Identification and Modeling of Crowdfunding Risk Indicators in FinTech-Based Businesses Based on the Combined Approach of Thematic Analysis and Partial Least Squares in SEM

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ABSTRACT

The purpose of this research is to identify and model crowdfunding risk indicators in FinTech-based businesses based on the combined approach of thematic analysis and partial least squares in SEM. The research population consists of the professors and experts of the certified crowdfunding platforms of Iran, including Pars Funding, Karnekrad, Dungi, Hamafarin, Phoenix, and IBkrad. In the qualitative part, the opinions of 12 experts were used using the purposive judgment method. In the statistical part and based on the power analysis method, the opinions of 290 experts related to the research topic were used in the mentioned platforms. The process of data analysis was carried out in two stages, which includes identifying the risk of crowdfunding in FinTech-based businesses through interviews and using theme analysis method and relations evaluation, fitting, testing the research model, and achieving the final model through questionnaire and modeling tools of structural equations. The research results showed that the risk of crowdfunding in FinTech-based businesses is divided into two main parts. The risk of internal factors, including lack of quick liquidity, conflict of interests between entrepreneurs and investors, high failure rate, equity dilution, lack of control over all aspects of investment, lack of transparency, limited information, possibility of fraud and corruption, risk of contracts and transactions, improper valuation, operational risk, and the risk of external factors, including market risk, macroeconomic risk, and lack of coordination in regulations.

Keywords: Risk, Crowdfunding, FinTech

1. Introduction

The emergence of new and powerful digital technologies and platforms has increasingly transformed the businesses of companies. Digital transformation is a new emerging term used to describe the alarming changes that businesses, organizations, and society in general take to respond to digitalization (Nambisan et al., 2017). The global financial crisis and the fundamental problems faced by start-up companies to find the necessary foreign capital for their growth have led entrepreneurs to search for new sources of finance to develop their entrepreneurial initiatives (Pivaa & Rossi-Lamastra, 2018).

An interesting opportunity created by advanced digital technologies is related to the rise and evolution of crowdfunding platforms. These new investment platforms have recently emerged as an important player and powerful tool in digital markets, driving transformative innovation in entrepreneurial financing (Marrone & Hazelton, 2019). Financial technologies, abbreviated as FinTech, are financial innovations with technological capabilities that can benefit crowdfunding by creating new business models, applications, processes, or products with related material impact on financial markets and institutions and providing financial services (Alaassar et al., 2021). However, along with all the advantages that crowdfunding can bring, there are undoubtedly some difficulties in its growth and development, the most important of which are the risk and uncertainty for the investor and the cost of capital (funding) for the entrepreneur. Regarding equity and debt funding, there are ambiguities and challenges that should be dealt with more delicately and carefully (Malamir, 2018). The literature review shows various risks such as fraud (Kirby & Worner, 2014), project failure (Ahlers, 2015), information disclosure (Malamire, 2018), valuation (Hornuf & Neuenkirch, 2017), information asymmetry (Vismara, 2018), lack of transparent rules (Zarandi et al., 2016), etc. in the field of crowdfunding. In addition, there are two major groups of factors that influence the behavior and decision-making process of investors and the population as follows: One group of factors is related to signaling theory, which is an essential element for informed decision-making and reducing uncertainty in financial forecasts and risk disclosure (Ahlers et al., 2015). Signaling theory is used to overcome information asymmetry associated with investment decisions (Connelly et al., 2011). Investors also tend to consider financial information, such as return on capital, as a motivation for investment (Vismara, 2019). The other group of factors are related to behavioral theories of decision-making and as disclosure of essential information are related to the typology of companies involved in campaigns, knowledge about team skills, characteristics of founders, training entrepreneurs, receiving funds, initial financing, product or service characteristics, market social relations, and campaign size (Piva & Rossi-Lamastra, 2018). However, no coherent research studies have been conducted in Iran so far to identify beneficial indicators as tools for assessing the risk of crowdfunding in digital financing platforms, including FinTech-based businesses. Identifying existing risks can be effective in minimizing investment risk and increasing the performance of FinTech-based businesses in the field of crowdfunding. Therefore, to cover this research gap, the current research answers the following main question that how the conceptual model of crowdfunding risk is like in FinTech-based businesses and what are the components of the so-called model?

The present article is organized as follows: First, it examines the theoretical and empirical background and reviews literature related to financial technology (FinTech), risk, and crowdfunding. Second, the methodology used in this research is summarized. Then, it presents the findings, and finally discusses the results and practical implications of the research.

2. Theoretical foundations and research background

FinTech is a new term in information technology that has achieved significant growth during the last decade. Despite the growing interest in FinTech from a scientific and practical point of view, there is still a lack of consensus on its definition and effects. Lee (2015) defined FinTech as an innovator and disruptor of the financial system. FinTech companies have new business models that have more flexibility, security, efficiency, and opportunities compared to traditional financial institutions. Gay et al. (2018) believed that FinTech is a set of information application technologies used by financial companies to improve the quality of services. Milian et al. (2019) introduced a list of definitions of FinTech provided by different

authors and institutions and concluded that FinTech has three dimensions: the first dimension includes the combined input of technology and capital flows of the organization; the second dimension includes the mechanism that creates, improves, changes, or disrupts the initial model; the third dimension has new applications and services that have a significant impact on the financial market and the provision of financial services and is derived from frontier technologies, big data, block-chain, cloud computing, and artificial intelligence. On the other hand, crowdfunding is the use of small amounts of capital by a large number of people to finance a new business venture. Crowdfunding involves the easy access of large networks of people through social media and crowdfunding websites to bring together investors and entrepreneurs with the potential to increase entrepreneurship by expanding investors beyond the traditional circle of owners, relatives, and venture capitalists (Marrone & Hazelton, 2019).

Investing in financing, while being profitable, can also bring risks. Crowdfunding risk also means the failure to secure capital in crowdfunding platforms that significantly affect the costs of a company and its public reputation (Ralcheva & Roosenboom, 2020)

(Malamir, 2018). The literature review shows the existence of various risks such as fraud (Kirby & Worner, 2014), project failure (Ahlers, 2015), information disclosure (Malamire, 2017), valuation (Hornuf & Neuenkirch, 2017), information asymmetry (Vismara, 2018), lack of transparent rules (Zarandi et al., 2016), etc. in the field of crowdfunding. In addition, previous research has largely shown that companies participating in crowdfunding campaigns are nascent and face uncertainty and high risk (Shafi, 2021). Hence, the decision making process is very risky, especially for inexperienced investors. On the other hand, investors who participate share in investment with small amounts of equity (Belleflamme et al., 2014). They are often unprofessional in assessing credit risk and making investment decisions because they do not have the abilities and time to accurately assess the credit and performance of the company (Kgoroeadira et al., 2019). This lack of expertise among investors may affect their ability to take effective action (Ralcheva & Roosenboom, 2019). Therefore, previous studies confirm that investing in financing can bring risks while being profitable. Some of these studies are summarized and mentioned below (Table 1):

Table 1: Summary of domestic and foreign research studies

Researcher/Year	Title	Results
Venslavienė et al. (2021)	Evaluating the successful stimulators of crowdfunding projects based on the visual analog measurement scale for criteria weighting methods	To determine the main criteria that influence the investors' decision to invest, the visual analog scale matrix was used for the criteria weighting method. This method can record both the objective and subjective parts of the criteria's weight. The most important criteria for investors is related to risk. The main findings show that the criteria of the three risk groups have the most weight in the weighting method of the visual analog scale. In this research, only the investors' preferences for successful investment in the crowdfunding project were selected and analyzed.
Yeh & Chen (2020)	A machine learning approach to predict the success of FinTech project crowdfunding	The findings show that the number of other projects that an entrepreneur has proposed has the highest correlation coefficient with the final status. This factor, which is committed on another platform, has a stronger relationship with the final status. The results are supportive of human capital, and experience in creating networks that contribute to initial and constant funding for crowdfunding projects appears to be essential. This study shows that the success of crowdfunding projects can be predicted by measuring and analyzing big data of social media activity, investors' human capital, and online project presentation. The neural network method achieves the highest accuracy. The investments increased from the initial projects, and another platform by the investor acts as a reliable indicator for the next investors.
Irvani et al. (2021)	Risk modeling of financing structure according to probabilistic decision theory through ANP	The results showed that competition risk is the first priority and operational risk is the last priority. Also, the order of introduced risks in terms of importance is as credit risk, operational risk, liquidity risk, income distribution risk, market risk, systematic risk.
Xie et al. (2019)	Success factors and complex dynamics of	Regression analysis was done in four categories of projects. All models are statistically significant. Based on these factors, a multi-period and multi-

Researcher/Year	Title	Results
	crowdfunding: An empirical research on Taobao platform in China	sector simulation study was conducted that evaluated the positioning decisions of crowdfunding projects and the project financing decision of investors in a broad market. The simulation study has one target group and eight control groups. In the simulation study, the researchers changed the market features, such as the number of projects, the number of investors in each project, the moral risk of entrepreneurs, and the ratio of society to financial benefits to find out its influence on the success rate and return on investment of projects, as a result, the success rate of the project budget. The results show that the dynamics of crowdfunding market is very complex.
Haji Gholam Saryazdi et al. (2020)	Designing a dynamic model of the crowdfunding system in Iran	The results of the model simulation showed that the income of the platforms in their expansion, the existence of monitoring, evaluation, and screening mechanisms in the platforms can significantly attract investors and capital seekers, but the activity in social networks does not have a significant effect.
Abdul Maliki and Khabiri (2020)	Designing a model for crowdfunding in nascent innovative start-up businesses in Iran	In this research, the roles of seven factors on the success of crowdfunding were tested: informing about the nature of the project, the project goal, updating the status of the project, the risks related to the project, informing and complete introduction of the founder of the project, the time dedicated to financing, and the number of supporters and the investors. The result of logistic regression indicated that the four variables of informing about the risks related to the project, about the nature of the project, updating the status of the project, and the project goal project remained in the research model, confirming the role of these four variables on the success of crowdfunding.
Chen et al. (2018)	Decision making about crowdfunding under risk analysis	The simulation results show that the exchange rate greatly affects the behavior of international decision makers in crowdfunding. A low exchange rate leads to a lower investment decision on the part of the investor, and a high exchange rate leads to excessive investment, which challenges the investor's efforts. Project system risk may involve the participant's decision-making process and create ambiguity at the end.
Mokhtarrudin et al. (2017)	Crowdfunding as a financing opportunity for nascent start-ups in Malaysia	The results show that new start-ups desire crowdfunding based on donations and rewards. Also, the results of the multiple regression analysis show that little support has been received from the relevant authorities in the field of promoting crowdfunding based on donations and rewards to help start-ups.

According to the review of the theoretical and experimental foundations presented, it turned out that few studies have so far focused on the risk of crowdfunding. The main risks in digital crowdfunding identified by reviewing relevant literature are related to: information asymmetry, limited financial information disclosed, high risk of failure in the early stages, low level of income, a company's self-evaluation and dependence on its own capital that affects the cost of capital, and the low liquidity of the capital share (Secundo et al., 2020; Jiang et al., 2020; Chen et al., 2020; Damodaran & Roggi, 2016).

All these limitations create problems for the use of crowdfunding. Therefore, it is necessary to identify and screen the risks in the financing process to achieve crowdfunding goals. Accordingly, the following goals are defined to assess the risk of crowdfunding in FinTech-based businesses:

1) Identifying the factors affecting crowdfunding risk in FinTech-based businesses
2) Determining the measurement model and structural model of crowdfunding risk in FinTech-based businesses

Method

The current research is practical in terms of purpose. In terms of the inference method, it is descriptive, and in terms of the nature of the data, it is mixed-exploratory. The research population in the qualitative part of the study was formed by the experts of the certified crowdfunding platforms of the country, including Pars Funding 1, Karen-Crad 2, Dungi 3, Ham-Afarin 4, Gognus 5, and IB-Crad 6. These people were experts in the field related to the research topic. The participants' selection method was the judgment method (review by the members of the research team).

In other words, the researcher chooses from the range of potential people those who can enrich the required data in the process of gathering, so that the theory building is made possible. In this method, instead of choosing a fixed sample, the sample volume is increased until it is enough (theoretical saturation) (Bazargan Harandi et al., 2018). Based on this and according to the nature of the sampling method, finally, the sample size was determined to be 13 people based on the experts available and willing to cooperate. Also, the research population in the quantitative section includes all experts related to the research topic in the mentioned platforms. In order to determine the size of the random sample in the quantitative part, the power analysis method presented by Cohen (1992) is used. Calculating the sample size with Cohen's formula is a correct and scientific solution for estimating a sufficient number of samples in solving statistical problems and structural models (Westland, 2010). So, the required sample size for the structural equation method was determined at a confidence level of 95% and considering 13 obvious variables and two hidden variables equal to at least 288. Considering that some questionnaires might be incompletely completed, 300 questionnaires were distributed in the research population, and finally, 290 questionnaires were analyzed in the research process. Considering that in the exploratory mixed research method, qualitative research methods are used first and then quantitative research methods are used, the steps of the current research were carried out in the following way:

Qualitative part: In this section, in order to collect data and information for the analysis of the qualitative section, identifying the factors affecting the risk of crowdfunding in fintech-based businesses, interview and the theme analysis method (theme) were used. After the implementation of the interviews, primary and secondary coding was done in Atlas T software. Quantitative part: according to the purpose and nature of the research subject, the most suitable method in the quantitative stage was the descriptive-survey research method; therefore, to obtain the views of the experts regarding the validation of the research results (determining the measurement model and the structural model of risk crowdfunding in fintech-based businesses), this method was used. In this part of the research, a researcher-made questionnaire tool was used to collect quantitative data. The questionnaire was designed based on the dimensions and components extracted from the theme analysis process. To analyze the quantitative data, partial least squares (PLS) regression was used in SEM (Structural Equation Model) and in the software of the same name.

Results
Identifying factors affecting crowdfunding risk in fintech-based businesses

As mentioned in the research method section, to collect data in the qualitative section, interviews were used and theme analysis method was used for analysis. So, for collecting qualitative data, after reviewing the literature related to the research topic, a framework was developed for asking questions of interviews with experts. In the following, 13 academic experts as well as managers of the certified crowdfunding platforms of the country, including Pars Funding, Karn Krad, Dungi, Ham Afarin, Gognus, and IBkrad, were selected through a judgmental sampling method. In the second phase, the interviews using Braun & Clarke's (2006) six-step inductive theme analysis method were coded. Based on this and during the data familiarization phase, the identified speech evidences (50 cases) from the text of the interviews were labeled in the form of 13 primary codes. Then, the initial codes were categorized into two sub-themes and then a main theme. The summary of the final results of the current research (theme analysis) is summarized in Table 2.

Table 2: Summary of the results in the theme analysis section

Verbal evidence (the number in parentheses indicates the code of the interviewee)	Initial coding	Sub-theme	Main theme
• Crowdfunding is considered as highly illiquid investment (R5) • With the creation of secondary markets, crowdfunding in FinTech-based businesses will be more liquid (R6). • One of the parties in the financing operation may not obtain the necessary liquidity to accept its obligations (R7). • One of the main financial risks in financing operations is liquidity risk (R9). • As with traditional venture capital investors, crowdfunding investors in FinTech-based businesses may have to wait several years for their investment to come to fruition (R10). • Exit options in FinTech-based crowdfunders are limited or may not even exist (R12).	Lack of quick liquidity	Domestic risk	Crowdfunding risk in FinTech based businesses
• Unfortunately, the conflict of interest in the financial sector is very severe and multi-layered, part of which is in the monitoring field. Supervision must be powerful to expand financial development and reduce the underlying inequality to zero (R1). • The special benefits obtained from the benefits of a part of the entrepreneur in using the platform and not allocating it to the financial investors induce a strong conflict with the major financiers (R3).	Conflict of interests between entrepreneurs and investors		
• Due to the highly unpredictable nature of fintech-based businesses in the country, there are many uncertain and unfavorable possibilities in their crowdfunding (R2). • Startups are very risky investments. Therefore, the probability of company failure and subsequent investment failure is very high (R7). • Investors in public stock markets almost never expect the investment to reach zero. But in private and early-stage markets, failure is a norm not an exception (R5). • A company can continue its activity for several decades relatively successfully but never provide the necessary growth to exit the investor and never return the expected profit to the investors (R6).	High failure rate		
• Dilution of shares is usually not observed by existing shareholders. Companies sometimes initiate share buyback programs to help inhibit dilution (R3). • Dilution of shares is equivalent to a decrease in the value or percentage of ownership of the shares of the shareholders of a company (R8). • Dilution is a potentially large risk that can seriously reduce investors' returns in crowdfunding (R9).	Investment dilution		
• Normally, in the crowdfunding contract, the investor assigns governance rights to a single person such as the CEO (R1). • If you participate in fintech financing as an investor, you should not expect to meet the founder and managers (R10). • Don't expect that now that part of the company's financing is provided by you, the goals and plans of the company will change according to your wishes (R11).	Lack of control over all aspects of investment		
• If you're covering a small portion of the funding, it's not reasonable to expect the founder to send you a weekly (or even monthly) update on the exact progress they've made (R2). • You have to believe that sharing specific and sensitive issues with hundreds (or more) investors exposes them to greater risk, which is competitors' access to this information (R3). • Many fintech start-ups prefer to exercise caution when providing sensitive financial and business updates to investors, which means limited disclosure rights for small investors (R6).	Lack of transparency and limited information		
• Investors should also be aware of potential fraud plans in the crowdfunding process (R3).	The possibility of fraud and		

Verbal evidence (the number in parentheses indicates the code of the interviewee)	Initial coding	Sub-theme	Main theme
• Fraudsters may use asymmetric information as well as loopholes in regulations to deceive investors (R8). • By granting a license, Iran Foreign Exchange tries to check and verify the information provided only for licensed companies that are looking for financing. Therefore, the possibility of fraud in these companies is zero (R9). • Investors should be aware of the inherent risk of investing in this method of financing and should not act without knowing about investing in listed plans on different platforms (R12).	corruption		
• Preventing carelessness in the transaction process and finding a suitable solution in dealing with risk are among the factors that justify risk recognition and encourage and support the parties in the correct transaction path (R1). • In the crowdfunding contract, as a legal entity, to achieve its goals, it always faces uncertainties, which can only be clarified by proper control and response to the obligations and powers of the parties to the contract (R4). • The presence of risk in different stages of the transaction, i.e. finding the counterparty, preliminary negotiations, and finally concluding and executing the contract, is unavoidable and obvious (R5). • One of the biggest challenges for traders in fintech-based digital transactions is transaction risk management (R7). • By recognizing the nature of the risks of the parties' obligations, the impact of opportunities and threats, including financial, political, competitive, operational, social aspects, as well as the communication policies of the parties, a logical solution will be taken in the way of its implementation to prevent upcoming failures; as a result, it leads to the reduction of contract costs and its correct and timely implementation (R8). • Since the terms of concluding a contract can be considered as a guarantee of its implementation, it is necessary to pay special attention to the arrangement of the contract, the tasks of the parties, and the division of risks related to the transaction (R9).	Risk of contract and transaction conditions		
• What should be noted is that one should not exaggerate the capacity of crowdfunding and its profitability and success in general (R1). • Improper pricing of fintech projects and over- or under-investment in them is one of the challenges facing crowdfunding in this field (R2). • Mandatory pricing, if done, will cause improper distribution of goods and services and create special opportunities for some abuses (R4). • The fintech market and investment in this market, like other markets, operates with rationality and economic logic, and the mandated price causes real investors to leave crowdfunding, so profits gained from production and sales flow towards intermediaries (R6). • Pricing should be done based on competitive principles and of course taking into account the laws related to this area (R8). • Due to the multidisciplinary nature of fintech, its valuation is very complicated (R10). • The discussion of correct valuation has made investors more interested in financing start-ups focused on finance because they do not see it as speculative (R11).	Improper valuation		
• The possibility of loss due to failure in the processes, information, and internal systems of the platform also potentially exists (R5). • Losses caused by human error or the consequences of internal events may jeopardize financing, such as disagreements in the board of directors that affect the operational process of the business (R9).	Operational risk		
• Another risk that exists is that the fair value or future cash flows of	Market risk	Foreign risk	

Verbal evidence (the number in parentheses indicates the code of the interviewee)	Initial coding	Sub-theme	Main theme
a financial instrument may fluctuate as a result of price changes in the market (R3). • As a result of asset price fluctuations in the market, one of the parties in the financial operation may not be able to fulfill all the obligations agreed between the business and the investor; as a result, the other party may incur losses (R11).			
• The possibility of increasing financing costs due to the instability and change in monetary policy is not far from expected (R7). • In macroeconomics, investment is the amount of goods purchased per unit of time that are not consumed but are used for production in the future. Therefore, this theory is true in crowdfunding, which is a type of long-term investment, and its risks spread (R10).	Macroeconomic risk		
• Although new laws have recently been enacted to regulate crowdfunding operations, there is still some uncertainty regarding the application of some laws (R1). • Poor coordination between regulators in the country may create a fragmented market that does not help to increase crowdfunding (R3). • Crowdfunding is still a new phenomenon that has emerged only since the beginning of the century. Hence, some countries have recently adopted regulations on such fundraising methods, while others, including Iran, implement merely general and sometimes unrelated regulations (R6). • One of the main goals of regulations is to protect investors because this fundraising model is potentially prone to fraud (R7). • Inconsistent regulations related to financing should be corrected in pursuit of two goals: on the one hand, supporting investors who lack knowledge and on the other hand, facilitating access to financial resources for start-ups or small businesses (R9). • Laws set limits on the amount of funds that can be collected by companies and also on the amount of investment of each investor (R11).	Lack of coordination in regulations		

Validation of research results

In this part of the research, the results of the qualitative part are tested using the PLS method. First, the descriptive statistics and then the inferential statistics resulting from the analysis are reported.

Table 3 shows the descriptive statistics of the studied variables including mean and standard deviation. The results of sample distribution according to gender showed that 180 of the respondents were male (62%), and 110 were female (38%). Also, the sample distribution according to age showed that 147 people (51%) are 25 to 35 years old, 78 people (27%) are 35 to 45 years old, and 65 people (22%) were over 45 years old. The sample distribution according to the level of education showed that, 31% of the respondents (90 people) had a bachelor's degree; 50% of the respondents (146 people) had a master's degree; and 19% of the respondents (54 people) had a Ph.D degree. In addition, the sample distribution based on work experience showed that 28% of the respondents (82 people) had a work experience of 5 to 10 years;

29% of the respondents (85 people) had a work experience of 10 to 15 years; 22% of respondents (65 people) had experience of 15 to 20 years, 15% of respondents (42 people) had experience of 20 to 25 years, and 16% of respondents (16 people) had a work experience of more than 25 years.

In the following, the fitting of measurement models are done through factor loading and three measures of Cronbach's alpha, composite reliability, and divergent validity. Since all items had a factor load greater than 0.4, no question was removed. The values of Cronbach's alpha and composite reliability coefficient for all structures are higher than 0.7, which indicates the appropriate reliability of the model. Also, convergent validity assesses the degree of correlation of each construct with its variables (indices). Average Variance Extracted (AVE) calculated by PLS software is used for this purpose. The appropriate value for AVE is 0.5 or higher. According to Table 4, composite reliability (AVE) is in the relevant range. So, the appropriateness of the reliability and validity and the

convergence of the external relations of the research model can be confirmed.

Also, the research model was tested using the partial least squares technique and Smart Pls software. In this model, all relationships were analyzed simultaneously. In the following, the research model is presented in the form of standardized coefficients (t value) (Figure 1) .

According to the fitted model in Figure 1, the value of the t-statistic for all hypotheses is greater than 1.96, and the probability of the t-statistic is less than 0.05. Therefore, it is within the acceptable range. So,

according to the fitted model, path coefficients, standard deviation, T-statistic, and probability value (P) are as follow.

According to the results obtained from Table 5, the T statistic shows the significance of the relationships of the model variables because the probability value of this statistic is less than 0.05. In other words, the significance test of path coefficients shows that all paths are statistically significant and their effect is confirmed. This means that the components compiled in the research have adequate reliability according to the above paths.

Table 3: Characteristics of the respondents

Frequency percentage	Frequency	Variable levels	Demographic variables
۶۲	۱۸۰	Male	Gender
۳۸	۱۱۰	Female	
۵۱	۱۴۷	۲۵-۳۵years	Age
۲۷	۷۸	۳۵-۴۵years	
۲۲	۶۵	More than 45 years	
۲۸	۸۲	۵to 10 years	Work experience
۲۹	۸۵	۱۰to 15 years	
۲۲	۶۵	۱۵to 20 years	
۱۵	۴۲	۲۰to 25 years	
۱۶	۱۶	Over 25 years old	
۳۱	۹۰	Bachelor's degree	Education
۵۰	۱۴۶	Masters of science	
۱۹	۵۴	Ph.D	

Table 4: Fit of measurement models

Convergent validity (AVA>0.5)	Composite reliability (Alpha > 0.7)	Cronbach's Alpha (Alpha>0.7)	Number of components	
0.493	0.926	0.913	۱۳	Crowdfunding risk in fintech based businesses
0.66	0.854	0.743	3	The risk of external factors
0.5	0.909	0.888	10	The risk of internal factors

Table 5: The results of implementing the structural model

Probability values	T statistic	Standard deviation	Path coefficients	Path
0.000	42.961	0.02	0.84	Risk of external factors -> macroeconomic risk
0.000	35.97	0.022	0.798	Risk of external factors -> market risk
0.000	21.532	0.013	0.274	Risk of external factors -> Crowdfunding risk in fintech based businesses
0.000	35.689	0.022	0.799	Risk of external factors -> lack of coordination in regulations
0.000	32.732	0.024	0.796	Risk of internal factors -> possibility of fraud and corruption
0.000	25.632	0.028	0.71	Risk of internal factors -> inappropriate valuation
0.000	27.151	0.028	0.756	Risk of internal factors -> conflict of interest between entrepreneur and investors
0.000	18.746	0.036	0.63	Risk of internal factors -> dilution of investment
0.000	60.401	0.013	0.77	Risk of internal factors -> Crowdfunding risk in fintech based businesses
0.000	13.437	0.042	0.568	Risk of internal factors -> risk of contract and transaction conditions

| Probability values	T statistic	Standard deviation	Path coefficients	Path
0.000	22.959	0.03	0.682	Risk of internal factors -> operational risk
0.000	25.14	0.029	0.725	Risk of internal factors -> lack of transparency and limited information
0.000	26.334	0.027	0.714	Risk of internal factors -> rapid illiquidity
0.000	16.994	0/04	0/684	Risk of internal factors -> lack of control over all aspects of investment
0.000	27.782	0.026	0.736	Risk of internal factors -> high failure rate
0.000	42.961	0.020	0.840	Risk of external factors -> macroeconomic risk
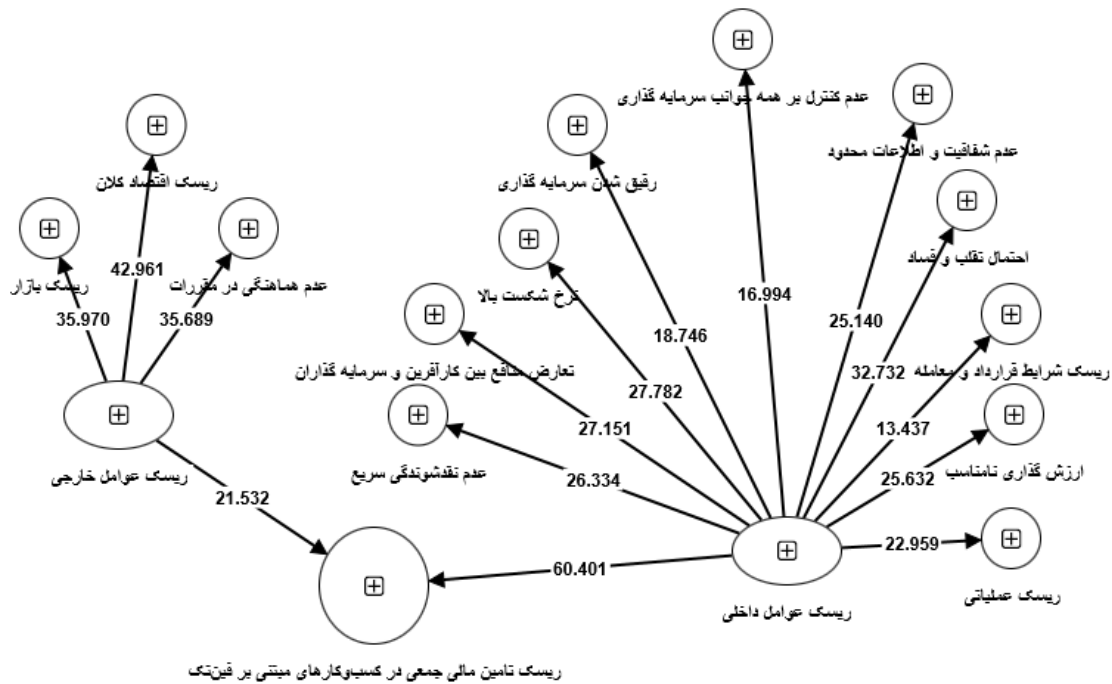
Figure 1: Test of the research model as standardized coefficients (t value)

Conclusion and suggestion

The current research identified and modeled the risk indicators of crowdfunding in fintech-based businesses. The aforementioned indicators were identified based on the analysis of the results of the interviews using the theme analysis method and then validated through the questionnaire and structural equation modeling with PLS method. The results showed that the risk of crowdfunding in fintech-based businesses is divided into two main parts. The risk of internal factors, including lack of quick liquidity, conflict of interests between entrepreneurs and investors, high failure rate, dilution of investment, lack of control over all aspects of investment, lack of transparency and limited information, possibility of fraud and corruption, risk of contract and transaction

terms, inappropriate valuation, operational risk, and the risk of external factors, which includes market risk, macroeconomic risk, and lack of coordination in regulations.

The review domestic and foreign research studies shows that there is no research dealing with the identification and modeling of crowdfunding risk indicators in fintech-based businesses. However, the present research aimed to examine topics such as financing risk, crowdfunding or fintech with the research studies of Venslavienė et al. (2021), Yeh and Chen (2020), Irvani et al. (2021), Xie et al. (2019), Haji Gholam Saryazdi et al. (2020), Abdul Maleki and Khabiri (2020), Chen et al. (2018) and Mokhtarrudin et al. (2017) in the literature review part. To explain the results, all institutions and organizations are potentially exposed to various real risks, depending on

the type of activity they are engaged in, which can be the source of accidental costs and damages for them. Such damages have different degrees from the point of view of frequency of occurrence and severity of damage. However, their accidental nature causes such damage to be a financial loss to the institution and sometimes lead to the collapse of the entire system. Meanwhile, digital crowdfunding includes a part of fintech that is responsible for providing financing for natural and legal persons. Among its types, we can mention a model that is based on the participation of a wide group of people and is called crowdfunding. In recent years, crowdfunding has been used as an alternative digital economy solution or a dynamic technological and financial investment manifesto, which actually includes both dimensions, for financing. However, crowdfunding is still a new phenomenon that has only emerged since the turn of the century. Hence, some countries have recently passed regulations on such fundraising methods, while others, including Iran, implement general and sometimes unrelated regulations. In addition, poor coordination between regulators in the country may create a fragmented market that is not conducive to increasing crowdfunding. Although new laws have recently been enacted to regulate crowdfunding operations, there is always a degree of uncertainty regarding the application of certain laws.

This research can be used in the direction of preparing the conditions of the country in the field of crowdfunding by communicating its results to decision-making organizations. This research has in general identified the risk of crowdfunding in fintech-based businesses. Therefore, according to the identified factors, it has the greatest impact on the preparation conditions of these businesses in facing the existing risks. It is possible to provide the necessary training in this area by creating a suitable substrate by government and private centers to provide the necessary substrate in understanding the various aspects of risks and also the ways to control them. In addition, fintech-based businesses are suggested. The risks of internal factors can be periodically assessed, including lack of quick liquidity, conflict of interest between entrepreneurs and investors, high failure rate, dilution of investment, lack of control over all aspects of investment, lack of transparency and limited information, the possibility of fraud and corruption, the risk of contract and transaction terms, inappropriate valuation, the operational risk that is in the inherent control of these businesses, and incorrect procedures and regulations can be corrected and modified.

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