RESEARCH ARTICLE

How Entrepreneurial Failure Experience Affects Firms' Entrepreneurial Behaviour-Evidence from the Wuling Mountains Region

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Abstract

The signals of economic recovery are getting stronger and serial entrepreneurship is increasing. Focusing on how to improve the quality of serial entrepreneurship, learning about entrepreneurial failure experiences has become a top priority. Based on the imprinting theory perspective, this study conducted a questionnaire survey among entrepreneurs in the Wuling Mountains to answer the following questions: first, how entrepreneurial failure experience affects entrepreneurial behaviours; and to understand how entrepreneurial failure experience affects entrepreneurial behaviours. Second, how resource bricolage as a mediating variable affects entrepreneurial actions of entrepreneurs in order to reveal the role that resource bricolage plays in the mechanism of influence of entrepreneurial failure experiences on entrepreneurial behaviours. The mediating role of resource bricolage is explored in relation to the moderating role of entrepreneurial behavioural learning. The results show that entrepreneurial failure experience not only has a direct positive effect on entrepreneurial behaviour, but also has an indirect facilitating effect through the creative integration process of resource bricolage. Meanwhile, entrepreneurial action learning strengthens the transformation of failure experience into resource bricolage ability through systematic reflection and experience reconstruction, suggesting that entrepreneurs can more effectively transform failure lessons into resource bricolage strategies through active learning, thus enhancing the adaptability and innovativeness of reentrepreneurship. This study helps the local government to formulate measures to stimulate economic vitality, and at the same time provides some theoretical basis for improving the success rate of serial entrepreneurship, which is of practical guidance for stimulating the entrepreneurial enthusiasm of re-entrepreneurs.

Keywords: imprinting theory, entrepreneurial failure, entrepreneurial actions, resource bricolage, entrepreneurial action learning.

Submitted: 28 November 2024
Accepted: 03 June 2025
Published: 25 August 2025

Vol. 2, **No.** 3, 2025.
10.62762/JSSPA.2024.680997

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Citation
Nie, Q., Luo, L., & Chen, X. (2025). How Entrepreneurial Failure Experience Affects Firms' Entrepreneurial Behaviour-Evidence from the Wuling Mountains Region. *Journal of Social Systems and Policy Analysis*, 2(3), 149–165.

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1 Introduction

Entrepreneurship encompasses a wide variety of theories that apply to a wide variety of phenomena [1]. With many enterprise SMEs and multinationals failing due to COVID-19, a deeper understanding of the business failure process is needed [2]. The COVID-19 pandemic is affecting the world in an unprecedented way and the recession brought about by the epidemic will be the worst since the Second World War [3]. Some scholars have pointed out that one of the main negative impacts of the crisis is that many entrepreneurs have had to close down their businesses and deal with the stigma of business failure. For example, the epidemic has significantly weakened the resilience of startups through the blockage of business scenarios due to physical isolation, the stagnation of production due to cyclical disruptions in the supply chain, and the loss of focus on market demand due to sudden changes in consumption patterns [4], and that failure is "something to think about". As researchers we need to understand entrepreneurship as a struggle against failure, therefore this thesis investigates the impact of the experience of entrepreneurial failure on entrepreneurial behaviour.

As the economic environment recovers, entrepreneurs who have suffered from entrepreneurial failure due to the impact of the epidemic are increasingly embarking on the journey of serial entrepreneurship. Against this background, the in-depth study of serial entrepreneurship behaviour is gradually becoming a new focus in both academia and practice, due to the specificity of serial entrepreneurship behaviour. This specificity lies in the fact that serial entrepreneurship often faces more constraints in accessing and utilising entrepreneurial opportunities, information, and resources when facing entrepreneurial challenges than first-time entrepreneurs. These constraints may stem from their previous experiences of entrepreneurial failure, which may have made their identification of market opportunities and access to resources more cautious or limited. Therefore, we introduce resource bricolage as a mediating variable to study how entrepreneurial failure experiences affect entrepreneurial actions of entrepreneurs.

Resource bricolage (bricolage) refers to the use of resources around the individual to achieve the individual's own purposes. Baker et al. [5] introduced resource bricolage into the field of entrepreneurship and gave the definition of "the process of assembling and integrating the resources at hand to solve new problems and develop new opportunities", based on which scholars pointed out that entrepreneurs with rich human capital such as prior experience and industry knowledge are more inclined to achieve entrepreneurial activities through resource bricolage [6]. For entrepreneurs in backward areas, the scarcity of resources is always an inextricable topic, and they often tend to use the resources at hand to solve problems [7]. Entrepreneurship balances unfavourable events and can also balance persistent adversity [8]. But entrepreneurship as an activity with both benefits and risks, failure is commonplace, and even more so for entrepreneurs in less developed regions, the hardship of the resource bricolage process as well as the experience of entrepreneurial failure will serve as a deep psychological imprint that will subconsciously influence the entrepreneurs' subsequent entrepreneurial behaviours, which may manifest itself as over-avoidance of risks, This influence may be manifested as excessive risk aversion [9], reassessment of opportunities, or a greater focus on learning from past failures in the decision-making process. This kind of imprinting is called "stigma", so we study the impact of entrepreneurial failure on entrepreneurial behaviour from the perspective of imprinting theory.

The application of imprinting theory in the field of entrepreneurship opens up new perspectives in the study of entrepreneurial failure, according to recent developments in imprinting theory [10], organisations form imprints during sensitive periods that are characterised by a dynamic imprinting. Such imprints do not exist statically, but continue to influence subsequent behaviours through a cyclical process of 'encoding - decoding - reconstructing' [11]. Unlike path-dependence theory, which emphasises historical decision-making inertia, imprinting theory is more concerned with the internalisation process of environmental features, especially under the dual role of resource constraints and institutional pressures [12]. This study further combines the Resource-Based View (RBV) and Dynamic Capability Theory, proposing that entrepreneurial failure experiences affect entrepreneurial behaviours through the dual paths of 'identification of resource heterogeneity' and 'dynamic capability reconfiguration', which provides a new perspective for understanding the adaptive behaviours of entrepreneurs in underdeveloped regions.

In summary, to address the special characteristics of underdeveloped regions, this study establishes and validates a model from the perspective of imprinting theory, with entrepreneurial failure experience as

the independent variable, resource bricolage as the mediator, entrepreneurial action learning as the moderator, and entrepreneurial behaviours as the outcome variable. Based on this model, a sample of enterprises in the Wuling Mountain region was selected as a good representative sample and an empirical study was conducted in an attempt to clarify how the experience of entrepreneurial failure affects entrepreneurial behaviours, reveal the role of resource bricolage in the mechanism of entrepreneurial failure on entrepreneurial behaviours, and explore the mediating role of resource bricolage and the moderating role of entrepreneurial action learning. In terms of theory, this study further explores the internal logic of entrepreneurial failure experience and resource bricolage, which helps to enrich the application of imprinting theory in the field of entrepreneurship, especially in the area of entrepreneurial failure, and is of some significance to the study of entrepreneurial poverty alleviation. On the practical side, the sample of this paper comes from entrepreneurs with entrepreneurial failure experience in the Wuling Mountain Region, which is an effective supplement to the sample of China's entrepreneurship and poverty alleviation research, helping the local government to formulate measures to stimulate economic vitality, and at the same time providing a certain theoretical basis for improving the success rate of serial entrepreneurship, which is of practical guidance significance for stimulating the entrepreneurial enthusiasm of re-entrepreneurs.

2 Literature review and hypothesis

2.1 Imprinting theory

Imprinting Theory has its origins in animal behaviour, specifically in the work of Austrian animal behaviourist Konrad Lorenz in the 1930s and 1940s. Lorenz first described the phenomenon of branding behaviour through observations and experiments on birds, particularly ducks, and developed the concept of the critical period. The intuitive appeal of imprinting has attracted numerous scholars to conduct research. Stinchcombe (1965) was the first to introduce imprinting theory into organisational research, arguing that characteristics developed during sensitive periods persist for decades despite changes in the environment. Based on this Marquis et al. [13] distinguished imprinting from other concepts (e.g. path dependence and queuing effects) and went on to give a specific definition of imprinting: imprinting is the assimilation and persistence of environmental traits that are absorbed and retained due to a high degree of susceptibility to external environments during a sensitive period of an organisation's or an individual's development, thus formalising the imprinting theory. Within the literature exploring organisational imprinting, Simsek et al. [11] provide a comprehensive framework to complement imprinting theory for understanding how organisations are embodied and manifested through their historical conditions and constraints. They propose that organisations develop a high degree of sensitivity to their environmental conditions during the sensitive early years of their existence, and that these environmental conditions leave lasting imprints on the organisation, influencing its structure, strategy and culture [14].

The application of imprinting theory in the field of domestic entrepreneurship research has formed multi-dimensional research results, but there is still academic space worth exploring in depth. In terms of negative experience imprinting effect, studies have shown that entrepreneurs' early life difficulties will have a continuous impact on their decision-making mode: Chen et al. [31] confirmed that childhood poverty experience can significantly enhance entrepreneurs' social entrepreneurial orientation and motivate them to be more proactive in assuming social responsibility; Zhang et al. [9] tracking study revealed that individuals experiencing the "Great Famine" in their teenage years will form a risk-avoidant decision-making preference, which will reduce their probability of participating in high-risk entrepreneurship. Li [15]'s empirical analysis further expands the application of this theory by finding that the experience of resource scarcity in childhood leads to a reduction in R&D investment of about 12-15% by affecting CEOs' perception of risk, which provides a new perspective for explaining organisational innovation differences.

In contrast to negative experiences, the positive imprinting effect of specific career experiences has gradually received academic attention. The tracking study by Wang et al. [59] shows that the probability of entrepreneurship among veterans is 23.6% higher than that of the general group, and the propensity to start a business increases by 4.2 percentage points for every additional year of military service, but this positive effect decays over time at an average annual rate of 3.8%. This dynamic feature provides an important basis for understanding the persistence mechanism of the stigma effect.

It is worth noting that existing studies still have significant theoretical gaps in the area of entrepreneurial failure. Although Landier et al. [18] confirmed that first-time entrepreneurial failure decreases the probability of serial entrepreneurship by 31.4% through data from the National Survey of Entrepreneurial Dynamics (NSEED), the generalisability of this finding and the mechanism of its action still need to be explored in depth. In view of the objective reality that the entrepreneurial failure rate is as high as 60% (GEM, 2023), this study starts from the perspective of imprinting theory and systematically analyses the dual influence mechanism of the failure experience on re-entrepreneurial behaviours, not only to make up for the insufficiency of the failure context research in the existing literature, but also to provide a theoretical basis for the precise formulation of entrepreneurial support policies. This exploration not only helps to improve the explanatory boundary of imprinting theory, but also opens up a new path for the study of entrepreneurial failure learning mechanism.

2.2 Entrepreneurship failure

Entrepreneurial failure is a complex and multidimensional phenomenon that involves not only the psychology and behaviour of individual entrepreneurs, but is also closely related to factors such as business strategy, external environment and cultural context. Reviewing previous studies on entrepreneurial failure, Tihula et al. [19] cut from the financial performance perspective arguing that failure experience reduces the likelihood of entrepreneurs to start their own business independently, and that team-managed firms perform better than firms without teams. From a growth performance perspective, Wakkee et al. [20] emphasise that failure re-entrepreneurs are more innovative, less financially disciplined, and that network embeddedness and growth expectations are not significantly different from those of other entrepreneurs; they exhibit better levels of performance, but negative performance growth rates. In terms of innovation performance, Vaillant et al. [21] argue that entrepreneurial failures have significantly higher levels of innovativeness in subsequent entrepreneurial activities than nascent entrepreneurs. In contrast, Moser et al. [22] based on the dual innovation theory, find that entrepreneurs who experience failure are more likely to change industries in their subsequent ventures, and that industry relevance is negatively related to innovation performance in subsequent ventures.

In addition, there are differences in tolerance and interpretation of entrepreneurial failure across cultures, which affects entrepreneurs' responses to failure and subsequent behaviour, especially for entrepreneurs in less developed regions. Cross-cultural studies have shown that cultural values, social support systems, and institutional environments have a significant impact on entrepreneurial failure [23]. In the study of failure learning mechanism, the "experiential learning theory" proposed by Cope [24] emphasises that failure experience enhances decision-making ability through cognitive restructuring, while Shepherd [25]'s "grief recovery theory" focuses on emotion management effects on learning outcomes. Synthesising the two perspectives, this study proposes that entrepreneurial action learning reinforces the transformation of failure experience to resource bricolage ability through the chain mechanism of ' cognitive reflection - emotional regulation - behavioural transformation'. Notably, Li [15]'s recent study found that childhood experiences of resource scarcity inhibit entrepreneurial innovation through a risk-averse tendency, but the present study found that adult entrepreneurial failure experiences instead promote innovation through resource bricolage, a discrepancy that reveals the life-cycle characteristics of the stigma effect.

2.3 Entrepreneurial Failure Experiences on Entrepreneurial Behavior

Within the framework of experiential learning theory, re-entrepreneurial behavioural adjustment is viewed as a dynamic process with metamorphic properties. Established research suggests that entrepreneurial failure experiences can drive re-entrepreneurs to implement significant behavioural strategy changes during the start-up phase, and such proactive adjustments have been shown to be significantly correlated with increased business success [16, 17]. Empirical studies in this theoretical school typically focus on comparative analyses of the magnitude of evolution of behavioural strategies in serial entrepreneurship as a means of assessing the validity of empirical translation: when re-entrepreneurs demonstrate a higher degree of behavioural strategy adjustment, it may both reflect their ability to circumvent the triggers of past failures [43], as well as imply a creative reconfiguration of entrepreneurial know-how [44]. Notably, re-entrepreneurs who successfully achieve metamorphic development tend to exhibit a synergistic effect of experience learning and strategy adjustment, a dynamic adaptation mechanism

that has been shown to be key to sustainable firm growth [45]. The dynamics driving the behavioural adjustment of re-entrepreneurs can be deconstructed from two dimensions: external environmental pressure and internal subject characteristics. At the level of environmental constraints, the failure stigma effect significantly affects the ability to access resources - compared to ordinary entrepreneurs, re-entrepreneurs often face a decline in social network support of about 37% [30]. To break through this structural constraint, they often adopt a dual coping strategy: on the one hand, they rely on their own capital accumulation (which on average accounts for up to 62% of startup capital) and strong relationship network reconstruction [47], and on the other hand, they reshape through explicit changes, such as industry switching [48] and strategic reorientation [49] to reshape the market perceptions. At the level of subject characteristics, however, the study presents contradictory findings: about 41% of re-entrepreneurs under the perspective of commitment escalation theory show a tendency of strategic path dependence [62], and this cognitive rigidity is particularly significant in neurotic personality trait groups [64]. Notably, Liu et al. [63]'s moderating effects model revealed that specific personality traits (e.g., moderate levels of narcissism) strengthen the efficiency of the translation of failure experience to strategy optimisation, a finding that provides important insights into understanding the heterogeneity of behavioural adjustment.

Based on the above theoretical debates and practical observations, this paper presents the core hypothesis:

H1: The experience of entrepreneurial failure is a significant positive driver of entrepreneurial behavioural adjustment

2.4 Entrepreneurial Failure Experience on Resource Bricolage

The cost-sinking effect of entrepreneurial failure significantly restructures the resource endowment structure of re-entrepreneurs. Specifically, the multidimensional resource constraints faced by entrepreneurial failure re-entrepreneurs present a stepwise strengthening feature: at the financial capital level, the pressure of historical debt settlement leads to an average contraction of 42% in initial capital size compared to the previous entrepreneurial venture [46], forming a rigid constraint on access to capital; at the level of institutional support, the signalling discrimination triggered by social stigmatisation reduces the formal channels of financing such as bank credits, venture capital and so on by success probability by 31% [65], resulting in channel blockage of external resource inputs; at the level of business relationships, partners' negative perception of entrepreneurial failure experiences lengthens the supply chain negotiation cycle to 2.8 times that of a first-time entrepreneurship [42], which significantly raises transaction costs. This structural gap created by multidimensional resource constraints forces re-entrepreneurs to turn to resource bricolage strategies to creatively reorganise residual resources through unconventional means, which is essentially an alternative to the traditional resource acquisition paradigm by dynamic capability iterations triggered by the failure experience.

The forcing effect of resource constraints presents non-linear characteristics in the innovation output dimension. Longitudinal tracking data show that the product innovation intensity of failed re-entrepreneurial firms is 27.6% higher than that of the first-time entrepreneurial group, confirming the adaptive innovation mechanism under the constraints; comparative studies of resource allocation efficiency further show that the resource mismatch rate of re-entrepreneurs (21.4%) is 17.3 percentage points lower than that of first-time entrepreneurs (38.7%) [49], suggesting that the failure experience strengthens the ability to accurately identify and reorganise resources. However, it is worth noting that there is an experience accumulation threshold for this positive effect: when the number of serial entrepreneurial failures exceeds three, the marginal utility of experience-based resources decays resulting in a 14-19% decrease in resource bricolage efficacy [50], revealing the capability boundary of the failure learning effect.

Based on the interaction mechanism between resource constraints and dynamic capabilities, this paper proposes:

H2: Entrepreneurial failure experience significantly and positively drives entrepreneurs' resource bricolage behaviour through the resource endowment reconstruction effect

The mechanism of resource bricolage on entrepreneurial behaviour is a dual path. At the level of immediate decision-making, resource bricolage requires entrepreneurs to implement the operational framework of "immediate action, stock collection, and goal reconstruction" under constraints [5], and this

improvisation ability directly affects the quality of entrepreneurial behaviours by improving the speed of market response and the efficiency of dealing with emergencies [52]. At the level of knowledge creation, the reorganisation of elements arising from the process of resource bricolage can give rise to new knowledge combinations [53], whose innovation-derived effects stem from the release of the novelty value of established resources. The decision-making process of failed re-entrepreneurs is simultaneously embedded in a unique psychological mechanism: the cognitive resources formed by the prior risk-taking experience [54] form a dynamic game with the fear of failure [60], and the moderating effect of this psychological tension affects the efficiency of external resource acquisition through the signalling mechanism [55]. Synthesising the above pathways of action, this paper proposes:

H3: Resource bricolage has a positive effect on entrepreneurial behaviour

2.5 Resource Bricolage Acts as a Mediator

Resources, as an indispensable and important element of entrepreneurship, are an important source of competitive advantage for firms. For entrepreneurs who have experienced entrepreneurial failure, the key resources of their entrepreneurship are manifested in human capital such as knowledge, skills and social networks [56]. According to human capital theory, entrepreneurs' prior experience, is one of the important sources of their human capital. Entrepreneurs' knowledge, skills and their demonstrated abilities are important human resources. The fact that some information about entrepreneurial experience needs to be apprehended through specific experiences, and that access to information is often uncertain, leads to the fact that people with different experiences will have different sets of information. Under this precondition, compared with people without entrepreneurial failure experience, serial entrepreneurship tends to have a wider range of practical information; in terms of social networks, the larger the size of the social network brought by entrepreneurs, and the more relationships they can make use of, the more important information they will obtain, the easier it is to find valuable opportunities and resources, and the more able to make reasonable entrepreneurial behaviour [57]. In addition, when the social network is strong enough, entrepreneurs can obtain additional support that other individuals cannot get, such as the help of previous entrepreneurial partners, other practitioners in the industry, and so on. These are important resources that can help make sound entrepreneurial behavioural choices. Based on this, we propose the fourth hypothesis of this paper:

H4 Resource bricolage mediates the relationship between experiences of entrepreneurial failure and entrepreneurial behaviour.

2.6 The Moderating Effect of Entrepreneurial Action Learning on the Experience of Entrepreneurial Failure and Resource Bricolage

The impact of entrepreneurial failure experience on entrepreneurs presents a significant ambivalence. On the one hand, failure may lead to resource depletion and psychological trauma, and even trigger negative effects such as reduced information processing ability and reduced efficiency in the use of resources [29]; on the other hand, the potential learning value of failure as an important source of practical knowledge has been widely demonstrated. Shepherd et al. [58] points out that entrepreneurs can achieve cognitive iteration by actively analysing the causes of failure, which in turn improves decision-making ability and resilience to risk, but this transformation process does not occur naturally and relies on specific learning mechanisms. This process of transformation does not occur naturally, but relies on specific learning mechanisms.

Entrepreneurial action learning plays a key moderating role in this process. According to Zheng et al. [28] definition, entrepreneurial action learning is a dynamic process in which entrepreneurs solve problems through social interactions, and its core lies in transforming individual experiences into systematic knowledge. The effectiveness of learning from failure depends on two dimensions: depth of experience and breadth of learning. In the depth of experience dimension, the degree of entrepreneurs' prior experience accumulation directly affects their ability to parse failure events.The theory of career experience transformation proposed by Politis [26] suggests that experienced entrepreneurs are better at extracting key features of resources such as technology and information from failures and updating their resource perceptions through action learning [31]. For example, entrepreneurs' pattern recognition ability based on industry experience can help them quickly locate feasible paths for resource bricolage after failure.

At the level of learning breadth, entrepreneurial

action learning enhances the moderating effect by expanding the scope of resource integration, and Minniti and Minniti et al. [27]'s dynamic learning model reveals that entrepreneurs break through the boundaries of existing cognition through cross-domain experience interactions. Bouncken et al. [32]'s study further demonstrates that entrepreneurs are motivated to reach out to new collaborators through experiences outside the industry, and that such social learning not only helps them to discover hidden needs, but also, more importantly, leads to a shift in the way of resource bricolage from path-dependent to pioneering and innovative. More importantly, it has led to a shift from a "path-dependent" to a "pioneering" approach. For example, entrepreneurs with cross-industry backgrounds are more inclined to reconfigure the mix of resources, such as technology and channels, to cope with market uncertainty.

In summary, the moderating effect of entrepreneurial action learning is reflected in the following: in the depth of experience, the inhibition of cognitive ability by negative emotions is mitigated through structured parsing of failure events; in the breadth of learning, the diversity of resource bricolage is expanded through social interaction. Together, these two mechanisms act on the transformational path between failure experience and resource bricolage, enabling entrepreneurs to transform the tacit knowledge embedded in failure into explicit competitive advantage. Based on this, the hypothesis is formulated:

H5: Entrepreneurial action learning has a positive moderating effect between entrepreneurial failure experiences and resource bricolage. The core theoretical model diagram is shown in Figure 1.

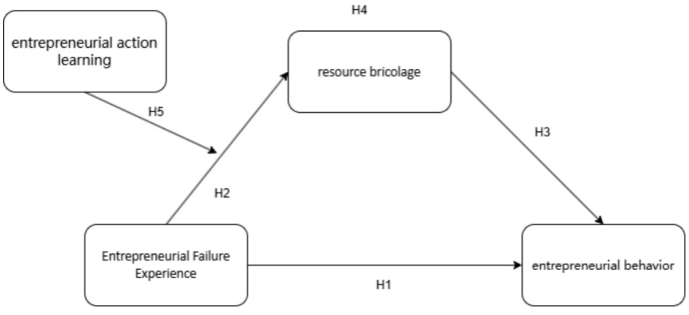

Figure 1. Theoretical model.

3 Research Design

3.1 Data Sources

This study combines long-term concern and research on China's poverty eradication and our team's social resources to collect data between August and October 2024 by distributing questionnaires on-site. The participating enterprises were all from the Wuling Mountain Region, which is located in the central and western regions of China, specifically, it covers the border zone of four provinces and cities, namely Chongqing, Hunan, Guizhou, and Hubei. Due to its relatively lagging economic development, the Wuling Mountain Region is one of the key regions in China's poverty alleviation and development, and it has been receiving more policy support and financial investment in recent years. In this study, 500 questionnaires were distributed to entrepreneurial firms and 331 were finally collected. After eliminating the questionnaires with incomplete data and those that did not meet the criteria, we obtained 330 valid samples, with an effective recovery rate of 66%. In order to ensure the reliability and validity of the questionnaire, we conducted a pre-survey in the questionnaire design stage and optimised the questions to avoid leading questions, as well as taking into account the educational background of the respondents, avoiding the use of jargon, and ensuring that the questions were clearly phrased and free of ambiguity; during the questionnaire collection process, we implemented anonymous completion. Taken together, these valid sample characteristics are consistent with the typical behavioural patterns of entrepreneurs in less developed regions, which further proves that our questionnaire can truly reflect the entrepreneurial situation in these regions, and therefore the distribution and selection of the target of this questionnaire are appropriate.

Among the survey respondents, Men accounted for 59.4%, 40.6%; Ethnic minorities accounted for 53.9%, The Han nationality accounted for 46.1%; High school education or below, those with 56.7%, 43.3% had a college degree or above; Local businesses accounted for 42.7%, Non-local enterprises accounted for 57.3%; 96.1% had role models, 3.9% have no example; Agriculture, forestry, animal husbandry and fishery accounted for 15.2%, Mining industry accounted for 2.1%, Manufacturing accounted for 6.7%, Construction industry represents 7.3%, Wholesale and retail logistics industry accounted for 28.8%, Accommodation and catering accounted for 12.4%, Information transmission accounted for 5.8%, Financial sector of 0.6%, Education accounted for 3.3%, Culture and others accounted for 7.0%, Tourism represents 1.8%, Others accounted for 9.1%; Enterprises with less than 10 people accounted for 68.5%, 10 – 49 individuals

accounted for 17.3%, 50 – 99,7.3%, 100 – 499,3.9%, More than 500 people accounted for 3.0%; Accounting for 48.8%, 3 to 38 years, Over 8 years, 20.9%. The sample covers multiple industries and is representative, which facilitates the study of industry impact differences, and also includes different age, scale and ownership types of enterprises to ensure the applicability and relevance of the research results.

3.2 Variable Measurement

The question items in this paper are all from well-established scales in the existing literature both at home and abroad, and have been adapted based on the specific Chinese scenario, while ensuring semantic constancy. For the measured items, interviewees were asked to assess their level of agreement with each question using a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Entrepreneurial failure experience variable: drawing on Wei et al. [61]'s scale, team entrepreneurial failure was measured in terms of the number of entrepreneurial failures and the degree of entrepreneurial failure, including three question items: "I once suffered a huge financial loss due to entrepreneurial failure." "I have been nearly bankrupt due to entrepreneurial failure." "I have been in debt because of entrepreneurial failure."

Resource Bricolage Variable:Resource Bricolage draws on Senyard et al. [33] and Wang et al. [59] measure of entrepreneurial bricolage, which consists of three questions such as "When faced with a new challenge, we are confident that we will be able to assemble a viable solution through the firm's existing resources." "When facing new challenges, we are confident that we can find feasible solutions through the firm's existing resources. "We are able to utilise existing resources for more challenges than other businesses."

Entrepreneurial behaviour was assessed using the research methodology of Kautonen et al. [34], where participants were asked to answer the following three questions, "How much time, effort and money have you invested in entrepreneurial activities in the past year?" "Have you applied for a tax identification number in order to start a full-time business?" "Are you in the process of assembling an entrepreneurial team?" The Cronbach's alpha is 0.831.

The entrepreneurial action learning variable draws heavily on the scale used by de Haan et al. [35] and consists of the following three question items: "The entrepreneurial action learning process questions or even overturns old ideas that were previously thought to be the cause of failure" "The more I interact with others, the more I am able to learn more, the better for entrepreneurship." "I will change the old rules and do things in a completely new way."

In order to ensure the reliability and validity of the scale, before formally conducting the questionnaire, we discussed with experts in entrepreneurship and poverty reduction, and solicited their opinions, based on which our group had repeated discussions and determined the first draft of the questionnaire. And we selected 20 entrepreneurs in the Wuling Mountains for pre-survey and asked them to evaluate the clarity and comprehensibility of the questionnaire, on the basis of which we corrected in detail the problems of unclear presentation, semantic ambiguity and misleading titles, and finally finalised the official questionnaire.

4 Empirical Analysis

4.1 Reliability and validity analysis:

Before testing the validity of the scale, this paper conducted an exploratory factor analysis of the sample using the KMO test analysis and the Bartlett sphere approximation chi-square test. The results showed a KMO value of 0.824 (Bartlett sphere test chi-square = 1276.34, $p<0.001$), a result with double statistical significance: firstly, the KMO value exceeds the threshold of 0.8 [51], indicating that there are strong systematic correlations between the variables of the sample data, and that the variable bias correlation coefficients squared are significantly higher than the the KMO value exceeds the threshold of 0.8 [17], indicating that there is a strong systematic correlation between the variables in the sample data, and the sum of squared partial correlation coefficients of the variables is significantly higher than the sum of squared correlation coefficients of the error coefficients, which suggests that the items of the scale have a good adaptability to the factor analysis. basic conditions for factor extraction. Combined with the significance result of Bartlett's test ($p<0.001$), the original hypothesis of variable independence can be further ruled out, confirming that there is a significant non-random structure in the correlation matrix of the observed data, which provides a reliable prerequisite basis for the subsequent validity test.The significance probability of the approximate chi-square statistic value of Bartlett's sphere test is 0.000, which is smaller than the significance level of 0.001 According to Kaiser et al. [37] and Bartlett [38], the internal correlation between the variables is strong and the sample data

Table 1. Variable measurement question items and reliability and validity test results.

Dimension (math.)	Measurement Item	Estimate	AVE	CR	Cronbach's alpha
Entrepreneurial failure experience	I have suffered huge financial losses from entrepreneurial failure.	0.781	0.616	0.828	0.827
	I once almost went bankrupt because of entrepreneurial failure.	0.772			
	I was once in debt from entrepreneurial failure.	0.802			
Resource bricolage	When faced with new challenges, we combine viable solutions with the resources available in the organisation.	0.776	0.614	0.827	0.837
	When faced with new challenges, we are confident that we can find viable solutions using the resources available to our organisation.	0.800			
	We are able to meet more challenges with our existing resources than other businesses.	0.775			
Entrepreneurial behaviour	How much time, effort and money have you invested in entrepreneurial activities over the past year?	0.675	0.632	0.836	0.831
	Have you applied for a tax identification number in order to start a full-time business?	0.847			
	Are you in the process of putting together a startup team?	0.850			
Rntrepreneurial action learning	The entrepreneurial action learning process questions and even overturns old ideas about what was previously believed to be the cause of entrepreneurial failure	0.875	0.635	0.836	0.836
	The more I interact with others, the more I am able to learn and the better it is for entrepreneurship.	0.788			
	I would change the old rules and do things in a whole new way.	0.719			

can be analysed by factor analysis. Regarding the reliability and validity tests, this paper uses Cronbach's α coefficient to test the internal consistency of each item and constructs a reliability coefficient to test the internal quality of the latent variables. As shown in Table 1, the values of Cronbach's α coefficients for the four latent variables are all greater than 0.7, indicating good scale reliability. Scale validity mainly includes content validity and structural validity, and the scale design in this study was based on previous studies by other scholars, so the content validity was good. Next, structural validity was measured using standardised factor loadings, average variance extracted values (AVE) and combined reliability (CR). As shown in Table 1, the AVEs of the latent variables are all greater than 0.5, which meets the requirements, and the CRs are greater than 0.8, indicating that the variables have good convergent validity and structural validity. Second, as shown in Table 2, the square root of variance of each variable is greater than the correlation coefficient between that row and that column, indicating that the measure has good discriminant validity. In addition, as shown in Table 1, the AVE square root values of entrepreneurial failure experience, resource bricolage, entrepreneurial actions, and entrepreneurial action learning are 0.616, 0.614, 0.632, and 0.635,respectively, all of which are greater than the maximum value of the correlation coefficients between the factors of Table 2, which indicates that there is a good discriminant validity between the variables [39].

4.2 Common Method Bias Test

The present study is based on the systematic control framework proposed by Podsakoff et al. [40], which controls homoscedasticity bias at two stages: the data collection process and statistical analysis. In the process control stage, three measures were used to reduce subjects' motivation to answer the questions in a consistent manner: anonymisation of the questionnaire, logical segregation of the questions (dispersal of the independent, mediator

and dependent variables in different modules), and implantation of reverse questions. In the statistical control stage, the Harman one-way test was used to assess the common method bias, and the results showed that there were six factors with eigenvalues greater than 1 extracted without rotation, and the variance explained by the first factor was 36.97% (the critical threshold was 40%), and the cumulative explained by 74.21%, which was in line with the criterion of "no single factor dominating the variation" [36], confirming that the data quality meets the criteria for further analysis.

4.3 Hypothesis Testing

This paper mainly uses hierarchical regression analysis to test the hypotheses written:

Drawing on the mediation effect test procedure proposed by Zhonglin et al. [41], this paper adopts a hierarchical regression method to build regression models for the independent variable on the dependent variable, the independent variable on the mediator variable, and the independent variable and mediator variable on the dependent variable, as follows.

(1) Main effect test. Hypothesis H1 proposes that entrepreneurial failure experience positively affects the entrepreneurial behaviour of enterprises, in order to test this hypothesis, this paper firstly only analyses the effect of control variables (entrepreneurial gender, entrepreneurial ethnicity and entrepreneurial qualifications) on entrepreneurial behaviour; secondly, the independent variable entrepreneurial failure experience is added, and the results, as shown in Table 3. Model 4 shows that entrepreneurial failure experience has a significant positive influence, thus H1 is verified. Combined with the imprinting theory, entrepreneurial failure experience leaves a deep imprint in entrepreneurs' minds, prompts entrepreneurs to reflect and learn, enhances their risk perception and management ability, and thus positively influences their subsequent entrepreneurial behaviour.

(2) Mediating effect test. Model 4 has verified that entrepreneurial failure experience has a significant positive effect on entrepreneurial behaviour, in addition, according to model 2, entrepreneurial failure experience positively affects corporate resource bricolage, with a regression coefficient of (β=0.411, $\rho < 0.01$), which indicates that the H2 hypothesis is valid; the standard regression coefficient of resource bricolage on entrepreneurial behaviour is ($\beta = 0.493$, $\rho < 0.01$), which means that resource bricolage can have a significant positive effect on entrepreneurial behaviour significantly and positively (according to the results shown in model 5), thus H3 is supported. Next, according to model 6, when resource bricolage is introduced into the research model, the regression coefficient of the independent variable on the dependent variable decreases from 0.493 to 0.357 the result remains significant. Thus, it can be concluded that resource bricolage plays a partial mediating role in relation to entrepreneurial failure experience and entrepreneurial behaviour , thus H4 hypothesis results are supported.

In addition, Bootstrapping was used to further validate the partial mediation effect of resource bricolage. The sample size of this Bootstrapping is 50,000, and the non-parametric estimation confidence interval is 95%. As shown in the Table 2, resource bricolage plays a partial mediating effect in the mechanism of entrepreneurial failure experience on entrepreneurial

Table 2. Intermediation effect regression results.

Independent variable	Implicit variable					
	Resource bricolage		Entrepreneurial behaviour			
	M1	M2	M3	M4	M5	M6
Distinguishing between the Gender	0.071	0.068	-0.246	-0.249	-0.246	-0.274
Nation	-0.25	-0.296	-0.335	-0.39	-0.335	-0.284
Academic qualifications	0.133	0.055	0.141	0.047	0.141	0.27
Entrepreneurial failure experience		0.411***		0.493***		0.357***
Resource bricolage					0.500***	0.347***
R^2	0.012	0.18	0.02	0.265	0.279	0.379
ΔR^2	0.012	0.168	0.029	0.245	0.27	0.1
F	1.335	66.63***	3.276	109.45***	112.73***	52.294***

Note: Values in parentheses are t-values; * indicates significant correlation at the 0.1 level, ** indicates significant correlation at the 0.05 level, and *** indicates significant correlation at the 0.01 level.

Table 3. Mediating role of resource bricolage.

Effect Description	Ratio	Standard error	P-value	Confidence interval (math.)	
				Lower limit	Limit
The direct effect of entrepreneurial failure experience on entrepreneurial behaviour	0.347	0.044	0	0.261	0.435
Indirect effects of resource bricolage on entrepreneurial behaviour	0.147	0.031	\	0.092	0.211

behaviour, and the test results show that the coefficient of the indirect effect is significant ($\beta = 0.147$), with a 95% confidence interval of [0.092, 0.211], which does not contain a null point. Therefore, hypothesis 4 is further tested.

(3) Moderating effects test. Hypothesis H5 proposes that entrepreneurial actions learning negatively moderates the relationship between entrepreneurial failure experience and resource bricolage. To test this hypothesis, independent and mediating variables were introduced gradually, and finally the interaction terms of independent and moderating variables were added. As shown in Table 4's M4, the interaction between entrepreneurial failure experience and entrepreneurial action learning has a positive effect on corporate resource bricolage ($\beta = 0.082$, $\rho < 0.05$), i.e., entrepreneurial action learning positively moderates the positive relationship between entrepreneurial failure experience and resource bricolage, and H5 is verified.

To further validate the moderating effect of entrepreneurial action learning, a decomposition of the moderating effect is plotted, Figure 2. As can be seen in Figure 2, the positive effect of entrepreneurial failure experience on resource bricolage increases as entrepreneurial action learning is enhanced. The hypothesis is further validated.

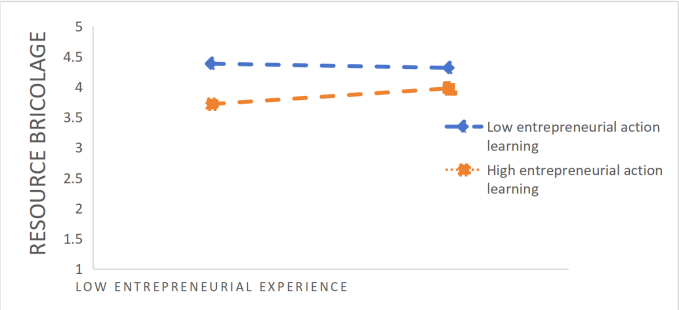

Figure 2. Moderating effects of entrepreneurial action learning.

Table 4. Moderating effects of entrepreneurial action learning.

Variant	Resource bricolage			
	M1	M2	M3	M4
Distinguishing between the sexes	0.071	0.068	0.086	0.027
Nation	-0.25	-0.296	-0.274	-0.277
Academic qualifications	0.133	0.055	0.028	0.044
Entrepreneurial failure experience		0.411***	0.405***	0.430***
Entrepreneurial action learning			0.126*	0.132**
Interaction term				0.082**
R^2	0.012	0.18	0.198	0.212
ΔR^2	0.003	0.17	0.185	0.197
F	1.335	66.629***	7.091***	5.866***

Note: Values in parentheses are t-values; * indicates significant correlation at the 0.1 level, ** indicates significant correlation at the 0.05 level, and *** indicates significant correlation at the 0.01 level.

5 Conclusion and Discussion

5.1 Research and Discussion

This paper follows the path of "entrepreneurial failure experience - resource bricolage - entrepreneurial behaviour", with resource bricolage as the mediating variable, through the questionnaire survey, the establishment of hypotheses, more than 500 entrepreneurial enterprises in the Wuling Mountain region issued questionnaires, and 331 valid questionnaires were returned as the basis for empirical analysis. The empirical analyses were conducted on the basis of the questionnaire survey and 331 valid questionnaires were collected. The results of this paper show that entrepreneurial failure experience has an impact on entrepreneurial behaviour through a variety of mechanisms, including (1) entrepreneurial failure experience → entrepreneurial action (2) entrepreneurial failure experience → resource

bricolage → entrepreneurial action, and ultimately concluded that: the experience of entrepreneurial failure can promote entrepreneurship by enhancing the resource bricolage ability of the company, and finally, we have concluded that: entrepreneurial failure experience can promote entrepreneurship by enhancing the resource bricolage ability of the company. and finally concluded that entrepreneurial failure experience can promote entrepreneurship by enhancing firms' resource bricolage ability, and resource bricolage mediates the relationship between entrepreneurial failure experience and entrepreneurial behaviours. Entrepreneurial action learning positively moderates the relationship between entrepreneurial failure experience and resource bricolage, and entrepreneurial action learning enhances the ability of entrepreneurial failure experience on resource bricolage.

First, entrepreneurial failure experience has a significant positive effect on entrepreneurial behaviour in poor areas. The imprinting theory states that individuals will form deep and lasting imprints after experiencing environmental influences during a critical period, and these imprints will have a significant impact on their subsequent behaviours. For entrepreneurs in poverty-stricken areas, entrepreneurial failure is precisely a critical period in which deep imprints are formed. The experience of failure not only gives them a deeper understanding of the market, but also develops a keen eye for risk and the psychological quality of resilience. These imprints enable entrepreneurs to better avoid risks and increase their entrepreneurial success rate in the subsequent entrepreneurial process, and to actively expand their social networks and seek more support and resources. Thus, the experience of entrepreneurial failure plays a crucial role in the growth path of entrepreneurs in poor areas.

Second, resource bricolage plays an intermediary role in entrepreneurial failure experiences and entrepreneurial actions. For entrepreneurs who have experienced entrepreneurial failure and have limited resources, it is not only an effective means to overcome the shortage of resources and achieve entrepreneurial goals, but also a key strategy to stimulate innovative thinking and enhance adaptive capacity. The importance of resource bricolage is especially prominent in underdeveloped regions, which helps entrepreneurs creatively integrate limited resources to cope with the complex and changing market environment, develop new products or services that meet the market demand, thus obtaining new sources of resources and forming a virtuous cycle. Therefore, entrepreneurs should make full use of the strategy of resource bricolage to continuously explore the potential of resources and enhance the success rate of entrepreneurship. At the same time, with the support of a series of supportive policies, various resources in less developed regions are more likely to be gathered, such as the provision of financial assistance, tax breaks, entrepreneurial guidance and market information support, in order to reduce the initial costs and risks of entrepreneurship. At the same time, the creation of business incubation centres and innovation networks to provide entrepreneurs with technical guidance and market expansion services will help promote the efficient allocation and use of resources. The implementation of these policies and measures will help amplify the positive impact of resource bricolage, inject new impetus into entrepreneurial activities in less developed regions, and thus promote balanced local economic development.

Finally, entrepreneurial action learning acts as a positive moderator between entrepreneurial failure experiences and entrepreneurial actions. Through entrepreneurial action learning from entrepreneurial failure experiences, entrepreneurs extract lessons from prior failure experiences, and through reflection and analysis, improve their own understanding of and ability to cope with the entrepreneurial process. This is because entrepreneurial failure experiences provide entrepreneurs with valuable first-hand information, meaning that these experiences contain a wealth of information about market dynamics, customer needs, product improvement points, and team management. However, simply experiencing failure does not guarantee that entrepreneurs will be able to effectively utilise this information, the key lies in whether entrepreneurs are able to transform these experiences into practical actions and strategies through learning. Entrepreneurial action learning is the catalyst for this transformation process. By systematically reviewing and analysing the causes of failure, entrepreneurs are able to identify what are controllable factors and what are external environmental factors. This improved analytical ability enables entrepreneurs to be more flexible in adjusting their strategies when facing future entrepreneurial actions and to avoid repeating the same mistakes. In addition, entrepreneurial action learning enhances the entrepreneur's ability to resource bricolage. Entrepreneurs are able to

creatively combine and utilise the resources at hand to achieve entrepreneurial goals. Through learning, entrepreneurs are better able to identify and utilise available resources, and are even able to effectively integrate seemingly unrelated resources, thus increasing the extent of resource utilisation. Thus, entrepreneurial action learning acts as a positive moderator between the experience of entrepreneurial failure and entrepreneurial actions. It not only helps entrepreneurs learn from their failures, but also improves their ability to resource bricolage and utilise resources, thus laying a solid foundation for future entrepreneurial actions.

5.2 Research Contribution

The main contributions and innovations of this paper are as follows:

First of all, the sample of this paper comes from entrepreneurs with entrepreneurial failure experience in Wuling Mountain Area, which is an effective supplement to the research sample of entrepreneurship as well as poverty alleviation in China. Poverty alleviation in the Wuling Mountain Region has achieved remarkable results, based on which this paper explores the impact of entrepreneurial failure experience on entrepreneurial behaviour from the perspective of imprinting theory, and through empirical analysis, aims to find an effective way to improve the success rate of entrepreneurship, previous research often focuses on start-up behaviour, entrepreneurial incentive policies and resource allocation, and scholars tend to pay attention to successful entrepreneurial cases and their related Previous studies have often focused on entrepreneurial behaviour, entrepreneurial incentive policies and resource allocation, and scholars have tended to focus on successful entrepreneurial cases and their related areas, thus neglecting in-depth exploration of the subsequent impact of entrepreneurial failure and its inherent value. This study makes up for the shortcomings of previous studies, provides more targeted programmes for entrepreneurship poverty alleviation in China, and provides a theoretical basis for improving the entrepreneurial success rate in less developed regions.

Secondly, the role of resource bricolage in the relationship between entrepreneurial failure experience and entrepreneurial behaviour is clarified to provide new theoretical guidance for entrepreneurial success. Introducing the perspective of resource bricolage, the positive impact of resource bricolage on entrepreneurial behaviour is analysed and verified, which not only provides entrepreneurs with new ways of thinking, but also points out the direction for entrepreneurship education and training. Therefore, resource bricolage plays an important role in entrepreneurial poverty reduction. Poverty-stricken areas often face challenges such as lack of resources and poor infrastructure, and entrepreneurship, as one of the important means of poverty reduction, also faces many difficulties. However, through resource bricolage, entrepreneurs are able to effectively utilise the resources around them to create market-competitive products and services, thereby driving the development of the local economy and achieving the goal of poverty reduction. This finding not only provides valuable practical guidance for entrepreneurs in poverty-stricken areas, but also provides a theoretical basis for the formulation of entrepreneurial poverty reduction policies.

Again, further exploration of the logic inherent in the experience of entrepreneurial failure and resource bricolage can help to enrich the application of imprinting theory in the field of entrepreneurship, particularly in the context of entrepreneurial failure. Prior studies have focused on the role of imprinting theory in the entrepreneurial process, such as how entrepreneurs' personal traits and prior experiences influence their subsequent entrepreneurial behaviour. However, most of these studies have focused on success stories and relatively limited exploration of entrepreneurial failure experiences and their subsequent effects. This study further expands the scope of the application of imprinting theory in the field of entrepreneurial failure by providing insights into entrepreneurs' journeys and behavioural responses after experiencing failure and how they overcome the challenges through resource bricolage. The study not only elucidates how entrepreneurial failure leaves a stigma in entrepreneurs' behavioural patterns and affects their future decision-making and resource utilisation, but also explores the intrinsic link between this stigma and resource bricolage behaviour and reveals new ways in which the experience of entrepreneurial failure affects entrepreneurial performance. Therefore, this study not only fills the gap of previous research in the field of entrepreneurial failure, but also provides a more comprehensive and in-depth perspective on the application of imprinting theory in the field of entrepreneurship by analysing in-depth the intrinsic logic of entrepreneurial failure experience and resource bricolage. At the same time,

by revealing new ways in which entrepreneurial failure experience affects entrepreneurial performance, this study also provides valuable insights and guidance for entrepreneurs.

Finally, the moderating effect, this study reveals that entrepreneurial action learning for entrepreneurs with entrepreneurial failure experience has a positive effect on entrepreneurial behaviour. In less developed regions, entrepreneurs with entrepreneurial failure experience accumulate more experience through entrepreneurial action learning, resource integration ability is improved, the belief in entrepreneurial success is stronger entrepreneurial enthusiasm is higher, thus increasing the incidence of entrepreneurial actions. This is of some significance for the study of entrepreneurial poverty alleviation.

5.3 Practical Implications

This study has the following implications for re-entrepreneurs in deprived areas as well as for local governments.

i. The experience of entrepreneurial failure is a valuable resource, and entrepreneurs should face up to failure and learn from it, rather than seeing it as the end of the road. By analysing the reasons for their failures, entrepreneurs can identify and compensate for their own shortcomings so that they can avoid repeating the same mistakes in their future entrepreneurial activities. In addition, entrepreneurs should actively seek external resources and network support to enhance their competitiveness and resilience. In the case of a tea processing enterprise in the Wuling Mountain region, for example, after the founder experienced 2019 e-commerce entrepreneurial failure, he systematically analysed the reasons for the failure through the "action learning group" and found that the supply chain management capability was insufficient. Subsequently, it adopted a resource bricolage strategy: uniting with local tea farmers to establish a "shared workshop" (integrating idle factory buildings and labour), introducing a short-video live-streaming team (making use of the resources of the county's e-commerce incubation centre), and ultimately realising sales of more than 5 million yuan in 2023, driving the employment of 87 people. This case shows that the government can systematically improve the efficiency of entrepreneurs' resource integration by establishing a "failure case database" (e.g., including 200 + local entrepreneurial failure cases) and a "resource bricolage service platform" (integrating idle factory buildings and equipment in the county). Combined with the data from China Rural Entrepreneurship Development Report 2023, the resource bricolage usage rate of entrepreneurs in the Wuling Mountains (68.3%) is significantly higher than the national average (52.7%), which verifies the practical value of the findings of this study.

ii. Entrepreneurial action learning can enhance the resilience of entrepreneurs to engage in resource bricolage. After experiencing failures, entrepreneurs should actively engage in self-reflection and learning, identifying and improving their own shortcomings in order to prevent repeating the same mistakes in the future. At the same time, the government should provide necessary support, such as organising entrepreneurs' exchange activities to share successful experiences and help entrepreneurs expand their vision of resource pooling. In addition, constructing a casebook containing lessons learnt from failures for entrepreneurs to learn from and draw on is also an effective means to enhance the ability of resource bricolage. Through these measures, entrepreneurs can increase their resilience in the face of challenges, while the government can contribute to creating a more favourable environment for entrepreneurship.

iii. Entrepreneurial action learning can enhance the resilience of entrepreneurs to engage in resource bricolage. After experiencing failures, entrepreneurs should actively engage in self-reflection and learning, identifying and improving their own shortcomings in order to prevent repeating the same mistakes in the future. At the same time, the government should provide necessary support, such as organising entrepreneurs' exchange activities to share successful experiences and help entrepreneurs expand their vision of resource pooling. In addition, constructing a casebook containing lessons learnt from failures for entrepreneurs to learn from and draw on is also an effective means to enhance the ability of resource bricolage. Through these measures, entrepreneurs can increase their resilience in the face of challenges, while the government can contribute to creating a more favourable environment for entrepreneurship.

5.4 Research Shortcomings and Prospects:

There are three limitations in this study: (1) the sample is limited to the Wuling Mountain region, and future comparisons with other less developed regions (e.g., Yunnan-Guizhou-Guizhou rocky desertification region) are needed to verify the generalisability of the findings; (2) the influence of the time interval between failures is not taken into account, and the latest research suggests that there is a "decay curve" for the branding effect [59, 66] and (3) Differences in industry characteristics are not adequately discussed, e.g., there may be significant differences in resource bricolage strategies between agricultural and manufacturing entrepreneurs. It is recommended that follow-up studies adopt cross-industry tracking data to further expand the theoretical boundaries.

Data Availability Statement

Data will be made available on request.

Funding

This work was supported without any funding.

Conflicts of Interest

The authors declare no conflicts of interest.

Ethical Approval and Consent to Participate

Not applicable.

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