

Research on the Relationship between Leader Error Tolerance, Employee Learning from Failure, and Entrepreneurial Orientation in Start-ups—A Resource-Based View Perspective

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Abstract: Based on the Resource-Based View (RBV), this study focuses on start-ups and delves into the complex relationships among leader error tolerance, employee learning from failure, and entrepreneurial orientation. By reviewing relevant theories and conducting empirical analysis, it reveals the pathways through which leader error tolerance influences employee learning from failure, and the internal mechanisms by which employee learning from failure affects entrepreneurial orientation. The results indicate that leader error tolerance can create a safe learning atmosphere for employees, driving them to proactively draw lessons from failures, thereby facilitating the formation and strengthening of the firm's entrepreneurial orientation. This research provides theoretical support and practical guidance for start-ups to enhance their entrepreneurial capabilities and achieve sustainable development.

Keywords: Start-ups; Leader Error Tolerance; Entrepreneurial Orientation; Resource-Based View (RBV)

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1 Introduction

In the current fiercely competitive and highly uncertain market environment, the survival and development of start-ups face severe challenges. Against the backdrop of digital transformation, global market fluctuations, and technological disruption, start-ups are particularly vulnerable. Statistics show that over 70% of start-ups fail within their first five years, with failure to adapt to market changes and insufficient innovation being the primary causes (Startup Genome Report, 2024). These challenges are compounded by their limited resource endowments, including constrained funding, lack of established customer bases, and underdeveloped organizational structures, making it difficult to withstand market shocks compared to mature enterprises. Entrepreneurial orientation, as a key strategic guide for start-ups to respond to challenges and achieve growth, is crucial for gaining competitive advantages and realizing sustainable development. Entrepreneurial orientation is not merely a static strategic choice but a dynamic capability that integrates innovativeness (the willingness to develop new products or services), proactiveness (the ability to anticipate and seize market opportunities), and risk-taking (the readiness to invest in uncertain ventures). For example, start-ups in the fintech sector that exhibit strong entrepreneurial orientation often outperform competitors by rapidly iterating products based on user feedback and entering emerging markets ahead of rivals. Leaders, as the core of start-ups, profoundly influence the firm's development direction and employee behavior patterns through their management actions and decisions. In start-ups, where formal organizational systems are often underdeveloped, leaders' personal values and behavioral styles directly shape organizational culture. A leader's attitude toward failure, for instance, can determine whether employees perceive the work environment as supportive or restrictive—this perception, in turn, affects employees' willingness to take risks and engage in innovative activities. Leader error

tolerance, as an important management concept and behavior, can create a relaxed work atmosphere for employees, encouraging them to dare to try and innovate. Leader error tolerance encompasses not only refraining from punishing employees for failures but also actively supporting reflection and learning after failure. This includes behaviors such as holding post-failure review meetings, providing resources for employees to rectify mistakes, and publicly acknowledging the value of "intelligent failures" that result from legitimate experimentation. Such practices signal to employees that innovation is valued more than perfection, thereby reducing their fear of taking risks. Simultaneously, employees' ability and attitude towards learning when facing failure, i.e., employee learning from failure, plays a critical role in enabling the organization to learn from failures and enhance its capabilities. Employee learning from failure is a dynamic process involving three stages: reflection (systematically analyzing failure causes), knowledge codification (summarizing actionable lessons), and application (applying lessons to future tasks). Mathematically, this process can be expressed as:

$$LFF=f(R,C,A)$$

where LFF= effectiveness of learning from failure, R= reflection depth, C= codification quality, A= application intensity, and f denotes a positive correlation function. According to the Resource-Based View, unique internal resources and capabilities are the source of a firm's competitive advantage. RBV emphasizes that intangible resources with VRIN characteristics (Valuable, Rare, Inimitable, Non-substitutable) are the foundation of sustainable competitive advantage. For start-ups, leader error tolerance (a cultural resource), employee learning from failure (a capability resource), and entrepreneurial orientation (a strategic resource) form a complementary bundle of VRIN resources that are difficult for competitors to replicate. Leader error tolerance, employee learning from failure, and entrepreneurial orientation, as important internal resource and capability elements within start-ups, warrant in-depth exploration of their interrelationships. Therefore, deeply investigating the relationship between leader error tolerance, employee learning from failure, and entrepreneurial orientation in start-ups holds significant theoretical and practical value for enriching and improving entrepreneurship management theory, as well as guiding the practical activities of start-ups. Theoretically, this study contributes to bridging the gap between leadership studies, organizational learning theory, and entrepreneurship research by examining how leadership behaviors influence strategic orientation through employee-level processes. Practically, it offers start-up leaders concrete strategies to foster a culture of innovation and learning, thereby enhancing their firm's ability to survive and thrive in competitive environments.

2 Theoretical Foundation and Research Hypotheses

2.1 Overview of Resource-Based Theory (RBV)

The Resource-Based View posits that a firm is a bundle of various resources, which include tangible resources (e.g., land, equipment, capital) and intangible resources (e.g., brand, technology, corporate culture). A firm's competitive advantage stems from its unique resources and capabilities, which possess the characteristics of being valuable, rare, inimitable, and non-substitutable (VRIN). Barney (1991) first proposed the VRIN criteria to identify strategic resources: "valuable" resources help the firm exploit opportunities or mitigate threats; "rare" resources are not widely available to competitors; "inimitable" resources cannot be easily copied due to factors like historical path dependence or causal ambiguity; and "non-substitutable" resources have no functional equivalents. For start-ups, which often lack abundant tangible resources, developing VRIN-compliant intangible resources is a critical path to gaining competitive advantage. Formally, a resource R is strategic if:

$$VRIN(R)=V(R)\cap R(R)\cap I(R)\cap N(R)$$

where V(R)= valuable, R(R)= rare, I(R)= inimitable, N(R)= non-substitutable. For start-ups, which often lack tangible resources, intangible resources like organizational culture and employee capabilities are critical for survival.

When a firm's resources and capabilities satisfy these characteristics, they can create a sustainable competitive advantage, enabling the firm to occupy a favorable position in the market. For start-ups, which are relatively resource-scarce, it is even more crucial to fully explore and utilize internal resources to cultivate unique capabilities. Start-ups typically face resource constraints in terms of financial capital and physical assets, so they must rely on intangible resources to compete. For example, a start-up in the software industry may lack the funds to compete with tech giants in marketing, but its unique

organizational culture that encourages rapid experimentation (an intangible resource) can allow it to develop and launch products faster than competitors. Leader error tolerance can foster a positive organizational climate, employee learning from failure helps accumulate knowledge and experience, and entrepreneurial orientation guides the firm to actively explore markets and innovate products and services. All three have the potential to become important resources and capabilities for start-ups to gain competitive advantages.

Table 1 illustrates how the three core variables align with VRIN characteristics, with practical examples from start-ups:

Table 1 VRIN Characteristics of Core Variables in Start-ups

Variable	Valuable	Rare	Inimitable	Non-substitutable
Leader Error Tolerance	Reduces failure fear, stimulates innovation	<40% of start-up leaders adopt tolerant behaviors	Shaped by leader's values/experience over time	No alternative to cultural influence
Employee Learning from Failure	Converts failure to actionable knowledge	<30% of employees systematically reflect on failure	Embedded in team routines and norms	Experience-based learning cannot be replaced by training
Entrepreneurial Orientation	Guides resource allocation to seize opportunities	<50% of start-ups have clear proactive strategies	Developed through cumulative strategic choices	No substitute for strategic direction

2.2 Leader Error Tolerance and Employee Learning from Failure

Leader error tolerance refers to leaders holding a tolerant attitude towards failures and mistakes made by employees in their work, avoiding excessive punishment, and instead offering understanding and support, encouraging employees to learn and grow from failures. In start-ups, characterized by high uncertainty and risk, employees inevitably encounter failures during exploration and innovation processes.

When leaders exhibit error tolerance, they enhance employees' psychological safety—a key antecedent of learning behavior (Edmondson, 1999). Psychological safety reduces the perceived cost of failure, motivating employees to engage in reflective activities. This relationship can be modeled as:

$$LFF = \beta_0 + \beta_1 \times LET + \epsilon$$

where LFF = employee learning from failure, LET = leader error tolerance, $\beta_1 > 0$ (positive effect), and ϵ = error term.

For example, when a leader encourages an employee for a failure in new product development resulting from trying a new method, helps analyze the reasons, and guides the employee to learn from the experience, it motivates the employee to actively engage in learning from failure. Based on this, Hypothesis H1 is proposed: Leader error tolerance has a significant positive impact on employee learning from failure.

2.3 Employee Learning from Failure and Entrepreneurial Orientation

Employee learning from failure is the process by which employees acquire knowledge and experience from failure experiences and apply them to future work to improve performance and promote organizational development. Through learning from failure, employees gain deeper insights into market demands, technological bottlenecks, and their own work deficiencies, subsequently providing valuable suggestions for the firm's innovation and development.

The knowledge accumulated from failure learning enhances the firm's ability to innovate (by identifying unmet needs), take risks (by reducing uncertainty), and act proactively (by anticipating pitfalls). This relationship is expressed as:

$$EO = \alpha_0 + \alpha_1 \times LFF + \mu$$

where EO = entrepreneurial orientation, LFF = employee learning from failure, $\alpha_1 > 0$ (positive effect), and μ = error term.

Simultaneously, innovative thinking and problem-solving abilities cultivated by employees during the failure learning process align with the innovativeness, risk-taking propensity, and proactiveness emphasized by entrepreneurial orientation. When employees actively engage in learning from failure, they become more willing to propose new ideas and suggestions, promote innovation activities within the firm, and dare to venture into new business areas, thereby strengthening the firm's entrepreneurial orientation. For example, an employee, through learning from a failed market promotion campaign, discovers a new market segment, prompting the firm to adjust its market strategy and explore the new market. This exemplifies the facilitating role of employee learning from failure on entrepreneurial orientation. Therefore, Hypothesis H2

is proposed: Employee learning from failure has a significant positive impact on entrepreneurial orientation.

2.4 Leader Error Tolerance and Entrepreneurial Orientation

As the guiding force of the firm, leaders' behaviors and decisions significantly impact the firm's strategic orientation. The relaxed environment fostered by leader error tolerance not only promotes employee learning from failure but also cultivates a cultural atmosphere within the firm that encourages innovation and risk-taking. Under such a cultural atmosphere, the firm is more inclined to adopt proactive strategies, pursue innovation and development opportunities, thereby strengthening entrepreneurial orientation. For example, leaders frequently emphasizing tolerance for failure and encouraging employees to try new things can gradually shape an entrepreneurial-oriented culture within the firm, driving it to continuously launch new products and explore new markets. Thus, Hypothesis H3 is proposed: Leader error tolerance has a significant positive impact on entrepreneurial orientation.

2.5 The Mediating Role of Employee Learning from Failure

As discussed above, leader error tolerance can promote employee learning from failure, and employee learning from failure, in turn, helps enhance entrepreneurial orientation. Therefore, it is speculated that employee learning from failure may play a mediating role between leader error tolerance and entrepreneurial orientation. This suggests a mediating mechanism: leader error tolerance enhances entrepreneurial orientation through employee learning from failure. The mediating effect is calculated as:

$$\text{Indirect Effect} = \beta_1 \times \alpha_1$$

where β_1 = effect of LET on LFF, α_1 = effect of LFF on EO. If Indirect Effect is significant, partial or full mediation is confirmed. That is, leader error tolerance positively influences entrepreneurial orientation by stimulating employee learning from failure. For example, a leader's error-tolerant behavior encourages employees to actively learn from failed projects; employees then apply the learned experiences to new business expansions, driving the firm towards entrepreneurial orientation. Based on this, Hypothesis H4 is proposed: Employee learning from failure plays a mediating role between leader error tolerance and entrepreneurial orientation.

3 Research Design

3.1 Sample Selection and Data Collection

This study takes start-ups as the research object. A "start-up" is defined as an enterprise established for ≤ 8 years with < 500 employees (OECD, 2021). Questionnaires were distributed using a combination of online and offline methods. Online distribution utilized a professional survey platform, pushing questionnaire links to eligible managers and employees of start-ups. Offline distribution involved attending entrepreneurial events and visiting startup parks to directly hand out questionnaires to relevant personnel in start-ups. A total of 300 questionnaires were distributed, and 230 valid questionnaires were recovered, yielding an effective response rate of 76.67%. The sample covers start-ups in multiple industries such as the internet, technology, and cultural creativity, demonstrating certain representativeness.

Table 2 Sample Demographics (N=230)

Characteristic	Category	Frequency	Percentage
Firm Age	≤ 3 years	128	55.65%
	4-8 years	102	44.35%
Industry	High-tech (IT/biotech)	156	67.83%
	Non-high-tech	74	32.17%
Employee Count	≤ 50	172	74.78%
	51-500	58	25.22%
Respondent Position	Employees	145	63.04%
	Managers	85	36.96%

3.2 Variable Measurement

All variables were measured using 5-point Likert scales (1=strongly disagree, 5=strongly agree), with scales adapted from mature literature:

Leader Error Tolerance (LET): assessing the leader's tolerance level towards employee failures and behaviors encouraging learning from failure. It consisted of 5 items from Zhang et al. (2020). Example: "Leaders understand failures from new attempts." Cronbach's $\alpha = 0.87$.

Employee Learning from Failure (LFF): assessing employees' reflection on failure causes, acquisition of lessons from failures, and application to future work. It consisted of 4 items from Edmondson (2004). Example, "I analyze failure causes to improve." Cronbach's $\alpha = 0.85$.

Entrepreneurial Orientation (EO): assessing three sub-dimensions: Innovativeness, Risk-Taking, and Proactiveness. It consisted of 9 items from Covin & Slevin (1989), covering innovativeness. Examples:

"Our firm frequently introduces new products or services." (Innovativeness)

"Our firm is willing to take certain risks to explore new markets." (Risk-Taking)

"Our firm proactively plans development strategies for the next 3-5 years." (Proactiveness) Cronbach's $\alpha = 0.91$.

Control Variables: Firm size (number of employees) and industry type (1=high-tech, 0=non-high-tech). Considering that factors like firm size and industry type might affect the research results, firm size (measured by number of employees) and industry type (categorized as high-tech and non-high-tech) were included as control variables.

3.3 Data Analysis Methods

SPSS 22.0 statistical software was used for data analysis, including descriptive statistical analysis, correlation analysis, and regression analysis to test the research hypotheses. Firstly, descriptive statistics were used to understand the mean, standard deviation, and other basic characteristics of the variables. Secondly, correlation analysis was conducted to preliminarily judge the direction and strength of relationships among variables. Finally, regression analysis was employed to further verify the causal relationships among leader error tolerance, employee learning from failure, and entrepreneurial orientation, and to test the mediating role of employee learning from failure. The mediating effect was tested using the stepwise regression method: testing the effect of the independent variable (leader error tolerance) on the mediator (employee learning from failure); testing the effect of the mediator on the dependent variable (entrepreneurial orientation); and testing the effect of both the independent variable and the mediator simultaneously on the dependent variable. The existence of a mediating effect was determined based on the significance of the regression coefficients.

4 Data Analysis Results

4.1 Descriptive Statistics and Correlation Analysis

Descriptive statistics for the variables showed that different start-ups exhibited certain variations in the levels of leader error tolerance, employee learning from failure, and entrepreneurial orientation. Correlation analysis results indicated that leader error tolerance was significantly positively correlated with employee learning from failure, leader error tolerance was significantly positively correlated with entrepreneurial orientation, and employee learning from failure was significantly positively correlated with entrepreneurial orientation. This provided preliminary support for Hypotheses H1, H2, and H3.

Table 3 Descriptive Statistics and Correlation Matrix (N=230)

Variable	Mean	SD	1	2	3	4	5
1. Firm Size	1.25	0.43	1				
2. Industry Type	0.68	0.47	0.12	1			
3. LET	3.76	0.72	0.09	0.15	1		
4. LFF	3.58	0.78	0.07	0.11	0.54**	1	
5. EO	3.89	0.65	0.13	0.21	0.49**	0.58**	1

Note: ** $p < 0.01$; LET=Leader Error Tolerance, LFF=Employee Learning from Failure, EO=Entrepreneurial Orientation.

4.2 Regression Analysis Results

Regression of Leader Error Tolerance on Employee Learning from Failure: With employee learning from failure as the dependent variable and leader error tolerance as the independent variable, controlling for firm size and industry type. Results showed that leader error tolerance had a significant positive impact on employee learning from failure. LET positively affects LFF ($\beta = 0.42, p < 0.001$). Hypothesis H1 was further validated.

Regression of Employee Learning from Failure on Entrepreneurial Orientation: With entrepreneurial orientation as the dependent variable and employee learning from failure as the independent variable, controlling for firm size and industry type. Results showed that employee learning from failure had a significant positive impact on entrepreneurial orientation. LFF positively affects EO ($\beta = 0.49, p < 0.001$). Hypothesis H2 was supported.

Regression of Leader Error Tolerance on Entrepreneurial Orientation: With entrepreneurial orientation as the dependent variable and leader error tolerance as the independent variable, controlling for firm size and industry type. Results showed that leader error tolerance had a significant positive impact on entrepreneurial orientation. LET positively affects EO ($\beta = 0.38, p < 0.001$). Hypothesis H3 was confirmed.

Dependent Variable	Predictors	β	t	R ²	ΔR^2
LFF	Firm Size	0.05	0.82	0.28	0.26**
	Industry Type	0.11	1.63		
	LET	0.42***	7.31		
EO	Firm Size	0.08	1.35	0.32	0.30**
	Industry Type	0.15	2.31*		
	LFF	0.49***	8.25		
EO	Firm Size	0.06	1.02	0.25	0.23**
	Industry Type	0.13	1.98*		
	LET	0.38***	6.47		
EO	Firm Size	0.05	0.89	0.39	0.14**
	Industry Type	0.12	1.87		
	LET	0.17*	2.53		
	LET	0.17*	2.53		

Test of the Mediating Effect of Employee Learning from Failure:

First, the significant impact of leader error tolerance on employee learning from failure was verified.

Second, the significant impact of employee learning from failure on entrepreneurial orientation was verified.

Finally, both leader error tolerance and employee learning from failure were included as independent variables in the regression predicting entrepreneurial orientation. Results showed that the coefficient for employee learning from failure remained significant, while the coefficient for leader error tolerance decreased. This indicates that employee learning from failure played a partial mediating role between leader error tolerance and entrepreneurial orientation. When LFF is included, LET's coefficient decreases ($0.38 \rightarrow 0.17$), and LFF remains significant ($\beta = 0.43, p < 0.001$), indicating partial mediation. Bootstrap results confirm the indirect effect ($0.21, 95\% \text{ CI } [0.14, 0.29]$, excluding 0). Hypothesis H4 was confirmed.

5 Research Conclusions and Implications

5.1 Research Conclusions

Based on the Resource-Based View and through empirical analysis of 230 start-ups, this study deeply explored the relationships among leader error tolerance, employee learning from failure, and entrepreneurial orientation, yielding the following main conclusions:

1. Leader error tolerance has a significant positive impact on employee learning from failure. In start-ups, leaders' tolerant attitude towards employee failures creates a safe learning environment for employees, alleviates their fear of failure,

and stimulates them to proactively learn from failures.

2. Employee learning from failure has a significant positive impact on entrepreneurial orientation. The knowledge and experience accumulated by employees through learning from failure help enhance the firm's innovation capability, risk-taking spirit, and proactive thinking, thereby strengthening the firm's entrepreneurial orientation.

3. Leader error tolerance has a significant positive impact on entrepreneurial orientation. Leaders' error-tolerant behavior not only directly affects employees' learning behavior but also shapes an internal culture that encourages innovation and risk-taking, propelling the firm towards entrepreneurial orientation.

4. Employee learning from failure plays a partial mediating role between leader error tolerance and entrepreneurial orientation. Leader error tolerance positively influences entrepreneurial orientation by promoting employee learning from failure, indicating that employee learning from failure is an important pathway through which leader error tolerance affects entrepreneurial orientation.

5.2 Practical Implications

Start-up leaders should establish a correct concept of error tolerance: Leaders need to recognize that failure is an inevitable phenomenon in the development process of start-ups. They should adopt a tolerant and understanding attitude towards employee failures, avoiding excessive punishment. By establishing error tolerance mechanisms and clarifying the scope and standards for tolerance, employees can understand what types of failures are acceptable, thereby encouraging them to dare to try and innovate, creating a favorable learning and growth environment.

Encourage employees to actively engage in learning from failure: Firms should guide employees to view failure correctly as an opportunity for learning and growth. Training sessions, sharing meetings, and other forms can be organized to help employees master effective methods for learning from failure and improve their ability to summarize lessons from failures. Simultaneously, establish knowledge-sharing platforms to facilitate experience exchange among employees, enabling the learning outcomes from individual failures to benefit the entire organization.

Strengthen the firm's entrepreneurial orientation: Building on the facilitating role of employee learning from failure on entrepreneurial orientation, firms should focus on cultivating an entrepreneurial culture, encouraging employees to propose new ideas and suggestions, and supporting them in conducting innovative activities. At the same time, actively monitor market dynamics, dare to explore new markets, launch new products or services, and continuously strengthen the firm's entrepreneurial orientation to enhance its competitiveness in the market.

5.3 Research Limitations and Future Research Directions

While this study has achieved certain results, some limitations remain:

1. **Cross-sectional Data:** This study used cross-sectional data, making it impossible to establish the temporal sequence of causality between variables. Future research could employ longitudinal research designs to track the development process of start-ups, revealing the dynamic relationships among variables more accurately.

2. **Limited Scope of Variables:** This study only considered the relationships among leader error tolerance, employee learning from failure, and entrepreneurial orientation, without exploring other factors that might influence these relationships, such as organizational culture or market environment. Subsequent research could expand the scope by incorporating more influencing factors to build a more comprehensive theoretical model.

3. **Sample Representativeness:** The sample for this study primarily came from start-ups in specific regions, potentially limiting its representativeness. Future research could expand the sample scope to cover start-ups in different regions and of different sizes to improve the generalizability of the findings.

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