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## Differing associations between organizational training types and operational resilience

### **Abstract**

**Purpose** – How and when organizational training relates to operational resilience remains under-explored empirically, despite a growing body of literature suggesting that human capital development is essential for enhancing operational resilience. To address this limitation, this study examines how two forms of organizational training—dynamic and ordinary capability training—relate to operational resilience under differing levels of job autonomy.

**Design/methodology/approach** – The study uses the ability-motivation-opportunity theory to develop hypotheses regarding how each type of organizational training relates to operational resilience and how job autonomy moderates these relationships. Survey data from 259 firms in Ghana were analyzed using covariance-based structural equation modeling to test the hypotheses.

**Findings** – The results reveal that the relationship between organizational training and operational resilience varies by training type and level of job autonomy. Specifically, compared to ordinary capability training, dynamic capability training has a stronger positive association with operational resilience. The positive relationship between dynamic capability training and operational resilience is weaker in high than low job autonomy conditions. Conversely, ordinary capability training has a stronger positive relationship with operational resilience in high than low job autonomy conditions.

**Originality** – This study elaborates on the underdeveloped literature on the link between human capital development and organizational resilience outcomes. Rather than assuming homogeneity in organizational training, this study reveals distinct ways in which dynamic and ordinary capability training relate to operational resilience under varying levels of job autonomy.

**Keywords:** Human capital development, Ordinary and dynamic capabilities, Organizational resilience, Autonomy, Developing country

**Article classification:** Research paper

## 1. Introduction

Industry and research interest in operational resilience has surged following recent global supply chain disruptions, such as the COVID-19 pandemic and the Russia-Ukraine conflict (Zheng and Lin, 2024; Essuman *et al.*, 2023). Operational resilience, the ability of a firm's operations to absorb and recover from disruptions, is a fundamental feature of resilient organizations and supply chains (Essuman *et al.*, 2020). It drives organizational stability, survival, competitiveness, and profitability (Li *et al.*, 2023; Essuman *et al.*, 2020). Thus, investment in operational resilience has become a strategic priority. For example, the Business Continuity Institute (2022) survey reveals that 78% of the firms they studied were engaged in operational resilience improvement programs.

In particular, there is a growing interest in human resource investment for building operational resilience (Business Continuity Institute, 2022). This development follows the literature suggesting that human resource practices and competencies are critical for driving organizational resilience (Tortorella *et al.*, 2024; Shela *et al.*, 2023). This literature has begun receiving empirical consideration. However, as shown in Table 1, our review of the literature reveals that the evidence regarding the organizational/supply chain resilience value of human capital factors is inconclusive. For instance, Gu *et al.* (2023) found that employee skills positively contribute to both internal organizational resilience and customer resilience. Similarly, He *et al.* (2024) reported that training availability enhances firms' ability to repurpose production during major disruptions. On the contrary, Nikookar and Yanadori (2022) found that supply chain managers' human capital does not directly contribute to supply chain resilience. Likewise, Yu *et al.* (2023) found that employees' human capital does not have a direct impact on supply chain resilience.

He *et al.*'s (2024) study provides a direct empirical assessment of the link between human capital development and organizational resilience outcomes. Although the study

suggests a positive relationship between training and firms' ability to repurpose their production following a major disruption, it treats training as a binary variable (i.e., whether a firm has a training program for its full-time employees). The paper's theorization assumes that all training develops ordinary and dynamic capabilities that drive firms' resilience outcomes: "employee training programs not only cover operational specifics of their usual tasks, but also include adaptive skills crucial for navigating transitions in production demands" (p. 9). While the training literature reveals that organizational training is not a binary concept (Tharenou *et al.*, 2007; Bulut and Culha, 2010), theoretical and empirical understanding of how and when particular aspects of the training concept relate to organizational resilience outcomes is lacking. Addressing this limitation in literature could help firms better understand how to design and implement training programs that improve their resilience outcomes.

Accordingly, this study examines the following question: how and when do specific organizational training types relate to operational resilience? We use the ability-motivation-opportunity (AMO) theory and survey from firms in Ghana to address this question. We integrate the training literature (Garavan *et al.*, 2019; Tharenou *et al.*, 2007) and organizational capabilities literature (Fainshmidt *et al.*, 2016) to analyze two types of training: dynamic and ordinary capability training. Drawing on these literature streams, we define ordinary capability training as the degree to which firms develop their workforce to acquire skills necessary for meeting current operational needs and objectives. In contrast, dynamic capability training is defined as the degree to which firms develop their workforce to acquire skills that allow them to create, extend, and adapt the ways they operate. From the AMO perspective (Bos-Nehles *et al.*, 2023; Marin-Garcia and Tinasm, 2016), we theorize about the unique ability-enhancing mechanisms that link each training type to operational resilience. We argue that dynamic capability training provides a firm's workforce with

exploratory, creative, and adaptive benefits, while ordinary capability training offers them automaticity and proficiency advantages. Thus, each training type may help firms navigate their operations effectively during disruptions (Gu *et al.*, 2023; He *et al.*, 2024).

Notwithstanding, the contingency perspective of the training evaluation literature suggests that the consequences of training on organizational outcomes are dependent on contextual factors (Tharenou *et al.*, 2007). From the AMO perspective, the operational resilience benefits of training may depend on opportunity-enhancing practices (Bos-Nehles *et al.*, 2023). Since speed and flexibility in responding to disruptions are critical for achieving operational resilience (Essuman *et al.*, 2023), the relationship between dynamic and ordinary capability training and operational resilience may depend on the extent to which firms foster an environment that encourages employees to act swiftly and flexibly. Thus, consistent with the AMO view, we propose job autonomy as an opportunity-enhancing condition (Bos-Nehles *et al.*, 2023) that may strengthen the positive relationship between each training type and operational resilience. Job autonomy refers to the degree of freedom, independence, and discretion individuals have in their work tasks (Park, 2018; Yang *et al.*, 2024). We argue that the extent to which employees can deploy the competencies gained through dynamic or ordinary capability training increases in firms that offer higher job autonomy (Cho *et al.*, 2021), strengthening the relationships between these training types and operational resilience.

The study contributes to literature and practice as follows. By examining specific types of organizational training, the study provides clarity to the literature suggesting that human capital and its development practices are essential for building resilience (Tortorella *et al.*, 2024; He *et al.*, 2024; Gu *et al.*, 2023; Mubarik *et al.*, 2022). Unlike extant literature, this research differentiates between training that fosters ordinary capability and training that promotes dynamic capability, **revealing differences in their associations with operational resilience, especially when accounting for the boundary condition role of job autonomy. This**

finding clarifies previous applications of AMO theory in organizational resilience studies, which assume all training forms matters for resilience-building (e.g., He *et al.*, 2024; Gu *et al.*, 2023). The study also reveals variations in how job autonomy moderates the relationship between organizational training and operational resilience. This finding enriches the AMO theory, which broadly suggests that job autonomy would complement training (Bos-Nehles *et al.*, 2023). Contrary to the prediction of AMO theory, the study's findings and discussion suggest that job autonomy can either complement or substitute for training in explaining operational resilience, depending on whether the training targets ordinary or dynamic capability development. Additionally, the study expands the domain of the training evaluation literature by shedding light on an underexplored organizational outcome in this literature: operational resilience. Finally, the study's findings are valuable for practitioners, given the increasing interest in how firms can leverage human capital to improve resilience (Business Continuity Institute, 2022). Unlike existing literature, this study highlights the importance of distinguishing between training initiatives and aligning them with appropriate organizational conditions to improve operational resilience outcomes.

## **2. Theoretical Background and Hypothesis Development**

As documented in Table I, this study is positioned within the literature on the relationships between organizational resilience outcomes and human capital- and training-related factors. This section analyzes the relevant literature and presents the study's conceptualization of operational resilience and organizational training, followed by a discussion of AMO theory and the theoretical arguments supporting the study's hypotheses.

--- Insert Table I here ---

## 2.1. Operational resilience

Advances in research on organizational and supply chain resilience highlight the value of building resilience at the operations level of the firm (Jiang *et al.*, 2023; Li *et al.*, 2023). Li *et al.* (2023) contend that operational resilience is “...the most basic and important part of organizational resilience, comprises the latent ability of a firm’s operations to maintain their existing structure/function and recover from supply chain disruptions” (p. 2). Operations underpins how firms create and deliver market value, and because organizations cannot overhaul the current domain and configuration of operations in the short run (i.e., amid disruptions), the operational resilience notion underscores resilience properties that enable organizations to achieve and preserve operational stability and continuity during disruptions (Essuman *et al.*, 2020).

Accordingly, this study’s conceptualization and measurement of operational resilience follow prior studies that identify disruption absorption and disruption recovery as the defining features of the operational resilience construct (Ataburo *et al.*, 2024; Essuman *et al.*, 2020). Disruption absorption, elsewhere termed “robustness”, refers to firms’ capacity to maintain the structure and normal function of operations (Wieland and Wallenburg, 2012; Brandon-Jones *et al.*, 2014). This operational resilience dimension manifests in the early phases of disruptions, and it allows firms to minimize operational failure and losses. In contrast, disruption recovery, defined as firms’ capacity to restore normal operations rapidly, occurs at the latter stage of disruptions, where firms strive to bounce back (Essuman *et al.*, 2020; Jiang *et al.*, 2023). These dimensions of operational resilience reflect the performance of operations and production systems during disruptions (Essuman *et al.*, 2023; Jiang *et al.*, 2023).

## 2.2. Organizational training

This research focuses on two aspects of the training literature: training content and evaluation, both of which have been subject to diverse conceptual and empirical assessments (Garavan *et al.*, 2019; Tharenou *et al.*, 2007). Tharenou *et al.* (2007) define training as “the systematic acquisition and development of the knowledge, skills, and attitudes required by employees to adequately perform a task or job or to improve performance in the job environment” (p. 6). More broadly, training is often framed as an organizational investment in employees’ knowledge, skills, and abilities for current and future job roles (Bulut and Culha, 2010; Garavan *et al.*, 2019). Thus, regarding training content, the literature largely emphasizes the job-related focus of training (Sitzmann and Weinhardt, 2018).

However, recent studies suggest that firms also use training to develop higher-order competencies that extend beyond those required to perform current job roles (Ajgaonkar *et al.*, 2022; Kurtmollaiev *et al.*, 2018). Such higher-order capabilities enable firms to explore and exploit innovative solutions to unusual problems while adapting to changing environmental conditions. For example, Do *et al.* (2022) demonstrate how firms leverage human resource-based management initiatives to develop organizational capabilities, while Kurtmollaiev *et al.* (2018) illustrate how design-thinking training fosters firms’ dynamic capabilities.

Building on this foundation, we draw on organizational capabilities literature (Helfat and Winter, 2011; Teece, 2014) to propose and analyze two forms of organizational training: ordinary and dynamic capability training. The organizational capabilities literature distinguishes between ordinary and dynamic capabilities (Fainshmidt *et al.*, 2016; Teece, 2014). Ordinary capabilities allow firms to maintain current operations, whereas dynamic capabilities enable firms to modify current operations and resource base (Helfat and Winter, 2011). The former involves executing well-defined tasks such as operations and

administration (Teece, 2014). As Teece (2014: p. 330) puts it, ordinary capabilities “can be measured against the requirements of specific tasks, such as labor productivity, inventory turns, and time to completion, ...”. Thus, ordinary capabilities seek to ensure consistency, reliability, and continuity in producing organizational outputs (Kurtmollaiev *et al.*, 2018). In contrast, dynamic capabilities are required to modify how firms create and deliver value and their resource base. Dynamic capability generates innovations and modifications, enabling firms to adapt to changing environmental conditions (Kurtmollaiev *et al.*, 2018).

Scholars argue that human resource practices such as training develop both organizational capabilities (Kurtmollaiev *et al.*, 2018; Teece, 2014; Do *et al.*, 2022). We suggest, therefore, that firms may use training to build ordinary and/or dynamic capabilities (He *et al.*, 2024; Do *et al.*, 2022). Specifically, firms can design and implement training programs that equip employees with skills to meet current operational needs and objectives or develop their ability to create, extend, and modify their work practices and resource base (He *et al.*, 2024). We refer to these training types as “ordinary capability training” and “dynamic capability training”, respectively. From a training evaluation standpoint, we examine how and when these training types relate to firms’ operational resilience.

Kirkpatrick’s training evaluation model allows researchers to examine two broad types of training outcomes: short-term (reaction and learning) and long-term (behavior on the job and organizational impact) outcomes (Wang and Wilcox, 2006). These outcomes can be examined at the individual (worker) and organizational levels. This study follows prior studies that examine the impact of training on organizational level outcomes, such as productivity, efficiency, quality, sales, financial performance, and social performance (Garavan *et al.*, 2019; Reio *et al.*, 2017; Tharenou *et al.*, 2007; Wang and Wilcox, 2006). Specifically, we contribute to recent research on the effects of training on organizational resilience outcomes (Li *et al.*, 2023; Menéndez Blanco and Montes-Botella, 2017).

One major shortcoming of Kirkpatrick's model is that it ignores organizational contingencies (Bates, 2004). The literature suggests that contingency models offer a more nuanced understanding of the effects of training programs (Tharenou *et al.*, 2007), including their impact on organizational resilience outcome (He *et al.*, 2024). Advancing the contingency perspective, this study uses AMO theory to argue that the relationship between organizational training and operational resilience is moderated by training type (ordinary versus dynamic capability training) and job autonomy. The following section presents the study's application of AMO theory and its hypotheses.

### **2.3. AMO perspective**

AMO theory emphasizes that employees' discretionary efforts and contributions to organizational outcomes depend on their abilities, motivation, and available opportunities (Bos-Nehles *et al.*, 2023; Marin-Garcia and Tinasm, 2016; Appelbaum *et al.*, 2000). Employees lacking the necessary skills will be demotivated to work hard, think smart, improvise, and show creativity during disruptive times. Meanwhile, a highly skilled workforce may lack motivation if the job environment is too restrictive and lacks necessary organizational support and participation opportunities (Bos-Nehles *et al.*, 2023; Marin-Garcia and Tinasm, 2016).

Training evaluation studies applying the AMO theory typically consider how training increases the abilities of employees, enhances their motivation to apply what they have learned, and provides opportunities to use the skills in their daily work environments. For example, Kim and Ployhart (2020) applied AMO theory to evaluate how training programs improve long-term performance in large organizations. Using the AMO framework, the authors explain how employees who were provided with more opportunities applied their acquired skills after training performed relatively better. Similarly, Garavan *et al.* (2021) used

the AMO theory to explain how ability, motivation, and opportunity predict both individual learning outcomes and the transfer of those outcomes to job performance. Moreover, Chung and Lia (2021) applied the AMO framework to understand how training influences employees' skills, inspires creativity, and offers sufficient opportunities to innovate to drive performance outcomes.

The AMO theory has been extended to organizational and supply chain resilience literature. For example, He *et al.* (2024) used the theory to explain the relationship between training and firms' ability to repurpose their production and how government wage subsidies and labor shortages moderate this relationship. Also, Gu *et al.* (2023) applied the AMO theory to link firms' employee skills to supply chain resilience outcomes.

Literature suggests that AMO concepts, including ability, motivation, and opportunity, may have additive or multiplicative (interaction) effects on organizational outcomes (Siemsen *et al.*, 2008; He *et al.*, 2024). This study incorporates the additive and multiplicative perspectives of AMO. We conceptualize organizational training as an ability-enhancing practice (Bos-Nehles *et al.*, 2023). Training equips employees with knowledge, skills, and abilities and prepares them for career progression (Bos-Nehles *et al.*, 2023). Training can boost employees' efficacy and confidence to enact rapid and effective responses during disruptive conditions (He *et al.*, 2024; Gerschberger *et al.*, 2023).

From a multiplicative perspective of AMO, we argue that training may interact with other components of AMO (Siemsen *et al.*, 2008; He *et al.*, 2024). When employees are not given the necessary opportunity to act, their competences may not be fully exploited (Cho *et al.*, 2021). Because job autonomy offers opportunities and motivation for employees to proactively initiate actions (Park, 2018; Bos-Nehles *et al.*, 2023), we propose that a greater level of it can enable dynamic and ordinary capability training to be effective, amplifying their relationships with operational resilience.

#### **2.4. Organizational training and operational resilience**

Operational resilience is a latent manifestation of firms' cognitive, behavioral, and contextual elements, such as workforce attributes (Lengnick-Hall *et al.*, 2011; Gerschberger *et al.*, 2023). Firms' capacity to absorb and recover from disruptions is contingent upon their workforce attributes, including 1) cognitive abilities to sense changes, interpret events, and respond effectively and 2) behavioral traits like preparedness, resourcefulness, and improvisation (Tortorella *et al.*, 2024; Gerschberger *et al.*, 2023; Zhou *et al.*, 2023; Huang and Jahromi, 2021). Training equips employees with these crucial attributes, enabling them to search and design solutions and acquire, integrate, reconfigure, and leverage resources to drive firms' operations in both normal and disruptive times (Zhou *et al.*, 2023; Do *et al.*, 2022; Battisti *et al.*, 2019; Bustinza *et al.*, 2023).

Dynamic capability training develops adaptable skills for navigating disruptions (Zhou *et al.*, 2023; Do *et al.*, 2022). Such training adds to employees' problem-solving skills and ability to act spontaneously by generating new ideas and using bricolage during disruptive times (He *et al.*, 2024). Prior research suggests these competencies are critical for building operational resilience (Essuman *et al.*, 2023; Do *et al.*, 2022). Disruptive events render normal operating procedures ineffective and may necessitate operational adaptation or moving to entirely new ways of doing things in the organization (Essuman *et al.*, 2023; Ataburo *et al.*, 2024). Dynamic capability training can improve employees' effectiveness in searching and extracting new resources, reconfiguring and coordinating, and leveraging resources to address disruption challenges (Zhou *et al.*, 2023; Lengnick-Hall and Beck, 2005).

On the other hand, ordinary capability training focuses on job-specific skills and knowledge necessary for current roles, boosting employee efficiency, productivity, and speed. Such skills and knowledge support everyday operations and help employees fix issues

pertaining to their jobs (Tortorella *et al.*, 2024). Employees who acquire strong job-specific skills and knowledge through training may develop automaticity—a shift in operational modes, from controlled to automatic processing (Shneider and Shiffrin, 1977)—so that job performance is fluid, accomplished, and individualized (Kraiger *et al.*, 1993; Zhou *et al.*, 2023). Under automaticity, employees achieve greater cognitive capacity reserve to cope with extra demands and operational bottlenecks during disruptions (Lengnick-Hall *et al.*, 2011; Zhou *et al.*, 2023). For instance, Kraiger *et al.* (1993) illustrated automaticity with driving, whereby drivers who have automatized operating a car can converse with passengers while flawlessly controlling (i.e., changing speed, monitoring the road, using indicators, etc.) while reacting to environmental changes in real-time. Therefore, employees who have received ordinary capability training may achieve greater proficiency, confidence, and motivation to act quickly during disruptions, reducing rippling effects and recovery time (He *et al.*, 2024).

The preceding arguments align with the AMO theory suggesting that firms emphasizing either dynamic or ordinary capability training are more likely to acquire the skills, knowledge, and abilities needed to absorb and recover from operational disruptions (He *et al.*, 2024; Do *et al.*, 2022). Therefore, we hypothesize that:

**H1a.** Dynamic capability training is positively related to operational resilience.

**H1b.** Ordinary capability training is positively related to operational resilience.

Although the above arguments suggest that both dynamic and ordinary capability training types have unique value for operational resilience, organizational capabilities literature indicates that the utility and effectiveness of dynamic and ordinary capabilities can differ depending on the nature of the outcome variable of interest (e.g., Irwin *et al.*, 2022; Drnevich and Kriauciunas, 2011). For example, Drnevich and Kriauciunas (2011) found that while ordinary capabilities consistently improve both operational and firm-level performance outcomes, dynamic capabilities enhance operational performance but reduce firm-level

performance, likely because they are more costly to manage and deploy. Tharenou *et al.*, (2007) argue that certain types of training may be more effective than others in improving specific organizational outcomes, encouraging researchers to theorize the effects of training content based on its alignment with a given organizational outcome.

We propose that dynamic capability training, compared to ordinary capability training, will have a stronger positive association with operational resilience. The arguments for H1a and H1b highlight the distinct benefits of ordinary and dynamic capability training, which serve as mechanisms explaining why both training types may positively relate to operational resilience. However, we contend that the mechanisms of dynamic capability training are better suited to the context and requirements of operational resilience-building. This is because resilience-building typically occurs in uncertain and unpredictable environments shaped by disruptions. Firms often lack complete information about when, where, and how disruptions will occur and impact their operations (Bode *et al.*, 2011). As a result, the ability to develop creative and novel responses to disruptions becomes crucial for attaining operational resilience objectives (Essuman *et al.*, 2023).

Compared to dynamic capability training, the knowledge, skills, and abilities offered by ordinary capability training are defined by and constrained within organizational routines and specific job roles. This limitation can reduce firms' capacity to quickly and effectively address unfamiliar challenges, such as disruptions. That is, considering its content and intended purpose, ordinary capability training offers limited opportunities to enhance employees' ability to modify existing operational routines or disruption response protocols to address disruption challenges. Even if ordinary capability training is expanded to include disruption and resilience-related topics, it is unlikely to cover all possible disruption scenarios. In contrast, dynamic capability training encourages employees to adopt problem-solving approaches while also enabling them to search for, seize, and coordinate the

resources needed to orchestrate change. This training, therefore, can be more effective in empowering employees to implement existing disruption response protocols or rapidly develop and deploy new solutions to unfamiliar disruption challenges. Overall, we argue that dynamic capability training provides greater opportunities that are better suited to driving operational resilience outcomes. Therefore, we hypothesize that:

**H1c.** Compared to ordinary capability training, dynamic capability training has a stronger positive relationship with operational resilience.

### **2.5. Boundary condition roles of job autonomy**

An implicit assumption about the relationship between organizational training and operational resilience is that employees can and will always deploy their skills and knowledge. However, not all organizations provide a supportive environment that allows employees to apply their training effectively (Cho *et al.*, 2021). We argue that job autonomy, which varies among firms, may moderate the relationship between organizational training and operational resilience.

Job autonomy refers to the extent of freedom, independence, and discretion in work tasks (Lartey, 2021; Wu and Ma, 2019). It can improve employees' intrinsic motivation to take initiative, be creative, and engage deeply with their work (Yang *et al.*, 2024; Bakker *et al.*, 2007). Additionally, job autonomy motivates continuous personal learning and effective transfer of training gains to job performance by the employees. Job autonomy may also allow room for failure and mistakes from employees, allowing them to choose how to tackle tasks and promoting psychological safety and improvisation (Gerschberger *et al.*, 2023; Lengnick-Hall *et al.*, 2011).

Firms that provide greater job autonomy can derive benefits from both types of training. In such firms, employees have more opportunities to experiment with the skills, knowledge, and abilities they acquire through training, enabling them to reinforce and expand

their competencies. High job autonomy can also boost employees' confidence and motivation to apply their competencies (Noble-Nkrumah *et al.*, 2022; Park, 2018), even when they encounter unexpected issues, such as disruptions. This opportunity for employees to fully and swiftly leverage their training can enhance the firm's ability to explore and implement solutions for dealing with operational disruptions (He *et al.*, 2024). In firms with high job autonomy, the opportunity and motivation to act are especially important for activating the automaticity mechanism that links ordinary capability training to operational resilience. Additionally, while dynamic capability training develops employees' adaptive and exploratory competencies, these competencies may be reinforced and enriched in high job autonomy environments, where employees are encouraged to be creative (Wu and Ma, 2019).

Conversely, low job autonomy may stifle initiative and innovation (Wu and Ma, 2019; Noble-Nkrumah *et al.*, 2022). In low job autonomy situations, employees are expected to follow procedures and wait for instructions and orders from superiors, which can hinder their adaptation and speed in responding to events that disrupt operations. Research indicates that low job autonomy, characterized by control, induces stress and hampers employees' creativity, innovation, and improvisation (Huang and Jahromi, 2021), and overall well-being (Lartey, 2021). Where job autonomy is lacking, employees with even superior ordinary and dynamic competencies may take longer to solve disruption problems. Thus, consistent with the AMO literature, we hypothesize that:

**H2a.** Job autonomy moderates the relationship between dynamic capability training and operational resilience, such that the relationship is positive and stronger in high than low job autonomy conditions.

**H2b.** Job autonomy moderates the relationship between ordinary capability training and operational resilience, such that the relationship is positive and stronger in high than low job autonomy conditions.

Whereas the primary limitation of ordinary capability training in resilience-building is that it provides skills and knowledge that may not be well-suited for addressing unfamiliar disruption challenges, job autonomy encourages employees to explore and experiment with their skills and knowledge. Thus, greater job autonomy can not only compensate for the limitations of ordinary capability training but also help employees develop and apply the skills and knowledge it provides in innovative ways, enabling them to respond effectively to unexpected disruptions in their firms' operations.

On the other hand, although job autonomy aligns with dynamic capability training, a greater level of it can introduce challenges that reduce its complementary benefits. That reason is that both job autonomy and dynamic capability training empower employees to engage in exploration and improvisational activities, and a simultaneous increase in both may lead to unguided and haphazard responses, potentially prolonging disruption absorption and recovery processes. Supporting this view, prior research indicates that excessive creative improvisation undermines operational resilience (Essuman *et al.*, 2023). Therefore, we posit that:

**H2c.** Compared to the interaction between dynamic capability training and job autonomy, the interaction between ordinary capability training and job autonomy has a stronger positive association with operational resilience.

### **3. Methodology**

#### ***3.1. Design, sample, and data collection***

Supply chain disruption and resilience-building are global phenomena. This research focuses on firms in a developing country, Ghana, where the business environment is fraught with supply chain disruptions and resource scarcity challenges (Essuman *et al.*, 2023). Our sample comprises manufacturing and service firms with between 5 and 500 full-time employees.

Most of them are small and medium enterprises, reflecting the population of firms in Ghana (Ghana Statistical Service, 2016). Due to a lack of available secondary data, we used a survey design to collect data, follows examples of related prior studies (e.g., Zheng and Lin, 2024; Gu *et al.*, 2023; Tortorella *et al.*, 2024). The respondents comprised senior management positions (e.g., CEO, director, general manager) with extensive firm and industry-specific experience (Gu *et al.*, 2023). As disruptions tend to impact firms' operations immediately, the benefits of organizational training and job autonomy for operational resilience, if any, can be direct. Thus, cross-sectional survey data is suitable for testing our hypotheses (Essuman *et al.*, 2023).

We used a face-to-face approach to collect the data. We trained and supervised fieldworkers to deliver and retrieve the questionnaires (Essuman *et al.*, 2023). We relied on firm contact information from the Ghana Yellow Pages. We approached a sample of 750 SMEs in two industrial and commercial hubs in Ghana (Greater Accra and Kumasi Metropolis) with questionnaires. The sampling criteria included firms that had been in operation for at least three years and had respondents who met our key respondent requirements: knowledgeable, experienced, and literate top or senior managers who consented to participate in the study. Because the firms are SMEs, one key respondent per firm provided the data (Kull *et al.*, 2018). An average respondent had held their current position for 7.13 years ( $SD = 5.583$ ), and 76.8% of them had at least a bachelor's degree.

After several follow-ups, we retrieved 284 questionnaires. Twenty-five questionnaires with incomplete responses were discarded, leaving 259 usable questionnaires. This sample compares favorably with those used in related prior research (e.g., Tortorella *et al.*, 2024). Table II details the characteristics of the sample and the respondents. On average, a firm in the sample had 41 full-time employees (standard deviation  $\approx 61$ ) and had been operating for

15.60 years (standard deviation = 10.39). Most of the firms operated in the service sector (73%), reflecting the Ghanaian economy (Ghana Statistical Service, 2016).

-- Insert Table II here --

### **3.2. Measure and questionnaire development**

We followed measurement guidelines to generate items to capture the constructs (e.g., MacKenzie *et al.*, 2011). We first surveyed extant literature to identify items that reflect the operational definitions of the constructs. Next, we revised the items and the preliminary questionnaire based on review comments from three supply chain and strategy scholars with relevant expertise in the study's area. This process allowed us to remove items with poor face validity and reframe those with better face validity for clarity. No new items were introduced in this process. Following this, we piloted the revised questionnaire on 30 senior executives (e.g., CEOs and general managers) taking part in an Executive MBA program. There were no major concerns aside from issues of clarity and readability. The items were rated on a seven-point scale ranging from "strongly disagree (=1)" to "strongly agree (=7)". The questionnaire was prepared and administered in English.

We implemented several procedural remedies to minimize common method bias (Podsakoff *et al.*, 2003). For example, we ensured the physical distances between the items of interest in the questionnaire were wide enough to minimize the risk of artefactual correlations. Again, we used expert review and pilot study to improve face and content validity. These initiatives further improved item clarity. Moreover, we used a cover letter to explain the study's practical value and assure respondents of anonymity and confidence. Further, given their busy job schedules, we gave the respondents ample time (i.e., 14 working days) to complete the survey.

Table III presents the survey items along with their reliability and validity results. Below, we discuss the operationalization of the study's substantive variables (operational

resilience, organizational training, and job autonomy) and control variables (resource slack, disruption orientation, firm size, firm age, and firm industry).

### 3.2.1. Operational resilience

We measured and analyzed operational resilience at its dimensional levels: disruption absorption and disruption recovery (Essuman *et al.*, 2020). Six items were adapted from Wieland and Wallenburg (2012) and Brandon-Jones *et al.* (2014) to measure disruption absorption. Disruption recovery was measured with five items adapted from Brandon-Jones *et al.* (2014). We asked the respondents to consider the unexpected disruptions in their firms' operations in the last three years to rate the items. A sample item for disruption absorption is “for the past 3 years, whenever disruptive events occur, our company is able to carry out its regular functions” and a sample item for disruption recovery is “over the past 3 years, whenever our operations breakdown due to a disruptive event, it does not take long for us to restore normal operations”.

### 3.2.2. Organizational training

Consistent with our conceptualization of organizational training, we developed three items for ordinary capability training and five for dynamic capability training. We drew insights from prior conceptualization and operationalization of job-related training to measure ordinary capability training (e.g., Akhtar *et al.*, 2008; Bulut and Culha, 2010). A sample item for ordinary capability training is “in the last 3 years, our company has been enrolling our employees in ‘job-related’ training programs”. We drew on dynamic capabilities literature to generate the items for the dynamic capability training construct (Kurtmollaiev *et al.*, 2018; Fainshmidt *et al.*, 2016). The items captured the extent to which firms engaged in each training in the last three years. A sample for this training type is “in the last 3 years, our company has provided training opportunities to our employees aimed at boosting their ability to reconfigure resources”.

### 3.2.3. Job autonomy

Job autonomy was conceptualized as the extent of freedom, independence, and discretion in work tasks (Lartey, 2021; Wu and Ma, 2019). Accordingly, we adopted three items from Park (2018) to measure job autonomy. A sample item is “our company allows employees considerable opportunities for independence and freedom in how they do their work”.

### 3.2.4. Resource slack

Resource slack refers to the amount of a firm’s overall discretionary resources that be used to fund organizational initiatives (Atuahene-Gima *et al.*, 2005). Firms with more resource slack can design and implement more effective training initiatives. Moreover, resource slack can buffer operations against disruptions and help firms explore and implement solutions to recover operations from disruptions. We used five items adapted from Atuahene-Gima *et al.* (2005). A sample item is “our company usually has adequate resources available in the short run to fund its initiatives”.

### 3.2.5. Disruption orientation

Disruption orientation refers to a firm’s general awareness and consciousness of, concerns about, attitude toward, and recognition of the opportunity to learn from disruptions (Bode *et al.*, 2011). Disruption orientation underlies firms’ proactive development of disruption-specific knowledge, which can enable them to build resilience. We adapted four items from Bode *et al.* (2011) to measure disruption orientation. A sample item is “we always feel the need to be alert to possible disruptive events”.

### 3.2.6. Firm size

Training programs can be more formalized in medium-sized firms than in small firms. Besides, small and medium firms can differ in their flexibility and, for that matter, their ability to build resilience. We operationalized firm size as a natural logarithm of the number of full-time employees.

### 3.2.7. Firm age

Firm age is an important indicator of business experience, which can be leveraged to access resources and deal with organizational problems. We operationalized firm age as the natural logarithm of the number of years of operation.

### 3.2.8. Firm industry

We studied firms in the service and manufacturing industries. Opportunities and threats can vary by industry, as can issues of operations configurations and complexities and the ability to incorporate buffer resources into such systems. We created a dummy variable equal to one for service firms and zero for manufacturing firms.

-- Insert Table III here --

## 4. Data Analysis and Results

### 4.1. Measure validation

We used covariance-based confirmatory factor analysis (CFA) in Mplus 7.4 to validate the items for the study's latent variables: ordinary capability training, dynamic capability training, disruption absorption, disruption recovery, job autonomy, disruption orientation, and resource slack. The multi-factor CFA model fits the data:  $\chi^2 = 669.65$ ,  $DF = 413$ ,  $RMSEA = 0.05$ ,  $TLI = 0.96$ ,  $CFI = 0.97$ ,  $SRMR = 0.05$  (Hair *et al.*, 2019). The factor loadings and their associated t-values, Cronbach's alpha, congeneric reliability, and average variance extracted values are reported in Table III.

The factor loadings range between 0.63 and 0.97 and are significant at 1%. The Cronbach's alpha values range from 0.79 to 0.97, congeneric reliability values range from 0.82 to 0.97, and the average variance extracted values range from 0.58 to 0.92. These results indicate that the constructs explain more than 0.50 of the variances in their items. Again, the results demonstrate the items are reliable and unidimensional and exhibit strong convergent validity (Hair *et al.*, 2019). To assess discriminant validity, we squared the latent correlations

from the CFA to obtain shared variances and compared them with the average variance extracted values (Hair *et al.*, 2019). The highest shared variance is 0.38, which is less than the lowest average variance extracted value of 0.58, indicating the items exhibit discriminant validity (Hair *et al.*, 2019).

#### **4.2. Common method bias assessment**

We used the marker variable technique to assess the extent to which common method bias may inflate or deflate the main results. We considered two social desirability items as marker variables (Podsakoff *et al.*, 2003): marker variable 1 = “I always admit my mistakes openly”; marker variable 2 = “I sometimes only help because I expect something in return”. Each item was anchored on “true (=1) and false (= 0)”. These items are theoretically unrelated to the substantive constructs. The results displayed in Table IV confirm this. Importantly, the direction, strength, and significance of the zero-order and the marker variable-adjusted correlations are similar. These results and the fact that the study’s analyses incorporate moderation terms suggest common method bias may not be a major concern in the study (Podsakoff *et al.*, 2003).

#### **4.3. Hypothesis testing**

Table IV presents the descriptive statistics and correlations for the variables in the study. We used Mplus 7.4 and covariance-based structural equation modeling (SEM) to test the study’s hypotheses. The full item sets for the latent constructs were used in the analysis. To avoid violating sample size-to-parameter ratio assumptions, we created the interaction terms using the mean-centered averaged scales for the independent and moderating variables (Miocevic *et al.*, 2023). Using SEM enabled us to simultaneously analyze both hypothesized and control relationships, allowing the dimensions of the independent and dependent variables to vary freely (Bagozzi and Yi, 2012). SEM also allowed us to analyze a single structural model

incorporating both main and moderation relationships, which facilitated accurate interpretation of the results for H1a and H1b (Aguinis *et al.*, 2017). Finally, it permitted us to perform model and parameter constraint analyses to test H1c and H2c.

We estimated two SEM models to test the hypotheses. The first is an unconstrained model (Model 1), which analyzes the main and moderating effect hypotheses (H1a, H1b, H2a, and H2b). The second is a constrained model (Model 2), which tests whether the main effects (H1c) as well as the moderating effects (H2c) effects differ statistically. Model fixes the coefficients of H1a and H1b to be equal, and H2a and H2b to be equal.

Model 1 fits the data:  $\chi^2 = 947.44$ ,  $DF = 558$ ,  $RMSEA = 0.052$ ,  $TLI = 0.944$ ,  $CFI = 0.949$ ,  $SRMR = 0.069$ . The fit indices of Model 2 ( $\chi^2 = 985.25$ ,  $DF = 562$ ,  $RMSEA = 0.054$ ,  $TLI = 0.939$ ,  $CFI = 0.945$ ,  $SRMR = 0.072$ ) are significantly worse than those of Model 1, given  $\Delta\chi^2 = 37.81$ ,  $\Delta DF = 4$ ,  $p < 0.01$ . Also, whereas Model 1 explains a 29.5% variance in disruption absorption and a 25.4% variance in disruption recovery, Model 2 explains an 18.9% variance in disruption absorption, and an 18.2% variance in disruption recovery. Collectively, these results reveal that the unconstrained model better fits the data and suggests potential differences in the coefficients of interest, which we analyzed further using a test of difference in coefficients. Thus, we report the results for the unconstrained model (Model 1) in Table V.

Model 1 indicates that dynamic capability training has a positive and significant relationship with disruption absorption ( $\beta = 0.293$ ,  $SE = 0.095$ ,  $p = 0.002$ ); however, its relationship with disruption recovery is positive but not significant ( $\beta = 0.152$ ,  $SE = 0.091$ ,  $p = 0.094$ ). These results partially support H1a. Ordinary capability training is not significantly related to either disruption absorption ( $\beta = -0.031$ ,  $SE = 0.108$ ,  $p = 0.771$ ) or disruption recovery ( $\beta = 0.085$ ,  $SE = 0.105$ ,  $p = 0.416$ ). These results do not support H1b.

These coefficients qualitatively suggest that dynamic capability training, compared to ordinary capability training, has stronger positive associations with both dimensions of operational resilience. However, a test of the difference in coefficients did not provide strong statistical support. The difference in the coefficients for the paths linking dynamic and ordinary capability training types to disruption absorption is only significant at the 10% level ( $\Delta\beta = 0.324$ ,  $SE = 0.180$ ,  $p = 0.072$ ), whereas the path linking these training types to disruption recovery ( $\Delta\beta = 0.067$ ,  $SE = 0.174$ ,  $p = 0.698$ ) is not significant even at the 10% level. Therefore, there is weak statistical support for H1c.

Also, Model 1 reveals that job autonomy negatively and significantly moderates the relationships between dynamic capability training and both disruption absorption ( $\beta = -0.229$ ,  $SE = 0.040$ ,  $p < 0.001$ ) and disruption recovery ( $\beta = -0.173$ ,  $SE = 0.038$ ,  $p < 0.001$ ). As illustrated in Figure 1, dynamic capability training has stronger positive relationships with both dimensions of operational resilience in firms with low job autonomy (-1 standard deviation below the mean) than in firms with high job autonomy (+1 standard deviation above the mean). These results do not support H2a. Additional results show that job autonomy positively and significantly moderates the relationships between ordinary capability training and both disruption absorption ( $\beta = 0.060$ ,  $SE = 0.031$ ,  $p = 0.049$ ) and disruption recovery ( $\beta = 0.073$ ,  $SE = 0.030$ ,  $p = 0.015$ ). As shown in Figure 2, ordinary capability training has a stronger positive relationship with both dimensions of operational resilience in firms with high job autonomy (+1 standard deviation above the mean) compared to firms with low job autonomy (-1 standard deviation below the mean), supporting H2b.

The above results support H2c, which states that job autonomy has a stronger positive moderating effect in the case of ordinary capability training. A test of the difference in coefficients offers statistical support: the coefficients for the paths linking the interaction between ordinary capability training and job autonomy to both dimensions of operational

resilience are significantly different from the coefficients for the paths linking the interaction between dynamic capability training and job autonomy to both dimensions of operational resilience ( $\Delta\beta = 0.289$ ,  $SE = 0.061$ ,  $p < 0.001$ ;  $\Delta\beta = 0.246$ ,  $SE = 0.059$ ,  $p < 0.001$ ).

--- Insert Tables IV and V and Figures 1 and 2 here ---

#### 4.4. Additional analyses

The arguments for H1a and H1b reveal unique mechanisms linking dynamic and ordinary capability training to operational resilience. However, the organizational capabilities literature suggests that firms' dynamic and ordinary capabilities may not exist in isolation; rather, they may interact to shape organizational outcomes (Schulze and Brusoni, 2022; Zahra *et al.*, 2006). Given that some firms may emphasize both types of training, we explored how and when the interaction between these training types relates to operational resilience. To explore these questions, we applied the SEM procedures detailed in Section 5.3 to estimate a model that includes a two-way moderation term comprising ordinary and dynamic capability training, as well as a three-way moderation term comprising these training types and job autonomy (Aguinis *et al.*, 2017).

The results are reported in Table VI. The interaction between ordinary and dynamic capability is not significantly related to disruption absorption ( $\beta = 0.035$ ,  $SE = 0.025$ ,  $p = 0.166$ ) or disruption recovery ( $\beta = 0.042$ ,  $SE = 0.025$ ,  $p = 0.085$ ). The three-way interaction among dynamic capability training, ordinary capability training, and job autonomy has a positive and significant relationship with disruption absorption ( $\beta = 0.032$ ,  $SE = 0.016$ ,  $p = 0.047$ ) but not disruption recovery ( $\beta = 0.024$ ,  $SE = 0.015$ ,  $p = 0.126$ ). To better understand the nature of the significant interaction, we plotted the relationship between dynamic capability training and disruption absorption at minus and plus one standard deviation values of ordinary capability training and job autonomy. As shown in Figure 3, dynamic capability

training has a stronger positive relationship with the disruption absorption dimension of operational resilience at low levels of job autonomy than at high levels, regardless of whether ordinary capability training is high or low. However, dynamic capability training has the weakest association with disruption absorption when ordinary capability training is low and job autonomy is high.

## **5. Discussion**

This study analyzed how two organizational training types uniquely and relatively relate to operational resilience under varying job autonomy levels. The implications and limitations of the results are discussed below.

### ***5.1. Discussion of results and theoretical implications***

The study's first set of arguments was that both dynamic and ordinary capability training have positive relationships with operational resilience, with the relationship of between former training type and operational resilience expected to be stronger. However, the results indicate that, unlike dynamic capability training, ordinary capability training alone does not significantly relate to any dimension of operational resilience. While statistical support for the difference in the magnitude of their associations with operational resilience was weak, the finding that ordinary capability training alone has no significant relationship with any dimension of operational resilience warrants further investigation. Ordinary capability training emphasizes proficiency in relatively routine skills required for current job roles, which may lead to rigidity in decision-making during disruptions (Helfat and Martin, 2015). This drawback of ordinary capability training can offset its automaticity benefits (Shneider and Shiffrin, 1977; Zhou *et al.*, 2023), which we argued is crucial for building operational resilience. In contrast, dynamic capability training focuses on developing skills beyond

current job requirements, enabling firms to effectively explore and exploit new ways and resources to deal with disruptions (Helfat and Martin, 2015; Essuman *et al.*, 2023).

The results partially support and expand on previous applications of the AMO theory to explain how human capital and ability-enhancing practices relate to organizational resilience (He *et al.*, 2024; Gu *et al.*, 2023). By distinguishing between dynamic capability training and ordinary capability training, this study reveals that different types of ability-enhancing practices are associated with operational resilience in distinct ways. This finding is significant, as much of the existing literature assumes that human capital development inherently benefits resilience-building. Variations in evidence from earlier studies on the resilience benefits of human capital may stem from the lack of specificity in analyzing particular practices that cultivate such capital (e.g., Gerschberger *et al.*, 2023; Gu *et al.*, 2023; Yu *et al.*, 2023; Nikookar and Yanadori, 2022). The theoretical analysis and findings from this study suggest that research that aggregates different training practices that underpin human capital may obscure the unique relationships these practices have with organizational resilience outcomes.

The study's second set of arguments proposed that job autonomy would strengthen the relationships between both dynamic and ordinary capability training types and operational resilience, with a stronger positive moderation effect expected for the latter relationship. The study found that job autonomy moderates the relationship that each organizational training type has with operational resilience in different ways. Dynamic capability training has a stronger positive association with operational resilience under low rather than high job autonomy conditions, while the opposite is true for the relationship between ordinary capability training and operational resilience. Additional analysis reveals that, regardless of the level of ordinary capability training, dynamic capability training has a stronger positive

relationship with the disruption absorption dimension of operational resilience at low levels of job autonomy than at high levels.

Several factors can explain the above findings. While dynamic capability training expands employees' ability to handle unexpected disruptions through exploration and adaptation, extreme job autonomy may encourage individual action (Yang *et al.*, 2024), which can undermine the collaborative efforts needed to manage disruptive events (Essuman *et al.*, 2020). This issue, particularly arising from simultaneous increases in both dynamic capability training and job autonomy, may conflict with the collectivist cultural context to which employees in Ghana are accustomed (Darley and Blankson, 2020). Additionally, increasing both dynamic capability training and job autonomy can lead to overconfidence and hasty decision-making among employees when responding to disruptions (Kunz and Sonnenholzner, 2023; Cohee and Barnhar, 2024). Specifically, such overconfidence may encourage unguided experimentation and improvisation, which may not only deviate from established organizational routines for handling disruptions but also result in haphazard responses, potentially undermining operational resilience (Essuman *et al.*, 2023). Traditionally, the Ghanaian culture of low uncertainty avoidance favors adherence to established work rules and procedures, and employees may lack the creative experience needed to effectively leverage the opportunities offered by high levels of dynamic capability training combined with high autonomy. Why ordinary capability training has a stronger positive association with operational resilience when job autonomy is high is that ordinary capability training is job-specific and offers limited scope for exploration and creativity; thus, when job autonomy is high, employees trained in ordinary capabilities are more likely to experiment within established operational protocols, maintaining alignment with organizational routines and reducing mistakes when dealing with unexpected disruptions (Teece, 2014; Kunz and Sonnenholzner, 2023).

Overall, the contrasting results about the moderating role of job autonomy complicate and clarify the AMO literature underlying the study (Bos-Nehles *et al.*, 2023; Marin-Garcia and Tinasm, 2016). While a high presence of ability and opportunity factors is expected to be associated with a greater level of operational resilience (Bos-Nehles *et al.*, 2023), the study's results indicate that the outcome depends on the nature of the ability factor, whether it is ordinary capability-related or dynamic capability-related. The results suggest job autonomy (opportunity) and ordinary capability training are complementary in explaining levels of operational resilience; in contrast, job autonomy substitutes for dynamic capability training in explaining variations in operational resilience. These results offer an improved understanding of past studies that suggest that job autonomy strengthens the effectiveness of human capital attributes (Cho *et al.*, 2021; Patthnaik and Sahoo, 2021).

The above insights contribute to the training evaluation literature concerning how training practices relate to organizational-level outcomes (Wang and Wilcox, 2006; Hamblin, 1974). While this literature is well-established, it says little about how training relates to organizational resilience outcomes (He *et al.*, 2024). In advancing this literature, this study delineates the complexities and boundaries of organizational training in explaining operational resilience. By decomposing the organizational training construct into ordinary and dynamic capability training, the study reveals richer insights into the link between organizational training and operational resilience, especially when considering the boundary condition role of job autonomy. Our theoretical and empirical analyses advance and clarify the emerging research that suggests that human capital factors are positively associated with organizational resilience outcomes (He *et al.*, 2024; Do *et al.*, 2022; Shela *et al.*, 2023; Gu *et al.*, 2023; Mubarik *et al.*, 2022).

## 5.2. Practical implications

While human capital development is gaining importance in organizational resilience-building (He *et al.*, 2024; Business Continuity Institute, 2022), the study results offer important directions for industry. Firms must appreciate what training programs are more helpful for building operational resilience and what organizational atmosphere is conducive to specific training programs. The results from this study suggest that training programs focused on developing employees' ability to create, extend, and modify how firms operate appear to have a stronger positive association with operational resilience. Such programs can cover design thinking, problem-solving, and analytical activities/tools, such as brainstorming and simulations (Kurtmollaiev *et al.*, 2018). Training programs aimed at enhancing workers' job-related skills, knowledge, and abilities show a weaker association with operational resilience. These findings underscore the need to prioritize such training programs, particularly when firms in the study's setting aim to leverage training to improve their operational resilience.

Additionally, while the results suggest that job autonomy is positively associated with operational resilience, firms should consider the type of training program they emphasize and align it with an appropriate level of job autonomy. In the empirical setting of this study, the results encourage firms to match ordinary capability-focused training programs with more job autonomy. Executives whose values align with Ghana's power distance culture should be open to embracing workforce autonomy. For example, they can consider empowerment, decentralized decision-making, delegation, and redesigning jobs for greater control.

Dynamic capability training programs and job autonomy are both important for building operational resilience. However, increasing both simultaneously may introduce challenges that need to be managed to maximize their benefits. For example, providing high levels of both dynamic capability training and job autonomy may lead to overconfidence among employees, causing them to overlook established organizational processes for

responding to disruptions. Employees might also resort to untested solutions that other employees or procedures that the firms' supply chain partners are unfamiliar with, potentially hindering effective collaboration during disruption management. To address these challenges, top managers can implement control mechanisms that define acceptable problem-solving and creative behaviors, while providing oversight and support to ensure employees stay on track. Special attention should be given to employees who may misuse their job autonomy.

Additionally, top managers need to recognize that the challenges of providing greater job autonomy are more likely to arise in environments with limited teamwork or a lack of a collaborative work climate. When teamwork is encouraged, the tendency for employees to act individually, make errors, or deviate from established routines can be reduced. Teamwork offers opportunities for employees to exchange ideas and learn from one another. The shared understanding and collective memory created through teamwork can enhance the effectiveness of the exploratory and creative actions that dynamic capability training and job autonomy facilitate.

### **5.3. Limitations and future research**

The study has theoretical and methodological limitations. Our analysis of operational resilience does not capture the full domain of the organizational resilience construct. The manifestations of adaptive and transformative resilience aspects of organizational resilience tend to take time and require a more dynamic response from employees. Also, unlike operational resilience, these dimensions of organizational resilience reflect changes in many aspects of the organizations, beyond production and operations systems (Essuman *et al.*, 2023). In essence, building adaptive and transformative resilience can be more demanding, time-consuming, and stressful than building operational resilience. Therefore, the explanatory power of organizational training—particularly ordinary capability training—may be lower when considering dynamic and transformational resilience rather than operational resilience.

We encourage future research to further develop and explore these arguments. Again, in presenting a firm-level analysis of the training and job autonomy constructs, this research does not consider the organizational level at which these initiatives apply. Studies focusing on large organizations can explore whether training programs for top executives, middle-managers, and operational-level workers differ in explaining operational resilience or other forms of organizational resilience.

Like prior studies, we used cross-sectional data (Zheng and Lin, 2024; Gu *et al.*, 2023; Yu *et al.*, 2023), which does not allow for causal inferences. Longitudinal surveys can address this concern. The study could not obtain secondary data to measure its variables. Moreover, our sample and empirical setting are unique in many ways, calling for future work to use data from different firm groups and or countries to test our hypotheses. For example, firms in Ghana face resource scarcity problems and must navigate power distance and uncertainty avoidance cultural issues. The current study does not explore the extent to which such factors moderate the results. Finally, although the study implemented procedural measures to mitigate common method bias, it is challenging to completely eliminate this issue in single-respondent survey-based research.

## **6. Conclusion**

This study provides an enhanced theoretical and empirical understanding of the relationship between organizational training and operational resilience. While a dominant perspective in the literature—grounded in AMO theory (e.g., Gu *et al.*, 2023; He *et al.*, 2024) and resource-based theories (e.g., Do *et al.*, 2022; Yu *et al.*, 2023)—suggests that human capital development practices, such as training, are generally associated with organizational resilience outcomes positively, this study reveals that the relationship between organizational training and operational resilience depends on two factors: the type of training and the level of job autonomy.

Theoretically, this study elaborates on the concept of training and the mechanisms that explain its relationship with organizational resilience outcomes. Specifically, it offers insights into the unique mechanisms linking dynamic and ordinary capability training to operational resilience and illustrates how job autonomy moderates these relationships in distinct ways. We hope that the study's theoretical and empirical approaches will inspire further research to deepen insights on the resilience outcomes of organizational training.

## Reference

- Aguinis, H., Edwards, J.R. and Bradley, K.J. (2017), "Improving our understanding of moderation and mediation in strategic management research", *Organizational Research Methods*, Vol. 20 No. 4, pp. 665-685.
- Ajgaonkar, S., Neelam, N. G. and Wiemann, J. (2022), "Drivers of workforce agility: A dynamic capability perspective", *International Journal of Organizational Analysis*, Vol. 30 No. 4, pp. 951-982.
- Akhtar, S., Ding, D.Z. and Ge, G.L. (2008), "Strategic HRM practices and their impact on company performance in Chinese enterprises", *Human Resource Management*, Vol. 47 No. 1, pp.15-32.
- Appelbaum, E., Bailey, T., Berg, P. and Kalleberg, A.L. (2000), "*Manufacturing advantage: Why high-performance work systems pay off*", ILR Press, London.
- Ataburo, H., Ampong, G. E. and Essuman, D. (2024), "Developing operational resilience to navigate transportation disruptions: the role and boundaries of efficiency priority", *Annals of Operations Research*, pp.1-33.
- Atuahene-Gima, K., Slater, S. F. and Olson, E. M. (2005), "The contingent value of responsive and proactive market orientations for new product program performance", *Journal of Product Innovation Management*, Vol. 22 No. 6, pp.464-482.

- Bagozzi, R. P. and Yi, Y. (2012), "Specification, evaluation, and interpretation of structural equation models", *Journal of the Academy of Marketing Science*, Vol. 40, pp.8-34.
- Bates, R. (2004), "A critical analysis of evaluation practice: the Kirkpatrick model and the principle of beneficence", *Evaluation and Program Planning*, Vol. 27 No.3, pp. 341-347.
- Battisti, M., Beynon, M., Pickernell, D. and Deakins, D. (2019), "Surviving or thriving: The role of learning for the resilient performance of small firms," *Journal of Business Research*, Vol. 100, pp.38-50.
- Bode, C., Wagner, S.M., Petersen, K.J. and Ellram, L.M. (2011), "Understanding responses to supply chain disruptions: Insights from information processing and resource dependence perspectives", *Academy of Management Journal*, Vol. 54 No. 4, pp.833-856.
- Bos-Nehles, A., Townsend, K., Cafferkey, K. and Trullen, J. (2023), "Examining the ability, motivation and opportunity (AMO) framework in HRM research: Conceptualization, measurement and interactions", *International Journal of Management Reviews*, Vol. 25 No. 4, pp.725-739.
- Brandon-Jones, E., Squire, B., Autry, C. W. and Petersen, K.J. (2014), "A contingent resource-based perspective of supply chain resilience and robustness", *Journal of Supply Chain Management*, Vol. 50 No. 3, pp.55-73.
- Bulut, C. and Culha, O. (2010), "The effects of organizational training on organizational commitment", *International Journal of Training and Development*, Vol. 14 No. 4, pp.309-322.
- Business Continuity Institute. (2022), "Operational resilience report 2022", available at <https://www.thebci.org/resource/bcioperationalresilience-report-2022.html> (accessed 20 May 2024).

- Bustinza, O.F., Vendrell-Herrero, F. and Perez-Arostegui, M. (2019), "Technological capabilities, resilience capabilities and organizational effectiveness", *The International Journal of Human Resource Management*, Vol. 5192, pp.1-23.
- Cho, J., Schilpzand, P., Huang, L. and Paterson, T. (2021), "How and when humble leadership facilitates employee job performance: The roles of feeling trusted and job autonomy", *Journal of Leadership & Organizational Studies*, Vol. 28 No. 2, pp.169-184.
- Cohee, G. L. and Barnhart, C. M. (2024), "Often wrong, never in doubt: mitigating leadership overconfidence in decision-making", *Organizational Dynamics*, Vol. 53 No. 3, 101011.
- Darley, W. K. and Blankson, C. (2020), "Sub-Saharan African cultural belief system and entrepreneurial activities: A Ghanaian perspective", *Africa Journal of Management*, Vol. 6 No. 2, pp.67-84.
- Do, H., Budhwar, P., Shipton, H., Nguyen, H.D. and Nguyen, B. (2022), "Building organizational resilience, innovation through resource-based management initiatives, organizational learning and environmental dynamism", *Journal of Business Research*, Vol. 141, pp.808-821.
- Drnevich, P. L. and Kriauciunas, A.P. (2011), "Clarifying the conditions and limits of the contributions of ordinary and dynamic capabilities to relative firm performance", *Strategic Management Journal*, Vol. 32 No. 3, pp. 254-279.
- Essuman, D., Ataburo, H., Boso, N., Anin, E.K. and Appiah, L.O. (2023), "In search of operational resilience: How and when improvisation matters", *Journal of Business Logistics*, Vol. 44 No. 3, pp.300-322.

- Essuman, D., Boso, N. and Annan, J. (2020), "Operational resilience, disruption, and efficiency: Conceptual and empirical analyses", *International Journal of Production Economics*, Vol. 229, 107762.
- Fainshmidt, S., Pezeshkan, A., Lance Frazier, M., Nair, A. and Markowski, E. (2016), "Dynamic capabilities and organizational performance: A meta-analytic evaluation and extension", *Journal of Management Studies*, Vol. 53 No. 8, pp.1348-1380.
- Garavan, T., McCarthy, A., Sheehan, M., Lai, Y., Saunders, M.N., Clarke, N., ... and Shanahan, V. (2019), "Measuring the organizational impact of training: The need for greater methodological rigor," *Human Resource Development Quarterly*", Vol. 30 No. 3, pp. 291-309.
- Gerschberger, M., Ellis, S.C. and Gerschberger, M. (2023), "Linking employee attributes and organizational resilience: An empirically driven model", *Journal of Business Logistics*, Vol. 44, pp.407-437.
- Ghana Statistical Service (2016), "Integrated business establishment survey: Regional spatial business report", available at <http://www.statsghana.gov.gh/gssmain/fileUpload/pressrelease/REGIONAL%20SPATIAL%20BUSINESS%20REPORT.pdf> (accessed 15 May 2024).
- Gu, M., Zhang, Y., Li, D. and Huo, B. (2023), "The effect of high-involvement human resource management practices on supply chain resilience and operational performance", *Journal of Management Science and Engineering*, Vol. 8 No. 2, pp.176-190.
- Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2019) *Multivariate data analysis*, Cengage Learning EMEA, UK.
- Hamblin A. C. (1974), "Evaluation and control of training", *Industrial Training International*, Vol. 9 No. 5, pp. 154-6.

- He, H., Ye, Y. and Huo, B. (2024), "Can employee training facilitate production repurposing in crises? An ability-motivation-opportunity perspective", *International Journal of Production Economics*, 109444. Ahead-of-Print
- Helfat, C. E. and Martin, J.A. (2015), "Dynamic managerial capabilities: Review and assessment of managerial impact on strategic change", *Journal of Management*, Vol. 41 No. 5, pp.1281-1312.
- Huang, A. and Jahromi, M.F. (2021), "Resilience building in service firms during and post COVID-19", *The Service Industries Journal*, Vol. 41 No.1/2, pp.138-167.
- Irwin, K., Gilstrap, C., Drnevich, P. and Sunny, M. (2022), "The acquisition of capabilities: How firms use dynamic and ordinary capabilities to manage uncertainty", *Journal of Management & Organization*, Vol. 28 No. 3, pp. 564-586.
- Jiang, S., Yeung, A. C., Han, Z. and Huo, B. (2023), "The effect of customer and supplier concentrations on firm resilience during the COVID-19 pandemic: resource dependence and power balancing", *Journal of Operations Management*, Vol. 69 No. 3, pp. 497-518.
- Kraiger, K., Ford, J.K. and Salas, E. (1993), "Application of cognitive, skill-based, and affective theories of learning outcomes to new methods of training evaluation", *Journal of Applied Psychology*, Vol. 78 No. 2, pp. 311–328.
- Kull, T. J., Kotlar, J. and Spring, M. (2018), "Small and medium enterprise research in supply chain management: The case for single-respondent research designs", *Journal of Supply Chain Management*, Vol. 54 No. 1, pp.23-34.
- Kunz, J. and Sonnenholzner, L. (2023), "Managerial overconfidence: promoter of or obstacle to organizational resilience?", *Review of Managerial Science*, Vol. 17 No. 1, pp. 67-128.
- Kurtmollaiev, S., Fjuk, A., Pedersen, P.E., Clatworthy, S. and Kvale, K. (2018),

- “Organizational transformation through service design: the institutional logics perspective”, *Journal of Service Research*, Vol. 21 No. 1, pp. 59-74.
- Lartey, F.M. (2021), “Impact of career planning, employee autonomy, and manager recognition on employee engagement,” *Journal of Human Resource and Sustainability Studies*, Vol.9, pp.135-158.
- Lengnick-Hall, C. A., Beck, T.E. and Lengnick-Hall, M.L. (2011), “Developing a capacity for organizational resilience through strategic human resource management”, *Human Resource Management Review*, Vol. 21 No. 3, pp. 243-255.
- Li, Y., Wang, X., Gong, T. and Wang, H. (2023), “Breaking out of the pandemic: How can firms match internal competence with external resources to shape operational resilience?” *Journal of Operations Management*, Vol. 69 No. 3, pp. 384-403.
- MacKenzie, S. B., Podsakoff, P. M. and Podsakoff, N. P. (2011), “Construct measurement and validation procedures in MIS and behavioral research: Integrating new and existing techniques”, *MIS Quarterly*, Vol. 35 No. 2, pp. 293–334.
- Marin-Garcia, J.A and Tomas, J.M. (2016), “Deconstructing AMO framework: A systematic review”, *Intangible Capital*, Vol. 12 No. 4, pp.1040-1087.
- Menéndez Blanco, J. M. and Montes-Botella, J.L. (2017), “Exploring nurtured company resilience through human capital and human resource development: Findings from Spanish manufacturing companies”, *International Journal of Manpower*, Vol. 38 No. 5, pp.661-674.
- Miocevic, D., Gnizy, I. and Cadogan, J. W. (2023), “When does export customer responsiveness strategy contribute to export market competitive advantage?”, *International Marketing Review*, Vol. 40 No. 3, pp.497-527.
- Mubarik, M.S., Bontis, N., Mubarik, M. and Mahmood, T. (2022), “Intellectual capital and supply chain resilience”, *Journal of Intellectual Capital*, Vol. 23 No. 3, pp.713-738.

- Nikookar, E. and Yanadori, Y. (2022), "Preparing supply chain for the next disruption beyond COVID-19: Managerial antecedents of supply chain resilience", *International Journal of Operations & Production Management*, Vol. 42 No. 1, pp.59-90.
- Noble-Nkrumah, F., Anyigba, H. and Mensah, H. K. (2022), "Psychological contract fulfilment and work behaviour nexus: the interactive effects of employee job autonomy and trust", *Management Decision*, Vol. 60 No. 5, pp. 1326-1348.
- Park, R. (2018), "The roles of OCB and automation in the relationship between job autonomy and organizational performance: a moderated mediation model", *The International Journal of Human Resource Management*, Vol. 29 No. 6, pp.1139-1156.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y. and Podsakoff, N. P. (2003), "Common method biases in behavioral research: A critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88 No. 5, pp.879-903.
- Reio, T.G., Rocco, T.S., Smith, D.H. and Chang, E. (2017), "A critique of Kirkpatrick's evaluation model", *New Horizons in Adult Education and Human Resource Development*, Vol. 29 No. 2, pp. 35–53, doi: 10.1002/nha3.20178.
- Schulze, A. Brusoni, S. (2022), "How dynamic capabilities change ordinary capabilities: Reconnecting attention control and problem-solving", *Strategic Management Journal*, Vo. 43 No.12, pp.2447-2477.
- Shela, V., Ramayah, T. and Noor Hazlina, A. (2023), "Human capital and organisational resilience in the context of manufacturing: A systematic literature review", *Journal of Intellectual Capital*, Vol. 24 No. 2, pp.535-559.
- Sitzmann, T. and Weinhardt, J.M. (2018) "Training engagement theory: A multilevel perspective on the effectiveness of work-related training", *Journal of Management*, Vol. 44 No. 2, pp.732-756.
- Teece, D.J. (2014), "The foundations of enterprise performance: Dynamic and ordinary

- capabilities in an (economic) theory of firms”, *Academy of Management Perspectives*, Vol. 28 No. 4, pp.328-352.
- Tharenou, P., Saks, A.M. and Moore, C. (2007), “A review and critique of research on training and organizational-level outcomes”, *Human Resource Management Review*, Vol. 17 No. 3, pp. 251-273.
- Tortorella, G., Prashar, A., Antony, J., Vassolo, R., Mac Cawley, A., Peimbert García, R. and Nascimento, D.L.D.M. (2024), “Soft lean practices and organizational resilience in the service sector”, *Management Decision*, Vol. 62 No. 4, pp. 1424-1452.
- Wang, G.G. and Wilcox, D. (2006), “Training evaluation: knowing more than is practiced”, *Advances in Developing Human Resources*, Vol. 8 No. 4, pp. 528-539.
- Wieland, A., Marcus Wallenburg, C. (2012), “Dealing with supply chain risks: Linking risk management practices and strategies to performance”, *International Journal of Physical Distribution & Logistics Management*, Vol. 42 No. 10, pp. 887-905.
- Wu, X. and Ma, Y. (2019), “The effect of proactive personality on individual improvisation: The moderating role of job autonomy”, *Open Journal of Social Sciences*, Vol. 7, pp. 178-190.
- Yang, C., Bao, Y. and Zhang, Z. (2024), “More autonomy, more proactive? The (in) congruence effects of autonomy on proactive behaviour”, *Management Decision*, Vol. 62 no. 5, pp. 1560-1575.
- Yu, W., Wong, C. Y., Chavez, R., Jacobs, M. and Nittala, L. (2023), “How intellectual capital builds supply chain resilience? Exploring mediation and interaction effects from an intellectual capital based view”, *Supply Chain Management: An International Journal*, Vol. 28 No. 6, pp. 1060-1074.

Zahra, S. A., Sapienza, H. J. and Davidsson, P. (2006), "Entrepreneurship and dynamic capabilities: A review, model and research agenda", *Journal of Management studies*, Vol. 43 No. 4, pp. 917-955.

Zheng, Q. and Lin, J. (2024), "Corporate social responsibility: an enabler of organizational resilience", *Management Decision*, Vol. 62 No. 6, pp. 1905-1923.

Zheng, Q. and Lin, J. (2024), "Corporate social responsibility: an enabler of organizational resilience", *Management Decision*, Vol. 62 No. 6, pp. 1905-1923.

Zhou, Q., Ejovi, T., Wu, E. C. and Doherty, B. (2023), "Building organisational resilience capability in small and medium-sized enterprises: The role of high-performance work systems", *Human Resource Management Journal*, Vol. 33, pp. 806-827.

Table I. Summary of related past studies.

Authors (year)	Predictor: Form of human resource/ competence	Outcome: Form/ level of analysis of resilience	Mediator (a)/ Moderator (b)	Theoretical foundation	Data type and empirical setting	Key findings
He <i>et al.</i> (2024)	Training program availability	Production repurposing	Government wage subsidy (b) Labor shortage (b)	Ability-motivation-opportunity theory	World Bank Enterprise Survey data from 4,679 firms in 32 countries	Training availability is positively related to production repurposing This relationship is stronger where firms have access to government wage subsidies but lower where they face labor shortages
Gu <i>et al.</i> (2023)	Firms' employee skills	Supply resilience Internal resilience Customer resilience		Ability-motivation-opportunity theory	Cross-sectional survey data from 206 Chinese manufacturers	Employee skills benefit internal and customer resilience but not supply resilience.
Yu <i>et al.</i> (2023)	Employees' human capital Employees' social capital	Supply chain resilience	Employees' social capital(a/b) Organizational capital(a/b)	Resource-based/ knowledge-based literature	Cross-sectional survey data from 241 Chinese manufacturers	Human capital does not directly contribute to supply chain resilience. Social capital enhances supply chain resilience. Social capital and organizational capital mediate (but not moderate) the relationship between human capital and supply chain resilience.
Mubarik <i>et al.</i> (2022)	Firm's human capital	Supply chain resilience	Supplier learning (a) Customer learning (b)	Dynamic capabilities/ knowledge-based view	Cross-sectional survey data from 159 food manufacturers in Pakistan	Human capital positively relates to supply chain resilience. Human capital contributes to supplier and customer learning, which in turn benefits supply chain resilience.
Nikookar and Yanadori (2022)	Supply chain manager's Human capital Social capital Cognition	Supply chain resilience	Supply chain visibility (a) Supply responsiveness (a) Supply chain flexibility (a)	Dynamic managerial capabilities theory	Cross-sectional survey data from 598 manufacturers in Australia	Supply chain manager's human capital and social capital do not directly contribute to supply chain resilience; their effects are mediated by supply chain visibility, responsiveness, and flexibility. Supply chain managers' cognition, both directly and indirectly, through supply chain visibility, responsiveness, and flexibility, enhances supply chain resilience.

Table I. Continued.

Authors (year)	Predictor: Form of human resource/ competence	Outcome: Form/ level of analysis of resilience	Mediator (a)/ Moderator (b)	Theoretical foundation	Data type and empirical setting	Key findings
Zhou <i>et al.</i> (2023)	High performance work systems (HPWS)	Organizational resilience capability		Human capital theory	Survey of 117 SMEs from Nigeria	HPWSs contribute to bounce-back resilience and bounce-forward resilience via human capital value and both human capital value and heterogeneity, respectively.
Menéndez Blanco and Montes-Botella (2017)	Human capital: training expenses, education, engagement in R&D	Company resilience: productivity, product diversification, product/process innovation		Human capital view, Complex adaptive systems, adaptive resilience approach	Secondary survey data	Human capital contributes significantly to company resilience.

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Table II. Sample and respondent profile

Variable	Category	Frequency	Percentage
Firm industry	Manufacturing	70	27.0
	Service	189	73.0
Respondent position	CEO	32	12.4
	General Manager	55	21.2
	Managing Director	31	12.0
	Operations Manager	62	23.9
	Other Middle-level Managerial Positions	79	30.5
Firm age (number of years of operation)	3 - 10	95	36.7
	10.01 – 20	104	40.2
	20.01 - 60	60	23.2
Firm size (number of full-time employees)	5 to 30	165	63.7
	31 to 99	70	27.0
	100 to 500	24	9.3
Variable		Mean	SD
Respondent's years in current position		7.13	5.58
Firm size (number of full-time employees)		40.5	60.59
Firm age (number of years in operations)		15.6	10.39

Table III. Measurement model results.

Construct, measures, Cronbach's alpha (CA), congeneric reliability ( $\rho_C$ ), and average variance extracted (AVE)	Loading	T-value
<i>Ordinary capability training</i> (CA = 0.97, $\rho_C$ = 0.97, AVE = 0.92). In the last 3 years,		
our company has been enrolling our employees in 'job-related' training programs	0.94	20.03
our company has frequently provided formal training programs for its employees to perform better	0.97	21.48
our company ensured that it has trained newly recruited employees to gain the skills necessary to perform their roles	0.97	21.36

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<i>Dynamic capability training<sup>a</sup> (CA = 0.96, <math>\rho_C</math> = 0.96, AVE = 0.81). In the last 3 years, our company has provided training opportunities to our employees aimed at boosting their</i>		
ability to solve problems	0.87	17.55
ability to coordinate resources	0.89	18.13
ability to search and seize opportunities and resources	0.91	18.85
ability to sense threats and opportunities	0.92	19.38
ability to reconfigure resources	0.92	19.43
<i>Disruption absorption (CA = 0.92, <math>\rho_C</math> = 0.92, AVE = 0.66). For the past 3 years, whenever disruptive events occur,</i>		
our company is able to carry out its regular functions	0.83	16.01
our company grants us much time to consider a reasonable response	0.71	12.84
our company is able to carry out its functions despite some damage done to it	0.83	16.13
without much deviation, we are able to meet normal operational and market needs	0.87	17.22
without adaptations being necessary, our company performs well over a wide variety of possible scenarios	0.85	16.66
our company's operations retain the same stable situation as it had before disruptions occur for a long time	0.79	14.92
<i>Disruption recovery (CA = 0.96, <math>\rho_C</math> = 0.96, AVE = 0.81). Over the past 3 years, whenever our operations breakdown due to a disruptive event,</i>		
it does not take long for us to restore normal operation	0.89	18.13
our company reliably recovers to its normal operating state	0.88	17.89
our company easily recovers to its normal operating state	0.91	19.07
our company effectively restores operations to normal quickly	0.92	19.18
we are able to resume operations within the shortest possible time	0.92	19.15
<i>Job autonomy (CA = 0.79, <math>\rho_C</math> = 0.82, AVE = 0.60)</i>		
Our company allows employees considerable opportunities for independence and freedom in how they do their work.	0.63	10.49
Our company permits employees to decide on their way how to go about doing the work.	0.97	17.54
Our company provides substantial freedom and discretion to the employees in scheduling and procedures.	0.69	11.96
<i>Disruption orientation (CA = 0.84, <math>\rho_C</math> = 0.85, AVE = 0.58)</i>		
We always feel the need to be alert to possible disruptive events	0.77	13.64
Previous unplanned disruptions show us where we can help improve our company's operations	0.83	15.18
We think a lot about how threatening events could have been avoided	0.74	12.86
After an unplanned operational disruption has occurred, our management lead in analyzing it thoroughly	0.70	11.81
<i>Resource slack (CA = 0.95, <math>\rho_C</math> = 0.96, AVE = 0.81)</i>		
Our company often has uncommitted resources that can quickly be used to fund new strategic initiatives	0.87	17.55
Our company usually has adequate resources available in the short run to fund its initiatives	0.90	18.61
We are often able to obtain resources at short notice to support new strategic initiatives	0.91	18.96
We often have substantial resources at the discretion of management for funding strategic initiatives	0.93	19.50
Our company usually has reasonable amount of resources in reserve	0.89	18.34

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Table IV. Descriptive statistics and correlations

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Job autonomy		0.28**	0.28**	0.24**	0.32**	0.07	0.22**	0.12	-0.10	0.03	-0.03	0.04
2. Disruption absorption	0.29**		0.56**	0.35**	0.22**	0.14*	0.14*	0.15*	0.07	-0.03	0.01	0.00
3. Disruption recovery	0.29**	0.57**		0.31**	0.26**	0.13*	0.18**	0.19**	0.12*	-0.09	-0.02	0.00
4. Dynamic capability training	0.26**	0.36**	0.32**		0.61**	0.17**	0.22**	0.23**	0.01	-0.05	0.04	-0.02
5. Ordinary capability training	0.33**	0.24**	0.27**	0.62**		0.39**	0.21**	0.36**	0.03	-0.07	0.02	-0.02
6. Resource slack	0.09	0.16*	0.15*	0.19**	0.40**		0.15*	-0.01	-0.02	-0.10	0.02	0.02
7. Disruption orientation	0.24**	0.16**	0.20**	0.24**	0.23**	0.17**		0.08	0.00	-0.04	0.04	-0.07
8. Firm size (log)	0.14*	0.17**	0.21**	0.25**	0.37**	0.010	0.10		0.60**	-0.15*	-0.11	0.00
9. Firm age (log)	-0.08	0.09	0.14*	0.03	0.05	0.00	0.02	0.61**		-0.08	-0.09	0.06
10. Industry (service firms = 1)	0.05	-0.01	-0.07	-0.03	-0.05	-0.08	-0.02	-0.13*	-0.06		0.11	-0.06
11. Marker variable 1	-0.01	0.03	0.00	0.06	0.04	0.04	0.06	-0.09	-0.07	.123*		-0.06
12. Marker variable 2	0.06	0.02 <sup>a</sup>	0.02	0.00	0.00	0.04	-0.05	0.02	0.08	-0.04	-0.04	
Mean	5.02	5.30	4.89	4.90	4.62	4.46	5.43	3.09	2.55	0.73	0.40	0.37
Standard deviation	1.21	1.09	1.43	1.52	2.05	1.45	1.01	1.09	0.64	0.44	0.49	0.48

Notes: Zero-order and marker variable adjusted correlations are reported below and above the principal diagonal, respectively; <sup>a</sup> = marker variable adjusted correlation = 0.02 (second least positive value); \*p < 0.05 (2-tailed test); \*\*p < 0.01 (2-tailed test).

## V. Main Results (structural equation modeling)

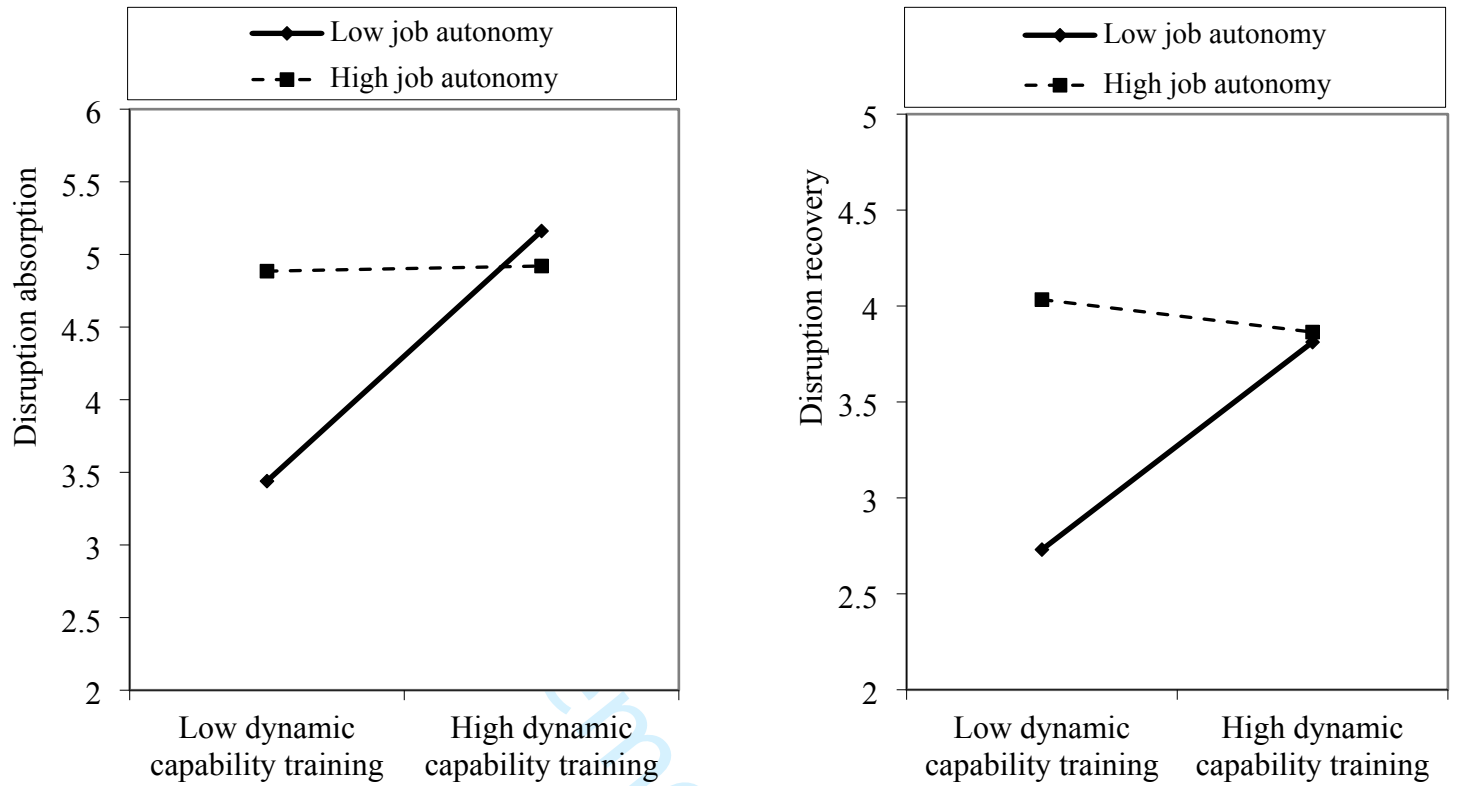
<i>Predictors:</i>	<i>Outcomes: Operational resilience dimensions</i>					
	Disruption absorption			Disruption recovery		
	$\beta$	SE	p	$\beta$	SE	p
Dynamic capability training (DCT)	0.293	0.095	0.002	0.152	0.091	0.094
Ordinary capability training (OCT)	-0.031	0.108	0.771	0.085	0.105	0.416
DCT $\times$ JA	-0.229	0.040	<0.001	-0.173	0.038	<0.001
OCT $\times$ JA	0.060	0.031	0.049	0.073	0.030	0.015
Job autonomy (JA)	0.248	0.082	0.003	0.281	0.080	<0.001
Resource slack	0.188	0.079	0.017	0.098	0.076	0.198
Disruption orientation	-0.017	0.078	0.825	0.048	0.076	0.528
Firm size (log)	0.060	0.086	0.487	0.025	0.084	0.770
Firm age (log)	0.080	0.136	0.559	0.210	0.133	0.114
Industry (service firms = 1)	0.020	0.153	0.896	-0.090	0.149	0.544
$R^2$	0.295			0.254		
$\chi^2$				947.438		
DF				558		
RMSEA				0.052		
TLI				0.944		
CFI				0.949		
SRMR				0.069		

Notes:  $\beta$  = unstandardized estimates; SE = standard error; p-value (2-tailed).

Table VI. Additional Results (structural equation modeling)

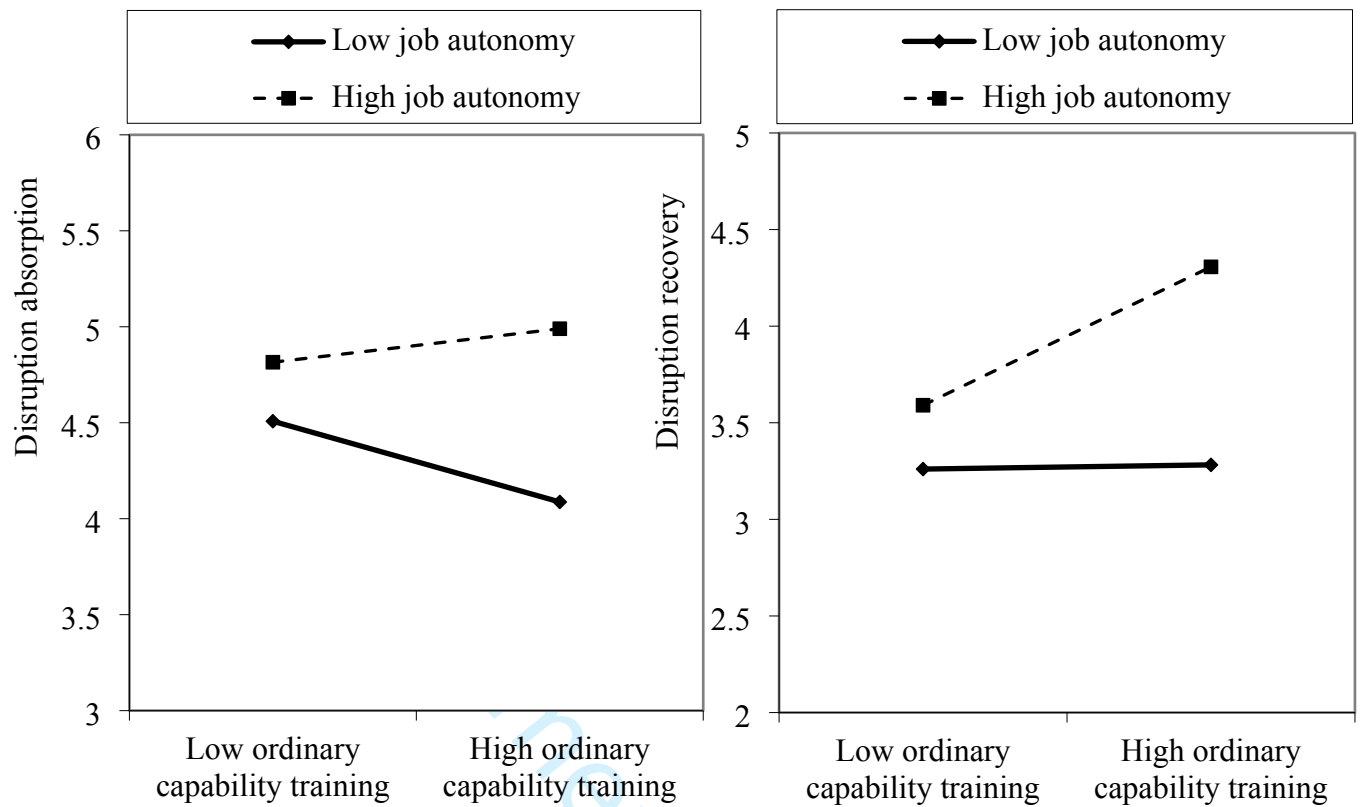
<i>Predictors:</i>	<i>Outcomes: Operational resilience dimensions</i>					
	Disruption absorption			Disruption recovery		
	$\beta$	SE	P	$\beta$	SE	p
Dynamic capability training (DCT)	0.363	0.107	0.001	0.234	0.102	0.023
Ordinary capability training (OCT)	-0.047	0.108	0.662	0.078	0.105	0.460
DCT $\times$ OCT	0.035	0.025	0.166	0.042	0.025	0.085
DCT $\times$ JA	-0.194	0.044	<0.001	-0.146	0.042	<0.001
OCT $\times$ JA	0.063	0.031	0.044	0.071	0.030	0.019
OCT $\times$ DCT $\times$ JA	0.032	0.016	0.047	0.024	0.015	0.126
Job autonomy (JA)	0.173	0.087	0.047	0.218	0.085	0.010
Resource slack	0.165	0.079	0.038	0.076	0.077	0.319
Disruption orientation	-0.005	0.079	0.954	0.054	0.077	0.484
Firm size (log)	0.083	0.087	0.342	0.045	0.085	0.591
Firm age (log)	0.062	0.137	0.650	0.188	0.134	0.161
Industry (service firms = 1)	-0.015	0.154	0.920	-0.126	0.150	0.400
$R^2$	0.303			0.263		
$\chi^2$				1142.445		
DF				616		
RMSEA				0.057		
TLI				0.926		
CFI				0.933		
SRMR				0.089		

Notes:  $\beta$  = unstandardized estimates; SE = standard error; p-value (2-tailed).



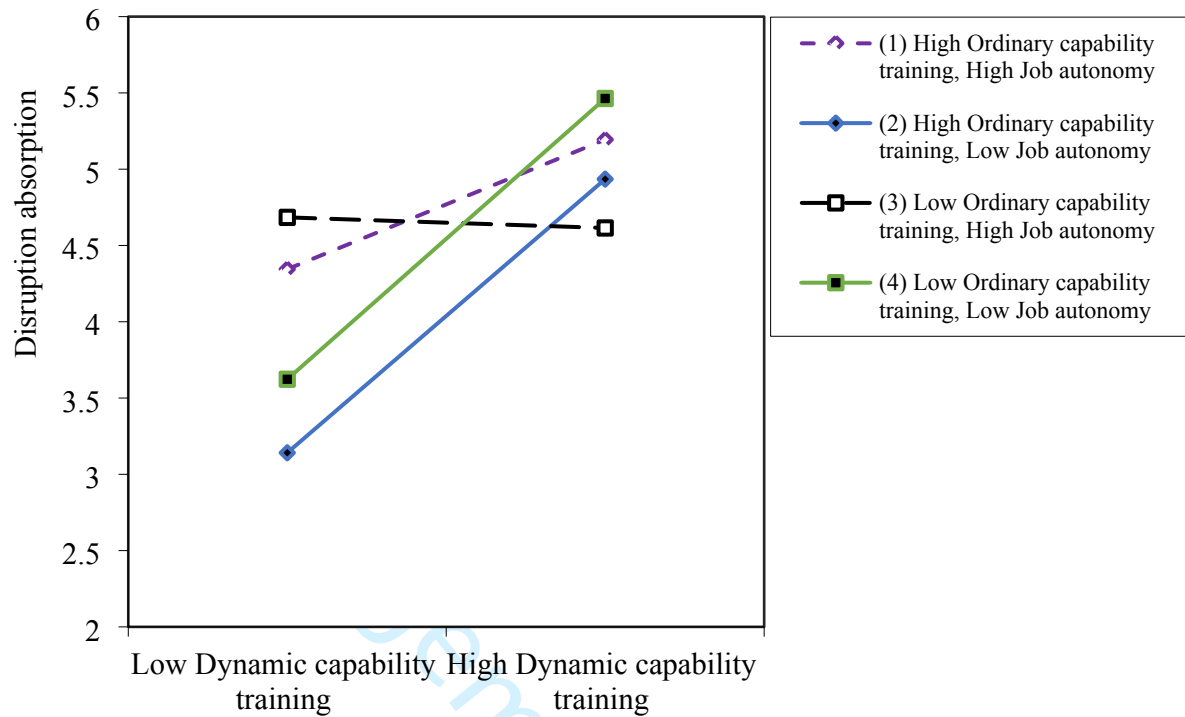
**Note:** Low and high levels of dynamic capability training and job autonomy correspond to one standard deviation below and above their respective mean values.

**Figure 1.** Moderating role of job autonomy in the relationship between dynamic capability training and operational resilience dimensions.



**Note:** Low and high levels of ordinary capability training and job autonomy correspond to one standard deviation below and above their respective mean values.

**Figure 2.** The moderating role of job autonomy in the relationship between ordinary capability training and operational resilience dimensions.



**Note:** Low and high levels of dynamic capability training, ordinary capability training, and job autonomy correspond to one standard deviation below and above their respective mean-centered mean values.

**Figure 3.** The relationship between the three-way interaction among dynamic capability training, ordinary capability training, and job autonomy and disruption absorption.