

# Linking Entrepreneurs' Felt Responsibility to Ventures' Innovation Performance: The Roles of External Learning and Shared Vision

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**Introduction:** In the aftermath of the COVID-19 pandemic, innovation has become a crucial factor for the success of entrepreneurial ventures in China. However, the mechanisms underlying the promotion of innovation by entrepreneurs are not yet fully understood. Drawing on self-determination theory, this study develops a comprehensive “motivation-behaviors-performance” model to examine the relationship between entrepreneurs' felt responsibility for constructive change and ventures' innovation performance.

**Methods:** Two waves of questionnaire surveys with a sample of 376 entrepreneurs in East China were conducted. Hierarchical regression analysis was performed to test the hypotheses.

**Results:** The empirical findings demonstrate that entrepreneurs' felt responsibility for constructive change is a key driver of innovation performance in ventures. Furthermore, external learning, encompassing technological and market learning, serves as a mediator for the positive link between entrepreneurs' felt responsibility and innovation performance. The study also reveals that entrepreneurs' perception of shared vision moderates the relationships between entrepreneurs' felt responsibility and both technological and market learning, such that the relationships are stronger when the perception of shared vision is higher.

**Discussion:** These results yield important contributions to the entrepreneurial psychology research and self-determination theory. The study also has managerial implications for entrepreneurs aiming to enhance ventures' innovation performance.

**Keywords:** entrepreneur, felt responsibility for constructive change, innovation performance, technological learning, market learning, shared vision

## Introduction

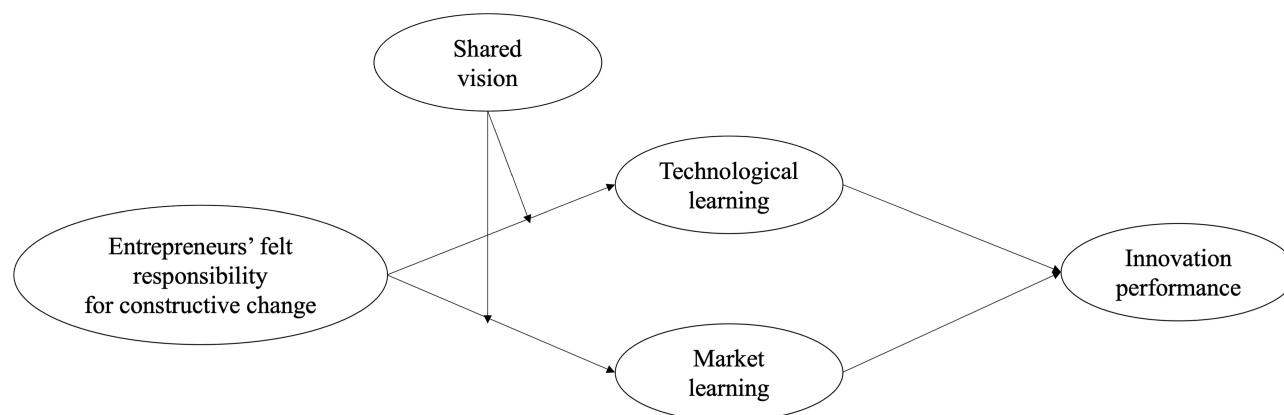
In the aftermath of the pandemic, many companies were forced to make significant changes to their global operations, requiring transformational change and entrepreneurial innovation to secure sustainable development.<sup>1</sup> Recently, Chinese entrepreneurs have recognized the importance of innovation for strengthening resilience and gaining a competitive edge in international markets.<sup>2</sup> Innovation can take various forms, including introducing new products, developing new techniques, establishing a presence in emerging markets, and utilizing new input factors.<sup>3</sup> Entrepreneurship literature commonly highlights innovation as a key feature of entrepreneurship<sup>4</sup> and the central role of entrepreneurs.<sup>5</sup> This is supported by the definition of entrepreneurs as individuals who recognize and exploit innovative opportunities to create or develop new ventures<sup>6</sup> who has broadened to cover a broad spectrum of roles, including not only venture founders but small business owners and corporate leaders.<sup>7</sup> In contrast to regular employees, entrepreneurs tend to engage more actively in daily business operations, and bear greater financial risk to potentially reap more significant rewards when their ventures thrive. However, entrepreneurs often struggle to achieve breakthrough innovation for their business, despite entrepreneurs' strong sense of felt responsibility and ambition. Therefore, understanding how entrepreneurs achieve innovative success can help ventures to design effective innovation management process and strategies.

The existing literature has examined the influence of entrepreneurs' corporate social responsibility (CSR) on business performance.<sup>8–10</sup> However, limited attention has been paid to internal aspect of entrepreneurs' responsibility, such as felt responsibility for constructive change,<sup>11</sup> which is recognized as an important dynamic factor contributing to entrepreneurial success.<sup>12,13</sup> While some studies suggest that felt responsibility is related to innovation, the mechanisms by which it affects innovation performance remain unclear.<sup>14,15</sup>

To establish a clear connection between entrepreneurs' felt responsibility for constructive change and innovation performance of ventures, we introduce self-determination theory to develop the theoretical framework. According to self-determination theory (SDT), individuals' actions are influenced by intrinsic and extrinsic motivations that arise from different psychological needs, including autonomy, relatedness and competence.<sup>16,17</sup> Research has shown that individuals who possess high-level of intrinsic motivation tend to actively engage in learning activities to improve their skills and knowledge, ultimately leading to better performance outcomes.<sup>18,19</sup> Essentially, the "motivation-behaviors-performance" pathway drives entrepreneurs to transform their intrinsic motivation into practical actions aimed at satisfying their critical needs for autonomy and competence.<sup>20</sup>

Thus, we propose that entrepreneurs' felt responsibility may lead to autonomous motivation and subsequent engagement in external learning, which, in turn, mediates the relationship between felt responsibility and innovation performance. External learning serves as a key strategy for achieving innovation performance that could help entrepreneurs gain new knowledge and abilities for implementing innovation and change in highly competitive environments.<sup>21–23</sup> Felt responsibility for constructive change serves as the intrinsic motivation for external learning for entrepreneurs.<sup>13,20</sup> Moreover, external factors that impact entrepreneurs' intrinsic motivation, such as shared vision within the venture, can also influence their subsequent behaviors.<sup>16,24</sup> The shared vision defined as collective goals and purpose formed by all members of ventures, can be viewed as an external factor for entrepreneurs.<sup>7,25</sup> High shared vision provides clear direction and scope for entrepreneurs' external learning and could accelerates the learning process.<sup>26</sup> When entrepreneurs have a high-level perception of shared vision in their own ventures, their profound sense of felt responsibility for constructive change serves to incentivize them towards engaging in external learning activities more effectively that align with their goals and objectives,<sup>26,27</sup> which in turn enhances ventures' innovation performance.<sup>28</sup> As such, we posit that the impact of felt responsibility for constructive change on innovation performance depends on the level of shared vision in the venture.

This study aims to reveal the relationship between entrepreneurs' felt responsibility for constructive change and ventures' innovation performance through empirical test. We argue that entrepreneurs' felt responsibility for constructive change increases innovation performance through external learning, encompassing technological and market learning. Moreover, we elucidate the conditional effect of perception of shared vision in a venture on the relationship between felt responsibility for constructive change and external learning. The theoretical model discussed in this paper is shown in Figure 1. This study contributes to research on the important topic of entrepreneurs' felt responsibility by developing



**Figure 1** The theoretical model.

a framework to clarify the relationship by which felt responsibility enhances innovation performance through external learning and perceived shared vision.

## Literature Review and Hypothesis Development

### Entrepreneurs' Felt Responsibility for Constructive Change

Felt responsibility for constructive change is defined as a psychological state in which individuals feel responsible for driving positive changes within their work environment.<sup>11,29</sup> Prior research has proposed both retrospective (reflecting on past behavior) and prospective (foreseeing future behavior) aspects of felt responsibility.<sup>30</sup> In the context of entrepreneurship, entrepreneurs' felt responsibility for constructive change involves intrinsic motivation aimed at promoting the long-term development of ventures.<sup>13</sup> This proactive mindset represents an assumed rather than assigned responsibility,<sup>31</sup> associated with personal initiative that reflects entrepreneurs' proactiveness in taking action to adapt to possible future changes and readiness for future innovation and development.<sup>28,32</sup> Strong felt responsibility has been linked to proactive action, risk-taking, and the pursuit of long-term goals.<sup>33</sup>

### Entrepreneurs' Felt Responsibility for Constructive Change and Innovation Performance

Entrepreneurs are pivotal in shaping the attitudes and behaviors of members in their ventures.<sup>34,35</sup> When other members of ventures observe the specific behaviors of entrepreneurs with felt responsibility for constructive change, they realize that these responsible behaviors are recognized and expected by the organizations.<sup>36</sup> Through modeling responsible and innovative behaviors, entrepreneurs inspire their members to follow suit, fostering a culture of proactiveness that continually drives and improves innovation performance.<sup>37,38</sup> By instilling a felt responsibility for constructive change, entrepreneurs encourage members to embrace the uncertainty of innovation, creating a positive disposition and inspiring proactive action towards external opportunities and threats.<sup>39</sup> The cultivation of such an environment can foster the cognitive flexibility of organizational members, allowing them to escape the "competence trap" and experiment with novel processes and techniques.<sup>40,41</sup> Based on the above analysis, this study proposes the following hypothesis.

H1: Entrepreneurs' felt responsibility for constructive change is positively related to the innovation performance of ventures.

### The Mediating Role of External Learning

External learning is an important knowledge acquisition strategy for entrepreneurs, that involves seeking and integrating new knowledge generated by other entities, and plays a critical role in promoting innovation.<sup>42,43</sup> This learning approach not only provides entrepreneurs with valuable information about market trends and emerging technologies,<sup>2</sup> also access to external resources, which could be combined with internal resources to meet their knowledge needs, leading to significant contributions to their ventures' innovative capabilities.<sup>44</sup> Consistent with the literature on entrepreneurial learning,<sup>21,22</sup> we define external learning as the acquisition, processing, and integration of knowledge from outside sources by entrepreneurs. Knowledge can be classified into two types: technological knowledge and market knowledge,<sup>45</sup> with the former pertaining to products and production techniques or technological systems, and the latter relating to market scenarios and business opportunities.<sup>46,47</sup>

As mentioned above, intrinsic and extrinsic motivations drive entrepreneurs to engage in learning activities that satisfy their autonomy and competency needs, respectively.<sup>16,20</sup> We argue that entrepreneurs who feel a strong sense of responsibility for constructive change are more likely to engage in external learning activities to acquire the knowledge and skills necessary to address innovation challenges. First, responsible entrepreneurs often have an awareness of their limits and deficiencies in knowledge and skills, resulting in a greater willingness to seek out external sources of information and being more alert to the potential needs of customers and emerging technologies.<sup>15,48</sup> As a result, they tend to expand their information search scope and process information more carefully to identify new opportunities.<sup>49,50</sup> Second, felt responsibility reflects the entrepreneurs' future orientation and induces them to broaden and deepen their

knowledge of their ventures for sustained economic growth.<sup>15,48</sup> Consequently, ventures respond to environmental signals much sooner than their competitors.<sup>51</sup> In addition, the desire to create positive changes for business can provide a strong motivation for entrepreneurs to engage in external learning activities to improve their effectiveness in achieving their goals.<sup>28</sup> Therefore, we propose the following:

H2: Entrepreneurs' felt responsibility for constructive change is positively correlated with technological learning.

H3: Entrepreneurs' felt responsibility for constructive change is positively correlated with market learning.

Existing studies generally propose that external learning promotes innovation.<sup>52,53</sup> Entrepreneurs improve the innovation performance of ventures by continuously acquiring, assimilating and combining new knowledge with existing knowledge.<sup>54</sup> We argue that both technological learning and market learning could generate positive impacts on ventures' innovation performance.

Technological learning refers to the intentional acquisition of external technological knowledge and resources by entrepreneurs.<sup>55,56</sup> This helps entrepreneurs stay up-to-date with the latest technologies and continuously improve their ventures' performance in complex and dynamic environments. Chipika and Wilson emphasized that entrepreneurs' technological learning positively impacts innovation by providing valuable insights into technology adoption and implementation in the venture.<sup>57</sup> Gilsing et al also stated that learning from outside companies with diverse technological knowledge provides opportunities for the integration of internal and external knowledge within organizations.<sup>58</sup> Entrepreneurs who acquire diverse technological knowledge can leverage them to create new products and service offerings, which leads to higher innovation performance.<sup>59</sup> Additionally, external learning activities provide opportunities for collaboration with other technical professionals. Fagerberg et al identified the importance of an entrepreneur's technical learning when they collaborate with technical experts to improve innovation performance.<sup>60</sup>

Market learning is the process of acquiring external knowledge about customer need, competitors, and market dynamic to identify market opportunities.<sup>61,62</sup> Through market learning, entrepreneurs can expand the breadth of market understanding of the needs and preferences of their target customers, enabling them to design new products and services to differentiate from competitors.<sup>63</sup> Moreover, entrepreneurs' market learning can enhance their ability to identify emerging trends and potential sources of innovation such as suppliers and partners, allowing them to create innovative products and services.<sup>64</sup> In sum, entrepreneurs' market learning can positively impact their ventures' innovation performance, as it allows them to identify market opportunities, understand customer needs, and develop innovative solutions. Based on this, we propose the following:

H4: Technological learning is positively related to ventures' innovation performance.

H5: Market learning is positively related to ventures' innovation performance.

Entrepreneurs who possess a high sense of felt responsibility for constructive change exhibit greater proficiency in assimilating new knowledge and ideas from external sources, demonstrating a heightened level of alertness when it comes to processing timely information and exhibiting an increased sensitivity towards external market trends and technological advancements.<sup>13</sup> In the event that entrepreneurs, as leaders, actively endeavor to secure external technological and market-related information, the venture's members are inclined to accord greater attention to new information and resources, thus facilitating the organization-wide acquisition of external knowledge and bolstering innovation performance.<sup>34,35</sup> As an important entrepreneurial trait, felt responsibility for change continuously drives entrepreneurs towards enhancing innovation performance by means of external learning. On this basis, we propose the following:

H6: Technological learning mediates the positive relationship between entrepreneurs' felt responsibility for constructive change and ventures' innovation performance.

H7: Market learning mediates the positive relationship between entrepreneurs' felt responsibility for constructive change and ventures' innovation performance.

## The Moderating Role of Shared Vision

A shared vision indicates that organizational members have consistent collective goals and common aspirations.<sup>65,66</sup> Shared vision is a critical component of successful entrepreneurship as it ensures that all members are aware of the entrepreneur's goals and aspirations for the venture. A strong shared vision enhances organizational cohesiveness and the high-level perception of shared vision helps entrepreneurs to ensure that everyone in the venture is moving in the same direction.<sup>67</sup>

Drawing on self-determination theory, external factors have an impact on intrinsic motivation, which in turn influences behavior.<sup>24</sup> The shared vision in the ventures perceived by entrepreneurs can be regarded as one such external factor that shapes the entrepreneurs' learning behavior. When entrepreneurs' perception of shared vision is high, their intrinsic motivation serves to incentivize them towards engaging in external learning activities more effectively that align with their goals and objectives.<sup>26,27</sup> Thus, it can be argued that the impact of felt responsibility for constructive change on entrepreneurs' external learning hinges on their level of perceived shared vision. To begin with, felt responsibility for constructive change serves as the intrinsic motivation for external learning for entrepreneurs, so they tend to adopt new technologies, learning new skills and continuously improve their knowledge about market. The role of shared vision in this relationship is to provide clarity and focus, such that entrepreneurs are better able to channel their felt responsibility and drive towards their goals and objectives.<sup>68</sup> Strese et al stated that a shared vision influences entrepreneurs to focus on, interpret, evaluate, and select external knowledge.<sup>25</sup> In this context, entrepreneurs with high felt responsibility for constructive change and high levels of perceived shared vision will demonstrate stronger motivation to gather external cutting-edge technology and market dynamic information. Then, a high level of shared vision can facilitate open communication and knowledge sharing among entrepreneurs and other members, which could promote external learning process. Eldor emphasized the role of shared vision in shaping a learning organization culture.<sup>69</sup> This culture can foster an environment where people feel responsible for constructive change and are motivated to engage in learning activities. Furthermore, shared vision reflects the degree of optimism and confidence of all members about the future of the venture.<sup>70</sup> When entrepreneurs have a high perception of shared vision in ventures, they are more likely to work collaboratively with other members towards achieving the goals, which ultimately leads to higher levels of innovation and productivity. Finally, we propose the following. Figure 1 shows the overall theoretical model of the study.

H8: Shared vision moderates the relationship between entrepreneurs' felt responsibility for constructive change and technological learning such that the effect is stronger when entrepreneurs' perception of shared vision is high.

H9: Shared vision moderates the relationship between entrepreneurs' felt responsibility for constructive change and market learning such that the effect is stronger when entrepreneurs' perception of shared vision is high.

## Method

Data were collected through a survey project aimed to investigate the drivers of innovation in Chinese high-tech ventures, which was a collaborative research project between Global Entrepreneurship Research Center of Zhejiang University and Jiaxing Municipal Government. The joint project is to inform the government's formulation of relevant innovative incentive policies. A venture is defined as a firm with less than 300 employees and less than 10 years of existence in our study. Initially, we designed a prequestionnaire survey and recruited a sample of 21 business ventures in Zhejiang Province. Based on their valuable inputs, we refined and modified the questionnaire to ensure its validity. Following the pre-survey, we conducted a formal questionnaire survey with help of Jiaxing Municipal Government. The municipal government contacted 10 science and technology parks in East China through official channels, and those parks assisted the research project team to invite most of the ventures in the park to participate in the survey. Totally, 448 entrepreneurs from various high-tech ventures, including software, electronics, biopharmaceuticals and so on, voluntarily participated in the survey. We ensured that the participants had a profound understanding of the organizational characteristics, strategy, and innovation performance of their respective ventures. As such, their responses could offer valuable insights into the real situation of the ventures.

The questionnaire was distributed and completed through online survey platform. The survey was conducted in two stages, six months apart. The first round measured entrepreneurs’ demographic information and felt responsibility for constructive change, technological learning and market learning. The second round measured entrepreneurs’ perception of shared vision and innovation performance of the venture. In the end, we received 376 complete and valid questionnaires, indicating an effective questionnaire rate of 83.9%. Demographically, 230 entrepreneurs were male (61.17%), 146 entrepreneurs were female (38.83%). The average age of entrepreneurs was 36.14 (SD = 6.31). In terms of education, 33 entrepreneurs had associate degrees (8.78%), 120 entrepreneurs had bachelors’ degrees (31.91%), 223 had masters’ or doctors’ degrees (59.31%). 262 entrepreneurs already had entrepreneurial experience. The average age of ventures was 4.31 years (SD = 1.19). On average, each venture had 75 employees. The detailed information of entrepreneurs is shown in Table 1.

We used original scales developed by prior scholars and adopted the back-translation method to translate the questionnaire accurately.<sup>71</sup> Additionally, we adapted the questionnaire to the specific cultural context of China, considering its unique cultural background. Entrepreneurs rated all the items on a 5-point Likert scale in ascending order from “strongly disagree” to “strongly agree”. The data collection process is shown in Figure 2.

Felt Responsibility for Constructive Change

Entrepreneurs evaluated their felt responsibility for constructive change using Morrison and Phelps’ five-item scale.<sup>11</sup> Example items include “I feel a personal sense of responsibility to bring about change at work” and “I feel obligated to try to introduce new procedures where appropriate”. The Cronbach’s alpha for this measure was 0.87.

Technological Learning

Technological learning was evaluated by entrepreneurs using a five-item scale developed by Bao et al.<sup>52</sup> A sample item is “With regard to technological expertise and product development or design, I often systematically process and analyze other ventures’ ways to develop new products to upgrade our techniques”.<sup>52</sup> The Cronbach’s alpha for this measure was 0.80.

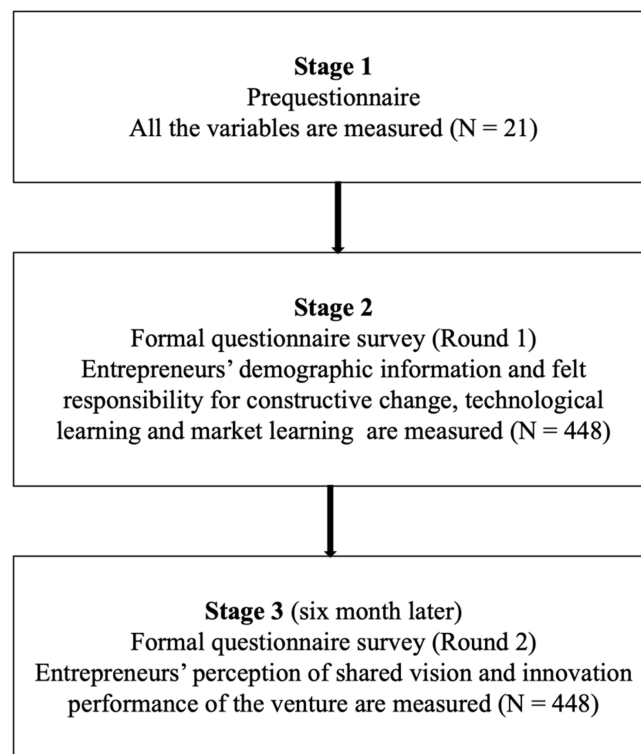
Market Learning

Market learning was measured with the scale developed by Kim and Atuahene-Gima.<sup>61</sup> A sample item is “I tend to use market information that takes the venture beyond its current product market experiences (eg, through market experiments)”. The Cronbach’s alpha for this measure was 0.81.

Table 1 Descriptive Statistics of the Participants

Information	Features	Frequency/Mean	Ratio
Gender	Male	230	61.17%
	Female	146	38.83%
Age	Mean	36.14	/
Education	Associate degree	33	8.78%
	Bachelor's degree	120	31.91%
	Master's or doctor's degree	223	59.31%
Entrepreneurial experience	Yes	262	69.68%
	No	114	30.32%
Firm age	Mean	4.31	/
Firm size	Mean	75 employees	/

Note: N = 376.



**Figure 2** Data collection process.

## Shared Vision

Entrepreneurs evaluated perception of shared vision in the venture based on the four-item scale developed by Strese et al.<sup>25</sup> A sample item is “All employees are committed to achieving the ventures’ goals”. The Cronbach’s alpha for this measure was 0.82.

## Innovation Performance

We used the five-item scale developed by Prajogo and Ahmed to measure ventures’ innovation performance.<sup>72</sup> A sample item is “How do you evaluate the level of newness (novelty) of your firm’s new products?” The Cronbach’s alpha for this measure was 0.80.

## Control Variables

Following previous research,<sup>31</sup> we controlled for individual-level variables (including gender, age, education, and entrepreneurial experience) and firm-level variables (including firm size and firm age). Entrepreneurs with entrepreneurial experience were coded as 1, while those without entrepreneurial experience were coded as 0. For education, entrepreneur with associate degree was coded as 1, entrepreneur with bachelor’s degree was coded as 2, entrepreneur with master’s or doctor’s degree was coded as 3. For firm age, the number of years for which the firm had existed was used. Firm size was calculated from the natural logarithm of the number of employees.

## Results

### Common Method Bias Test

Considering the homogeneity of the data sources, the data of this study may be subject to the problem of common method bias. To test this issue, an exploratory factor analysis was conducted with Harman’s one-factor test using SPSS26 for all indicators. Results demonstrated that the first factor accounted for 35.14% of the variance, indicating that common method variance was not a significant concern in our survey.

## Descriptive Statistics

Table 2 presents the means, standard deviations, and correlations of all variables in our study. As indicated in Table 2, entrepreneurs' felt responsibility for constructive change was positively correlated with technological learning ( $r = 0.59$ ,  $p < 0.01$ ) and market learning ( $r = 0.36$ ,  $p < 0.01$ ). Innovation performance was positively correlated with technological learning ( $r = 0.49$ ,  $p < 0.01$ ) and market learning ( $r = 0.32$ ,  $p < 0.01$ ). Thus, the hypotheses were preliminarily verified.

## Tests of Convergent and Discriminant Validity

We assessed the convergent validity of the construct by calculating the average variance extracted (AVE) and composite reliability (CR), while the discriminant validity was assessed by comparing the AVE with the squared correlations between two constructs. As shown in Table 3, the minimum value of AVE was above the critical value 0.5 and the minimum value of CR was above the critical value of 0.7, indicating good convergent validity for all constructs. Additionally, the results of the discriminant validity tests showed that the amount of the variance captured by each construct was greater than the shared variance with other constructs, indicating good discriminant validity for all constructs.

## Confirmatory Factor Analyses

Confirmatory factor analyses (CFAs) were conducted to examine the validity of these constructs in our study using Mplus 8.0. As reported in Table 4, the CFA results indicated that our hypothesized five-factor model (felt responsibility for constructive change; technological learning; market learning; shared vision; innovation performance) provided a better fit to the data ( $\chi^2/df = 3.454$ ; CFI = 0.896; TLI = 0.885; RMSEA = 0.081; SRMR = 0.089) than other models. The above results revealed that the model we proposed had the best validity.

## Hypothesis Testing

Before hypothesis testing, the variance inflation factor (VIF) method was used to test for multicollinearity. The VIFs for entrepreneurs' felt responsibility for constructive change (1.56), technological learning (1.69), and market learning (1.27) were below 5, indicating that multicollinearity is not a serious problem in our study.

We conducted hierarchical regression analysis using the SPSS PROCESS macro developed by Hayes to test the hypothesis. The results of hierarchical regressions are presented in Table 5.

**Table 2** Means, Standard Deviations and Interrelations of Variables

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1.Education	2.51	0.65										
2.Gender	0.61	0.49	−0.02									
3.Age	36.14	6.31	−0.03	0.03								
4.EE	0.70	0.46	−0.08	0.19	0.06							
5.FS	4.25	0.32	0.01	0.02	0.06	0.03						
6.FA	4.13	1.19	0.02	−0.09	0.05	0.14	0.07					
7.FRCC	4.61	0.48	−0.03	0.05	0.1	0.07	0.04	−0.04				
8.TL	4.37	0.49	−0.01	0.04	0.09	0.11	−0.01	−0.12	0.59**			
9.ML	3.70	0.75	0.01	0.03	0.19	0.03	0.11	−0.17	0.36**	0.49**		
10.SV	4.21	0.58	0.03	0.12	0.12	0.14	−0.03	−0.12	0.46**	0.61**	0.40**	
11.IP	4.20	0.60	−0.01	0.06	0.1	0.11	0.02	−0.09	0.41**	0.49**	0.32**	0.56**

Note: \*\* $p < 0.01$ . N=376.

**Abbreviations:** EE, Entrepreneurial experience; FS, Firm size; FA, Firm age; FRCC, Felt responsibility for constructive change; TL, Technological learning; ML, Market learning; SV, Shared vision; IP, Innovation performance.

**Table 3** Tests for Convergent and Discriminant Validity

Variables	Convergent Validity	Discriminant Validity
Felt responsibility for constructive change		
CR	0.887	AVE/(Corr) <sup>2</sup> > 1
AVE	0.613	
Technological learning		
CR	0.818	AVE/(Corr) <sup>2</sup> > 1
AVE	0.532	
Market learning		
CR	0.853	AVE/(Corr) <sup>2</sup> > 1
AVE	0.541	
Shared vision		
CR	0.837	AVE/(Corr) <sup>2</sup> > 1
AVE	0.564	
Innovation performance		
CR	0.807	AVE/(Corr) <sup>2</sup> > 1
AVE	0.588	

**Table 4** Confirmatory Factor Analyses

	$\chi^2/df$	CFI	TLI	RMSEA	SRMR
Five-factor model	3.454	0.896	0.885	0.081	0.089
Four-factor model (TL+ML)	4.851	0.802	0.772	0.102	0.095
Four-factor model (FRCC+SV)	5.319	0.778	0.745	0.108	0.106
Three-factor model (FRCC+SV; TL+ML;)	6.62	0.706	0.668	0.123	0.112
Three-factor model (TL+ML+SV)	5.727	0.753	0.721	0.113	0.091
Two-factor model (FRCC+SV+TL+ML)	7.454	0.659	0.619	0.132	0.105
One-factor model	8.176	0.618	0.576	0.139	0.107

**Abbreviations:** CFI, Comparative Fit Index; TLI, Tucker–Lewis Index; RMSEA, root-mean squared error of approximation; SRMR, standardized root mean square residual; FRCC, Felt responsibility for constructive change; TL, Technological learning; ML, Market learning; SV, Shared vision; IP, Innovation performance.

## The Relationship Between Entrepreneurs' Felt Responsibility for Constructive Change and Innovation Performance

Hypothesis 1 posits a positive relationship between entrepreneurs' felt responsibility for constructive change and ventures' innovation performance. To test this hypothesis, control variables were first regressed on innovation performance. Then, entrepreneurs' felt responsibility for constructive change and control variables were regressed on innovation performance. The results showed that the effect of entrepreneurs' felt responsibility for constructive change on innovation performance was 0.48 ( $p < 0.01$ ) (Table 5, Model 8).

## Mediating Effects of Technological Learning and Market Learning

We followed Baron and Kenny to test whether technological learning and market learning mediate the relationship between entrepreneurs' felt responsibility for constructive change and innovation performance.<sup>73</sup> Specifically, felt responsibility for constructive change was significantly correlated with innovation performance. In Models 2 and 5, entrepreneurs' felt responsibility for constructive change was positively correlated with technological learning ( $\beta = 0.58$ ,  $p < 0.01$ ) and market learning ( $\beta = 0.51$ ,  $p < 0.01$ ). Thus, Hypotheses 2 and 3 were supported. In Model 9, after controlling for entrepreneurs' felt responsibility for constructive change, technological learning and market learning were

**Table 5** Results of Hierarchical Multiple Regression

	Technological Learning			Market Learning			Innovation Performance		
	M1	M2	M3	M4	M5	M6	M7	M8	M9
<b>CV</b>									
Education	0.01	0.02	0.01	0.05	0.06	0.05	−0.01	0.01	−0.01
Gender	−0.07	−0.05	−0.07	0.03	0.03	0.04	−0.05	−0.04	−0.05
Age	0.01*	0.01	0.01	−0.01	−0.02	−0.02	0.02*	0.01	0.01
EE	0.05	0.06	0.03	0.05	0.05	0.05	−0.01	0.01	−0.07
FS	0.05	0.02	0.07	0.05	0.04	0.05	0.07	0.05	−0.01
FA	−0.1**	−0.06	−0.04	−0.19*	−0.16*	−0.14	−0.10	−0.07*	−0.03
<b>IV</b>									
FRCC		0.58**	0.41**		0.51**	0.41**		0.48**	0.20**
<b>Mediator</b>									
TL									0.41**
ML									0.08*
<b>Moderator</b>									
SV			0.36**			0.31**			
<b>Interaction</b>									
FRCC×SV			0.14*			0.42**			
R <sup>2</sup>	0.05	0.37	0.51	0.24	0.35	0.41	0.04	0.18	0.27
F	3.08**	30.43**	42.74**	19.74**	27.65**	28.15**	2.30**	11.64**	15.28**

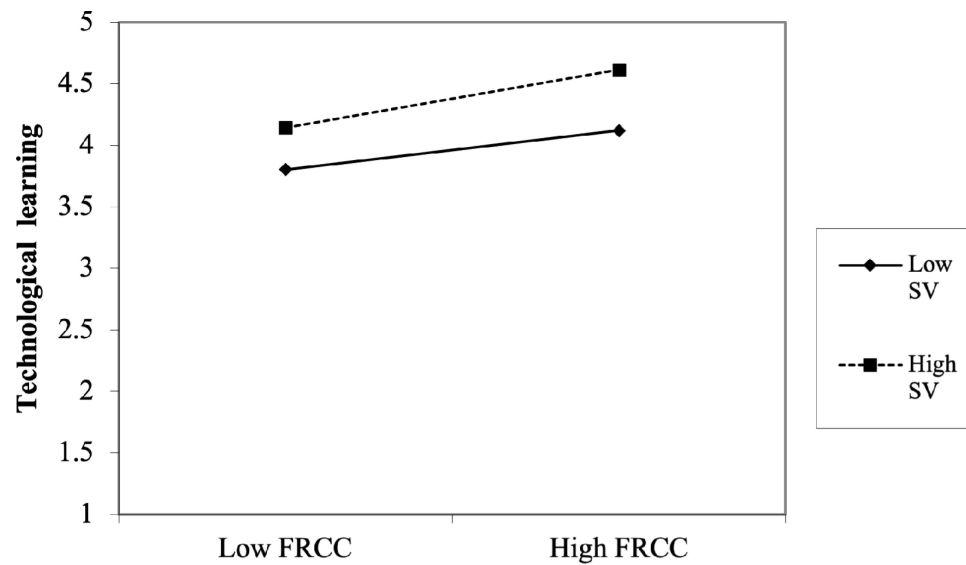
Notes: \* $p < 0.05$ ; \*\* $p < 0.01$ .  $N=376$ .

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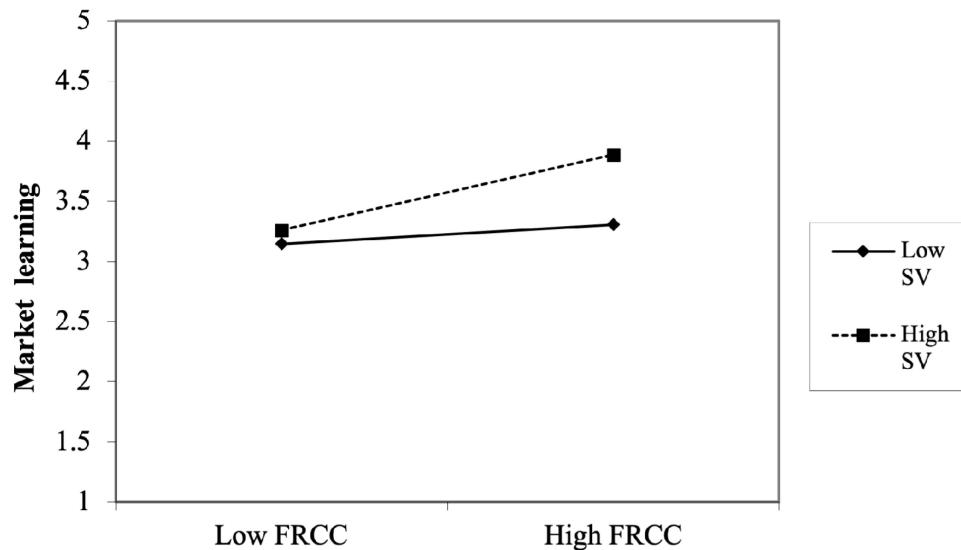
significantly correlated with innovation performance ( $\beta = 0.41$ ,  $p < 0.01$ ;  $\beta = 0.08$ ,  $p < 0.05$ ), supporting Hypotheses 4 and 5. In addition, the relationship between entrepreneurs' felt responsibility for constructive change and innovation performance became weaker (from  $\beta = 0.48$ ,  $p < 0.01$  in model 8 to  $\beta = 0.20$ ,  $p < 0.01$  in model 9). Combining these above conditions, technological learning and market learning played a partially mediating role in the relationship between entrepreneurs' felt responsibility for constructive change and innovation performance, thus supporting Hypotheses 6 and 7.

## Moderating Effect of Shared Vision

According to Table 5, the interaction term between entrepreneurs' felt responsibility for constructive change and entrepreneurs' perception of shared vision was significantly positively related to technological learning ( $\beta = 0.14$ ,  $p < 0.05$ , Model 3) and market learning ( $\beta = 0.42$ ,  $p < 0.01$ , Model 6). A simple slope test was used to further verify the moderating effect of shared vision. Under a high level of shared vision (mean plus one SD), entrepreneurs' felt responsibility for constructive change was positively correlated with technological learning ( $\beta = 0.49$ ,  $t = 7.97$ ,  $p < 0.01$ ) and market learning ( $\beta = 0.66$ ,  $t = 6.24$ ,  $p < 0.01$ ). Under a low level of shared vision (mean minus one SD), entrepreneurs' felt responsibility for constructive change was positively correlated with technological learning ( $\beta = 0.32$ ,  $t = 6.57$ ,  $p < 0.01$ ) and market learning ( $\beta = 0.16$ ,  $t = 1.94$ ,  $p < 0.05$ ). We plotted the effect of entrepreneurs' felt responsibility for constructive change on technological learning and market learning according to different levels of shared vision (high vs low). As depicted in Figure 3, entrepreneurs' felt responsibility for constructive change was more strongly related to technological learning when entrepreneurs' perception of shared vision was higher rather than lower, which further verified Hypothesis 8. As depicted in Figure 4, entrepreneurs' felt responsibility for constructive change was more strongly related to market learning when entrepreneurs' perception of shared vision was higher rather than lower, which further verified Hypothesis 9.



**Figure 3** The moderating effect of SV on FRCC and TL.



**Figure 4** The moderating effect of SV on FRCC and ML.

## Discussion

Drawing from the literature of self-determination theory and entrepreneurial learning perspective, this study examined the effect of entrepreneurs' felt responsibility for constructive change on innovation performance of the ventures, and the roles of external learning and shared vision on the above relationship. Specifically, the results revealed that entrepreneurs' felt responsibility for constructive change was positively related to ventures' innovation performance, external learning consisting of technological learning and market learning served as a mediator in the relationship between entrepreneurs' felt responsibility and innovation performance, and the positive mediating effect was reinforced as the entrepreneurs' perception of shared vision in ventures became higher, providing evidence of the moderated mediation effect of external learning.

## Theoretical Contributions

This study has three theoretical implications according to the results of hypothesis testing. First, it expands our understanding of the connection between entrepreneurs' felt responsibility for constructive change and innovation performance in ventures. Previous studies have mainly focused on entrepreneurs' corporate social responsibility (CSR) and its impact on a venture's performance.<sup>8–10</sup> This study broadens the research by exploring the impact of felt responsibility for constructive change on innovation performance through the lens of self-determination theory. This empirical evidence provides new insights into the role of entrepreneurs' characteristics in innovation performance.<sup>12</sup> Second, previous studies suggest that felt responsibility is related to innovation, the mechanisms by which it affects innovation performance remain unclear.<sup>14,15</sup> By integrating self-determination theory and the entrepreneurial learning perspective, this study sheds light on the mechanism by which entrepreneurs' internal responsibility drives entrepreneurial performance via external learning (technological and market learning). This result enriches the external learning literature by identifying dual pathways that influence innovation.<sup>22,45</sup> These findings build upon prior research by Bao et al and empirically test the two-component construct of external learning on innovation performance.<sup>52</sup> Third, this study demonstrates how perceived shared vision moderates the relationship between entrepreneurs' felt responsibility for constructive change and innovation performance through external learning. By providing a clear direction and scope for learning while facilitating open communication and collaborative knowledge sharing, shared vision plays a critical role in the external learning process, that could be viewed as external factors impacting entrepreneurs' intrinsic motivation.<sup>7,25</sup> Moreover, a moderated mediation model highlights how entrepreneurs with a high-level perception of shared vision are more likely to engage in external learning to benefit venture innovation performance, despite similar levels of felt responsibility. As such, this study deepens our understanding of when entrepreneurs' felt responsibility is most instrumental in promoting external learning activities and innovation performance. It also enhances the research on shared vision in the field of entrepreneurship.<sup>25</sup> Overall, this study not only complements prior work on felt responsibility in entrepreneurship contexts,<sup>31</sup> but also enriches our understanding of the complex interplay between felt responsibility, shared vision, and innovation performance.<sup>25</sup>

## Managerial Contributions

This study has provided valuable insights for entrepreneurs. Firstly, in the post-epidemic era, to deal with various challenges, entrepreneurs must take responsibility for creating constructive change to address formidable problems ahead of breakthrough innovations. Innovation involves an act of positive change and creating new combinations.<sup>3</sup> Entrepreneurs actively taking proactive actions are less inhibited by environmental constraints. Secondly, entrepreneurs' external learning is essential for entrepreneurs to convert responsibility into performance, enabling them to acquire critical knowledge (including technological and market knowledge) and external resources to enhance their skills and abilities when implementing innovations. Driven by the assumed responsibility, entrepreneurs tend to be more alert to the potential needs of customers and emerging technologies, that could accelerate business innovation process.<sup>15</sup> Thirdly, in the process of external learning, entrepreneurs need to prioritize the development and reinforcement of the venture's shared vision. A shared vision encourages collective behaviors and inspires the venture to pursue actions that align with organizational objectives, avoiding the pursuit of disparate directions or possibilities.<sup>65,66</sup> This approach promotes a sense of bonding within the venture, as employees recognize that they share common goals and are invested in the venture's activities. When the entrepreneur perceives that employees are aligned with the venture's goals and trust its actions, the entrepreneur is highly motivated to identify novel opportunities to enhance the business, and external learning is more readily facilitated.

## Limitations and Future Research

This study has several limitations that future research could overcome. First, the study sample was drawn from high-tech ventures in the Yangtze River Delta, including three major provinces. While this sampling method may control the impact of contextual variables, such as regional and industrial variables, it suffered from limited external validity of the

research results. Therefore, future research may test the theoretical model in different industrial sectors and geographical regions. Second, shared vision is a group or organizational-level construct. As such, the entrepreneur's evaluation of shared vision in the venture may not be an exact reflection of the entire picture. Future inquiries may gather data from different participants within the same venture to achieve a more accurate measurement. Ultimately, our study investigated the influence of individual variables on innovation performance. To develop theories of felt responsibility for constructive change and innovation performance at the organizational level, future research may adopt a multilevel design to explore the contextual factors at the environmental or organizational level on the hypothetical relationship between responsibility and innovation performance.

## Conclusion

Entrepreneurs' felt responsibility has become an important topic both in academic and in practice in recent years.<sup>13,15</sup> While little empirical study has focused on understanding how entrepreneurs' felt responsibility contributes to innovation performance of ventures. This study aims to provide new insights into this relationship by proposing and verifying a moderated mediation model that involves the relationship among entrepreneurs' felt responsibility for constructive change, external learning, entrepreneurs' perception of shared vision and innovation performance of ventures. Based on a two-wave questionnaire survey data collected from 376 entrepreneurs in East China, the results reveal that entrepreneurs' felt responsibility for constructive change has a positive impact on innovation performance and that external learning mediates this relationship. Moreover, entrepreneurs' perception of shared vision moderates the mediated process. By uncovering the role of entrepreneurs' felt responsibility as a critical precursor to innovation performance and by identifying the mechanisms and moderators that shape this relationship, this study not only complements prior work on felt responsibility in entrepreneurship and innovation contexts, which yielding important contributions to the entrepreneurial psychology research and self-determination theory, but also enriches our understanding of how shared vision as an external factor impacts the "motivation-behaviors-performance" process, that could contribute to the field of entrepreneurial learning and innovation research.

## Ethics Statement

The study was conducted in accordance with the recommendations of Ethical Guidelines of School of Management, Zhejiang University. School of Management, Zhejiang University approved this study. Informed consent was obtained from all subjects involved in the study. The authors confirmed that the guidelines outlined in the Declaration of Helsinki were followed.

## Disclosure

The authors report no conflicts of interest in this work.

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