

Developing a Model of Financial Flexibility in Companies Listed on the Tehran Stock Exchange in Response to Environmental Drivers

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ABSTRACT

This study aimed to identify and analyze the factors affecting the financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers. The importance of this issue stems from the fact that listed companies are exposed to severe economic fluctuations, regulatory changes, and capital-market pressures and therefore require flexible financial structures to ensure survival and sustainable growth. The study employed an exploratory mixed-methods design and was conducted in two qualitative and quantitative phases. In the qualitative phase, data were collected through semi-structured interviews with 10 financial experts, including senior managers, faculty members, and capital-market specialists. Thematic analysis revealed 41 basic themes, which were classified into six organizing themes: macroeconomic and political environmental pressures, economic and legal instability and risks, regulatory challenges and transparency requirements, short-term capital-market expectation pressures, financial-technology opportunities and barriers, and the role of risk management and supportive policies. In the quantitative phase, these organizing themes were entered as key variables into fuzzy cognitive mapping analysis. Data for this phase were collected through a specialized questionnaire administered to 20 financial managers and experts. The results indicated that the network of relationships among the identified factors was highly dynamic and characterized by feedback effects, with a total of 271 relationships among the 41 factors. Furthermore, all factors were classified as Ordinary, indicating that they simultaneously exert influence on and are influenced by other factors. Macroeconomic and political environmental pressures and legal instability exhibited the highest levels of influence, whereas financial technology and risk management played predominantly responsive and moderating roles.

Keywords: financial flexibility, environmental drivers, listed companies, thematic analysis, fuzzy cognitive mapping

Introduction

In contemporary business environments, firms operate under conditions characterized by heightened economic uncertainty, regulatory volatility, technological disruption, intensified competition, and recurring systemic shocks. These conditions have fundamentally altered the way organizations approach financing, liquidity management, investment planning, and risk control. Traditional financial policies based primarily on static capital-structure targets and predictable market conditions are increasingly insufficient for firms exposed to abrupt changes in interest rates,



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exchange rates, inflation, access to external finance, and investor expectations. Consequently, the ability of firms to adapt their financial structures and financing decisions in response to environmental changes has emerged as an important dimension of corporate resilience and strategic financial management. Financial flexibility, broadly understood as the capacity of a firm to obtain and restructure financial resources at reasonable cost when unexpected needs or investment opportunities arise, has therefore become a central concern in both financial management research and managerial practice (1, 2).

Financial flexibility reflects an organization's ability to preserve financing capacity, maintain adequate liquidity, adjust leverage, access alternative sources of capital, and respond rapidly to financial constraints or strategic opportunities. From this perspective, financial flexibility is not limited to maintaining cash reserves or reducing debt; rather, it represents a multidimensional organizational capability that allows firms to adapt financing, investment, and payout policies to changing environmental conditions. Firms with higher degrees of financial flexibility are generally better positioned to absorb unexpected shocks, avoid financially constrained decisions, preserve investment opportunities, and sustain operations during periods of economic instability. In contrast, firms with rigid financing structures, excessive short-term debt, inadequate liquidity reserves, or limited access to alternative financing mechanisms may be forced to reduce investment, liquidate assets, or accept costly financing when adverse conditions arise (3, 4).

The strategic relevance of financial flexibility has become particularly evident following major economic disruptions and crises. The COVID-19 pandemic, for example, demonstrated that firms with stronger liquidity positions and lower dependence on restrictive debt financing were generally better able to withstand sudden declines in revenues, disruptions in supply chains, and uncertainty regarding future cash flows. Evidence concerning debt-free firms during the pandemic suggests that the preservation of financial capacity can provide meaningful advantages when conventional financing markets become constrained or when the cost of external capital increases rapidly (3). Such findings reinforce the broader argument that financial flexibility functions as a form of organizational preparedness, enabling firms to respond to adverse environmental conditions without immediately sacrificing strategically important investments or compromising operational continuity.

At the same time, financial flexibility does not necessarily produce uniformly positive outcomes under all conditions. Maintaining excess liquidity, unused borrowing capacity, or conservative leverage may impose opportunity costs, while excessive financial slack may reduce managerial discipline or lead to inefficient allocation of resources. Accordingly, the value of financial flexibility depends on how it is developed, deployed, and aligned with corporate investment and financing policies. Recent evidence indicates that financial flexibility can improve investment-policy efficiency when firms use available financial capacity strategically rather than merely accumulating unused resources (2). Similarly, the relationship between financial flexibility and corporate sustainability may be nonlinear, suggesting that insufficient flexibility can constrain strategic adaptation, whereas excessive financial slack may produce diminishing benefits or inefficiencies (5). Therefore, understanding financial flexibility requires attention not only to its level but also to the environmental and organizational conditions that determine its effectiveness.

Capital structure represents one of the principal channels through which financial flexibility is created or constrained. Firms with excessive reliance on debt, particularly short-term debt, may face refinancing risk, increased sensitivity to interest-rate fluctuations, and reduced borrowing capacity during periods of instability. Conversely, firms that maintain a more balanced mix of debt, equity, internal funds, and liquid assets may retain greater

discretion when confronting changing economic circumstances. Research on capital-structure determinants has shown that financial flexibility interacts with asset structure and earnings volatility in shaping corporate financing decisions, indicating that financing policy cannot be separated from firms' underlying operating and risk characteristics (4). This relationship is particularly relevant in volatile markets, where changes in earnings, asset values, financing costs, and investor sentiment can rapidly alter firms' capacity to raise additional capital.

The importance of financial flexibility also extends to financial distress and bankruptcy risk. When firms encounter deteriorating cash flows, restricted access to external financing, or increased debt-service obligations, flexible financial arrangements may create additional room for adjustment. The ability to renegotiate financing, utilize trade credit, issue new securities, or draw on internal liquidity can reduce the probability that temporary financial difficulties escalate into insolvency. Evidence from companies listed on the Tehran Stock Exchange indicates that financial flexibility is associated with bankruptcy-related outcomes and that trade credit may play a moderating role in this relationship (6). Such findings are especially important in environments where conventional banking channels are constrained and firms may depend more heavily on alternative financing mechanisms to preserve liquidity.

Beyond firm-level characteristics, financial flexibility is strongly conditioned by the broader economic environment. Economic resilience at the national and institutional levels affects firms' ability to absorb shocks, maintain productive activity, and obtain financial resources under adverse conditions. Studies of economic resilience have emphasized that economies with greater adaptive capacity are generally better positioned to maintain growth in the face of external disturbances (7). At the corporate level, this implies that financial flexibility is embedded within a wider ecosystem of macroeconomic stability, monetary and fiscal policy, financial-market development, regulatory quality, and institutional capacity. Firms operating in unstable macroeconomic environments may therefore require substantially greater financial flexibility than firms operating under relatively predictable conditions.

Environmental drivers can influence corporate financial flexibility through multiple interconnected mechanisms. Inflation raises operating costs and increases working-capital requirements; exchange-rate volatility affects import costs, debt obligations, and the value of foreign-currency transactions; rising interest rates increase financing costs; recessions reduce revenues and asset values; and abrupt policy changes complicate long-term financial planning. Political instability, trade restrictions, and international sanctions may further restrict access to foreign capital, banking services, technology, and international markets. These factors can create simultaneous pressures on liquidity, profitability, investment, and capital structure. In such circumstances, financial flexibility becomes a dynamic capability through which firms seek to preserve strategic options despite uncertainty.

The Tehran Stock Exchange provides a particularly relevant context for examining these relationships because listed Iranian firms operate within an environment characterized by recurring macroeconomic instability, exchange-rate fluctuations, inflationary pressures, sanctions, restricted international financial access, and frequent regulatory adjustments. Such conditions can substantially alter firms' financing opportunities and increase the importance of internally generated resources, cash reserves, domestic debt instruments, and alternative financing mechanisms. Moreover, the simultaneous presence of capital-market pressures and institutional constraints can produce competing demands. Listed companies are expected to maintain transparency, comply with regulatory requirements, satisfy shareholder expectations, and preserve profitability, while at the same time retaining sufficient financial capacity to respond to unpredictable environmental shocks. The interaction among these pressures makes

financial flexibility a complex and system-level phenomenon rather than a single financial ratio or isolated policy choice.

Risk management constitutes another critical component of financial flexibility. Financially flexible firms require not only access to financial resources but also the capacity to anticipate, evaluate, and respond to different categories of risk. The concepts of resilience and risk management are closely connected because organizations that systematically identify vulnerabilities, diversify exposures, conduct scenario analysis, and establish contingency mechanisms are generally better prepared to withstand disruptive events (8). In this sense, financial flexibility can be strengthened through integrated risk-management systems that combine liquidity planning, hedging, capital-structure management, investment diversification, and crisis preparedness. Rather than responding reactively after a shock has occurred, proactive risk management can enable firms to preserve financing capacity before environmental pressures become critical.

The growing digitalization of financial processes has further transformed the mechanisms through which firms can manage financial flexibility and risk. Digital transformation has altered information processing, reporting, risk assessment, customer interaction, financing, and organizational decision-making across financial industries. Research on the digitalization of the insurance value chain demonstrates that technological transformation can improve efficiency and generate new approaches to risk assessment while simultaneously creating new categories of operational and technological risk (9). Similarly, studies of digital transformation emphasize that innovation must be balanced against emerging risks associated with technological dependence, implementation costs, cybersecurity, organizational adaptation, and governance (10). These insights are applicable beyond the insurance sector because listed firms increasingly depend on digital platforms and integrated information systems to manage liquidity, financing, reporting, and investment decisions.

Artificial intelligence has become particularly influential in financial decision-making because of its capacity to process large volumes of information, identify complex patterns, improve forecasting, and support automated decision processes. Practical applications of artificial intelligence demonstrate that organizations can use AI to enhance business processes, improve analytical capabilities, and augment managerial decision-making when implementation is aligned with clearly defined organizational problems (11). In financial management, these capabilities may strengthen cash-flow forecasting, credit-risk analysis, scenario modeling, investment evaluation, and early identification of financial distress. Machine-learning applications in financial risk modeling similarly provide opportunities to improve predictive accuracy and develop more adaptive approaches to risk assessment (12). Accordingly, AI-supported financial analytics may contribute to financial flexibility by allowing managers to detect changes earlier and respond more rapidly.

Big-data analytics represents another important technological driver. The increasing availability of structured and unstructured financial data has created opportunities for organizations to identify risk patterns, improve forecasting, and support more precise resource allocation. Research on big-data analytics in insurance has highlighted applications in risk assessment and decision support while also identifying challenges related to data quality, governance, integration, infrastructure, and analytical expertise (13). These challenges are especially relevant for firms attempting to use digital technologies to enhance financial flexibility, because technological capability cannot generate strategic benefits unless organizations possess appropriate data infrastructure, managerial competence, and skilled human resources.

Technological innovation may therefore function simultaneously as an opportunity and a constraint. Innovations such as artificial intelligence, blockchain, cloud computing, enterprise resource planning systems, and automated financial reporting can improve information quality, reduce transaction costs, strengthen transparency, and enhance the speed of financial responses. However, technological adoption requires significant investment and may generate new risks associated with implementation failure, cyber threats, insufficient skills, and organizational resistance. Studies of technological innovation in financial industries indicate that digital tools can fundamentally reshape risk assessment, service delivery, and financial operations, but their effective adoption depends on organizational capabilities and an appropriate regulatory environment (14). Furthermore, the measurement and management of risks accompanying digital transformation require systematic analytical frameworks, because technological innovation itself can introduce uncertainty and interconnected vulnerabilities (15).

The interaction between financial flexibility and technological capability is therefore increasingly important. In turbulent environments, firms need timely information to determine how much liquidity to retain, when to borrow, whether to postpone or accelerate investments, and how to respond to emerging risks. Digital analytics can support these decisions by reducing information asymmetry and improving the speed and precision of financial planning. Yet firms with weak technological infrastructure may experience the opposite effect, as inadequate systems can delay decision-making or prevent managers from obtaining accurate information during crises. Consequently, technological readiness should be viewed as part of the broader architecture of financial adaptability rather than as an isolated operational characteristic.

Regulation and transparency requirements also influence financial flexibility in complex ways. Strong disclosure requirements can increase compliance costs and restrict managerial discretion in the short term, but they can simultaneously reduce information asymmetry, strengthen investor confidence, and facilitate access to capital. Regulatory instability, by contrast, may increase uncertainty and undermine long-term planning because firms cannot reliably forecast financing costs, taxation, disclosure obligations, or capital-market rules. This tension is particularly pronounced in emerging and institutionally volatile markets, where regulatory reforms may occur alongside substantial macroeconomic changes. The ability to anticipate regulatory developments and integrate them into financing strategies therefore constitutes an important aspect of organizational financial adaptability.

Capital-market expectations add another layer of complexity. Publicly listed companies must respond not only to economic and regulatory conditions but also to pressures from shareholders and investors. During periods of uncertainty, shareholders may prioritize immediate dividend payments or short-term returns, whereas maintaining financial flexibility may require the retention of earnings and postponement of distributions. This creates a potential conflict between short-term market expectations and long-term financial resilience. A company that distributes excessive cash during a crisis may satisfy immediate investor demands while simultaneously reducing its capacity to finance strategic investments or absorb subsequent shocks. Accordingly, financial flexibility involves balancing current market expectations against the preservation of future strategic options.

Recent literature increasingly conceptualizes financial flexibility as a determinant of broader organizational sustainability rather than merely a defensive response to financial distress. Evidence from manufacturing firms suggests that financial flexibility may influence corporate sustainability through nonlinear mechanisms, indicating that the relationship depends on how effectively financial resources are allocated and mobilized (5). A broader review of the literature likewise indicates that financial flexibility is associated with financial performance through mechanisms involving financing capacity, liquidity, investment opportunity, and resilience to uncertainty (1). These

findings suggest that firms capable of dynamically reconfiguring their financial resources may be better positioned not only to survive crises but also to exploit emerging strategic opportunities.

Nevertheless, several gaps remain in the existing literature. Much of the previous research has examined financial flexibility through isolated quantitative indicators, such as cash holdings, leverage, unused debt capacity, or the absence of debt. Although these indicators are important, they may not adequately capture the interconnected environmental forces that jointly determine corporate financial flexibility. Furthermore, studies often examine individual relationships between financial flexibility and outcomes such as investment efficiency, sustainability, capital structure, or bankruptcy, rather than identifying how macroeconomic, regulatory, technological, market, and risk-management factors interact within an integrated system (2, 4, 6). This limitation is especially important in environments characterized by multiple simultaneous shocks, where causal relationships are likely to be reciprocal rather than linear.

Another important gap concerns the contextual specificity of financial flexibility. Findings generated in developed and relatively stable financial systems may not be directly transferable to markets where firms face sanctions, high inflation, currency instability, restricted international transactions, and unpredictable regulatory changes. Economic resilience research suggests that the capacity to respond to shocks depends substantially on institutional and environmental conditions (7). Accordingly, understanding financial flexibility in the Tehran Stock Exchange requires an approach capable of incorporating the experiences of financial experts and identifying the interdependencies among contextual drivers.

A mixed-methods approach combining thematic analysis and fuzzy cognitive mapping can address these limitations by first identifying factors inductively from expert experience and subsequently modeling the strength and direction of causal relationships among those factors. Thematic analysis enables the systematic extraction and organization of detailed concepts from qualitative data, while fuzzy cognitive mapping provides a means of representing complex systems in which variables influence one another simultaneously. Such an approach is particularly appropriate for studying financial flexibility because the phenomenon is shaped by feedback relationships among environmental pressures, regulatory requirements, capital-market expectations, technological capabilities, financial structure, and risk-management practices. By representing these factors within an interconnected causal network, it becomes possible to distinguish highly influential drivers from more responsive or mediating variables and thereby establish more meaningful priorities for managerial action and policymaking.

In light of the increasing importance of corporate adaptability, the evidence on the role of financial flexibility in investment efficiency, capital-structure decisions, financial distress, and corporate sustainability (2, 3, 5), together with the growing significance of digital transformation, artificial intelligence, big-data analytics, and technologically enabled risk management (9-15), highlights the need for an integrated examination of the environmental factors shaping financial adaptability in listed firms. Such an examination is particularly necessary in the Tehran Stock Exchange, where macroeconomic and political pressures interact with regulatory requirements, market expectations, technological opportunities, capital-structure vulnerabilities, and risk-management practices to create a highly dynamic financial environment.

Therefore, the present study aimed to identify, categorize, and model the key factors affecting the financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers using thematic analysis and fuzzy cognitive mapping.

Methods and Materials

This study employed a mixed-methods research design. Thematic analysis was used in the qualitative phase, while fuzzy cognitive mapping was employed in the quantitative phase. Thematic analysis is an appropriate method for exploring emerging areas in which available information is limited or incomplete. Because of its compatibility with the context under investigation and its emphasis on context-derived data rather than pre-existing theories, this method is considered more effective, practical, and applicable. Accordingly, thematic analysis and fuzzy cognitive mapping were used in the present study. To achieve theoretical saturation, the researcher conducted interviews with 10 experts in the stock-exchange industry using purposive and convenience sampling.

Findings and Results

To examine the research findings, the transcribed texts of the semi-structured interviews were first reviewed carefully. After entering the transcripts into tables and separating meaningful statements into different rows, the factors affecting financial flexibility were identified, analyzed, and categorized using thematic analysis. At the beginning of each interview, a brief explanation of the research design and fundamental definitions was provided to establish a common discursive framework. Each interview lasted approximately one hour. The texts were subsequently analyzed through thematic coding, a thematic network was developed, and the final model was extracted accordingly. In the present study, the Attride-Stirling model was used for thematic analysis. This model consists of three general stages: text reduction, text exploration, and integration of the explorations. At each stage, a progressively higher level of abstraction is applied in accordance with the analytical requirements.

For the qualitative phase of the study, semi-structured interviews were conducted with 10 experts and specialists in finance, investment, and capital markets to obtain in-depth and specialized perspectives on the financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers. Participants were selected purposively based on criteria such as work experience, familiarity with the capital market, managerial experience, and educational attainment in order to achieve a diverse yet topic-relevant sample. The interviewees included senior financial managers, middle managers, researchers, and senior specialists in stock exchange and investment, with work experience ranging from 7 to 20 years. Their educational qualifications were predominantly at the master's and doctoral levels, and their areas of specialization covered financial management, risk analysis, regulation, and financial technologies. Table 1 summarizes the demographic and professional characteristics of the interviewees, including gender, occupational position, work experience, educational level, area of expertise, and interview duration. This diversity among respondents made it possible to collect a broad range of perspectives and experiences related to the research topic and enhanced the content richness of the thematic analysis.

Table 1. Descriptive Statistics of the Qualitative Phase

No.	Interviewee Code	Gender	Position	Work Experience (Years)	Educational Level	Area of Expertise
1	M01	Male	Senior Financial Manager	18	PhD	Financial Management and Investment
2	M02	Female	Senior Financial Manager	12	PhD	Accounting and Financial Reporting
3	M03	Male	CEO of a Listed Company	20	Master's Degree	Financial Strategies
4	M04	Male	Vice President for Finance at a Holding Company	15	Master's Degree	Financial Risk Control
5	M05	Female	Senior Stock Exchange Specialist	10	Master's Degree	Capital-Market Analysis

6	M06	Male	Audit Department Manager	17	PhD	Financial Transparency and Regulation
7	M07	Male	Middle-Level Financial Manager	8	Master's Degree	Budgeting and Reporting
8	M08	Female	Senior Financial Researcher	9	Master's Degree	Financial Technologies
9	M09	Male	Senior Investment Specialist	7	Master's Degree	Risk and Opportunity Analysis
10	M10	Male	Board Member of a Listed Company	14	PhD	Financing Strategies

Through thematic analysis, a total of 90 descriptive codes (basic themes) were extracted. Analysis of these codes generated 24 interpretive codes (organizing themes), and the final review yielded three relational codes (global themes). Because of the large number of codes,

For the qualitative analysis of data obtained from expert interviews, all responses were initially decomposed into smaller units of meaning, referred to as basic themes. These basic themes represented the most detailed and dispersed concepts extracted directly from the interviewees' statements. In the next stage, similar and related basic themes were integrated and grouped into larger conceptual clusters referred to as organizing or intermediate themes. These intermediate themes represent broader thematic categories that establish a connection between detailed and overarching themes. Finally, all organizing themes were placed under a single global theme representing the central essence of the interviewees' experiences and perspectives regarding the financial flexibility of listed companies in response to environmental drivers. The following table systematically illustrates this categorization process from the micro level of basic themes to the macro level of the global theme.

Table 2. Extracted Interpretive and Relational Codes

Basic Themes	Organizing Themes	Global Theme
Economic and banking sanctions	External pressures arising from the macroeconomic and political environment	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Restrictions on international transactions	External pressures arising from the macroeconomic and political environment	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Problems in money transfers and access to foreign resources	External pressures arising from the macroeconomic and political environment	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
High import costs and dependence on foreign suppliers	External pressures arising from the macroeconomic and political environment	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Severe exchange-rate fluctuations	Economic and legal instability and risks	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Financial-market instability and periodic recessions	Economic and legal instability and risks	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Sudden changes in laws and economic policies	Economic and legal instability and risks	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Unpredictable government decisions	Economic and legal instability and risks	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
High and structural inflation	Inflationary pressures and liquidity constraints	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Declining customer purchasing power	Inflationary pressures and liquidity constraints	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers

Increased production and operating costs	Inflationary pressures and liquidity constraints	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Difficulty obtaining low-cost financing	Inflationary pressures and liquidity constraints	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Unpredictable tax pressure	Regulatory challenges and transparency requirements	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
New capital-market reforms	Regulatory challenges and transparency requirements	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Stringent regulatory supervision	Regulatory challenges and transparency requirements	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Transparency and disclosure requirements	Regulatory challenges and transparency requirements	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Global crises such as COVID-19	Unpredictable environmental shocks	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Economic recession and regional crises	Unpredictable environmental shocks	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Disruptions in raw-material supply chains	Unpredictable environmental shocks	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Market and shareholder pressure for short-term profits	Short-term capital-market expectation pressures	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Pressure for high dividend distribution	Short-term capital-market expectation pressures	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Reduced resources for development and long-term investment	Short-term capital-market expectation pressures	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
High concentration of short-term debt	Vulnerability of capital structure and financial resources	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Lack of diversification in financial resources	Vulnerability of capital structure and financial resources	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Unstable and high-risk capital structure	Vulnerability of capital structure and financial resources	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Use of ERP and financial automation	Financial-technology opportunities for enhancing flexibility	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Use of blockchain and cloud-based systems	Financial-technology opportunities for enhancing flexibility	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Big-data analytics and advanced data mining	Financial-technology opportunities for enhancing flexibility	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Cultural resistance and lack of digital skills	Internal barriers to technology utilization	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
High cost of implementing emerging technologies	Internal barriers to technology utilization	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Comprehensive and integrated risk management	Role of proactive risk management in strengthening financial resilience	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Use of derivative and innovative financial instruments	Role of proactive risk management in strengthening financial resilience	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers

Scenario planning and crisis simulation	Role of proactive risk management in strengthening financial resilience	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Stability of macroeconomic policies	Need for infrastructure improvement and supportive policies	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Development of domestic financial markets	Need for infrastructure improvement and supportive policies	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers
Access to global technologies and financial resources	Need for infrastructure improvement and supportive policies	Financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers

According to Table 2, a substantial proportion of the basic themes referred to economic sanctions, restrictions on international transactions, difficulties in money transfers, high import costs, and dependence on foreign suppliers. These factors are imposed directly by the macro-level political and economic environment and lie beyond the control of individual companies. These challenges were therefore consolidated under the category of external pressures arising from the macroeconomic and political environment. This theme indicates that many threats to financial flexibility among companies listed on the Tehran Stock Exchange originate from factors formed at the international level and within the country's macroeconomic policies. These pressures reduce companies' ability to undertake long-term planning and maintain adequate liquidity.

In addition to external pressures, several basic themes concerned severe exchange-rate fluctuations, periodic recessions, sudden regulatory changes, unpredictable government decisions, high inflation, declining purchasing power, and difficulties in obtaining low-cost financing. These factors were consolidated under the categories of economic and legal instability and risks and inflationary pressures and liquidity constraints. These two organizing themes indicate that even in the absence of international crises, the domestic economic structure and weaknesses in the stability of monetary and fiscal policies exert considerable pressure on corporate financial flexibility. In other words, such domestic instability compels companies to rely more heavily on short-term strategies and prevents them from undertaking long-term investments.

To complement the qualitative analyses and quantitatively assess expert perspectives, a questionnaire based on the identified themes was developed and administered to 20 managers and specialists from companies listed on the Tehran Stock Exchange. The questionnaire included items assessing the importance and influence of each factor affecting financial flexibility in response to environmental drivers, using a five-point Likert scale ranging from "very low" to "very high." The purpose of this phase was to examine the degree of convergence among respondents' perspectives and statistically assess the relative importance of each factor.

For the analysis of the resulting data, respondents' demographic characteristics, including gender, work experience, occupational position, and educational level, were first examined to provide an overall picture of the statistical sample. Subsequently, descriptive questionnaire indices, including the mean, standard deviation, minimum, and maximum recorded responses for each factor, were calculated. These indices indicate both the relative importance of each factor and the degree of dispersion in respondents' perspectives.

In addition, the frequency distribution of responses to each factor was presented separately for the Likert-scale categories of "very low," "low," "moderate," "high," and "very high" to determine the percentage of respondents assigning each factor to the respective levels. This approach enables a more detailed analysis of response patterns and helps clarify experts' perceived priorities. The following table first describes the demographic characteristics of the respondents.

Table 3. Descriptive Statistics of the Quantitative Phase

Characteristic	Group	Frequency	Percentage
Gender	Male	14	70%
Gender	Female	6	30%
Work Experience	Less than 5 years	4	20%
Work Experience	5–10 years	8	40%
Work Experience	More than 10 years	8	40%
Occupational Position	Senior Financial Manager	6	30%
Occupational Position	Middle Manager	9	45%
Occupational Position	Senior Financial Specialist	5	25%
Education	Bachelor's Degree	7	35%
Education	Master's Degree	10	50%
Education	PhD	3	15%

To analyze causal relationships among the organizing themes and identify the extent to which each variable influences or is influenced by other variables, a correlation matrix, or fuzzy relational matrix, must first be constructed. This matrix constitutes the primary input to FCMapper software, which processes fuzzy cognitive maps. The process of constructing this matrix involves several key stages.

In the first step, the principal variables to be incorporated into the model are specified. In this study, the organizing themes derived from thematic analysis serve as the variables. These include macroeconomic and political environmental pressures, economic and legal instability and risks, institutional pressures and transparency requirements, short-term capital-market expectation pressures, financial-technology opportunities and barriers, and the role of risk management and supportive policies. These themes are placed in both the rows and columns of the matrix.

In the second step, experts or interview participants are asked to determine the extent to which each variable influences the other variables. This assessment is typically performed using a fuzzy or linguistic scale, for example:

- 0 = No influence
- 0.25 = Weak influence
- 0.50 = Moderate influence
- 0.75 = Strong influence
- 1.00 = Very strong influence

The result of these evaluations is an $n \times n$ square matrix, where n represents the number of organizing themes. Each row represents an influencing variable, whereas each column represents a variable being influenced. The value in each cell indicates the strength of the influence exerted by the row variable on the column variable. The main diagonal of the matrix, representing a variable's influence on itself, is generally set to zero. A portion of this matrix is presented in Table 4.

Table 4. Matrix of Influence Relationships

Variables ↓ on Variables →	1. Macroeconomic Environmental Pressure	2. Economic Instability	3. Regulatory Challenges	4. Short- Term Market Pressure	5. Technology Opportunities and Barriers	6. Risk Management and Policies
1. Macroeconomic Environmental Pressure	0	0.75	0.50	0.75	0.25	0.50
2. Economic Instability	0.50	0	0.50	0.75	0.25	0.50
3. Regulatory Challenges	0.25	0.50	0	0.50	0.25	0.50

4. Short-Term Market Pressure	0.25	0.50	0.50	0	0.25	0.50
5. Technology Opportunities and Barriers	0.25	0.25	0.25	0.25	0	0.75
6. Risk Management and Policies	0.25	0.25	0.50	0.25	0.75	0

This matrix demonstrates that macroeconomic and political environmental pressures exert the greatest influence on the other variables. As shown in the matrix, this variable has a strong effect on economic instability, short-term capital-market pressure, and even regulatory challenges. In other words, changes resulting from sanctions, trade restrictions, and macroeconomic policies can generate a chain of consequences throughout companies' financial structures and activate other variables within the system. This demonstrates the fundamental role of this factor in shaping financial flexibility, and FCMapper typically identifies such a variable as a "primary driving factor."

Economic and legal instability and risks also exert substantial effects on other variables in the matrix. As shown, this variable has a strong influence on short-term capital-market pressure and regulatory challenges and exerts a moderate influence on the development of financial technology and risk-management policies. This means that exchange-rate fluctuations, economic recessions, or legal changes can generate secondary pressures that are transmitted to other components of the financial system. In fuzzy models, such variables generally function simultaneously as drivers and as variables influenced by upstream drivers; accordingly, they may be considered both "driving" and "intermediate" factors.

According to the matrix, regulatory challenges and transparency requirements exert a moderate influence on other variables. This factor is more strongly influenced by economic conditions and macro-environmental pressures and subsequently affects market pressure and the risk-management structure. Although the intensity of its influence is lower than that of the preceding two factors, its role in the gradual and long-term transformation of the financial system is substantial. In fuzzy analysis, FCMapper typically classifies such variables as "intermediate factors" or "transmitters of effects," because they are influenced by other variables while also transmitting their effects to additional variables.

Financial-technology opportunities and barriers and the role of risk management and supportive policies appear in the matrix as variables that are more strongly influenced by other factors than they influence those factors. For example, financial technology exerts only a weak effect on environmental pressures or economic instability, but it is strongly affected by policies, market pressures, and economic conditions. Nevertheless, technology and risk management can ultimately exert positive effects on financial flexibility, although the intensity of their influence is more limited than that of external factors. In FCMapper, such variables are generally recognized as "system outcomes or outputs."

Overall, the matrix indicates that the structure of relationships among organizing themes has a sequential and hierarchical nature. Macroeconomic environmental pressures initially function as the principal drivers, followed by economic instability and regulatory challenges as mediating factors, with outcomes ultimately manifesting at the levels of technology and risk management. This structure enables FCMapper to construct the fuzzy network and identify which variables play key roles in policymaking and improving financial flexibility. In other words, the matrix constitutes the input to a causal model that provides a representation of influence pathways and managerial priorities.

The model developed in this study consists of 41 principal factors, among which a total of 271 causal relationships were identified. Fuzzy cognitive mapping analysis showed that all 41 factors simultaneously had positive outdegree (OD) and positive indegree (ID) values and were therefore classified as Ordinary factors. In other words, none of the identified factors functioned exclusively as a Transmitter or exclusively as a Receiver; rather, all factors both influenced and were influenced by other factors. This finding indicates the existence of a reciprocal and dynamic causal network among the model variables in which no factor is completely independent or completely dependent. The distribution of factors among the three categories of Ordinary, Receiver, and Transmitter is presented in Figure 1, demonstrating that Ordinary factors account for 100% of the model, whereas the Receiver and Transmitter categories contain no factors.

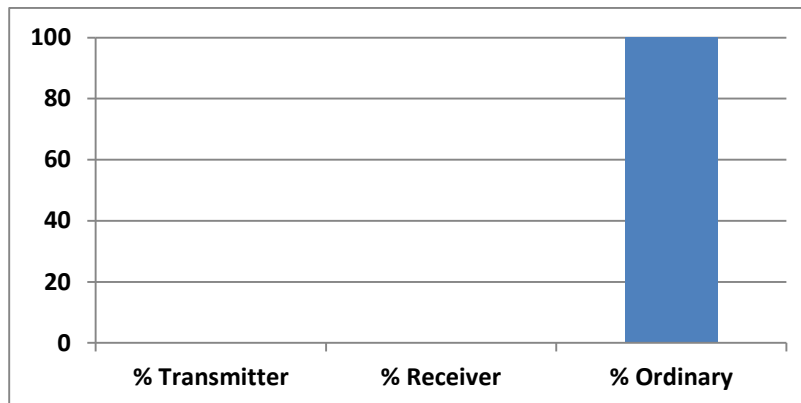


Figure 1. Bar Chart of the Distribution of Factors

Indegree represents the extent to which factors are influenced by other factors. Figure 2 depicts the ID values of the factors. The three factors "formulation of financial policies and strategies within a specified time horizon," "increase in market share," and "information integration" exhibited the highest levels of influence received, respectively. By contrast, "participative management," "effective fulfillment of social responsibility," and "classification of qualitative reports" exhibited the lowest levels of influence received, respectively. Figure 2 illustrates the indegree of the factors.

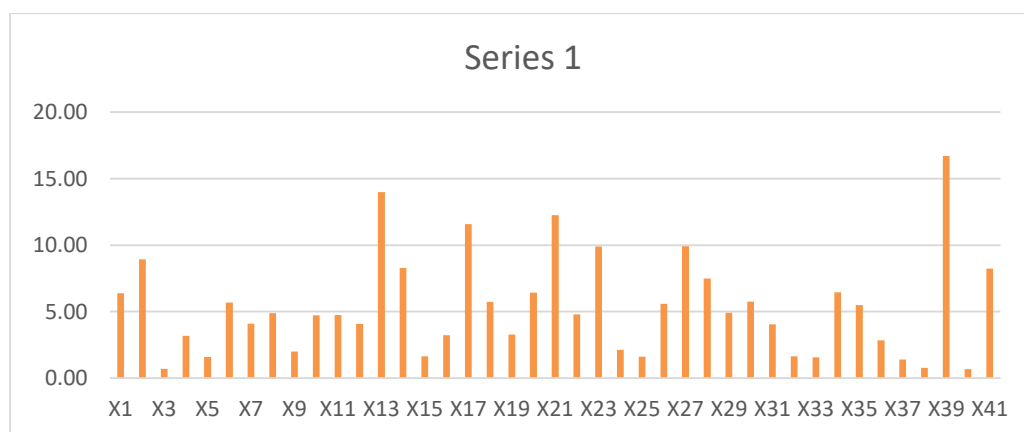


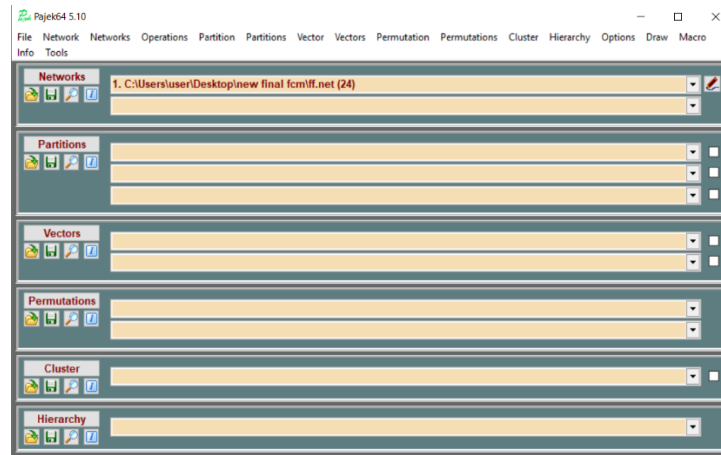
Figure 2. Bar Chart of the ID Values of the Factors

Table 5 presents all model indices referred to in the preceding figures in detail, together with their corresponding numerical values.

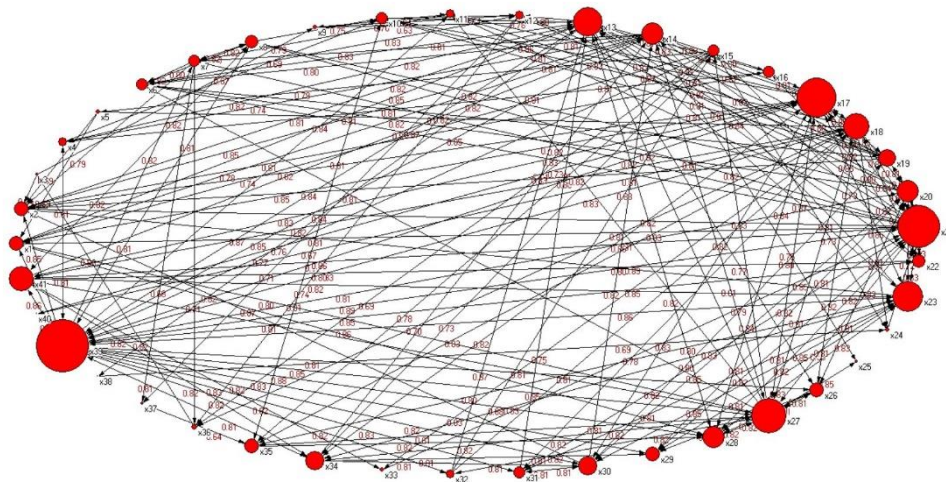
Table 5. Calculation of Indices Related to the FCM Model

No.	Factor (Variable)	OD (Influence Exerted)	ID (Influence Received)	TD (Total Degree)	Role of Factor in the Network
1	Macroeconomic and Political Environmental Pressures	8.75	7.50	16.25	Ordinary
2	Economic and Legal Instability and Risks	7.00	6.75	13.75	Ordinary
3	Regulatory Challenges and Transparency Requirements	5.50	6.00	11.50	Ordinary
4	Short-Term Capital-Market Expectation Pressures	6.25	6.50	12.75	Ordinary
5	Financial-Technology Opportunities and Barriers	4.00	7.25	11.25	Ordinary
6	Role of Risk Management and Supportive Policies	4.50	7.00	11.50	Ordinary

As previously explained, to construct the fuzzy cognitive map, the output generated by FCMapper software was used as input to Pajek software. The network file used in Pajek is presented below.

**Figure 3. Input File for Pajek**

The resulting graph, which represents the causal relationships among the concepts, is shown in Figure 3.

**Figure 4. Fuzzy Cognitive Map of Factors Affecting Financial Flexibility**

In the fuzzy cognitive-map model presented in Figure 4, negative effects, representing inverse relationships, are shown by dashed lines, whereas positive effects are represented by solid lines. Overall, all relationships shown in

this figure are direct, and no indirect relationship exists. Furthermore, the larger the red circles, the greater their centrality and, consequently, the greater their influence exerted and influence received. Therefore, Factor 39, "increasing the level of financial flexibility," represented by the largest circle, plays the most prominent role in terms of both influence exerted and influence received. This result is consistent with the findings obtained from the corresponding ID and OD diagrams.

Discussion and Conclusion

The present study was conducted to identify and model the factors affecting the financial flexibility of companies listed on the Tehran Stock Exchange in response to environmental drivers. The qualitative findings revealed a broad set of interconnected determinants that were ultimately organized around major themes including macroeconomic and political environmental pressures, economic and legal instability and risks, regulatory challenges and transparency requirements, short-term capital-market expectation pressures, financial-technology opportunities and barriers, and the role of risk management and supportive policies. The fuzzy cognitive mapping results further demonstrated that these factors do not operate independently; rather, they form a highly interconnected and reciprocal causal network. A total of 271 causal relationships were identified among 41 factors, and all variables were classified as Ordinary, indicating that each factor simultaneously influenced and was influenced by other factors. Among the major dimensions, macroeconomic and political environmental pressures and economic and legal instability demonstrated the highest levels of influence, whereas financial technology and risk-management-related factors were comparatively more responsive to broader environmental conditions. These findings indicate that financial flexibility among Tehran Stock Exchange companies is best understood as a dynamic organizational capability shaped by interactions among external pressures, internal financial structures, technological readiness, regulatory conditions, and managerial responses.

One of the most important findings was the dominant role of macroeconomic and political environmental pressures. Economic sanctions, restrictions on international transactions, difficulties in accessing foreign financial resources, rising import costs, and dependence on external suppliers were identified as fundamental pressures on corporate financial flexibility. These factors were also among the most influential variables in the fuzzy cognitive model. This finding can be explained by the fact that macroeconomic and political disturbances directly affect firms' access to financing, foreign exchange, imported inputs, technology, and external markets. When such pressures intensify, firms face greater uncertainty regarding cash flows, financing costs, and future investment capacity. This result is consistent with the broader concept of economic resilience, which emphasizes that the capacity of economic actors to withstand shocks depends heavily on the stability and adaptability of the surrounding institutional and economic environment (7). In the context of listed companies, environmental instability can therefore reduce financial flexibility by narrowing financing alternatives and increasing the cost of preserving liquidity.

The strong influence of macroeconomic pressures is also consistent with research emphasizing the strategic value of financial flexibility during periods of crisis and uncertainty. Firms that maintain sufficient financial capacity are generally better able to absorb disruptions without sacrificing strategically important operations or investments. Evidence from firms operating during the COVID-19 pandemic showed that debt-free or less financially constrained firms were better positioned to preserve operational and strategic flexibility under conditions of severe disruption (3). The present findings extend this argument by showing that external pressures not only affect firms directly but also generate secondary effects through economic instability, market pressure, regulatory responses, and internal

financing decisions. Accordingly, financial flexibility should not be viewed solely as a firm-level balance-sheet characteristic; it is also a response to the intensity and persistence of external environmental pressures.

A second major finding concerned economic and legal instability, including exchange-rate fluctuations, periodic recessions, sudden regulatory changes, unpredictable government decisions, inflation, and difficulties in obtaining low-cost financing. These factors exhibited both substantial outdegree and indegree values, indicating that they function as both recipients and transmitters of environmental pressure. In practical terms, macroeconomic shocks can intensify economic and legal instability, which in turn affects capital-market expectations, financing choices, and managerial responses. This finding supports the view that financial flexibility is closely linked to firms' ability to preserve financing options in the face of volatile economic conditions. Financial flexibility allows firms to modify their leverage, cash holdings, and financing sources as circumstances change, thereby reducing the risk of being forced into unfavorable financing or investment decisions (1, 2).

The findings related to inflation and liquidity constraints were particularly important. Interviewees repeatedly emphasized that high inflation, rising production costs, declining purchasing power, and increasing financing costs make long-term financial planning more difficult and compel firms to retain larger liquidity buffers. Such behavior is consistent with the logic of financial flexibility because firms operating under uncertainty may choose to preserve liquidity and unused borrowing capacity as protection against future funding shortages. However, maintaining excessive financial slack can also create opportunity costs. Recent evidence suggests that the benefits of financial flexibility depend on how effectively it is translated into efficient investment policy (2). Similarly, the relationship between financial flexibility and corporate sustainability may be nonlinear, with insufficient flexibility restricting strategic responses and excessive financial slack potentially generating inefficiency (5). The current results therefore suggest that firms need not simply maximize liquidity or minimize leverage, but instead maintain an optimal degree of financial adaptability that allows them to respond to shocks while continuing to invest productively.

The findings also demonstrated that capital-structure vulnerability is an important mechanism through which environmental pressures affect financial flexibility. High dependence on short-term debt, lack of diversification in financing sources, and unstable capital structures were repeatedly identified as sources of vulnerability. These findings align with research showing that financial flexibility interacts closely with capital-structure decisions. Firms with more volatile earnings or particular asset structures may require financing policies that preserve greater strategic room for maneuver (4). Excessive dependence on short-term debt can be especially problematic during recessions because refinancing risks increase precisely when access to external finance becomes more difficult. Therefore, maintaining a balanced combination of debt, equity, internal resources, and liquidity reserves appears to be a central component of financial flexibility.

The observed relationship between financial flexibility and financial distress is also consistent with previous findings from the Tehran Stock Exchange. Financial flexibility has been linked to bankruptcy-related outcomes, while trade credit has been shown to play a moderating role in this relationship (6). The present findings provide a broader explanation for this association. Firms that face external shocks but retain multiple financing channels, liquidity reserves, and flexible debt structures are better positioned to prevent temporary financial pressure from escalating into severe financial distress. Conversely, firms with concentrated short-term obligations and limited access to alternative funding may experience a rapid decline in resilience when confronted with exchange-rate shocks, sanctions, regulatory changes, or market downturns.

Another important result concerned regulatory challenges and transparency requirements. These factors had moderate levels of influence and influence received, suggesting that regulation functions primarily as an intermediate mechanism within the broader financial system. The qualitative findings showed a dual effect: stricter taxation, new capital-market regulations, and regulatory supervision can create immediate liquidity and compliance pressures, whereas greater transparency and disclosure can strengthen investor confidence and facilitate capital attraction. This dual role is conceptually important because regulatory requirements may simultaneously constrain short-term financial discretion and improve long-term access to capital. In this sense, the effects of regulation on financial flexibility depend on the predictability, consistency, and quality of regulatory implementation rather than simply on the degree of regulatory intensity.

Short-term capital-market expectation pressures also emerged as a key theme. Interviewees emphasized that shareholder demands for high dividend payouts during periods of crisis can reduce retained earnings and limit firms' ability to finance future investments or maintain liquidity buffers. This result suggests that financial flexibility can be undermined not only by external economic shocks but also by governance and market expectations. Managers of listed companies often face a trade-off between satisfying short-term shareholder expectations and preserving resources for long-term resilience. The literature on financial flexibility supports the strategic importance of maintaining unused financial capacity to exploit future opportunities and protect investment programs during periods of uncertainty (1, 2). Therefore, excessive emphasis on short-term distributions may weaken the firm's capacity to respond to subsequent shocks.

The findings concerning financial technology were also noteworthy. Financial technology was identified as both an opportunity and a constraint. Tools such as artificial intelligence, blockchain, ERP systems, cloud technologies, financial automation, big-data analytics, and data mining were perceived as capable of improving financial forecasting, liquidity management, transparency, and decision-making. At the same time, inadequate digital infrastructure, high implementation costs, shortages of specialized skills, and organizational resistance limited the ability of many firms to realize these benefits. These findings are consistent with previous research showing that digital transformation can create substantial improvements in information processing and risk management while simultaneously generating new implementation and governance risks (9, 10).

The role of artificial intelligence and data analytics in strengthening financial flexibility can be explained through their contribution to more accurate and timely managerial decisions. Artificial intelligence can support forecasting, risk classification, scenario analysis, and automated decision processes when it is aligned with clearly defined organizational needs (11). Similarly, machine-learning approaches can enhance risk modeling and improve the identification of complex patterns that may not be visible through conventional analytical methods (12). Big-data analytics can further support risk assessment and financial planning, although its effectiveness depends on data quality, analytical expertise, technological infrastructure, and organizational governance (13). Thus, technological capability may enhance financial flexibility by increasing the speed and accuracy with which firms detect emerging threats and reallocate financial resources.

However, the current findings also show why technology cannot be treated as an autonomous solution. In the fuzzy cognitive map, financial-technology opportunities and barriers demonstrated relatively lower direct influence and relatively higher influence received from other factors. This indicates that technological outcomes are substantially conditioned by environmental and organizational circumstances. For example, firms may possess advanced analytical tools but still be unable to benefit from them if macroeconomic instability, financing constraints,

regulatory uncertainty, or insufficient human capabilities prevent effective implementation. This is consistent with research emphasizing that technological innovation in financial systems must be accompanied by effective risk management and organizational adaptation (14). Likewise, digital transformation introduces new categories of operational and technological risk that require explicit measurement and management (15).

The findings also revealed the importance of integrated and proactive risk management. Interviewees emphasized the value of scenario planning, derivative instruments, diversification, crisis simulations, and forward-looking analyses. Risk management was primarily positioned as a responsive and moderating variable within the network, meaning that it is activated by broader environmental conditions but can reduce the severity of their effects on financial flexibility. This finding aligns with research linking resilience to effective risk-management systems and emphasizing the importance of anticipating rather than merely reacting to disruptive events (8). In this regard, financial flexibility and risk management are complementary: financial flexibility provides the resources and options required for adjustment, while risk management helps managers identify when and how those options should be deployed.

The importance attributed to advanced risk-management technologies is also consistent with developments in financial industries more generally. Digitalization has transformed risk assessment, underwriting, forecasting, and resource allocation across financial sectors (9). Technological innovation in financial and insurance systems has expanded the ability of organizations to integrate data, automate analysis, and improve risk-sensitive decision-making (14). Nevertheless, such benefits must be balanced against new technological vulnerabilities and implementation risks (10, 15). The present study therefore suggests that financial flexibility is strengthened most effectively when technology is embedded within a broader framework of governance, risk management, and strategic financial planning.

Perhaps the most important systemic finding was that all 41 factors were classified as Ordinary rather than as pure Transmitters or Receivers. This means that every factor simultaneously affects other factors and is affected by them. Such a pattern confirms that financial flexibility is characterized by reciprocal causality and feedback rather than by a simple linear sequence of causes and outcomes. For example, macroeconomic instability may increase liquidity pressure, but firms' liquidity strategies may subsequently affect investment decisions, market expectations, and risk-management practices. Similarly, regulation may constrain financial choices while improved transparency may enhance investor confidence and expand future access to capital. This reciprocal structure supports the use of fuzzy cognitive mapping because conventional linear models may not adequately represent these multidirectional relationships.

This network-based interpretation also helps explain why the factors with the greatest influence were not necessarily the factors most directly controllable by firms. Macroeconomic and political pressures were highly influential but largely external, whereas technology and risk management were more controllable but more responsive. Consequently, managerial strategies should distinguish between environmental drivers that cannot be eliminated and organizational capabilities that can be developed to reduce their impact. This interpretation is compatible with the broader literature on financial resilience, which suggests that firms derive value from financial flexibility by preserving options under uncertain conditions rather than by attempting to eliminate uncertainty itself (1, 3).

Overall, the findings support an integrated interpretation of financial flexibility in which external pressures, capital structure, liquidity, regulation, investor expectations, technology, and risk management interact continuously. The

results extend prior research by demonstrating that the relevance of financial flexibility goes beyond isolated outcomes such as investment efficiency, bankruptcy, sustainability, or capital structure (2, 4-6). In the context of the Tehran Stock Exchange, financial flexibility appears to function as a system-level adaptive capacity through which firms absorb environmental pressures, preserve strategic choices, and maintain continuity under conditions of high uncertainty.

This study has several limitations that should be considered when interpreting its findings. First, the qualitative phase relied on interviews with a relatively small purposively selected group of experts, and although theoretical saturation was achieved, the perspectives obtained may not fully represent all industries listed on the Tehran Stock Exchange. Second, the quantitative phase included only 20 managers and financial specialists, which limits the generalizability of the numerical evaluations used in constructing the fuzzy cognitive map. Third, the relationships in the FCM model were based on expert judgments and therefore may be affected by subjective perceptions, professional experience, and cognitive biases. Fourth, the study was conducted within the specific economic, regulatory, and political context of the Tehran Stock Exchange, and the resulting model may not be directly transferable to companies operating in more stable or differently regulated financial markets. Finally, the cross-sectional nature of data collection prevented examination of how the identified relationships may change over time as economic conditions, regulations, technologies, and financing structures evolve.

Future studies should replicate the present model using larger samples of managers, investors, financial analysts, regulators, and board members across different industries to evaluate the robustness of the identified relationships. Longitudinal designs are recommended to examine how financial flexibility and its environmental drivers change across periods of economic stability, recession, inflationary shocks, or regulatory reform. Future research could also combine fuzzy cognitive mapping with structural equation modeling, system dynamics, Bayesian networks, or machine-learning techniques to test the causal pathways identified in this study using larger quantitative datasets. Comparative studies across emerging and developed capital markets would also be valuable for distinguishing context-specific drivers from more universal determinants of financial flexibility. In addition, future research could examine the moderating effects of firm size, industry type, ownership structure, corporate governance quality, export orientation, leverage, and technological maturity on the relationships identified in the present model.

Managers of listed companies should treat financial flexibility as an integrated strategic capability rather than as a narrow liquidity or leverage objective. Companies should diversify financing sources, reduce excessive dependence on short-term debt, maintain adequate liquidity buffers, and design dividend policies that balance shareholder expectations with long-term investment requirements. Financial managers should institutionalize scenario planning, stress testing, and integrated risk-management systems to anticipate the financial consequences of exchange-rate movements, inflation, regulatory changes, and supply-chain disruptions. Investment in ERP systems, financial automation, data analytics, artificial intelligence, and digital reporting should be accompanied by employee training and clear governance mechanisms to ensure effective implementation. Policymakers and capital-market authorities should also prioritize regulatory predictability, transparent policy communication, development of domestic financing instruments, and support for technological infrastructure so that firms can preserve greater financial adaptability under uncertain environmental conditions.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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