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Identifying the components of financial risk management in knowledge-based startup companies

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Abstract

Risk management manages risks through controlling them and financing losses that have occurred despite efforts to control them. The present research is qualitative in nature, in which 18 experts including professors and researchers in the field of auditing, managers and partners of knowledge-based companies, and developers of accounting and auditing standards and principles have been considered as the population using a purposive and discriminative sampling method for semi-structured interviews. The data were analyzed using the grounded theory method. The data obtained from the interview analysis and within-case analysis consisted of 5 main themes, 20 sub-themes, and 178 conceptual codes, which were ultimately categorized into 5 main domains for financial risk management, including causal factors, contextual conditions, interveners, financial strategies, consequences, and feedback. Based on the findings of the research, the identification of opportunities, financial provisioning, government material and spiritual support, business expansion speed, competitors, profitability stability stage, environmental turbulence, technology, market, consultancy, uncertainty of environmental factors, financial risk threats, research challenges, threats and marketing weaknesses, inability to formulate and implement financial strategies, executive management weaknesses of knowledge-based startup companies, fulfillment of social responsibilities, increased investor confidence, and profitability effectiveness are among the components of financial risk management in knowledge-based startup companies.

Keywords: financial risk management, knowledge-based companies, financial opportunities
2020 MSC: Primary xxxxx (mandatory); Secondary xxxxx, xxxxx (optionally)

1 Introduction

Various market changes such as trade liberalization and the speed of technological advancements have led to increased competition and management challenges in organizations. In such markets, companies require sound decision-making by managers. Effective risk management, based on credible conceptual principles, constitutes an important part of this decision-making process [8]. Risk management is the process of assessing risks and designing strategies to identify them. The startup approach and concept have been able to create a significant revolution in the world of entrepreneurship and business in less than a decade. Being able to generate income, a system, or an organization based on an idea and bring it to the threshold of growth and investment is the essence of a startup. A startup,

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or its Persian equivalent "Rouydad Shetab", is an event held to launch new companies and startups. According to experts' definition, a startup is a nascent company that offers a novel solution to a problem [1]. Startups emerge as entrepreneurial investments for a new business in the form of a nascent company. However, to launch and develop these companies, there is a need for evaluating, analyzing, and developing their ideas [17].

One of the management branches that has gained significant importance in the management system in recent decades is risk management. Although each manager operates within a specific domain of expertise, the primary and common responsibility of all managers is to achieve organizational goals through effective use of financial and human resources [16]. Senior managers, based on their understanding of the macro environment, industry environment, and awareness of the financial and human resources capabilities of their institution, explore various ways to achieve goals and select the most appropriate path or paths among them [8]. Risk management primarily deals with reducing the adverse effects of internal and external events that adversely affect organizational activities. Risk management should consist of a set of continuous and evolving processes that are employed throughout an organization's strategy and should systematically address all past, present, and future risks [5].

One of the main concerns of knowledge-based companies is to execute their projects with minimal cost and in the shortest time possible while adhering to quality issues. The existing uncertainties in knowledge-based companies have led to increased complexity in project execution and management. This is a concern that makes risk management inevitable. Risk management is one of the most important tools for dealing with complexities and uncertainties. Risk management involves the process of identifying risk factors, assessing them, and planning to reduce the undesirable effects of risks. What is important for managers is the identification of risks, their assessment, and the selection of appropriate strategies for each risk [13]. The issue is that investments in top ideas in startups always come with risks for investors. Idea owners are often biased towards their own thinking and idea, considering it the best option for investment. Additionally, investors are always seeking the highest return on their investment and are not easily attracted to other ideas. Startups are often small or eventually medium-sized businesses that constantly seek to offer innovative products and services in the market. But the problem is that these companies always carry a high risk for investment. This is because the ideas proposed in startups inherently have a high failure rate; meaning out of 100 percent of ideas, only 2 to 5 percent of them will ultimately justify the necessary investment. On the other hand, attracting investors for ideas and selected plans is very challenging. Therefore, funding in startups always faces numerous challenges. The question here is, as an investor, how and when can one start this process?

Startups, by their nature of generating and accepting ideas in the market, always entail significant risks. This leads to many startups facing challenges in their commercialization process and ultimately encountering failure [15]. However, the important point is that their lack of success in the market is not solely due to the nature of the idea itself; rather, the crucial factor is who (investors) invest in these ideas and how they do it. This means that the effectiveness and ultimately the success of an idea depend not only on the viability of the idea but also on the suitability and strength of the investors behind it. This group of investors always scrutinizes and analyzes influential factors when considering and accepting a creative and high-risk idea, and the result is obtaining investment approval for that idea [19].

In other words, the acceptance of the risk associated with the ideas and plans present in startups for any investor depends on factors that make those ideas and plans successful in their commercialization process, thereby making the idea effective in the market. This, in turn, encourages other new investors to invest in new ideas [7]. The important point in this analysis is to determine which factors among others will play a causal role and which ones will be consequential in the investment in startups. Understanding this will significantly impact the level and intensity of investor attraction to new ideas and plans. Therefore, understanding this aspect will facilitate risk management of ideas and innovations in the market for investors [6].

The reason for examining and selecting risk management is one of the most important topics in the capital market is the awareness of the level of risk in companies, especially systematic or market risk, which is beyond control. However, it plays a significant role in decision-making and the success of the organization. This is because it is believed that the returns of company stocks are a function of risk. Systematic investment in companies requires risk acceptance. A portion of the total risk a company undertakes is related to asset allocation and operational decisions based on financial reporting principles. It is noted that financial reports summarized in financial statements contain useful information for predicting cash flows and risks. Many factors influence risk, with one of the most important being customer characteristics. If customers are permanent, logically shareholders have had special characteristics that enabled them to exert such influence on their customers. Important characteristics of them will be examined in various sections of the article.

According to Coso's theory, within the framework of organizational risk management, five components can be

considered for the success of companies: governance and culture. Governance determines the tone of the organization and emphasizes the need to define responsibilities for risk management within organizations. Culture emphasizes adherence to ethical principles, desirable behaviors, and understanding of risk within the organization. Strategy and goal setting: Organizational risk management, strategies, and goal setting are interconnected in the process of strategic planning. Risk appetites are determined in line with strategies. Business objectives provide the groundwork for achieving strategies and create a basis for identifying, evaluating, and responding to risks. Performance: Risks that affect the achievement of strategies and objectives are identified and evaluated. Risks are prioritized based on severity and within the framework of the organization's risk appetites. The organization then selects appropriate responses to risks and considers a portfolio of risks. Results of this process are reported to key stakeholders. Review and revision: Through organizational performance review, it is determined how risk management components within the organization have performed and what updates and revisions are necessary in line with fundamental changes that have occurred. Information, communication, and reporting: Organizational risk management requires a continuous process of receiving and sharing information from internal and external sources. This information circulates throughout different levels of the organization, from top to bottom, bottom to top, and horizontally. In this regard, this research seeks to develop theoretical literature based on behavioral reasons influencing the relationship between risk management and profitability characteristics. Given the discussed topics, studying and investigating the research subject is the main concern. This is because it will increase awareness and knowledge regarding how to identify and evaluate risks in companies. Therefore, this research aims to achieve two objectives:

1. What are the components and various dimensions of each component effective for implementing risk management in knowledge-based companies?
2. What is the suitable model and the relationship between components for achieving comprehensive risk management in startup knowledge-based companies?

Based on the content discussed, the conducted research is as follows:

Pourahmadi et al. [12] examined the impact of organizational risk management on the relationship between external financing and profit management. The findings of the research indicate that organizational risk management affects profit management as well as the relationship between external financing and profit management. Ultimately, organizational risk management was found to be influential in the relationship between external financing and profit management. In other words, organizational risk management can improve operational performance and increase company value, allowing companies exposed to high-risk environments to prevent and control the undesirable effects of risks and minimize adverse consequences while reducing profit fluctuations. Mohammadsharifi et al. [14] investigated the impact of organizational risk management on the performance of companies listed on the Tehran Stock Exchange (measured by the Tobin's Q ratio) in the merger and acquisition process using the two-stage Heckman model in the time span from 2013 to 2018. The results of the first stage indicated that firm size, financial leverage, and industry control variables have a significant relationship in the model of determinants of organizational risk management. In the second stage, it was confirmed that organizational risk management significantly affects the performance of companies listed on the Tehran Stock Exchange in the merger and acquisition process. Viganò and Castellani [18] demonstrated that financial decisions and risk management of low-income households in vulnerable areas are highly susceptible to disasters, confirming the vulnerability of families to systematic shocks. Adegboye et al. [2] found that the role of executives in implementing organizational risk management strategies is significant. Shad et al. [**?**], in a study on the integration of sustainable reporting in organizational risk management and its relationship with business performance, concluded that effective implementation of organizational risk management has a considerable impact on company performance. Additionally, sustainable reporting can influence company performance through organizational risk management.

2 Research methodology

The present study, adopting a qualitative approach and grounded theory method in 2023, aimed to identify the components of financial risk management in knowledge-based startup companies through semi-structured interviews. Qualitative methods are utilized to reveal behaviors, perspectives, emotions, and uncover existing realities. The qualitative research population consisted of 18 experts, including professors and researchers in the field of auditing, managers and partners of knowledge-based companies, and developers of accounting and auditing standards and principles, who were considered as the statistical population. The sampling was conducted using purposive sampling method and continued with the snowball sampling method to ensure maximum diversity. The inclusion criteria for participation in the research, in addition to having knowledge and expertise in the subject, included holding a specialized doctoral

degree, holding executive responsibility in knowledge-based companies, influence on other colleagues, willingness to cooperate, and their ability to participate in the research, as well as having over 10 years of work experience.

To collect the data, ethical approval was obtained from the university. Subsequently, this code was re-validated and the necessary authorization was obtained from the university's research ethics committee. Then, necessary coordination for data collection was conducted by contacting the managers and partners of knowledge-based companies. Data collection was carried out through semi-structured interviews based on a pre-prepared interview guide by the researcher at the interviewees' workplace. Prior to the interviews, informed consent of the participants and permission to record the discussions were obtained after explaining the study's objectives. Participants were asked to complete the informed consent form for participation in the research and the demographic questionnaire. To record and collect data during the interview sessions and group discussions, methods such as interview recording and note-taking during and after the interviews were utilized. Each interview began with comprehensive and straightforward questions. Then, based on the interviewees' responses and using semi-structured interview communication methods and principles, questions were posed in line with the study's objectives. Some of the main questions asked were:

In your opinion, what factors could potentially influence financial risk in startups?

What contextual factors do you think could affect financial risk in startups?

What intervention factors do you think are effective in influencing financial risk in startups?

What other factors do you think can affect financial risk in startups?

In your opinion, what could be the consequences of financial risk management in knowledge-based start-up companies?

Considering the semi-structured nature of the interviews, additional questions were asked to clarify the concepts presented in the respondents' answers. Moreover, guiding and exploratory questions were posed to gain a deeper understanding of the challenges and obstacles. For example, "you mentioned the experience of audit managers. Could you please elaborate on the topic? What role do managers play? Could you provide further elaboration on this role? Do you think there might be any other specific aspects to consider?" The duration of each interview session was approximately 50 to 90 minutes. All interviews and group discussion sessions took place in the participants' workplace during working hours and within the companies. The recorded interviews and conversations were immediately transcribed and implemented on paper. The interviews continued until the point of data saturation, where no new data were extracted with the continuation of the interview process. After complete implementation of the interviews, the interview texts were typed in Microsoft Word software and reviewed several times to ensure full comprehension. Each interview was considered as a unit of analysis. By 'unit of analysis,' we mean the notes that are intended to be analyzed and coded. Paragraphs, sentences, or words were considered as meaningful units. A meaningful unit refers to a set of words and sentences that are content-related and, based on their content, are summarized and placed together. Then, the meaningful units were abstracted and conceptualized based on the underlying concepts, leading to the formation of condensed meaningful units. These units were compared in terms of similarity and difference, classified into broader categories, and ultimately into main and subcategories. To assess the validity and reliability of the data in the current study, the four criteria of Guba and Lincoln [10] were utilized. Based on this criterion, rigor in qualitative studies is determined by four terms: credibility, transferability, dependability, and confirmability. Credibility reflects the researcher's faithful portrayal of participants' experiences, while transferability refers to the ability to transfer research findings to other settings. Dependability relates to impartiality and prevention of personal bias from the researcher. Trustworthiness is established when another researcher can achieve similar results with the primary researcher's perspective. Confidence refers to the stability of data over time and under similar conditions. In the present study, data credibility was achieved through long-term engagement of researchers, appropriate interaction and sufficient participation with participants, as well as the integration and examination of data by participants. Transferability was ensured by providing rich data explanations, presenting quotations and examples to knowledgeable experts, and seeking academic consultation. To ensure data dependability, diverse sampling of participants and temporal triangulation were employed. Data confidence was established by promptly conducting interviews, obtaining feedback from colleagues, and thoroughly reviewing all data. To observe ethical considerations and protect participants' rights, the researcher introduced themselves, explained the research objectives, and obtained verbal consent. Interviews were conducted confidentially and anonymously, and integrity was maintained in the interview transcripts. Grounded theory analysis method was utilized for data analysis.

3 Research findings

3.1 Qualitative data analysis

In the qualitative section, data analysis based on the Grounded Theory was conducted as follows: Firstly, key points relevant to each semi-structured interview were marked by listening to the recorded interviews and studying the written notes taken during the interviews. Then, essential key points from within the interviews were extracted. Subsequently, these key points were categorized into professional terminologies, and necessary labeling was applied. Afterwards, the labeled terminologies of each interviewee were organized into a table format based on their relationships and relevance to each other, categorized into dimensions and components.

First step: open coding

Open coding is an analytical process through which identified concepts and their attributes and dimensions are discovered in the data [9]. In this stage, grounded theory provides initial insights into the phenomenon under study by segmenting the data. The researcher assigns concepts to all collected data, such as interviews, observations, events, or field notes [3].

Open coding table, which consists of two parts: the table of primary codes extracted from interviews and the table of extracted categories from concepts along with their secondary codes.

Primary coding: In this stage, each key point of the interviews is assigned a title. Then, all these titles are placed in the tables below.

Secondary coding and conceptualization: In the next stage, primary codes are converted into secondary codes due to their large number (primary codes are grouped into similar categories). Several secondary codes are transformed into one conceptual code. The table below presents the results of open coding based on secondary codes, conceptual codes, and concepts.

Table 1: The initial extracted concepts identifying the components of financial risk management in knowledge-based startup companies, secondary coding, and shaping conceptual codes and themes.

Themes (sub-categories)	Conceptual codes	Secondary codes
Causal factors	Identifying opportunities	Identification of the target market and its components
		Identification of new customer needs and market demands
		Opportunities for technological entrepreneurship
		Designing and producing new resources
		Identification of entrepreneurial opportunities
		Identification of existing opportunities
	Financial provisioning	Venture capital funds
		Appropriate investments
		Utilizing financial backers for new ventures
		Involving high-net-worth individuals in high-risk ventures
		Selling a portion of the company as shares
		Personal, family, and friends' capital
		External support
		Bank and non-bank loans and facilities
Contextual conditions	Financial and spiritual support from the government	Establishing a structured system for creativity and innovation education at different educational levels
		Increasing governmental financial and moral support to innovation hubs
		Prioritizing tools and operational objectives for implementing overarching technology and innovation policies considering limitations
		Organizing government and private financial institutions as applicants for supporting technology and innovation-based initiatives by knowledge-based companies
		Defining quantitative indicators for the knowledge-based economy to monitor and revise existing procedures
	The speed of business expansion	Access to financial resources
		Entrepreneurship education
		Capability to produce high-quality goods and a supportive culture fostering innovation
		Financial management and the ability to secure the necessary funds and credits
		Profitability and return on investment
		Rapid growth of the private sector in the region
		Placement in special economic zones or adjacent to them
		The ability to produce high-quality products or services
		Increasing the growth of entrepreneurial ventures

		Strengthening networking
		E-commerce-based businesses
	Competitors	Product quality
		Reliability of delivery time
		Cost management
		Identification of potential competitor customers
		Focus on better quality and performance compared to competitors
		Consideration of competitors' financial capabilities
		Identification of ethical and unethical principles of competitors
	Stabilization phase of profitability	Focusing on specific areas
		Product diversification, strengthening R&D
		Utilizing advanced technologies
		Compilation of competitive pricing strategies
		Developing diplomatic tools through trade treaties
		Mechanisms for policy collaboration between companies and cost-sharing arrangements
		Strengthening and sustaining technology diplomacy
	Environmental turbulence	Pioneering of science and technology parks in launching and developing knowledge-based businesses
		Sanctions conditions
		Government support policies
		Orientation of universities towards knowledge-based businesses
		Infrastructure related to information technology
		Patent registration and intellectual property ownership
		Physical infrastructure
	Technology	Selecting appropriate technology and innovation
		Employing market-oriented technology
		Having expertise and technical experience in using up-to-date technologies
		Business smartization
		Having suitable software infrastructures
		Software utilization
		Utilizing existing hardware infrastructures
		Using social networks to introduce ideas
	Market	Branding
		Competitive advantages
		Collaboration with industrial companies
		Industry growth rate
		Industry growth strategy
		Selling technology knowledge
		Customer loyalty
Intervener	Consultation	Consultation on financing experience
		Risk taking experience
		Investment advisory
		Strategic service-oriented planning
		Consultation on internationalization
		Consultation on organizational growth
	Uncertainty of environmental factors	Persistent sanctions
		Environmental competitors
		Existence of ambiguities
		Stringent regulations
		Currency exchange rate instability
		Technological changes and developments
		Market changes and fluctuations
		Social issues
	Hazards of financial risks	The risks of product sales
		Lack of guaranteed prices
		Risks of predicting sales before production
	Research and study challenges	Weakness in identifying needs
		Market analysis
		Attention to customer expectations
		Market fluctuations
		Lack of information resources
	Threats and marketing weaknesses	Lack of familiarity with the needs of the target markets
		Lack of familiarity with customer behavior
		Smuggling imports
		Importation of similar foreign products
		Failure to identify distribution channels
		Weakness in marketing budgeting
		Financial intermediaries

Financial strategies	Inability to formulate and implement financial strategies	Issues and problems in budgeting and resource planning for projects
		Lack of coordination and conflicts between shareholders and managers
		Failure to implement updates in economic studies of projects
		Severe and formal organizational bureaucracy and insufficient follow-up of affairs
	Weakness in the executive management of knowledge-based startup companies	Delay in contract enforcement
		Insufficient experience in managing certain strategic activities
		Timing risk
		Inadequate supervision
		Risk of insufficient expertise in specialized personnel
Consequences and feedback	Fulfillment of social responsibilities	Improvement of company's position
		Increase in efficiency
		Profitability
		Value and long-term survival of companies
	Increasing investor confidence	Utilizing institutional advantages
		Use of tax discounts
		Improving shareholder satisfaction
		Increasing the share of stock supply in the market
		Increasing focus on customers
	Profitability effectiveness	Improving company asset returns
		Improving shareholders' equity returns
		Improving company sales volume

Shaping the main classes

After identifying the concepts, the stage of constructing the main categories of the theory was carried out.

Second step: Axial coding

Axial coding is the second stage of data-driven theory building. The aim of this stage is to establish relationships between the produced categories (in the open coding stage). This is done based on the paradigm model and helps the theoretical framework to proceed smoothly. The basis of the relationship-building process in axial coding lies in the expansion and elaboration of one of the categories.

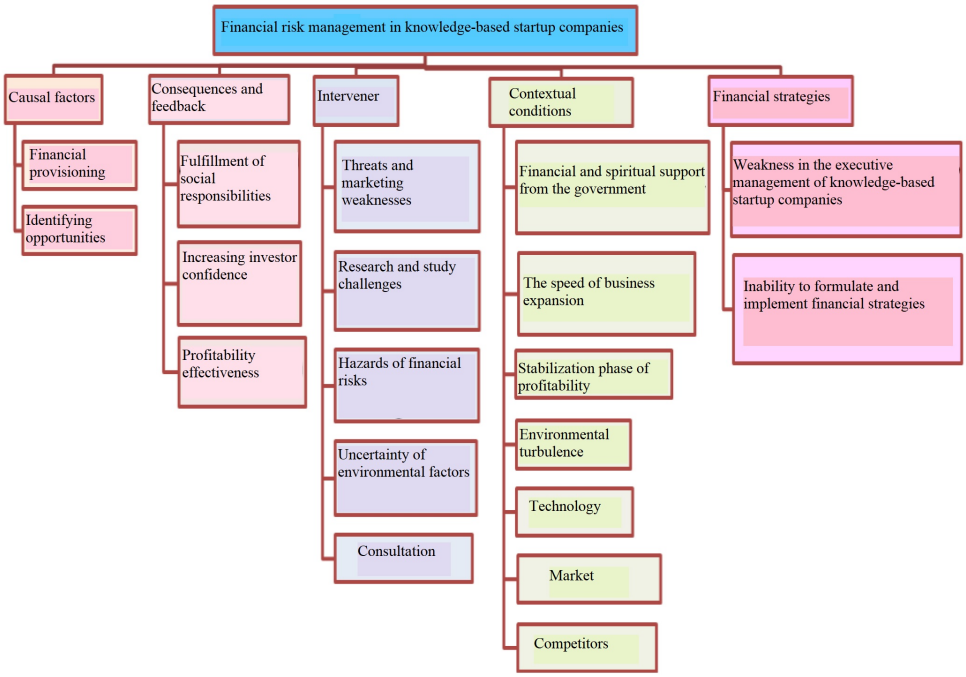


Figure 1: Axial coding based on complementary model

The third step: theorizing stage (selective coding)

As mentioned, the goal of grounded theory is to generate theory rather than merely describing the phenomenon. To convert analyses into theory, categories need to be systematically related to each other.

Selective coding, based on the results of the two previous stages of coding, is the main stage of theory development.

In this stage, the researcher systematically relates the axial categories to other categories, presents these relationships within a framework of narrative, and revises categories that require further improvement and development. The researcher then presents the final theory either narratively based on their understanding of the study phenomenon or by diagramming the paradigm model, as per their comprehension of the text [4].

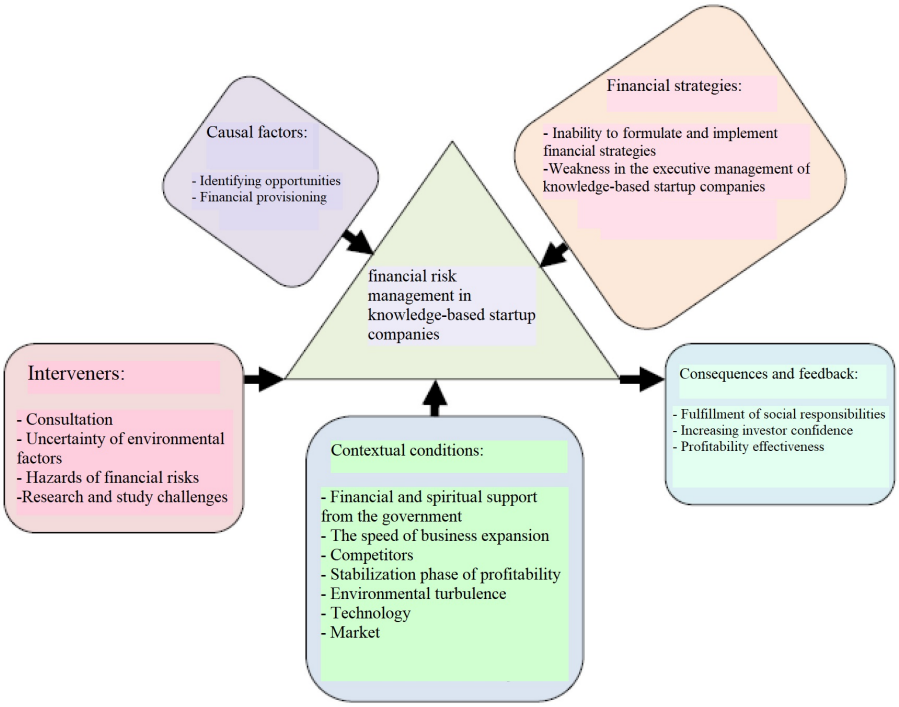


Figure 2: Financial risk management model of knowledge-based start-up companies

An example of the interview:

An interview with one of the knowledge-based companies

Project-oriented organizations such as knowledge-based companies, like other governmental and non-governmental organizations, are exposed to risks. Failure to pay attention to and properly manage these risks increases the likelihood of failure in innovative projects. Therefore, the proper identification of these unique risks for these organizations is of paramount importance, given that the success of knowledge-based companies is closely tied to the success of their projects. Proper risk management can reduce the likelihood of crises for these companies. Project risk management requires proper prioritization of risks so that resources and facilities can be allocated appropriately to project factors. Since risks external to knowledge-based companies rank highest, especially in science and technology parks, these companies should prioritize how to deal with and confront these risks in their work plans. Financial risk has been identified as having the greatest impact on projects of knowledge-based companies after risks external to the organization. Therefore, project managers should pay attention to budget allocation, financial supporter management, and cost management.

4 Conclusion and recommendations

In the global economy, new technology-based companies not only generate new knowledge (science and technology) but also contribute to employment of specialists and university graduates as engines of economic growth and sustainable development of countries. The unique and diverse conditions in Iran in the global context, along with the experiences gained from sanctions, have doubled the importance of focusing on resilient and domestic economy for economic authorities and activists. Therefore, attention to the establishment and development of new technology-based companies (knowledge-based companies) has been on the agenda in recent years. Over five thousand knowledge-based companies have been established so far. Access to financial resources, especially in the early stages of growth, is one of the most important factors in the growth and development of these companies. Various studies have shown that knowledge-based companies face multiple challenges in the financial procurement process, making access to financial resources difficult for them.

Based on the current research and studies conducted in this area, it can be stated that, regarding the effectiveness level, factors such as opportunity identification, financial procurement, government support both materially and spiritually, uncertainty of environmental factors, financial risk hazards, challenges in research and development, threats and weaknesses in marketing, inability to formulate and execute financial strategies, deficiencies in the executive management of knowledge-based startup companies, fulfilling social responsibilities, increasing investor confidence, and profitability effectiveness are among the components of financial risk management in knowledge-based startup companies.

Based on the fundamental approach, the constituent factors of risk, which cause changes in stock prices in the market, can be classified into political risk, commercial risk, interest rate risk, inflation rate risk, financial risk, liquidity risk, and exchange rate risk.

The term "financial risk" refers to the risk associated with the use of debt. The more debt a company takes on (or the more bonds it issues), the greater the risk to its common equity shareholders due to the reduction in the company's net profit margin.

Risk-based supervision should be based on appropriate regulatory planning that encompasses the development and health objectives of financial institutions. Tools associated with a risk-based approach include:

- Market entry controls: To ensure a minimum level of customer confidence in the accuracy and financial health of financial institutions.
- Sufficient capital adequacy or standard debt repayment capability: To ensure that financial institutions have the necessary capital adequacy to support the volume and nature of their trading activities and provide a buffer for institutions that may be exposed to significant and unexpected losses to client funds.
- Thorough examination of capacity and management strategy: To ensure that the manager of financial institutions possesses the necessary skills and adherence to market principles.

The results of this present research, are consistent along with the findings of Mohammadsharifi et al. [14], Pourahmadi et al. [12]. They indicate that mechanisms for rapid business expansion, competitors, profitability stabilization phase, environmental turbulence, technology, market, and consultation are important components of financial risk management. These findings align with the research of Viganò and Castellani [18], Adegboye et al. [2], and Shad et al. [14].

Suggestions for managing financial risks in knowledge-based companies:

Knowledge-based companies are among the pillars of economic development in the country, so it is necessary to provide a suitable platform for turning ideas into wealth. Therefore, efforts to solve problems and remove obstacles in their path are essential.

Risk assessment in knowledge-based companies should be conducted.

Since risk management plays a crucial role in managing knowledge-based companies, the provision of powerful methods such as designing expert systems and other decision-making systems in analyzing, evaluating, and responding to the risks of knowledge-based companies can become the focus of future research by researchers.

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