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Love and the practice of innovation! Roles of entrepreneurial passion and perceived innovation importance in the practice–innovation link

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ABSTRACT

In organizations, the success of innovation efforts in improving performance relies heavily on entrepreneurial passion and the perceived importance of innovation. Understanding the link between deliberate practice and innovation broadens our current knowledge, emphasizing entrepreneurial passion as a driving force and the perceived importance of innovation as a crucial amplifying factor for performance. This study posits that deliberate innovation practice enhances innovation performance by fostering entrepreneurial passion, which is further influenced by the perceived importance of innovation. Grounded in self-determination theory and social cognition theory, this research collected data through a multisource, three-wave approach from software company employees. Utilizing SmartPLS (v 4.0) for measurement and structural model evaluation, the findings reveal that deliberate innovation practice positively impacts innovation performance. Entrepreneurial passion serves as a mediator between deliberate innovation practice and innovation performance, with perceived innovation importance strengthening this effect. This study demonstrates that the impact of deliberate innovation practice on performance is more pronounced when entrepreneurial passion mediates, especially at higher levels of perceived innovation importance. The findings offer essential theoretical insights and practical implications.

Introduction

In today's pluralistic, cutthroat, and dynamic job environment, organizational development and sustenance rely on effective innovation performance (Hameed et al., 2021). Innovation performance implies the synthesis of knowledge about novel and valuable products and processes, leveraging a degree of uniqueness that yields condensed price sensitivity and superior customer loyalty (Ghasemaghaei & Calic, 2020). An extant body of research has identified an array of benefits for organizations that have efficaciously exploited innovation strategies to gain high market shares and profits (Rauter et al., 2019). Curado et al. (2018) argued that success in innovation is influenced by several contextual and environmental factors surrounding an organization. For instance, organizations competing in more mature and established markets do not reap competitive sales growth only by offering low prices but also by several "non-price" factors, e.g., customization and design (Wang & Lin, 2012). Similarly, innovating and developing new products are critical in dynamic and volatile environments (Curado et al., 2018).

Even with escalating interest in innovation performance, researchers have struggled to investigate the factors that contribute to innovation performance in entrepreneurship and work contexts (Giaccone & Magnusson, 2022). Although it has been theorized that individual factors can be linked with innovation performance, there is a scarcity of empirical studies in this research arena. This study speculates that to acquire and apply new knowledge for innovation, organizations require their workforce to continuously engage in innovative practices (Artusi & Bellini, 2022). Hence, the authors predict that deliberate innovation practice is one of the relevant inputs that cultivate superior innovation performance, an omission that may limit organizational capabilities to leverage innovation. Deliberate innovation practice is a self-regulated, purposeful, and iterative process that fuels organizational innovation by leveraging creative endeavors (Bilal & Fatima, 2022). Investigating deliberate innovation practice in this context is important because extant evidence has linked deliberate innovation practice to various outcomes (e.g., Baker et al. 2005, Bilal and Fatima 2022, Ericsson 2004, 2008, Ericsson and Harwell 2019). Furthermore, organizations can implement

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appropriate interventions to foster deliberate innovation practices (Sheffield et al., 2022). Thus, examining deliberate innovation practice as an antecedent may generate opportunities to improve innovation performance.

In addition to evaluating the direct relationship between deliberate innovation practice and innovation performance, this study draws on the self-determination theory (SDT, Deci & Ryan, 2013; Ryan & Deci, 2000) and seeks to expand this line of inquiry by exploring a causal mechanism that might also reinforce this association: entrepreneurial passion. Entrepreneurial passion is active involvement in entrepreneurial activities that are personally significant and evoke strong positive emotions (Lee & Herrmann, 2021). Entrepreneurial passion has been reported to have various consequences for employees and organizations (Neneh, 2022; Zhao & Liu, 2023). Particularly, harmonious entrepreneurial passion[1] has been shown to yield "venture growth," "communicated vision," "goals," "self-efficacy," "competencies," "motivation," and "competitive strategies" (Lee & Herrmann, 2021). In this study, we specifically project that (1) deliberate innovation practice enhances innovation performance because of entrepreneurial passion and (2) employees' perceived innovation importance strengthens the underlying linkage between deliberate innovation practice and innovation performance, which is mediated by entrepreneurial passion.

This study explores how deliberate innovation practice indirectly affects innovation performance through entrepreneurial passion, and it uses social cognitive theory (SCT, Bandura, 1986, 2001) to support its arguments. This theory specifies that human functioning depends on personal and environmental factors (Ng et al., 2022). Deliberate innovation practice and perceived innovation importance highlight the "person- and organization-centered" motivations for prioritizing innovation performance. Examining this interaction, we uncover the previously neglected concept of "attachment," considering that employees with strong inclination toward deliberate innovation practice and perceived innovation importance may be associated with elevated innovation performance. Thus, this study explores the impact of deliberate innovation practice on innovation performance, which is mediated by entrepreneurial passion and moderated by perceived innovation importance.

Our research has made significant contributions to the entrepreneurship and work fields. First, we utilize causal reasoning based on SCT to create and test a model that demonstrates the positive effects of deliberate innovation practice. Specifically, it proposes that employees with heightened entrepreneurial passion can enhance the impact of deliberate innovation practice on innovation performance. Second, by investigating the moderating role of perceived innovation importance, this study deepens the understanding of the conditions under which deliberate innovation practice is most effective, identifying that employees with higher entrepreneurial passion exhibit improved innovation performance.

Literature review

Deliberate practice

Deliberate practice, a concept central to understanding skill acquisition and expert performance, has been the focus of significant research over the past few decades (Ericsson, 2020). The recent literature emphasizes the multifaceted nature of deliberate practice and its application across various fields. Studies have increasingly emphasized the role of targeted, well-structured practice routines in achieving high levels of expertise (Di Mitri et al., 2022), echoing the foundational theories of Ericsson and colleagues. For instance, recent research on sports psychology has highlighted the importance of deliberate practice in skill development among elite athletes (Ericsson, 2020). Similarly, in the field of education, the application of deliberate practice has evolved, with studies exploring its impact on teaching methodologies and student learning outcomes (Chen, 2022). These studies suggest that when educators employ deliberate practice strategies, such as providing immediate feedback and setting clear, achievable goals, student engagement and learning efficacy significantly improve. Furthermore, in the field of music, recent research has extended beyond mere practice duration, focusing instead on the quality and structure of practice sessions (Hambrick et al., 2020). This shift reveals a deeper understanding of how deliberate, focused practice, as opposed to mere repetitive exercises, contributes to advanced musical proficiency.

In addition, the relevance of the concept in the business world has garnered attention, particularly in leadership development and employee training programs. Recent studies have indicated that deliberate practice principles can effectively enhance business skills, such as decision-making and strategic planning (Köhler & Rausch, 2022). This body of work suggests a growing recognition of deliberate practice as a tool not only for developing technical skills but also for fostering broader cognitive and decision-making capabilities. In summary, the literature on deliberate practice exhibits its increasing application and significance in diverse domains, offering valuable insights into how structured, intentional practice can lead to mastery and expert performance.

Entrepreneurial passion

The recent literature on entrepreneurial passion has highlighted its significant impacts on the psychology and behavior of entrepreneurs. Entrepreneurial passion, influenced by factors such as identity and entrepreneurial effort, is categorized into harmonious passion and obsessive passion (Newman et al., 2021). Harmonious passion, associated with positive emotions and voluntary engagement in activities, is more effective and flexible than obsessive passion, which often stems from negative emotions and external pressures (Lee & Herrmann, 2021). On the contrary, entrepreneurial passion promotes entrepreneurial behavior and effort, significantly affecting enterprise performance and personal satisfaction (Feng & Chen, 2020). According to Neneh (2022), entrepreneurs with higher levels of passion are more likely to identify opportunities and commit time and energy to their ventures, leading to better enterprise growth and personal satisfaction. However, excessive passion can lead to overconfidence and unrealistic expectations, potentially hindering enterprise growth (Luu & Nguyen, 2021). In essence, entrepreneurial passion plays a crucial role in influencing entrepreneurs' self-efficacy, decision-making, and overall success in their ventures.

Theoretical underpinning

SDT is a broad framework for studying human motivation and personality. This theory, developed by Deci and Ryan, focuses on different types of motivation (intrinsic and extrinsic) and their roles in driving human behaviors (Vasconcellos et al., 2020). Intrinsic motivation stems from genuine interest or personal satisfaction, whereas extrinsic motivation is driven by external rewards or pressures (Ntoumanis et al., 2021). SDT posits that the fulfillment of three basic psychological needs—autonomy, competence, and relatedness—is essential to foster intrinsic motivation and psychological well-being (Vasconcellos et al., 2020). Autonomy is the feeling of being in control and having freedom, competence is being skilled and capable; and relatedness is the sense of having a connection with others (Ntoumanis et al., 2021). With respect to organizational behavior and innovation, SDT can help explain how these needs influence an individual's

[1] Guided by the dualistic model of passion, passion is categorized as obsessive entrepreneurial passion and harmonious entrepreneurial passion. The focus of this research is on harmonious entrepreneurial passion.

motivation to engage in innovative activities and their overall performance.

SCT, developed by Bandura, emphasizes the importance of observational learning, imitation, and modeling in understanding human behaviors (Schunk & DiBenedetto, 2020). SCT proposes that learning occurs in a social context and can happen purely through observation or instruction, without a change in behavior (Luszczynska & Schwarzer, 2020). Central to this theory is the concept of self-efficacy, or the belief in one's abilities to execute actions required to manage prospective situations. Self-efficacy affects every aspect of human endeavor, such as the motivation to tackle a task and perseverance despite adversities (Bandura, 2001). In an organizational setting, SCT can be utilized to understand how employees observe and emulate innovative behaviors, how their beliefs in their own abilities impact their engagement in innovation processes, and how these factors collectively contribute to organizational innovation performance.

Herein, we suggest that deliberate innovation practice impacts innovation performance, which is mediated by entrepreneurial passion and moderated by perceived innovation importance. SDT provides a basis for understanding how fulfilling the psychological needs for autonomy, competence, and relatedness through deliberate practice can enhance entrepreneurial passion. This intrinsic passion drives innovation performance. Meanwhile, SCT offers a perspective on how the social environment and observed behaviors within an organization can influence an individual's self-efficacy in innovation. This can be attributed to the moderating role of perceived innovation importance because the collective belief in the value of innovation within an organization (a social cognitive aspect) can amplify the effects of individual entrepreneurial passion on innovation outcomes.

Hypotheses

The mediating role of entrepreneurial passion

Since the seminal work of Ericsson et al. (1993), the term deliberate practice has received much attention. The authors then defined deliberate practice as "the individualized solitary practice in classical instrumental music as directed by a qualified teacher" (Ericsson et al., 1993; Ericsson & Harwell, 2019, p. 2). With its increasing popularity, the theoretical roots of deliberate practice extended to other domains (Bilal & Fatima, 2022; Dunn & Shriner, 1999; Ericsson, 2004, 2008; Ericsson et al., 2009). According to Baker et al. (2005), deliberate practice is based on the idea that it is not just any type of training but participation in specific types of practice (innovation) that is required to achieve expertise. In addition, according to Ericsson (2004) and Bilal and Fatima (2022), deliberate practice significantly improve current performance and behaviors owing to repetition and feedback cultivated through self-regulated individuals' efforts to engage in those activities. A massive body of evidence supports the claim that deliberate practice leads to long-term superior performance owing to continuous improvement during the practice (e.g., innovation) (Bilal & Fatima, 2022; Ericsson et al., 2009; Ericsson & Harwell, 2019). SCT (Bandura 2001) specifies that individuals are "agentic," and they hold the beliefs that they can impact the environment (i.e., innovation performance) through their actions (i.e., deliberate innovation practice). Moreover, according to SCT, things happening by controlling and exercising one's actions (Ng et al., 2022) constitute the core of deliberate innovation practice. That is to say, deliberate innovation practice allows individuals to experience more task success, i.e., innovation, which will ultimately improve their confidence in mastering the ability to perform that task, translating into exaggerated innovation performance, formally as follows:

Hypothesis 1. *Deliberate innovation practice positively relates to innovation performance.*

However, this study also proposes that transforming deliberate innovation practice into increased innovation performance entails a causal mechanism that might underpin this linkage: entrepreneurial passion. Entrepreneurial passion is the intense happy emotion that an entrepreneur consciously experiences when engaging in activities related to their relevant and important responsibilities in their self-identity (Cardon et al., 2009). Hypothetically, deliberate innovation practice stems from entrepreneurial passion, which promotes "a positive source of activity [innovation] investment" (Vallerand et al., 2007, p. 505), ultimately stimulating innovation performance targets. Vallerand et al. (2007) observed that entrepreneurial passion is a crucial source of motivation, allowing individuals to endure lengthy and perhaps challenging practice sessions, ultimately leading to the achievement of exceptional levels of innovative performance. In addition, SDT (Deci & Ryan, 2013; Ryan & Deci, 2000) supports our theoretical deduction that deliberate innovation practice translates into increased innovation performance through the mediating role of entrepreneurial passion. Harmonious entrepreneurial passion stems from satisfaction with performing activities that leverage one's inner motivation (Astakhova & Porter, 2015). Moreover, SDT asserts that when individuals perform an activity, they find the experience of acting as a reward in and of itself (Cardon et al., 2017). Furthermore, the action of engagement in the activity can lead individuals to success, although it is not the primary motive for performing that activity (Astakhova & Porter, 2015). Therefore, individuals' volitional and prolonged engagement in activities emanating from entrepreneurial passion can promote innovation performance, formally as follows:

Hypothesis 2. *Entrepreneurial passion mediates the relationship between deliberate innovation practice and innovation performance.*

The moderating role of perceived innovation importance

Moreover, this study also expects the moderating role of perceived innovation importance in the association between deliberate innovation practice and innovation performance, mediated by entrepreneurial passion. Perceived innovation importance is the degree to which employees perceive innovation as vital to the well-being and success of their organizations (Ng et al., 2022). In other words, perceived innovation importance is the perception of employees about their organizations, such as how much they think their organizations value innovation. In addition, perceived innovation importance encompasses employees' perceptions and is subjective (Ng et al., 2022). It measures the extent to which employees perceive innovation importance in their organizations, which may vary across individuals owing to different interpretations of the intentions of the firms (Kehoe & Wright, 2013). However, it is important to mention that certain businesses prioritize innovation but do not provide tangible support, whereas others actively display support for innovation. This leads to variations in individuals' psychological beliefs regarding innovation (Ng et al., 2022).

Moreover, perceived innovation importance refers to the extent to which employees view innovation performance as a significant objective. As previously stated, the benefits of deliberate innovation efforts will be diminished when employees do not consider innovation performance as a prominent objective, which is likely to occur when innovation is regarded as less crucial to the success of an organization (Ng et al., 2022). In this scenario, employees may experience diminished entrepreneurial passion and exhibit less deliberate innovation practice because they perceive innovation as irrelevant or unimportant to the organization. In juxtaposition, when employees perceive that their organizations value innovation, they cultivate an elevated entrepreneurial passion and exhibit superior deliberate innovation practices that improve innovation performance. Furthermore, SCT (Bandura, 2001) extends the acumens that support this corollary; that is, when employees perceive that their deliberate

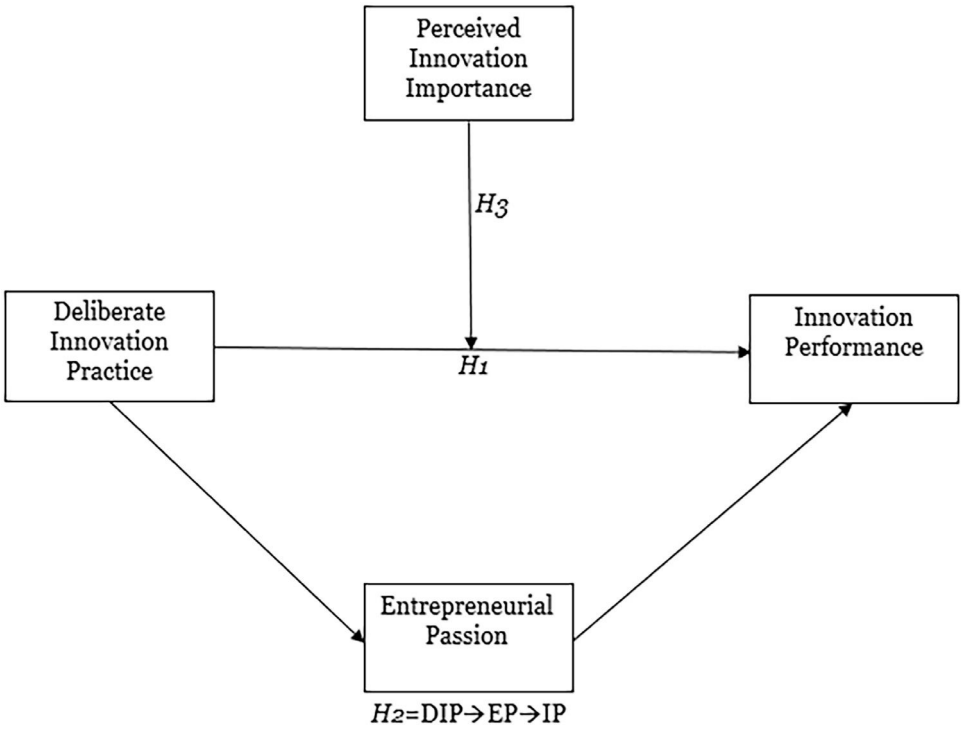

Fig. 1. Conceptual model.

innovation practices are cognitively appraised by goal salience (i.e., the perceived innovation importance), they are more likely to engage in the activities they love (i.e., pursuing innovation), promoting innovation performance. On the contrary, the diminished psychological belief in perceived innovation importance weakens the deliberate practice–innovation link (Fig. 1), formally as follows:

Hypothesis 3. *The positive association between deliberate innovation practice and innovation performance is moderated by perceived innovation importance, such that the association is strong (weak) at high (low) levels of perceived innovation importance.*

Method

Sample and procedure

The present study collected three-wave data from employees working in software houses. The information and communication technology sector engenders continuous improvement to leverage innovation by sanctioning employees to pursue creative endeavors (Yunis et al., 2018). Hence, to effectively execute strategies, software houses may increasingly need to rely on networks, constituting multitudes of people to exercise entrepreneurial behaviors (Vasilchenko & Morrish, 2011). There is growing evidence that suggests that entrepreneurial employee activity is an alternative type of entrepreneurship, particularly in knowledge economies (Jong et al., 2015). These arguments support the claim that employees in software houses are more likely to develop entrepreneurial passion, leveraging innovation performance.

This study utilized a time interval of 6 weeks between each wave owing to the temporal nature of the effects observed in the mediation analysis (Maxwell & Cole, 2007). This is because a study that neglects to do so may be influenced by potential biases when evaluating the parameters in "mediation analysis" (Cole & Maxwell, 2003). Preliminary research has supported the choice of 6-week intervals in a time-lagged research design (Demerouti et al., 2004; Ten Brummelhuis et al., 2014). Based on personal connections, the authors accessed the target organizations. The participants were given questionnaires along with a cover letter that explained the goal of the study and assured them that their responses would be kept confidential. This was done to alleviate any concerns that they may have had about being evaluated. This study utilized a nonexperimental research design and face-to-face data collection. The purposive sample technique was used to gather responses (Sahabuddin et al., 2021). Purposive sampling is suitable when the study aims to achieve its purpose by selecting specific replies without any random selection. The researchers distributed questionnaires to 400 participants in the initial phase to gather information regarding their demographic characteristics, intentional innovation practices, and perceived significance of innovation. The authors obtained a total of 367 fully completed responses. In the second phase, the authors administered questionnaires to selected participants who had been gathered in the initial phase. The participants were instructed to create a key by selecting the initial letter of their surnames and the month of their birth years. This facilitated the researchers in gathering replies throughout the successive waves and harmonizing the collected data. In the second wave, the participants were instructed to evaluate their level of entrepreneurial zeal. A total of 340 questionnaires were received, out of which 325 corresponded to the original responses. During the third phase, the authors gathered evaluations from peers regarding the level of innovation performance. To achieve the highest level of accuracy and prevent data overlap, each peer evaluated the data of only two main respondents. The participants were asked to indicate the complete names of the main respondents, which were then compared with the keys given by the participants in the initial two waves. The authors circulated 325 questionnaires to gather data on innovation performance, as judged by peers. Out of these, 312 questionnaires were fully completed and matched with the original responses.

This study processed 312 questionnaires after coordinating the responses gathered in each wave, with a response rate of 78 %. The data contain responses from 63 % male and 37 % female participants,

with an average age of 37 years (SD = 0.51). With respect to employment status, 57 % and 43 % of participants were permanent and contractual employees, respectively. With respect to positions, 28 % were in the low managerial positions, 42 % were in the middle managerial positions, and 30 % were in the high managerial positions. With respect to tenure, 20 % of the employees worked for less than 1 year, 24 % of the participants worked for 1–3 years, 28 % worked for 3–5 years, 15 % worked for 5–8 years, and 13 % worked for more than 8 years.

Measures

This study utilized recognized scales from reputable sources to gather data for this survey. The questionnaire items were assessed using a 5-point Likert scale, with "1″ indicating severe disagreement and "5″ indicating strong agreement (see Appendix 1). This study adapts the research instrument (15 items) developed by Sonnentag and Irion (2010) to measure deliberate innovation practice (Cronbach's alpha: 0.78). In addition, this study adapts the research instrument developed by Vallerand et al. (2003) to measure entrepreneurial passion, consisting of five items (Cronbach's alpha: ≥0.70). Moreover, this study utilized the research instrument to measure innovation performance developed by Welbourne et al. (1998) (four items, Cronbach's alpha: 0.90). Finally, this study adapts the research instrument developed by Ng et al. (2022) to measure perceived innovation importance (six items, Cronbach's alpha: 0.74).

Control variables

The analysis utilized firm size, firm age, and geographic location as control variables.

Data analysis

This study utilized partial least squares structural equation modeling and ran its algorithm in SmartPLS (V 4.0) for data analysis. The choice of partial least squares structural equation modeling, also known as "variance-based structural equation modeling," was based on two main reasons: (1) to investigate the explained variance in endogenous variables influenced by exogenous variables (Hair et al., 2018) and (2) to analyze a complex model that requires a sophisticated SEM approach to assess the moderated mediation model (Green et al., 2016).

Results

Measurement model

In this study, the authors evaluated a "reflective framework" using "internal consistency" and "convergent and discriminant validity." For measuring internal consistency, this study examined "composite reliability (CR)" and "Cronbach's alpha" metrics (Hair et al., 2018). According to Nunnally and Bernstein (1994)), the minimum acceptable value for CR and Cronbach's alpha is 0.70. As shown in Table 1, all CR and Cronbach's alpha values exceed this threshold. In addition, to assess convergent validity," this study calculated the "average variance extracted (AVE)" and "outer loadings," with a minimum threshold of 0.50 (Hair et al., 2018). Table 1 presents that all AVE and outer loading values are above 0.50, thereby confirming the convergent validity of this study.

Moreover, this study measured discriminant validity to ensure that interconstruct correlations do not exceed intraconstruct correlations (Hair et al., 2018). Discriminant validity was assessed using the "heterotrait–monotrait (HTMT)" criteria recommended by Hair et al. (2018) and Henseler et al. (2015). To determine the HTMT ratio, this study utilized "bias-corrected and accelerated (BCa)" bootstrapping with a resample of 3000, using a one-tailed *t*-test at a 90 % significance level. This approach helps to yield estimates with a 5 % error probability using a two-tailed test (Henseler et al., 2009). Henseler et al. (2015) suggested a maximum threshold value of HTMT.85. As shown in Table 2, all HTMT values are below this acceptable limit, thereby confirming discriminant validity.

Table 1
Validity and reliability for constructs.

	Loadings	AVE	CR	Cronbach's alpha
Deliberate innovation practice		0.515	0.812	0.768
DIP1	0.742			
DIP2	0.654			
DIP3	0.831			
DIP4	0.705			
DIP5	0.745			
DIP6	0.695			
DIP7	0.682			
DIP8	0.782			
DIP9	0.604			
DIP10	0.727			
DIP11	0.784			
DIP12	0.683			
DIP13	0.733			
DIP14	0.623			
DIP15	0.734			
Entrepreneurial passion		0.543	0.885	0.824
EP1	0.634			
EP2	0.664			
EP3	0.821			
EP4	0.764			
EP5	0.787			
Innovation performance		0.553	0.901	0.876
IP1	0.734			
IP2	0.812			
IP3	0.775			
IP4	0.643			
Perceived innovation importance		0.570	0.898	0.848
PII1	0.738			
PII2	0.764			
PII3	0.736			
PII4	0.722			
PII5	0.800			
PII6	0.764			

Structural model

After assessing the measurement model, the structural model was evaluated using BCa bootstrapping with a resample of 3000 to generate the *t* and *p* values for measuring the path coefficients (β). In addition, this study measures the "coefficient of determination (R^2)," "predictive relevance (Q^2)," and "effect size (f^2)" to estimate the relationships among the latent variables (Hair et al., 2018). Hair et al. (2018) recommended determining the effect size (f^2) in addition to estimating the R^2 value, which reflects "the change in the R^2 value

Table 2
Heterotrait–monotrait (HTMT) ratio.

	DIP	EP	IP	PII
DIP				
EP	0.702 $CI_{0.85}$ [0.631;0.782]			
IP	0.735 $CI_{0.85}$ [0.669;0.788]	0.610 $CI_{0.85}$ [0.534;0.689]		
PII	0.631 $CI_{0.85}$ [0.546;0.752]	0.547 $CI_{0.85}$ [0.470;0.611]	0.719 $CI_{0.85}$ [0.653;0.779]	

Table 3
Effects on endogenous variables.

Hypotheses	B	Confidence intervals	s.e.	T	P	Decision	f^2	R^2	Q^2
Firm size[1]	0.022 (n.s.)	(−0.011, 0.039)	0.011	0.320	0.477				
Firm age[2]	0.018**	(0.004, 0.031)	0.009	2.013	0.040				
Geographic location[3]	0.122	(−0.002, 0.198)	0.012	0.827	0.889				
H1 DIP → IP	0.440**	(0.378, 0.522)	0.042	8.734	0.000	Accept	0.240	0.556	0.345
H3 DIP x PII → IP	0.521**	(0.439, 0.590)	0.049	8.273	0.000	Accept	0.151		

when a specified exogenous construct is omitted from the model, used to evaluate whether the omitted construct has a substantive impact on the endogenous constructs" (p. 211). According to Cohen (2013), f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively. The results presented in Table 3 indicate that deliberate innovation practice has a significant positive association with innovation performance (β = 0.440; t = 8.734; p = 0.000; f^2 = 0.240), indicating a medium effect size. Therefore, this analysis supports Hypothesis 1.

For the moderation analysis, this study uses the "two-stage" approach to measure the interaction effect of deliberate innovation practice and perceived innovation importance on innovation performance (Henseler & Fassott, 2010). The effect size is measured using BCa bootstrapping with 3000 resamples. Results presented in Table 3 indicate that the interaction term (deliberate innovation practice_-perceived innovation importance) significantly affects innovation performance (β = 0.521; t = 8.273; p = 0.000; f^2 = 0.151), showing a medium effect size. Therefore, this analysis supports Hypothesis 3.

Furthermore, this study examines the graphical representation of the interaction effect using a "two-way unstandardized" approach to measure the interaction effect of deliberate innovation practice and perceived innovation importance on innovation performance (Dawson, 2014). Results presented in Fig. 2 demonstrate that at high levels of perceived innovation importance, the relationship between deliberate innovation practice and innovation performance is strong, whereas at low levels of perceived innovation importance, the deliberate practice–innovation link is weak.

Moreover, this study hypothesized that entrepreneurial passion mediates the direct effect of deliberate innovation practice on innovation performance. Mediation analysis was conducted using Zhao et al.'s (2010) approach. To obtain t and p values, BCa bootstrapping was performed on 3000 resamples. Results presented in Table 4 indicate that the direct effect of deliberate innovation practice on innovation performance is significant, with confidence intervals (CIs) between 0.248 and 0.409. In addition, the indirect effect of deliberate innovation practice on innovation performance, mediated by entrepreneurial passion, is significant, with CIs between 0.208 and 0.380, indicating complementary mediation (Hair et al., 2018). Moreover, this study assessed the "variance accounted for" with a value of 46 %, signifying the partial mediating role of entrepreneurial passion in the deliberate practice–innovation relationship. Therefore, this supports Hypothesis 2.

Furthermore, this study evaluated model fitness using the "goodness-of-fit index (GFI)" criteria. Tenenhaus et al. (2005) defined GFI as "the geometric mean of the average communality and average R^2." Table 5 presents the GFI value of 0.520, which exceeds the threshold of 0.36 for a large effect size (Hoffman & Brinbrich, 2012), indicating a good model fit. Lastly, to measure "predictive relevance," this study utilized Stone–Geisser's (Q^2) method with an omission distance of 5. A Q^2 value greater than 0 confirms the predictive relevance of the hypothesized model.

Discussion and conclusion

In the pursuit of innovation, deliberate innovation practice is essential to improving innovation performance in organizations with entrepreneurial passion and perceived importance of innovation playing crucial roles. There is a dire need to investigate the linkage between deliberate practice and innovation because it expands on existing ideas that view entrepreneurial passion as a mediating mechanism and perceived innovation importance as a factor that amplifies innovation performance. This study utilizes the SDT and SCT to guide its predictions and examines the expected links among these variables. The authors assess this association by collecting empirical data using a time-lagged research methodology. The results of this study confirm the following hypothesized connections: (1) deliberate innovation practice has a substantial positive effect on innovation performance, (2) entrepreneurial passion plays a

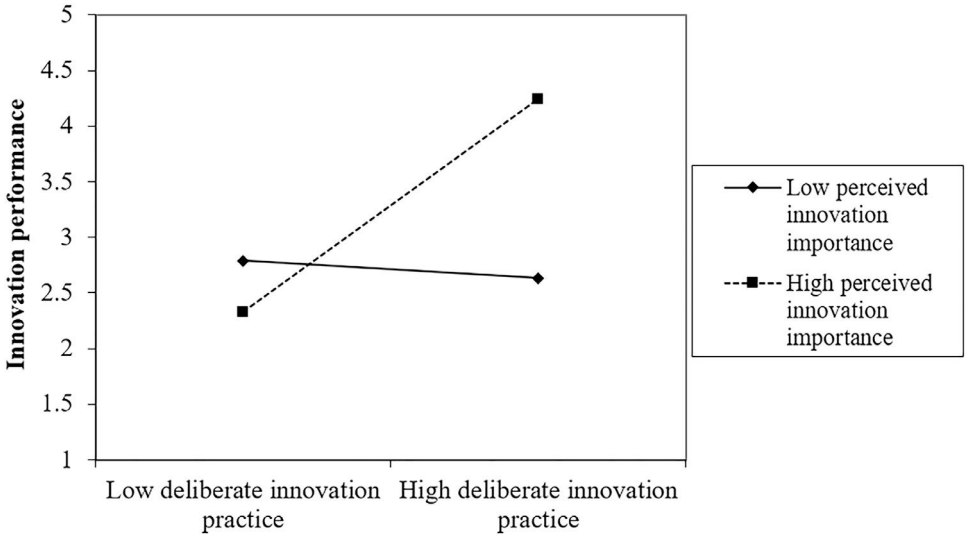

Fig. 2. Interaction effect.

Table 4
Summary of the mediating effect tests.

	B	T	Confidence intervals		B	T	Confidence intervals	Decision	VAF
Direct effect DIP → IP	0.341**	11.329	(0.248, 0.409)	Indirect effect DIP → EP → IP	0.291**	10.210	(0.208, 0.380)	Accept	0.460

Table 5
Goodness-of-fit index (GFI).

Constructs	AVE	R^2
DIP	0.515	
EP	0.543	0.446
IP	0.553	0.549
PII	0.570	
Average scores	0.545	0.496
$(GFI = \sqrt{\overline{AVE} \times \overline{R^2}})$	0.520	

significant role in mediating the relationship between deliberate practice and innovation, and (3) perceived innovation importance moderates the connection between deliberate innovation practice and innovation performance, with high levels of perceived importance strengthening the associations and vice versa.

Theoretical implications

Since the seminal work of Ericsson et al. (1993), there has been a growing interest in examining the impact of deliberate practice across several disciplines and fields. Recently, scholarly writing has shown an increasing application of deliberate practice in the entrepreneurship field and within the work context (Chereau & Meschi, 2022; Dew et al., 2018; Ericsson & Harwell, 2019; Keith et al., 2016). For instance, Bilal and Fatima (2022) conducted an experimental study investigating the association between individual entrepreneurial orientation and deliberate practice. A wide range of studies have also examined deliberate practice in connection with informal learning and entrepreneurial success (Keith et al., 2016), entrepreneurial learning and self-efficacy (Chereau & Meschi, 2022), and entrepreneurial expertise (Dew et al., 2018), among others. However, previous studies have overlooked innovation performance as a key outcome of deliberate practice. To the best of our knowledge, this study is the first to take insights into the SCT and examine the direct association between deliberate innovation practice and innovation performance. In addition, this study predicts that individuals perceive themselves as agents of an organization and expect to influence their environment with their inputs. Thus, deliberate innovation practices that facilitate innovation in organizations are at the heart of this study. Hence, this study furthered the examination of deliberate practice in leveraging innovation within organizations.

In doing so, the findings of this study have demonstrated much-needed empirical evidence by exhibiting how deliberate innovation practice translates into innovation performance. Thus, it contributes to the research topic of deliberate practice by associating it with entrepreneurial passion as a causal mechanism in the underlying linkage. This study predicts that stemming from a passion for innovation, deliberate practice yields retrospective and persistent outcomes of one's lovable activity (i.e., innovation), which engender continuous learning and facilitate innovation performance. These arguments are supported by the SDT (Deci & Ryan, 2013; Ryan & Deci, 2000), which posits that engagement in activities that one loves fosters inner motivation and enjoyment in performing the activity, thus elevating the exhibition of the deliberate innovation practice, ultimately stimulating innovation performance. Furthermore, the positive link between deliberate practice and entrepreneurial passion extends additional insights to the study of Park et al. (2019), who found the negative role of entrepreneurial passion between deliberate practice and venture performance.

Moreover, the findings of this study extend support for the perceived innovation importance construct. When employees perceive that their organizations value innovation, their inclination toward activities that leverage innovation increases, leading to superior innovation performance. This is consistent with the SCT (Bandura 1986, 2001), which supports this corollary. For instance, when employees perceive that their deliberate innovation practice is cognitively appraised by goal salience, their motivation to engage in passionate activities augments that boost innovation performance. Hence, this study extends the implications of deliberate practice in entrepreneurship and within the work context by expanding the boundary conditions of the deliberate practice–innovation association.

Practical implications

The findings of this study present several important practical implications for recruitment and selection, training, and other organizational activities in the software and information technology houses. First, this study emphasizes the crucial role of deliberate innovation practice as the key stimulator of innovation performance within the work context. It is worth noting that deliberate innovation practice is a self-regulated drive of individuals, which stems from the entrepreneurial passion in the activity and can promote innovation performance. Organizations should implement necessary interventions to foster deliberate innovation practice guided by entrepreneurial passion. In this milieu, organizational support (Rhoades & Eisenberger, 2002), organizational culture (Bellot, 2011), and leadership support (Demircioglu & Van der Wal, 2022) are important facilitators of deliberate innovation practices. For instance, past research has shown that clan culture and transformational leadership are positive predictors of harmonious passion (Astakhova & Porter, 2015), subsequently fostering deliberate innovation practice. Although managing culture is always challenging, its influence on entrepreneurial passion may be important for management to maintain the culture of deliberate innovation practice.

In addition, organizations should realize the importance of innovation as the only source of sustainable competitive advantage and entrepreneurial passion as important inputs in facilitating innovation performance through deliberate innovation practice. Managers should devise appropriate policies for recruitment and selection. In addition to evaluating applicants' skills and abilities, they should also consider their entrepreneurial passion for the activities involved in a job (Astakhova & Porter, 2015). Organizations can utilize the entrepreneurial passion scale used in this study to assess candidates' passion for entrepreneurial activities. Moreover, managers can amalgamate the current organizational values and practices and employment laws to finalize the passion scale in recruitment and selection. Moreover, to nurture passion among employees, organizations should implement policies that elevate job autonomy (Saragih, 2015) and add meaning to work. Recently, organizations have shifted their focus to flexible working arrangements to develop passion and improve performance (Lewis, 2003).

Lastly, this study suggests that perceived innovation importance is the foundation for the relationship between deliberate innovation practice and innovation performance, with entrepreneurial passion

playing a significant mediating role. The survey provides management with insights into employees' perceptions regarding the extent to which they value innovation within their organizations. An organization that genuinely prioritizes innovation should possess a nurturing culture and enabling infrastructure that practice innovation. Organizations should recognize and harness individuals' innovative potential to enhance innovation performance by providing the required assistance and fostering a common vision (Chorpita & Daleiden, 2018).

Limitations and future directions

The findings of this study should be studied with limitations. First, this study employed a time-lagged research design to measure the underlying relationships. Although a time-lagged research design reduces the considerable biases in estimating the parameters in the mediation analysis (Ayub et al., 2021), future studies should employ a longitudinal design to validate the hypothesized model. Second, this study examined the role of deliberate innovation practice on innovation performance through the mediating role of entrepreneurial passion in the work context. Though this study holds insights into the entrepreneurship field, future studies should test this model in the entrepreneurial context. Third, this study examined the mediating role of entrepreneurial passion in the underlying linkage and tested the impact of harmonious entrepreneurial passion because obsessive entrepreneurial passion was not the focus of this study. The authors recommend future studies to investigate the mediating role of obsessive entrepreneurial passion in the relationship between deliberate innovation practice and innovation performance, moderated by perceived innovation importance. As perceived innovation importance is an external factor, it may serve as a controlled internalization of the activity, underpinning obsessive entrepreneurial passion between deliberate innovation practice and innovation performance. Finally, this study examines the proposed model in non-Western cultures, which limits its generalization to Western countries. Therefore, future studies should replicate this model with respect to the Western context.

CRediT authorship contribution statement

Shichao Yu: Conceptualization, Formal analysis, Writing – original draft, Writing – review & editing. **Arslan Ayub:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Hasnain Bashir:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing.

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Shichao Yu: Conceptualization, Formal analysis, Writing – original draft, Writing – review & editing. **Arslan Ayub:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Hasnain Bashir:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing.

Appendix 1. Questionnaire

Deliberate Practice

1. "I regularly set aside time to brainstorm new ideas for innovation."
2. "I actively seek feedback on my innovative ideas to refine them."
3. "In order to improve my innovation skills, I deliberately take some time to re-think my working technique."
4. "I make a conscious effort to think outside the box and challenge conventional methods."
5. "I attend workshops and seminars to stay updated on the latest innovation techniques."
6. "I collaborate with others to generate diverse perspectives on innovation."
7. "I regularly review and reflect on my past innovation projects to learn from them."
8. "I set specific goals for improving my ability to innovate."
9. "I experiment with different approaches to find more effective innovation strategies."
10. "I keep a journal to document my innovation processes and thoughts."
11. "I allocate time to read about and research new trends and technologies."
12. "I actively participate in professional networks to exchange innovative ideas."
13. "I seek out challenging projects to push the boundaries of my innovation skills."
14. "I use feedback from failures to guide my future innovation efforts."
15. "I practice creative problem-solving exercises to enhance my innovative thinking."

Entrepreneurial Passion

1. "For me, being an entrepreneur is a passion."
2. "I am completely taken with being an entrepreneur."
3. "Being an entrepreneur allows me to live a variety of experiences."
4. "Being an entrepreneur reflects the qualities I like about myself."
5. "Being an entrepreneur is in harmony with the other activities in my life."

Innovation performance

1. "Coming up with new ideas."
2. "Working to implement new ideas."
3. "Finding improved ways to do things."
4. "Creating better processes and routines."

Perceived Innovation Importance

1. "I believe in the value of innovation here."
2. "Continuous innovation is a good strategy for this organization."
3. "I think that management here is doing the right thing by promoting innovation."
4. "Innovation serves an important purpose for this organization."
5. "Things will be better with continuous improvement in this organization."
6. "Innovation in this organization is highly necessary."

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