



Original Research

Foresight of Financial Resilience of Entrepreneurial Businesses Using Causal Layered Analysis (CLA)

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ABSTRACT

Financial resilience in businesses refers to their ability to withstand economic shocks and challenges while maintaining financial stability under difficult conditions. This study adopts an applied research approach with both descriptive and prescriptive future-oriented methods. It is qualitative research that uses Causal Layered Analysis (CLA) to identify financial resilience in entrepreneurial businesses. To achieve a deep understanding of causal layers, scenarios are developed based on the global business network perspective. Two rounds of interviews were conducted with 35 experts, both structured and unstructured, to extract financial resilience indicators in Iranian entrepreneurial businesses. From the literature review and expert interviews, 35 factors were identified. Two factors, enthusiasm and fear of failure, were eliminated, resulting in 33 final factors. The matrix of financial resilience scenarios for entrepreneurial businesses was presented in four scenarios: economic crisis, economic boom, old technology, and new technology. Subsequently, SWOT analysis was used to analyze and propose strategies aimed at directing towards the third scenario. The findings indicate that utilizing the CLA approach aims to offer a plan in the field of financial resilience for entrepreneurial businesses. This helps planners to set aside current thinking and consider possible and probable futures, which may not necessarily be a continuation of past trends, to achieve a long-term plan to enhance financial resilience in entrepreneurial businesses.

1 Introduction

Currently, entrepreneurial businesses have become key cores of the economies of countries, but their resilience has always been a significant challenge. In recent years, many studies have been conducted on the resilience of these businesses. A report showed that of all startups launched in 2014, only 56% survived until 2018, while the rest failed over the years. Another study showed that 60% of entrepreneurial businesses disappear within the first five years, and 75% of venture capital investments in entrepreneurial businesses fail [38]. Statistical analysis by Startup Ranking indicates that globally there are 86,527 startups over three years old, with nearly 54% of these startups located in the United States.

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Thus, the United States ranks first with 46,645 startups, while Iran ranks 48th with 182 startups. Current data shows that the number of registered startups in Iran's ICT Empowerment and Facilitation Center is about 1,315, with over 80% being less than one to three years old [37]. The concept of financial resilience was first defined by McDonough [17]. According to him, financial resilience refers to a tool for controlling an organization's expenses in the face of severe inflation and other external disruptive drivers that were present in the United States at that time. Currently, the world is changing rapidly; intense global competition, high customer demands, rapid technological changes, economic uncertainty, and market crashes have recently converged, creating one of the most challenging business environments in decades [9]. The primary goal of financial resilience is to establish strong companies that can leverage their economic and financial strength to generate significant economic returns and save themselves from potential failures during crises. Entrepreneurial and entrepreneurial business activities in any country will lead to the prosperity and economic boom of that country. To understand this, one can look at the economic conditions of developed countries; financial strength has become a priority and policy [19]. Financial resilience in entrepreneurial businesses, which are usually in the early stages of development, is recognized as a critical factor for survival and sustainable growth. Due to their inherent instability and limited resources, entrepreneurial businesses are particularly vulnerable to financial shocks. Financial resilience helps them to continue operating and even grow under difficult conditions [3]. On the other hand, the concepts of "management" and "future" are closely related. For any manager, in any organization or business, "knowing the future" can offer enormous potentials, and ignoring it can bring significant risks. Managers and organizations can benefit from foresight; however, sometimes significant losses may occur due to overlooking a wide range of possible futures. Therefore, it is logical for managers to continuously pay attention to the future; in today's world, rapid and systemic changes are occurring at all levels of business and society. At the same time, the average lifespan of businesses has significantly decreased, resulting in lower profitability throughout their lifetime. Since the future can be examined in various ways using two common methods, "forecasting" and "foresight," corporate foresight can help businesses to identify their direction ahead of competitors and gain deeper insights into how such trends will affect their organization, using the most effective responses identified for future exploration. Strategic foresight research and practice, also known as corporate foresight, dates back to the late 1940s. Drawing the future enables individuals and organizations to imagine different future scenarios and plan for greater resilience in the future [10]. This research, by developing financial sciences within the framework of financial resilience of entrepreneurial businesses, provides a model for decision-making and evaluation, which is significant considering the inconsistency and lack of coherence in current approaches to financial resilience of entrepreneurial businesses. Moreover, the relevance and alignment of the research topic with the predicted priorities in the higher-level documents of the Islamic Republic of Iran and the needs of the academic community are among the features of this research. In this study, by reviewing the literature and research background, key drivers were identified and categorized through interviews and questionnaires, and based on the most important drivers, future scenarios for the financial resilience of entrepreneurial businesses were proposed. Developing strategies aligned with different scenarios is another achievement of this research, which can be very effective in forming a comprehensive framework for the financial resilience model of entrepreneurial businesses. The innovation of this research lies in the fact that previous studies on the financial resilience of entrepreneurial businesses have been retrospective and have not considered the future of this field for planning and providing new strategies.

2 Theoretical Foundations and Literature Review

Financial resilience of companies refers to their ability to absorb economic shocks and challenges and return to normal performance. This concept is crucial for the success of entrepreneurial businesses and includes proper financial planning, intelligent resource management, cost control, and ensuring sustainable resources. Strategies to strengthen financial resilience include proper cash flow management, utilizing various resources, setting appropriate budgets, investing in human resources and technology, and obtaining credit facilities. Financial resilience helps companies withstand market fluctuations, economic recessions, natural disasters, and political crises, achieving sustainable growth. Disaster management studies also emphasize resilience, presenting it as resilience engineering in safety management. Enhancing national resilience and understanding its various dimensions are essential for coping with external and uncontrollable risks. In 2005, the Hyogo Framework for Action until 2015 was adopted, focusing on creating resilience in communities instead of reducing vulnerability. This shift in approach from vulnerability to resilience has led to cultural transformations in risk reduction management. The importance of financial resilience can be outlined as follows:

- Continuation of activities: Financial resilience helps businesses continue their activities during difficult times and avoid closure or bankruptcy.
- Maintaining profitability: Even in challenging times, businesses with high financial resilience can maintain their profitability.
- Attracting investment: Investors have more trust in financially resilient businesses and are more willing to invest in them.
- Competition: Financially resilient businesses can outperform competitors in difficult conditions [36].

Factors influencing financial resilience include:

- Risk management: Identifying and managing financial risks, including credit risk, market risk, and liquidity risk, are important factors in financial resilience.
- Revenue diversification: Businesses with diverse revenue sources are more resistant to economic shocks.
- Cost-saving: Controlling costs and creating financial reserves help businesses be financially flexible in tough conditions.
- Access to financial resources: Businesses with access to various financial resources, such as credit lines and loans, can use them for financing during difficult times.
- Organizational culture: A strong organizational culture emphasizing flexibility, innovation, and teamwork can aid in financial resilience [36].

Strategies for increasing financial resilience include:

- Financial planning: Developing detailed and comprehensive financial plans helps businesses prepare for difficult conditions.
- Risk analysis: Identifying and assessing financial risks and planning to address them are essential for financial resilience.
- Creating financial reserves: Creating financial reserves for times when the business faces financial problems is highly important.
- Liquidity management: Accurate liquidity management and maintaining positive cash flow are key factors in financial resilience.
- Insurance: Using various types of insurance to compensate for potential losses can help in financial resilience.

- Innovation: Innovation and adapting to new conditions can help businesses overcome tough situations [23].

Financial resilience is one of the most important factors for the survival and growth of businesses. This concept refers to the set of actions and strategies a company employs to resist unwanted changes in financial conditions and continue its activities. Financial resilience is crucial for businesses as it enables them to respond to sudden occurrences such as economic recessions, cost increases, revenue decreases, liquidity problems, and other fluctuations. Overall, financial resilience requires a smart, precise, and strategic approach to financial management, helping businesses resist market fluctuations and changing financial conditions through appropriate planning, intelligent cost management, accessing diverse financial resources, and taking measures to reduce risks [11]. Currently, most societies, organizations, and individuals are situated in diverse and variable environmental conditions. Despite the potential of these environments to offer significant opportunities for organizational success and growth, they can also pose serious threats and challenges. Various events such as natural hazards, political unrest, economic instability, and human errors can severely threaten an organization's performance. Consequently, the need to develop resilience within organizational systems and infrastructures becomes prominent to overcome these complex and destructive events. The question arises: why do some organizations remain strong and continue to grow despite these events, while others fail to cope with the aforementioned risks and are doomed to failure? What is the secret of the success and distinction of such organizations?

The need to achieve sustainable survival and success has led many organizations to reconsider their priorities and focus on adapting to business changes and appropriately responding to environmental requirements. To this end, a new concept called financial resilience has been introduced in financial management. Flexibility refers to a company's capacity to survive, adapt, and grow in the face of changes. One of the most important strategies for business continuity in times of crisis is to build resilience to cope with environmental changes and threats. Resilience is a tool that can lead to a competitive advantage for organizations and enhance their survival in the face of crises [25]. [4] define resilience as the ability to recover from a shock or withstand its effects. The concept of resilience against shocks and disasters is mentioned in terms of recovery, recovery time, and recovery costs. Business resilience is defined as the ability to anticipate, avoid, and positively adjust to disruptions and environmental changes. This ability is a combination of the necessary capacities to restore efficiency after a disruption and to build the necessary capacities before reacting to a crisis. Therefore, flexibility and adaptability have become essential for all businesses in today's rapidly changing environment, and the need to develop a strong attitude towards it is keenly felt by all businesses [3]. From a theoretical perspective, this section addresses the definitions related to innovativeness and resilience. According to Blank, an innovator is a temporary organization in search of a repeatable and scalable business model. [6] defines entrepreneurial resilience as the ability to cope well with a high level of disruptive changes and challenges that exist in the business path; changing the business to a completely new direction after realizing that the current path will not be successful; the ability to return the business to a normal state after enduring setbacks or pivots; maintaining mental health and energy under high and continuous pressure from business problems [6]. Today, many businesses are ready to make changes; however, a significant percentage of them, for various reasons such as lack of sufficient awareness about their business needs or fear of change, do not even consider making major changes in the near future. Since resilience can be effective in maintaining environmental, socio-cultural, and ecological factors in startup activities, using foresight may be a significant strategic tool for resilience to reform, change, or redesign business

models and thus be suitable for predicting trends. Various dynamic and directed perspectives on organizational resilience exist in studies, supporting different factors affecting the survival and growth of entrepreneurial businesses. New business models also experience unique sustainability challenges due to limited resources, which are unlikely to be faced by traditional businesses. Resilience has emerged as an entrepreneurial skill that enables businesses to adapt and strengthen against challenges [7]. Based on resilience principles, the most suitable strategy to maintain a dynamic business system is a control-based strategy; however, some authors believe that defining resilience should include two essential conditions: first, the system is exposed to problems resulting from a serious threat or significant source of stress or shock. Second, the system moves towards a type of evolution and becomes more positive. Therefore, foresight is vital for business owners and managers who want their companies to survive and grow and can be especially beneficial for those willing to create innovative and pioneering investments. Since business and resilience are widely intertwined in society, businesses can support broader communities by providing resources and enhancing community resilience through rapid recovery and continued services [18]. Resilience is the ability of a system to withstand and absorb any changes or disruptions while maintaining itself and its relationships. In this regard, Kover-Mishra believes that resilience is the capacity to overcome challenges and problems, and the need for resilience is a factor for increasing the potential change capacity of businesses in response to challenges and problems. Van de Ven and colleagues were among the first scientists to show that entrepreneurship deals with concepts such as ideas, creativity, innovation, development of new products or services, opportunities, and similar matters. Therefore, it is better to consider entrepreneurial theories in the early stages of starting a business or organization. Beyond entrepreneurial theories, there are organizational and managerial theories dealing with managing people and organizations [22]. Financial resilience in entrepreneurial businesses refers to their ability to anticipate, plan, respond, and adapt to economic changes and unforeseen shocks for survival and prosperity. This includes factors such as financial literacy, organizational readiness, entrepreneurial competence, and entrepreneurial flexibility. Financial literacy programs targeting entrepreneurs are unable to address financial resilience during and after crisis conditions such as pandemics [2]. Organizational readiness of startups for financial resilience is an important factor, and elements such as digital financial innovation, liquidity planning, and financial strategy of financial managers are of high importance. Entrepreneurial competence and financial literacy have a positive impact on the sustainable performance of small companies, and entrepreneurial resilience mediates this relationship [1]. Financial literacy among entrepreneurs is important for the performance of their companies through flexibility, and a conceptual framework has been proposed to explain this relationship. Resilience in entrepreneurs is considered a response to competitive and unpredictable environments and can help reduce the failure rate of small and medium-sized enterprises [8]. Ghasemi, Saraf, Ahadi, IJafar, [11] examined "Proposing a Financial Resilience Model in Tehran Stock Exchange Companies to Prevent Bankruptcy" using data analysis based on meta-analysis and mixed methods. According to the findings from the combined process in identifying the dimensions and categories of financial resilience, it can serve as a basis for future research on implementing financial empowerment policies and maintaining financial resilience. Zahedi, Salehi, Moradi [25] investigated "Identifying and Classifying Financial Resilience Measurement Indicators Using Intuitive Fuzzy DEMATEL." They identified 29 financial resilience indicators, and 12 indicators were finalized after screening and positioning. The selected indicators were then categorized into two groups and influenced each other, and the significance range of each was determined. Finally, executive and research suggestions were provided based on the obtained results. The research findings indicate higher redundancy and visibility in financial resilience.

[23] examined the concept of financial resilience from various dimensions and explored its quantification approaches. The developed models in this article calculate financial elasticity in terms of key indicators: value at risk and conditional value at risk. Then, by comparing these methods, the performance of the methods was evaluated based on quantitative data from four bankrupt companies and four listed companies in Tehran Stock Exchange in recent years. [12] in their article showed that both financial literacy and digital literacy are key factors for creating financial inclusion and resilience. Heterogeneities are evident across regions and especially for poor households, rural residents, and women [20] discussed "Creating Financial Resilience: A Path to Economic Progress in Developing Countries." In this article, they argue that financial resilience: an individual's ability to function effectively in adverse financial conditions can better help cope with financial problems, create effective policies, and ultimately improve economic development. This article builds on an existing financial resilience measurement framework and adapts it to develop a measure suitable for developing country contexts. [16] in their research titled "Organizational Readiness for Digital Financial Innovation and Financial Resilience" examined the relationship between various financial innovation factors and resilience and found that achieving DFI in organizations requires reconfiguration and flexibility of resources, information technology, strategy, collaborations, and organizational culture. [21] examined "Conceptualizing and Measuring Financial Resilience: A Multidimensional Framework." [3] examined "Providing an Appropriate Model for Financial Resilience of Entrepreneurial Businesses with a Risk Management Approach." The results of the current research include activities such as designing mechanisms for discovering and creating financial resilience in entrepreneurial businesses; redesigning financial resilience processes; creating creativity and innovation processes in financial resilience; fostering a culture of using new technologies and a willingness to innovate in implementing financial resilience. For financial resilience [15] examined the financial resilience of fintech businesses with a risk management approach. The objective was to determine strategies that prevent inefficiency and collapse, quickly restoring the system to a desirable state. A comprehensive model of resilience for these businesses was presented, identifying 12 failure modes. The statistical population included managers and experts in the fintech sector in Tehran. For data analysis, the FMEA technique was used to determine pre-failure strategies, and the FAO technique was used for post-failure strategies. The result was the identification of six strategies for risk management and increased resilience. Business in the field of entrepreneurship refers to activities aimed at creating and developing a commercial unit to offer products and services in the market. Entrepreneurs, in the business process, identify market opportunities, analyze competition, examine customer needs and problems, design a business model, and conduct strategic planning to establish a sustainable and successful company. Essentially, entrepreneurs seek value creation, creating value for themselves, customers, society, and other stakeholders [24]. Behrami and colleagues present a model for evaluating the resilience of supply chains against risks. By using Data Envelopment Analysis (DEA) and Fuzzy Set Theory, a fuzzy network DEA model was employed to examine the risks of global tire supply chains and their various layers. The results of a survey conducted with 130 petrochemical companies in Iran revealed that the resilience of supply chains and their layers varies, and good performance in one layer does not necessarily contribute to the overall resilience of the system [13]. Sehat in a study, examined the role of financial markets in economic development and the importance of assessing financial resilience and performance in the insurance industry. Given the differences between insurance companies and other financial institutions, it is essential to investigate the factors affecting their efficiency and financial resilience. In this research, factors such as wealth, liquidity, credit, and the operations of insurance companies were evaluated and ranked based on expert opinions. The results show

that efficiency is the most important factor, followed by liquidity [5]. The experimental results of another study has shown that generally, there is a positive relationship between economic and accounting performance indexes and dividend policy, and that accounting performance indicators also have more explanatory power than economic performance indicators in predicting dividend in Iranian capital market [39].

3 Methodology

The present research is applied in terms of objectives, descriptive and prescriptive in terms of the future research approach, and qualitative in terms of data nature and analysis style. To identify the factors affecting financial resilience in entrepreneurial businesses, the method of causal layered analysis is used. After gaining a deep understanding of the causal layers, an attempt is made to write scenarios with a global business network approach.

The research questions are as follows:

1. What are the key drivers affecting the financial resilience of entrepreneurial businesses?
2. What are the plausible futures of financial resilience for entrepreneurial businesses?
3. Considering the existing capabilities and capacities in Iran, what strategies should be developed for each possible scenario?

Population and Sample The statistical population include professional and academic experts in financial resilience in entrepreneurial businesses. The snowball method is used to find experts familiar with futures studies for interviews. In this process, 35 two-session interviews are conducted over a month.

3.1 Research Stages

First Stage: Identifying Indicators Affecting the Financial Resilience of Entrepreneurial Businesses

In the first step, based on library studies (various data between the years 2000-2024 were reviewed, and information related to the factors affecting the financial resilience of entrepreneurial businesses was collected), specific keywords were used to search for articles. Keywords such as "financial resilience," "entrepreneurial businesses," etc., were searched. The main purpose of this step was to obtain key information from the articles. The number of codes and criteria extracted from the articles reached 30 factors. Then, 5 more factors were added after interviews with experts, bringing the total number of factors to 35. Given the abundance of key factors, a questionnaire was designed to assess the importance of the factors to eliminate those that seem to be of lesser importance.

Second Stage: Deep Understanding of Causal Layers

The method of Causal Layered Analysis (CLA) was introduced by Sohail Inayatullah in the 1990s. This method aims to combine empirical, interpretive, critical, and action-learning perspectives and uses stories and narratives to explore and construct possible futures. The key assumption of this method is that the framing of problems determines the nature of policies. CLA is a qualitative and exploratory method that, by delving deeper into the constituent layers of a phenomenon, achieves a better understanding of it. These layers consist of four levels, each broader and deeper than the previous one. The first level in the Causal Layered Analysis (CLA) method is called the "Litany Level." At this level, realities are often presented by news or other media in an exaggerated manner for political purposes. In this stage of analysis, the phenomenon under consideration is examined without deep critique and by accepting existing assumptions. Events are seen independently, without considering their interconnection and mutual influence.

Table 1: Identified Indicators for Financial Resilience in Entrepreneurial Businesses

Row	Variables	Source
1	Lean customer creation	[27]
2	Technology	[27]
3	Designing mechanisms for discovering and creating financial resilience in entrepreneurial businesses	[3]
4	Creating processes of innovation and creativity in financial resilience	[3]
5	Creating a culture of using new technologies	[3]
6	Willingness to innovate in implementing financial resilience	[3]
7	Passion and enthusiasm	[14]
8	Support systems	[14]
9	Financial resources and investment structure	[14]
10	Knowledge sharing and learning	[28]
11	Management system infrastructure	[29]
12	Alignment of key pillars	[29]
13	Ecosystem and environmental factors	[29]
14	Agile leadership	[30]
15	Fear of failure	[31]
16	Dynamic organizational competitiveness	[32]
17	Utilization of responsible employees	[28]
18	Adequate market, customer, and product knowledge	[33]
19	Reconfiguration and flexibility of resources	[16]
20	Human resource crises within the organization	[34]
21	Organizational structure	[34]
22	Key team capabilities	[27]
23	Financial literacy	[12]
24	Use of technology in providing customer service	[35]
25	Creation and recognition of opportunities	[35]
26	Entrepreneurial alertness	[3]
27	Stakeholder engagement	[3]
28	Collaboration among entrepreneurs	[3]
29	Risk acceptance capability	[3]
30	Characteristics of entrepreneurial financial managers	[3]
31	Social crises	[34]
32	Economic crises	[34]
33	Governments	[34]
34	Natural crises	[34]
35	Political crises	[34]

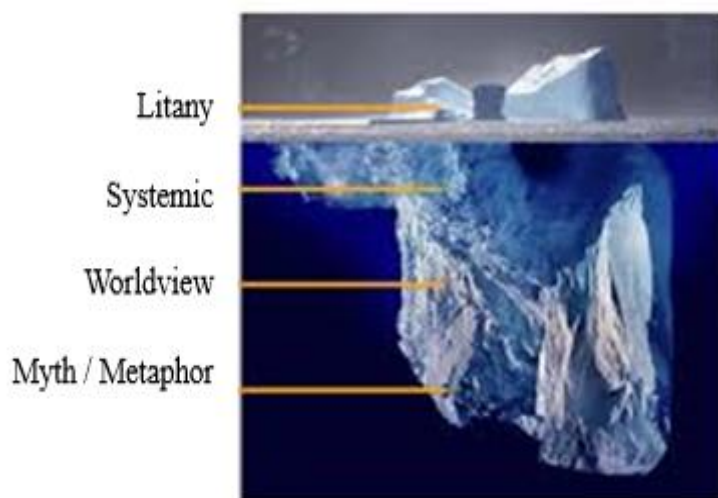


Fig. 1: Causal layered analysis (CLA) [26]

The second level in the CLA method examines social causes and systematic viewpoints. At this layer, social causes related to economic, cultural, political, and historical factors are analyzed. Efforts are made to interpret quantitative data based on variable correlations, causal relationships, applying a specific theory, and critiquing other theories. At this level, data can be questioned, but the paradigm within which the questions are formed is not itself questioned.

The third level in the CLA method is called the "Worldview or Discourse Level." At this level, deeper assumptions, reasoning, unconscious worldviews, and ideologies are identified. The task at this level is to find deeper social, linguistic, and cultural structures that are independent of the actors. At this level, one can examine how different stakeholders construct the two higher levels (the Litany Level and the Social Causes Level).

The fourth level in the CLA method is the "Myth and Metaphor Level." This level represents the unconscious motivational dimensions of the subject, embodied in myths and metaphors. This level provides an instinctive-emotional experience of the concerned worldview. The language used at this level is less specific and more related to visual imagery that touches the heart rather than being read aloud. At this layer, the deepest narratives, schemas, and mental images that shape the future are explored. [26].

Third Stage: Scenario Writing with a Global Business Network Approach

In the method of layered analysis of causes, it is called "the level of discourse or worldview". At this level, deeper, reasoning, worldview and ideological unconscious assumptions are identified. The task of this level is to find deeper social, linguistic and cultural structures that are independent of actors. At this level, it is possible to examine how different stakeholders construct the two higher levels (litany level and social cause level).

Fourth Stage: Strategy Adoption Towards Optimal Scenario

Finally, to adopt strategies towards the optimal scenario, five experts in political science, management, economics, sociology, and financial management are engaged. These strategies are considered as research recommendations.

4 Findings

The objective of this research is to examine the factors affecting the future financial resilience of entrepreneurial businesses, analyze leading scenarios, and provide strategies to move towards the best scenario. In this regard, a deep analysis of the factors affecting the future financial resilience of entrepreneurial businesses is conducted using Causal Layered Analysis. Then, using scenario planning with the Global Business Network method, potential uncertainties impacting the financial resilience of entrepreneurial businesses are examined. For this purpose, two series of interviews are conducted: one structured and the other unstructured. The characteristics of the experts are as follows:

Table 2: Demographic Information of Experts

Field	Gender	Highest Degree	Number	Average Age (Years)	Average Work Experience (Years)	Selection Criteria
Professional	Female	-	-	-	-	Active in the field of entrepreneurial businesses
	Male	Ph.D.	10	49	18	
Academic	Female	Ph.D. and above	2	45	18	Research and teaching in the field of financial resilience in entrepreneurial businesses
	Male	Ph.D. and above	23	52	25	

After completing the questionnaire by the experts, the significance level of the factors is calculated using SPSS software and the Binomial Test. The Binomial Test is a non-parametric test used when the data do not have a normal distribution. Based on the results of this test, factors with a significance level greater than 5% are evaluated, and less important factors may be eliminated. Based on the results obtained from previous studies and expert interviews, two factors, "Passion" and "Fear of Failure," were excluded from the set of 35 factors due to their relative lack of importance compared to other factors. This left 33 final factors, focusing on the main and more influential factors in the financial resilience of entrepreneurial businesses.

In the next phase, information was gathered through semi-structured interviews. Using the snowball sampling method, interviews were conducted with a sample of 35 people. The interviews continued until the point of saturation was reached, providing newer and deeper insights from the interviewees. Following this method, different levels of Causal Layered Analysis (CLA) were conducted. At the first level, the primary examination of the issue of financial resilience in entrepreneurial businesses was carried out. The second level involved a deeper analysis of the previous layer with organized viewpoints. The worldview layer examined deeper assumptions that affect financial resilience in entrepreneurial businesses. Additionally, the myth and metaphor layer, as the deepest analytical layer, was evaluated. In the final two steps, to more deeply align the CLA with scenario planning using the Global Business Network method, efforts were made to categorize items based on policy, economic, social, technological, environmental, and legal analyses.

Table 3: Screening of Driving Forces Using Binomial Test

Row	Driving Forces	Statistical Hypotheses	Test Probabilities	Significance Coefficient	Test Result
1	Lean customer development	$3=>, 3<$	0.50	0.000	Accepted
2	Technology	$3=>, 3<$	0.50	0.000	Accepted
3	Designing mechanisms to discover and create financial resilience in entrepreneurial businesses	$3=>, 3<$	0.50	0.002	Accepted
4	Creating innovation and creativity processes in financial resilience	$3=>, 3<$	0.50	0.006	Accepted
5	Fostering a culture of using new technologies	$3=>, 3<$	0.50	0.001	Accepted
6	Tendency to innovate in implementing financial resilience	$3=>, 3<$	0.50	0.000	Accepted
7	Passion and enthusiasm	$3=>, 3<$	0.50	0.175	Rejected
8	Supportive systems	$3=>, 3<$	0.50	0.000	Accepted
9	Financial resources and investment structure	$3=>, 3<$	0.50	0.000	Accepted
10	Knowledge sharing and learning	$3=>, 3<$	0.50	0.000	Accepted
11	Management system infrastructure	$3=>, 3<$	0.50	0.000	Accepted
12	Alignment of key pillars	$3=>, 3<$	0.50	0.000	Accepted
13	Ecosystem and environmental factors	$3=>, 3<$	0.50	0.000	Accepted
14	Agile leadership	$3=>, 3<$	0.50	0.000	Accepted
15	Fear of failure	$3=>, 3<$	0.50	0.736	Rejected
16	Dynamic organizational competitiveness	$3=>, 3<$	0.50	0.000	Accepted
17	Utilization of responsible employees	$3=>, 3<$	0.50	0.000	Accepted
18	Sufficient knowledge of the market, customer, and product	$3=>, 3<$	0.50	0.000	Accepted
19	Resource reconfiguration and flexibility	$3=>, 3<$	0.50	0.000	Accepted
20	Human resource crises in the organization	$3=>, 3<$	0.50	0.000	Accepted
21	Organizational structure	$3=>, 3<$	0.50	0.002	Accepted
22	Key team capabilities	$3=>, 3<$	0.50	0.000	Accepted
23	Financial literacy	$3=>, 3<$	0.50	0.002	Accepted
24	Use of technology in providing customer service	$3=>, 3<$	0.50	0.001	Accepted
25	Creating and recognizing opportunities	$3=>, 3<$	0.50	0.002	Accepted
26	Entrepreneurial alertness	$3=>, 3<$	0.50	0.006	Accepted
27	Stakeholder engagement	$3=>, 3<$	0.50	0.017	Accepted
28	Collaboration among entrepreneurs	$3=>, 3<$	0.50	0.002	Accepted
29	Risk acceptance capability	$3=>, 3<$	0.50	0.002	Accepted
30	Characteristics of entrepreneurial financial managers	$3=>, 3<$	0.50	0.001	Accepted
31	Social crises	$3=>, 3<$	0.50	0.002	Accepted
32	Economic crises	$3=>, 3<$	0.50	0.006	Accepted
33	Governments	$3=>, 3<$	0.50	0.000	Accepted
34	Natural crises	$3=>, 3<$	0.50	0.000	Accepted
35	Political crises	$3=>, 3<$	0.50	0.001	Accepted

Table 4: Explores the Causal Layered Analysis of Factors Affecting Financial Resilience in Entrepreneurial Businesses.

Layer		Factors		
Litany		<ul style="list-style-type: none"> • Tendency to innovate in implementing financial resilience • Management system infrastructure 		
Systematic	Capital Asset Management	<ul style="list-style-type: none"> • Financial resources and investment structure • Resource reconfiguration and flexibility 	Product and Service Development	<ul style="list-style-type: none"> • Sufficient knowledge of the market, customer, and product • Agile leadership • Characteristics of entrepreneurial financial managers
	Human Resource Management	<ul style="list-style-type: none"> • Utilization of responsible employees • Human resource crises in the organization • Key team capabilities • Financial literacy Organizational structure 	Customer Relationship Management	<ul style="list-style-type: none"> • Lean customer development • Entrepreneurial alertness
	Strategic Entrepreneurial Management	<ul style="list-style-type: none"> • Designing mechanisms to discover and create financial resilience in entrepreneurial businesses • Creating innovation and creativity processes in financial resilience • Fostering a culture of using new technologies • Creating and recognizing opportunities • Stakeholder engagement • Collaboration among entrepreneurs • Risk acceptance capability 		
Worldview	Environmental	<ul style="list-style-type: none"> • Natural crises • Ecosystem and environmental factors 	Technological	<ul style="list-style-type: none"> • Use of technology in providing customer service • Level of technology
Myths/Metaphors	Social	<ul style="list-style-type: none"> • Social crises 	Political	<ul style="list-style-type: none"> • Political crises • Governments
	Economic	<ul style="list-style-type: none"> • Economic crises 		

In the subsequent phase, after identifying the factors affecting financial resilience in entrepreneurial businesses, scenario writing was conducted using the Global Business Network approach. In this approach, system-level titles were considered key factors, and elements from the worldview and myth levels were regarded as driving forces. Then, uncertainties were tracked based on these driving forces. In the deductive approach, the factors that play the main role in constructing scenarios are the key uncertainties. Scenarios are written based on the most significant uncertainties.

Table 5: Uncertainties in Financial Resilience of Entrepreneurial Businesses

Row	Uncertainty	Row	Uncertainty
1	Natural crises	5	Social crises
2	Use of technology in customer service	6	Political crises
3	Ecosystem and environmental factors	7	Governments
4	Level of technology	8	Economic crises

In the next step, these driving forces were examined through a structured interview. The results of the second stage were evaluated using the TOPSIS method. In this evaluation, the options were the uncertainties, and the criteria considered were their importance and probability of occurrence. The significance of each option was determined using the linguistic variables specified in Table (4-5). In this analysis, the criteria weights were considered equal.

Table 6: Nine-Point Saaty Scale

Value	Comparison with Respect to	Description
1	Equally Preferred	The element is equally important as the other element.
3	Moderately Preferred	The element is slightly more important than the other element.
5	Strongly Preferred	The element is much more important than the other element.
7	Very Strongly Preferred	The element is very much more important than the other element.
9	Extremely Preferred	The element is absolutely more important than the other element.
2, 4, 6, 8	Intermediate Values	Used when a compromise between the above values is needed.

In the TOPSIS method, to rank the driving forces, a questionnaire encompassing expert opinions was provided to 35 specialists. The experts were asked to rate the importance of each criterion (driving force) using the specified scale. If the option being evaluated fully met the criterion conditions, a score of 9 was given, and lower scores were assigned as the criterion's influence decreased.

The first step in this technique is the formation of the decision matrix. A decision matrix is used to evaluate a number of options based on several criteria. In other words, it is a matrix in which each option is rated based on several criteria. This matrix is denoted by X, and each element is represented by x_{ij} , where the importance of the option concerning the criteria is assessed.

Table 7: Decision Matrix for Ranking Driving Forces

Criteria	c1	c2	c3	c4	c5	C6
P. N.	+	+	+	+	+	+
W _i	1	1	1	1	1	1
A1	4	5	6	3	5	5
A2	5	4	6	4	5	3
A3	6	5	4	5	6	1
A4	4	8	5	3	3	3
A5	4	4	5	5	3	4
A6	9	5	6	2	5	1
A7	7	5	6	5	5	7
A8	4	6	7	2	3	2

In the aforementioned table, A1 represents the first driving force under study, whose importance relative to other options (driving forces) is to be identified. Normalization, or scaling, is the second step in

solving all multi-criteria decision-making techniques based on the decision matrix. In multi-criteria decision-making methods, it is better to use the term "scaling." In the TOPSIS technique, vector normalization is used. The output of this stage is displayed as a normalized matrix.

Table 8: Normalized Decision Matrix for Driving Forces

Criteria	c1	c2	c3	c4	c5	C6
A1	0.025	0.027027	0.025641	0.035714	0.030303	0.030303
A2	0.1	0.1351351	0.153846	0.107143	0.151515	0.151515
A3	0.125	0.1081081	0.153846	0.142857	0.151515	0.090909
A4	0.15	0.1351351	0.102564	0.178571	0.181818	0.030303
A5	0.1	0.2162162	0.128205	0.107143	0.090909	0.090909
A6	0.1	0.1081081	0.128205	0.178571	0.090909	0.121212
A7	0.225	0.1351351	0.153846	0.071429	0.151515	0.030303
A8	0.175	0.1351351	0.153846	0.178571	0.151515	0.212121

To scale the decision matrix, each element x_{ij} is normalized using the vector normalization method based on the following formula:

$$n_{ij} = \frac{x_{ij}}{\sqrt{\sum_{j=1}^m x_{ij}^2}} \quad (1)$$

Using this formula, each element in the decision matrix is scaled to form the normalized matrix.

In the third step of the TOPSIS method, the normalized decision matrix must be weighted. This is done by multiplying each element of the matrix by the weight of the corresponding criterion. Given that the weights of all criteria are considered equal (0.4), the results are presented based on Table (9).

Table 9: Weighted Normalized Decision Matrix

Criteria	c1	c2	c3	c4	c5	C6
A1	0.01	0.0108	0.0102	0.01428	0.0121	0.0121
A2	0.04	0.0540	0.0615	0.0428	0.0606	0.0606
A3	0.05	0.0432	0.0615	0.0571	0.0606	0.0363
A4	0.06	0.0540	0.04102	0.0714	0.0727	0.0121
A5	0.04	0.0864	0.0512	0.0428	0.03636	0.0363
A6	0.04	0.0432	0.0512	0.0714	0.0363	0.0484
A7	0.09	0.0540	0.0615	0.02857	0.0606	0.0121
A8	0.07	0.0540	0.06153	0.0714	0.0606	0.0848
PIS	0.09	0.086	0.0615	0.0714	0.0727	0.0848
NIS	0.01	0.0173	0.0102	0.0142	0.0121	0.0121

Finding Ideal and Anti-Ideal Solutions

$$d_i^+ = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^+)^2} \quad (2)$$

$$d_i^- = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^-)^2} \tag{3}$$

To summarize, we examine positive and negative criteria here. Positive criteria improve the system, so their ideal solution equals the highest possible value, and their anti-ideal solution equals the lowest possible value. For negative criteria, it's the opposite; the highest value is considered the anti-ideal, and the lowest value is the ideal solution. Then, in the next step, the distance of each option from the positive and negative ideals is examined to calculate the relative closeness of each option to the ideal solution.

Table 10: Distance of Options from Ideal and Anti-Ideal

1 ⁺ d	0.1472	d ⁻ 1	0.006
2 ⁺ d	0.067	d ⁻ 2	0.089
3 ⁺ d	0.061	d ⁻ 3	0.095
4 ⁺ d	0.04	d ⁻ 4	0.1083
5 ⁺ d	0.068	d ⁻ 5	0.093
6 ⁺ d	0.076	d ⁻ 6	0.084
7 ⁺ d	0.055	d ⁻ 7	0.113
8 ⁺ d	0.039	d ⁻ 4	0.114

To scale the decision matrix, each element x_{ij} is normalized using the vector normalization method based on the following formula: This formula generates a value between zero and one; the closer this value is to one, the nearer and better the option is to the ideal solution .

Table 11: Ideal Solution in the Evaluated Driving Forces

Option	Final Weight	Rank
CL 1	0.0421	8
CL 2	0.5717	6
CL 3	0.6066	4
CL 4	0.689	2
CL 5	0.576	5
CL 6	0.5254	7
CL 7	0.6736	3
CL 8	0.7418	1

Based on the results obtained from the final ranking of the studied options relative to the weighted final indices, the eighth driving force under study, namely economic crises, with a final weight of 0.741, ranks first. The level of technology, with a final weight of 0.689, ranks second, and finally, natural crises, with a final weight of 0.042, rank last, which is eighth.

$$cL_i^* = \frac{d_i^-}{d_i^- + d_i^+} \tag{4}$$

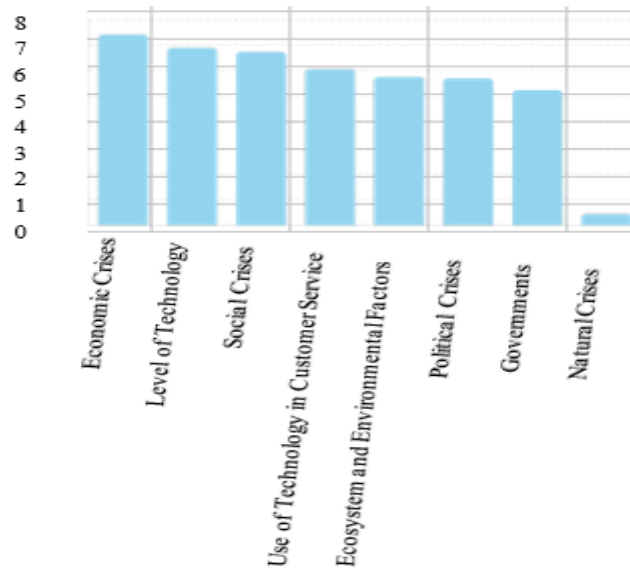


Fig. 2: Importance of Each Uncertainty

To examine the main uncertainties in shaping the future financial resilience of entrepreneurial businesses in the country, we can focus on the following two major dimensions:

1. **Economic Dimension:** Economic crisis
2. **Technological Dimension:** Level of technology

Considering these two dimensions, we can use a team of five financial management experts familiar with the futures studies process to develop the following scenarios:

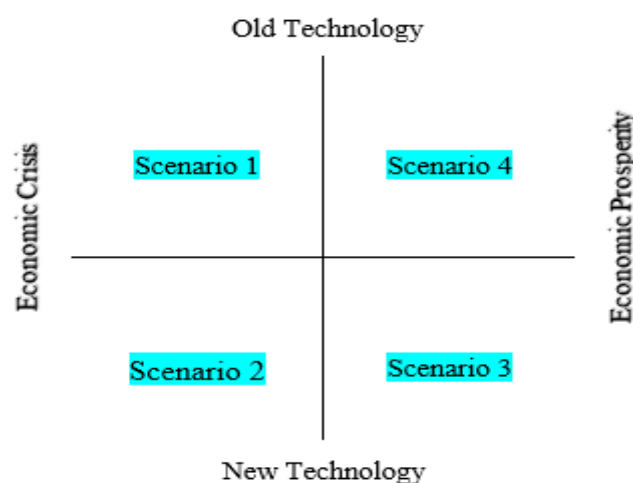


Fig. 3: Scenario Matrix for Financial Resilience in Entrepreneurial Businesses

Scenario 1: This scenario envisions a future where economic crisis increases, and external factors such as inflation, business cycles, the COVID-19 pandemic, etc., have a direct impact on the financial resilience of businesses. In this scenario, the software and hardware infrastructures used in entrepreneurial businesses become obsolete and inefficient, reducing the effectiveness of workforce training, the methods used, hardware and software, and the management and supervision system at the national level. These conditions lead to the inefficiency of existing management practices in entrepreneurial businesses, reducing their financial resilience. This scenario can be referred to as "The Great Crisis and Obsolete Technology."

Scenario 2: In this scenario, the economic crisis escalates, leading to a decline in demand and restricted access to credit. This situation results in a loss of motivation for many individuals to start their businesses. Additionally, financial constraints due to the credit crisis increase, reducing entrepreneurial opportunities. Although there is no intense competition for entrepreneurial businesses, new technologies are employed. Despite economic crises, there is a need for the renovation and updating of technologies for managing entrepreneurial projects in the country. This renovation may be driven by managerial perspectives or external factors such as political and social influences that affect the internal management processes of the country. This scenario can be described as "The Great Crisis and Showcase Technology."

Scenario 3: In this scenario, the new paradigm of the global economy, civil society expectations, social justice, and lifestyle changes in the urban middle class, along with the emergence of a new class of managers with a knowledge economy and entrepreneurial companies, elevate entrepreneurship. Under such conditions, economic growth can enhance the innovation and knowledge of entrepreneurial individuals, increasing the financial resilience of entrepreneurial businesses. Technological advancements in both hardware and software, along with changes in the structure and concept, education, and management of entrepreneurial businesses, create a more competitive environment. Financial resilience in entrepreneurial businesses reaches its maximum potential, bringing about profound changes in the concept of managing these businesses. This scenario can be named "Economic Growth and Efficient Technology."

Scenario 4: In this scenario, the overlap of two uncertainties, namely economic growth and the use of old technologies in managing entrepreneurial businesses, occurs. Under these conditions, the government seeks to create economic growth, but rent-seeking and strong connections remain ingrained in the government's mindset. This results in the absence of appropriate legal frameworks, significant governmental and public inertia, ideological concerns and pressures, and a lack of necessary infrastructure to support active institutions. Financial resilience in entrepreneurial businesses increases to a limited extent, but there are no significant changes in the management processes of these businesses or an increase in their financial resilience. Hence, this scenario can be referred to as "Pseudo-Economic Prosperity."

5 Discussion and Conclusions

In conclusion, this research, using the causal layered analysis approach, aims to provide a framework for financial resilience in entrepreneurial businesses. This framework helps planners set aside current thinking and, by considering possible futures, develop a plan to increase the financial resilience of entrepreneurial businesses in the long term. Since the variables and parameters influencing the financial resilience pattern of entrepreneurial businesses are uncertain and uncontrollable, traditional planning

methods that deal with relatively certain parameters and components will not be effective. Consequently, scenario planning and considering the likelihood of scenarios and the conditions for their realization can provide a more suitable approach for planning the financial resilience of entrepreneurial businesses. Currently, uncertainty in the environment has increased due to rapid changes and the complexity of relationships between factors. This causes our predictions and perceptions of the future to be flawed. Common tools for forecasting and planning, such as time series and moving averages, can be effective when there are few changes, but in highly uncertain environments, these approaches will not yield desirable results. Uncertainty arising from changes in various dimensions of the general environment, including economic, social and cultural, political and legal, technological, and physical (environmental) sectors, is known as external or exogenous uncertainty imposed on the organization and not under its control. In such conditions, scenario planning can be one of the three most useful tools for planning and management. Despite its widespread use, the theoretical foundations of this approach have not yet sufficiently demonstrated its positive effects and results in practice. The approach of designing a resilience model based on technology in entrepreneurial businesses has been used in Iran and other countries. This approach has also been used for studies on the financial resilience of entrepreneurial businesses in Iran and other countries. In this context, [34] examined business resilience and concluded that factors such as economic crises are recognized as significant and influential factors on business resilience. [35] also concluded in an article titled "Designing a Technology-Based Resilience Model for New Tourism Businesses in Baresar" that using technology in providing customer service is among the main conditions affecting the increase of financial resilience in entrepreneurial businesses, aligning with the results of the present study. The conceptual model presented in this research includes three main steps: identifying driving forces, causal layered analysis, and scenario development and strategy review. The main subject of the scenario in this article is the future study of financial resilience in entrepreneurial businesses with an emphasis on the causal layered analysis (CLA) method. Based on the results obtained, the third scenario is identified as the desirable scenario. This scenario, titled "Economic Growth and Efficient Technology," shows that with economic growth and technological advancements, entrepreneurs can find the best opportunities to create and develop their businesses. Due to increased financial resilience in entrepreneurial businesses, this scenario is considered the most desirable option. Given the importance of financial resilience in entrepreneurial businesses and the need for a comprehensive plan to create financial resilience, this scenario can serve as a basis for making decisions and designing future actions in this area. Considering the breadth of views and the need to respond to various decision-making areas, the issue of financial resilience in entrepreneurial businesses can gain more attention from experts and decision-makers in the future and be considered an important issue in the field of entrepreneurial businesses. This research, by providing an influential model for increasing financial resilience in entrepreneurial businesses in Iran, addresses a comprehensive and necessary reality in the field of economic research. This model not only contributes to the development and expansion of literature and theoretical foundations in the field of financial resilience but also serves as a basis for developing subsequent financial resilience models in entrepreneurial businesses by presenting effective components. This research can serve as a useful guide for decision-makers and experts in the field of entrepreneurial businesses and motivate further internal research and the development of concepts and models related to financial resilience in this field. Additionally, applying this model empirically can facilitate the improvement of entrepreneurial business performance and contribute to increasing entrepreneurship in various societies and economies. These efforts can generally help in the economic and social development and progress of the region and the country.

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