of Standardized indirect effect b1–b2					0.035* [0.004, 0.063]				0.015			

Mediation analysis			
	Effect coefficient	Standard error	t-value
Conclusion of PROCESS test		M1 Mediation effect: Confirmed M2 Mediation effect: Confirmed	
(X = Proactively developed organizational resilience capability; Y2 = ROE (2021); M1 = Incremental innovative capability; M2 = Radical innovative capability; 5000 bootstraps):			
Direct effect of X on Y2	0.277*** [0.234, 0.320]	0.022	12.526
Indirect effect of X on Y2 by M1	0.019** [0.008, 0.035]	0.007	
Indirect effect of X on Y2 by M2	0.007* [0.003, 0.013]	0.003	
Different effects of X on Y2 by M1-M2	0.012* [0.001, 0.028]	0.007	
Total effect of X on Y2	0.304*** [0.260, 0.347]	0.022	13.648
Direct effect of X on M1	0.147*** [0.093, 0.201]	0.028	5.312
Direct effect of X on M2	0.066*** [0.035, 0.097]	0.016	4.116
Standardized indirect effect b1	0.027*** [0.015, 0.040]	0.006	
Standardized indirect effect b2	0.010* [0.004, 0.020]	0.004	
Different effects of Standardized indirect effect b1-b2	0.017* [0.001, 0.031]	0.008	
Conclusion of PROCESS test		M1 Mediation effect: Confirmed M2 Mediation effect: Confirmed	
(X = Proactively developed organizational resilience capability; Y3 = ROI (2022); M1 = Incremental innovative capability; M2 = Radical innovative capability; 5000 bootstraps):			
Direct effect of X on Y3	2.342*** [2.150, 2.534]	0.098	23.884
Indirect effect of X on Y3 by M1	0.158*** [0.082, 0.248]	0.042	
Indirect effect of X on Y3 by M2	0.055* [0.008, 0.111]	0.026	
Different effects of X on Y1 by M1-M2	0.103* [0.002, 0.214]	0.053	
Total effect of X on Y3	2.555*** [2.351, 2.758]	0.104	24.609
Direct effect of X on M1	0.147*** [0.093, 0.201]	0.028	5.312

Mediation analysis			
	Effect coefficient	Standard error	t-value
Direct effect of X on M2	0.066*** [0.035, 0.097]	0.016	4.116
Standardized indirect effect b1	0.040*** [0.021, 0.061]	0.010	
Standardized indirect effect b2	0.014* [0.002, 0.028]	0.007	
Different effects of Standardized indirect effect b1–b2	0.026* [0.001, 0.054]	0.013	
Conclusion of PROCESS test	M1 Mediation effect: Confirmed M2 Mediation effect: Confirmed		
(X = Proactively developed organizational resilience capability; Y4 = ROE (2022); M1 = Incremental innovative capability; M2 = Radical innovative capability; 5000 bootstraps)			
Direct effect of X on Y4	3.013*** [2.675, 3.351]	0.172	17.503
Indirect effect of X on Y4 by M1	0.288*** [0.162, 0.434]	0.070	
Indirect effect of X on Y4 by M2	0.112** [0.037, 0.199]	0.042	
Different effects of X on Y4 by M1-M2	0.176* [0.022, 0.348]	0.082	
Total effect of X on Y4	3.413*** [3.052, 3.775]	0.184	18.535
Direct effect of X on M1	0.147*** [0.093, 0.201]	0.028	5.312
Direct effect of X on M2	0.066*** [0.035, 0.097]	0.016	4.116
Standardized indirect effect b1	0.045* [0.027, 0.065]	0.010	
Standardized indirect effect b2	0.017** [0.006, 0.032]	0.007	
Different effects of Standardized indirect effect b1–b2	0.028* [0.004, 0.052]	0.012	
Conclusion of PROCESS test	M1 Mediation effect: Confirmed M2 Mediation effect: Confirmed		

Note: Table. Process results: Firm performance. We report standardized regression coefficients with t-values in parentheses. Values in square brackets represent bootstrapped 95% Confidence Interval values (unstandardized coefficients) [LL, UL].

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.