



RESEARCH ARTICLE

Designing a Model of Intangible Causes of Bankruptcy by TISM

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How to cite this article:

Mazaheri, M., Safdarian, L., & Molaei, M. (2023). Designing a Model of Intangible Causes of Bankruptcy by TISM. Iranian Journal of Accounting, Auditing and Finance, 7(3), 17-37. doi: 10.22067/ijaaf.2023.42640.1138
https://ijaaf.um.ac.ir/article_42640.html

ARTICLE INFO

Article History

Received: 2022-03-21

Accepted: 2023-05-14

Published online: 2023-07-14

Abstract

One of the competitive conflicts of the capital market is the structural disruption of companies in terms of company capacity with market changes that can lead to the bankruptcy of companies. Bankruptcy will usually have detrimental social effects and loss of stakeholder rights due to individual negligence and lack of strategic structural insights at the market level, that knowing that can prevent financial helplessness and bankruptcy and maintain the ground for growth or maintaining the competitive position of the company in the markets as well as the capital market. This study aims to design a model of intangible causes of bankruptcy of capital market companies based on modeling a Total Interpretive Structural Modelling. This research is methodologically based on the result, developmental, and data type is a mixed method. In the qualitative part of the research, through Meta-synthesis and Delphi analysis, an attempt was made to screen the themes of companies' bankruptcy in the capital market and then determine their theoretical adequacy based on Delphi analysis. In the quantitative part of the research, an attempt was made to prioritize the approved themes of the qualitative part while analyzing the total interpretive structural model to determine the most influential theme of the bankruptcy of capital market companies. The target population in this research in the qualitative part included 12 accounting and financial management specialists at the university level and in the quantitative part were 25 managers of the top 50 companies of the stock exchange. The results showed that the lack of strategies to reduce the size of the company based on the product life cycle of products is the most intangible factor in the bankruptcy of capital market companies. This research is limited because it focuses on companies' content and structural dimensions in creating bankruptcy risk. Based on a combination of qualitative and quantitative analysis, he sought to explain the dimensions identified in prioritizing the themes of bankruptcy of capital market companies, an area that, despite its strategic importance and institutional governance in protecting the interests of shareholders, has received less attention. This research can be used to develop theoretical foundations on the one hand and the structural and content relevance of companies on the other to surround the stimulus considered the risks of bankruptcy. The paper shapes the relationship between a firm's situation, its symptoms, the bankruptcy syndrome and the causes of a particular situation. Using one of the newest developed theories, total interpretive structural modelling (TISM) used in firms' diagnosis – the bankruptcy syndrome – the paper extends the characteristics of this term and uses it in determining the causes that generate anomalies at the firm level.

Keywords:

Content Causes of Corporate
Bankruptcy, Structural
Causes of Corporate
Bankruptcy, Total
Interpretive Structural
Modelling

doi <https://doi.org/10.22067/ijaaf.2023.42640.1138>



NUMBER OF REFERENCES
40



NUMBER OF FIGURES
7



NUMBER OF TABLES
11

Homepage: <https://ijaaf.um.ac.ir>

E-Issn: 2717-4131

P-Issn: 2588-6142

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1. Introduction

Making the right decision in competitive conditions in the capital market today requires information that reflects reality and is consistent with the current situation of companies. This information, before analysis, is in the form of raw data that, if not properly analyzed, cannot be a basis for decision making and, possibly at the level of a competitive market, can lead to bankruptcy (Ghaderi and Ghaderi, 2017). In fact, for investors and many investment companies that are affected by the bankruptcy of companies, it is essential to use a quick and reliable tool to identify the financial distress of companies because they often have to make quick decisions about their capital and may not have an analytical understanding of the performance of companies (Nishi and Peabody, 2019). Identifying the causes of corporate bankruptcy in the form of mathematical techniques and simulating corporate disclosed data is considered an analytical basis in today's unbalanced economic conditions that can help create a free flow of information (Li et al., 2019). Increasing competition from businesses has limited profitability and increased the likelihood of bankruptcy. Thus, financial decision-making has become more strategic than in the past based on the application of identifying the causes of bankruptcy (Inam et al., 2019). It should be noted that financial decision making is always associated with risk and uncertainty; one of the ways to help investors is to provide cognitive models about the overall outlook of companies. Accordingly, the more the knowledge of the causes of companies' bankruptcy increases, the more correct decisions can be made (Setayesh and Aznab, 2019). Therefore, recognizing the effective causes of bankruptcy is one of the tools for estimating the future situation of companies so; that due to the focus on providing the necessary warnings, it can alert companies to the occurrence of financial instability and bankruptcy so that they can develop appropriate strategies to control these factors. Carrying out these processes is of great importance to investors and society because it indicates the importance of protecting the company's interests; companies are aware of the possibility of bankruptcy, so they can take preventive measures and strengthen the confidence of shareholders and investors. It should be noted that investors and creditors are very interested in understanding the bankruptcy status of companies because, in case of bankruptcy, they will incur high costs. Based on this, it can be stated that each of the models for predicting the bankruptcy of companies has its own strengths and weaknesses (Fakhrehosseini and Aghaei Meybodi, 2019). Assessing the causes of bankruptcy is also especially important for corporate governance mechanisms, as they examine the firm's structural strengths and weaknesses in response to changing needs. In this way, they help the company to develop a longer-term vision of the competitive situation and meet the expectations of shareholders and investors. Therefore, this research can help the development of financial literacy in stakeholder decision-making through the following:

First, the screening of models to identify the causes of corporate bankruptcy shows that most analytical models are classified into two groups: statistical models and artificial intelligence. In other words, a group of bankruptcy studies on linear methods were concentrated, such as multiple analysis models, Logit and Probit. While another group of studies on newer methods concentrated such as artificial intelligence; data mining techniques; genetic algorithms and intelligent systems, although they have been able to contribute well to the effectiveness and validity of the models in presenting linear assumptions through the normality of input variables, they pay less attention to the content and structural dimensions of companies in creating bankruptcy risk. Thus, as can be seen, most models analyze the company bankruptcy by the existence of standards or financial statement items. At the same time, less research has examined the existence of bankruptcy based on content screening for multidimensional theoretical analysis. (Jia et al., 2020). For example, previous research such as Qu et al. (2019) examined "identifying the causes of bankruptcy through machine learning"; Ptak-Chmielewska (2018) "Identifying the micro-causes of company bankruptcy through data mining

techniques"; Bateni and Asghari (2020) "bankruptcy prediction through genetic algorithm and logit regression" and Vaghfi (2019) "Analysis of the causes of financial bankruptcy based on artificial intelligence algorithm", confirms the claim that although the issue of identifying the causes and predicting the company bankruptcy has been considered. However, less research has examined the dimensions of failure in terms of combining the content and structural basis with the financial functions of financial statements, and this research can contribute to the development of theoretical literature in this area.

Second, the results of this study can help regulators, such as capital market policymakers, because of their ability to predict the competitive functions of enterprises to develop sustainability requirements in preventing the possibility of corporate bankruptcy to investor protection. Also, this research can look at the corporate governance structure in order to focus on controlling the probabilities of bankruptcy probability such as leverage ratios; legal mechanisms; timely and reliable disclosure of news and information will help increase the level of information transparency in financial reporting and prevent the company from being in a critical situation.

Therefore, to understand this theoretical and practical gap, the research tries to determine the components and themes of the causes of bankruptcy in the capital market by examining the content of similar research in the first step and then, based on theoretical adequacy, through a total interpretive structural model, to provide a model to determine the most influential themes of the causes of bankruptcy of Tehran Stock Exchange companies. Therefore, the main question of the research is what are the most effective themes of bankruptcy of Tehran Stock Exchange companies by total interpretive structural model?

2. Literature Review

In this section, an attempt is made to present the theoretical dimensions related to the concept of corporate bankruptcy in both theoretical and experimental sections.

2.1. Bankruptcy

The word bankruptcy means helplessness in business and is a kind of financial loss that causes the company's debt level to be overestimated over its assets.



Figure 1. The conceptual basis of bankruptcy

In legal terms, however, bankruptcy means the inability of the company to pay its debts to creditors so that, according to Article 412 of the Commercial Code, the property is seized and consequently stopped from paying the funds it owes (Heidari et al., 2021). Cooper and Uzun (2019) define corporate bankruptcy as follows: "bankrupt businesses enterprise stop their business operations and have legal responsibility for assigning creditors. In the Iranian Stock Exchange, the owner of the bankruptcy and delisting of companies from the stock exchange, in accordance with Article 141 of the Amended Commercial Code and its provisions,» if at least half of the company's capital is lost as a result of losses incurred, the board of directors is obliged to immediately convene an extraordinary

general meeting to invite shareholders to consider the issue of liquidation or survival of the company. Suppose the said assembly does not vote to dissolve the company. In that case, it must reduce the company's capital to the amount of the existing capital in the same meeting and compliance with the provisions of Article 6 of this law (Dabagh and Sheikhbeiglou, 2020). On the other hand, Karels and Prakash (1987) describe financial distress as a decrease in the firm's profitability, which increases the likelihood of inability to repay the principal and interest on the debt.

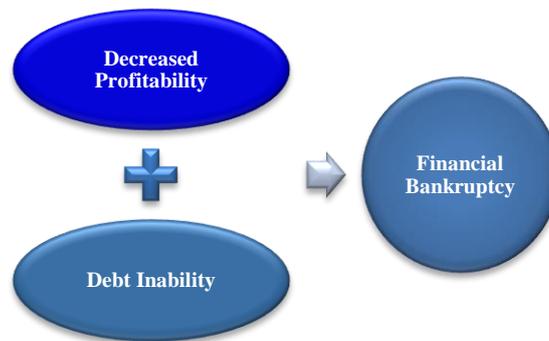


Figure 2. The basis of financial bankruptcy

In fact, according to this framework, in the early stages of financial distress, the mean operating profit of the company is not adjusted based on earnings. It can be measured after controlling for other factors that cause a significant change in increasing the company's performance. Notably, timely and accurate identification of companies on the verge of bankruptcy can greatly prevent potential stakeholder losses. But the question is, given the importance of identification time, what mechanisms can help identify the causes of corporate bankruptcy on time? In this regard, Aktan (2012) presented mechanisms for the timely identification of corporate bankruptcy in the form of the following theoretical framework.



Figure 3. The mechanisms for timely identification of company bankruptcies

As it turns out, R&D is seen as a mechanism for identifying bankruptcy in the first dimension of

the Aktan (2012) model, which can lead to a correlation between environmental expectations and stimuli with intra-organizational capacities for a more coherent perception of the environment; On the other hand, the dynamics of corporate governance create the ground for increasing effective oversight in order to adhere to equal benefits between the company and external stakeholders. The effective information environment is the third dimension of the bankruptcy identification model Aktan (2012) expresses the company's interactive atmosphere with external stakeholders in full reflection of news and information in a symmetrical way so that creating an effective information environment can identify bankruptcy incentives.

On the other hand, effective internal control is an important part of financial reporting processes in line with auditing standards, and this can transmit any deviation from the company's performance to the company's decision makers in the form of balanced evaluation programs and is an important mechanism in identifying the causes of bankruptcy. In the fifth dimension of this model, the effectiveness of decision-making refers to understanding the practical realities of the company and avoiding excitement and bias in the company's decisions. In the last dimension, wise management provides a level of managerial rationality (Berkovitch et al., 1998). As it turns out, the importance of identifying the causes of bankruptcy is so crucial that many Small and Medium Entrepreneur Companies (SMEs) do not reach the growth process and fail in their early years, so predicting the growth and decline of companies can come at a huge cost (Bărbuță-Mișu, N., and Madaleno, 2020).

On the other hand, Olsen and Tamm (2017) point out that due to the lack of identification of possible causes of bankruptcy, it is not necessary to directly use the data of financial statements to predict the bankruptcy of companies in the coming years and focus on the content and structural dimensions. Utilizing models created and defined by scientific-experimental methods can be more efficient, especially for enterprises operating in a competitive market. Therefore, relying on theoretical foundations and based on the existing theoretical and empirical gap regarding reliance on structural and content causes of companies in identifying the causes of bankruptcy, research questions are presented in the following order:

What are the components and themes of the causes of bankruptcy of capital market companies?

What are the most influential identified causes of bankruptcy of capital market companies?

2.2. Prior research

By examining the financial reports of the Chinese Stock Exchange, Hu et al. (2020) found that the main reason for the bankruptcy is the mismatch between the characteristics of the financial structure of companies and their competitive status, in such a way that the existence of financial restrictions has caused many companies to don't have the strength to invest in projects, or many projects to fail, and this increases the probability of bankruptcy.

To predict bankruptcy and profitability, Dabagh and Sheikh Begoo (2020) analyzed the financial performance and status using logistic regression and financial ratios of artificial neural network and Fulmer models and figured out that the power and accuracy of artificial neural network model bankruptcy prediction compared to Fulmer's model has a higher accuracy. Also, accounts receivable over sales are the highest, and debt-to-equity ratios are the lowest financial ratios affecting bankruptcy in the artificial neural network model.

Veganzones and Severin (2021) sought to identify the causes of commercial bankruptcy of companies through content analysis. The results indicated the creation of a model based on the theoretical consensus of experts, where the essential basis in predicting bankruptcy is the economic insight of companies in future estimates and the use of appropriate evaluation scenario models.

Laitinen (2021) used simple mathematical modeling to depict the bankruptcy process of companies and figured out that the linear system embedded in accounting can be effective in risk analysis due to

the evaluation of financial ratios linearly. Also, based on return and risk, the results showed a significant difference between companies with a low probability of bankruptcy and those with a high probability of bankruptcy.

Jandaghi et al. (2021) used the ant colony theme along with the k-nearest neighbor algorithm to select the characteristics and classification of companies and solved the problem of asymmetry of the data set with the subsampling technique and showed that variables such as the ratio of EBIT to total sales; proprietary; current; cash, and debt are most effective factors in predicting the state of credit health of companies.

Antill (2022) showed that since bankruptcy leads to the dissolution of companies due to the inability to fulfill obligations to creditors, companies can focus on recovering blocked resources to pay their obligations to creditors. That means by providing them with their products or a part of the blocked assets; they can improve their obligations and prevent bankruptcy at the commercial market level. Kuttner et al. (2023) considered the overall quality of accounting systems, the quality of early warning systems, and the reengineering of valid information disclosures to examine how insolvent SMEs can provide evidence to the court about their ability to repay their debt and found that the existence of a reorganization plan in the way of information disclosure can significantly help the short-term and long-term success of bankrupt small and medium-sized companies to continue their business activities with the efficient and effective use of resources.

By reviewing the studies, we can see that most of the studies are about analyzing the causes of corporate bankruptcy, based on the use of financial statement data and by relying on neural network models, Logit, and artificial intelligence, and few studies have examined dimensions other than financial dimensions to evaluate the reasons for bankruptcy. Therefore, this research aims to cover this weakness of studies by screening the content and identifying the dimensions of bankruptcy of capital market companies in the first step (qualitative part of the research) and then prioritizing it in the form of a hierarchical model to create more knowledge for the users in the second step (the quantitative part of the research).

3. Research Methodology

In terms of purpose, this research is in the category of descriptive research to explain the phenomenon at the level of capital market companies. In terms of results, it is part of developmental research because first, the concepts related to the causes of corporate bankruptcy are identified based on related research and relying on various theories, and then based on matrix analysis, it proceeds to prioritize each of the identified criteria. Therefore, relying on the lack of academic integrity in corporate bankruptcy's content and structural concept, this study tries to create an integrated model through development functions. Finally, in terms of data collection logic, this study is of inductive-deductive type because in the qualitative method, first, relying on the inductive approach will be identified the dimensions related to the causes of companies' bankruptcy. The themes identified among the participants in the quantitative section will then be evaluated inductively.

In this research, which is a mixed method, meta-synthesis is used in the qualitative part. Meta-synthesis involves steps to arrive at components and propositions; perhaps the most important way is through process steps, which include a range of knowledge of the root cause of the problem in the form of research question formulation and the presentation of a specific model based on identifying propositional themes from the results of previous research based on the participation of panel members. Then, based on Delphi analysis, in order to determine the theoretical adequacy according to the two criteria of mean and agreement coefficient, an attempt is made to confirm the propositions in terms of theoretical adequacy, which includes a range of knowledge of the root cause of the problem in the form of research question formulation, the presentation of a specific model based on

identifying propositional themes from the results of previous research based on the participation of panel members. Then, based on Delphi analysis, in order to determine the theoretical adequacy according to the two criteria of mean and agreement coefficient, an attempt is made to confirm the propositions in terms of theoretical adequacy. Finally, in a quantitative part, through the analysis of a comprehensive interpretive and structural model, the identified layers are explained in the form of a prioritization model in terms of influence and effectiveness.

3.1. Statistical population and research sampling method

Based on the nature of the research, which is mixed, the target population in the qualitative section includes the research related to the research topic and 12 accounting and financial management specialists at the university level who identify the content propositions of the research based on the process of meta-synthesis, critical evaluation and Delphi analysis. In order to select these individuals, a homogeneous qualitative sampling method in the form of panel group members has been used. In this sampling method, the researcher tries to select the research participants to gain in-depth knowledge to select experts with the necessary experience and analytical knowledge in relation to the research topic. The target audience in a small section is 25 managers of the top 50 companies on the Tehran Stock Exchange; based on the nature of the analysis based on the limited number of research participants, it tries to explain the components and propositions identified in the qualitative sector at the level of the capital market through cross-matrix analysis, because the purpose of quantitative analysis is to use cross-matrix questionnaires with the participation of 15 to 30 people according to [Singh and Kant research \(2011\)](#); [Malone \(2014\)](#); [Ramesh et al. \(2010\)](#) and [Attri et al. \(2013\)](#) confirmed the optimal sample size selection in the range of 15 to 30 people.

4. Findings

In this section, due to the nature of the research methodology, the analyses are presented in two parts, qualitative and quantitative, in order to create a more coherent understanding of the research findings.

4.1. Qualitative section analyzes

In this section, two Meta-synthesis and Delphi analyzes have been used. First, in this section, it is necessary to review the valid scientific databases to select similar research from 2018 to 2021 in domestic and foreign research. This will help to obtain newer research on the research phenomenon. Therefore, in order to achieve research related to the field of research, in the next step, screening should be done in the first three stages, including title screening, Content and action analysis to create a more specific perception, Figure (4) is used to perform the second step.

It should be noted that the 14 initial types of research should be analyzed in the third step in terms of critical evaluation with the participation of research experts. This process includes the following 10 criteria, which are examined based on a minimum score of (1) and a maximum of (5). The total score based on 10 criteria can be 50, and if a research score of 30 or more, it enters the fourth step. Based on a better understanding of the analysis process in this step, with the participation of research experts, 14 approved initial researches will be analyzed for points based on critical evaluation analysis.

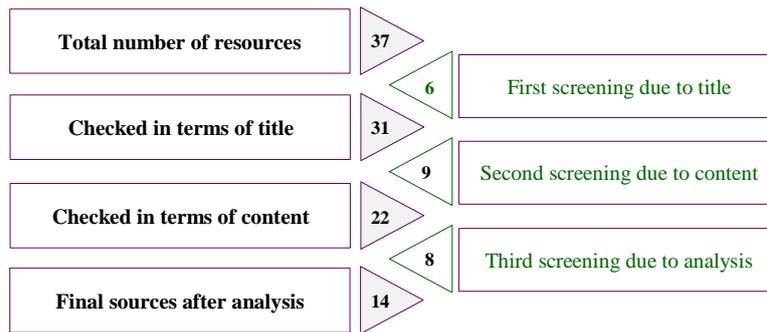


Figure 4. The screening analysis process

Table 1. The critical evaluation analysis

		International researches							Internal researches					
		1	2	3	4	5	6	7	8	9	10	11	12	13
Approved research		Nagel and Aviles (2021)	Oware and Appiah (2021)	Nguyen and Huynh (2020)	Jace et al. (2020)	He et al. (2020)	Lohmann and Ohliger (2019)	Nishi and Peabody (2019)	Ghosh (2019)	Farooq and Jibrán (2018)	Jandaghi et al. (2021)	Hashemi and Heidarpoor (2020)	Hosseini and Morshedi (2020)	Pour Tabarestani et al. (2019)
Critical proposal criteria	Purpose	3	2	3	2	2	4	3	2	3	5	3	2	3
	Method	5	1	4	1	2	3	3	3	4	4	5	3	3
	Plan	4	3	4	2	3	3	3	2	3	4	4	2	3
	Sample	3	2	5	3	4	4	4	3	3	3	3	1	2
	Collecting	4	3	4	2	3	4	3	2	3	3	4	3	4
	Generalization	4	2	3	3	3	4	4	3	4	4	3	2	3
	Ethical	5	3	4	3	3	3	4	3	4	3	3	3	4
	Analyze	4	2	3	3	3	3	3	3	4	4	3	1	3
	Theoretical	4	2	4	2	3	4	4	3	3	3	4	2	3
	Value	4	3	4	2	4	4	4	3	3	4	4	2	3
Total		40	23	38	23	30	36	34	27	34	37	36	21	31

After performing the critical evaluation process, it was determined that 4 studies were excluded from the total of approved studies because they scored below 30. In order to determine the themes of corporate bankruptcy, the process of selecting the largest number of distribution distributions by content analysis at the heart of approved research is used. Therefore, based on the approved research, first, all the criteria related to the research concept are determined and given in column (2) to put a "☑" sign in front of each research to finally determine what the highest frequency of the identified component is. In other words, based on each researcher's use of the sub-criteria written in the table column, the symbol "☑" is inserted, then the scores of each ☑ are added together in the sub-criteria column, and scores above the mean of the conducted research are selected as research components.

The result of the component determination process showed that they are the content and structural causes of corporate bankruptcy. In this section, after analyzing the basics of the approved components of the above research, the themes for each main component are determined separately.

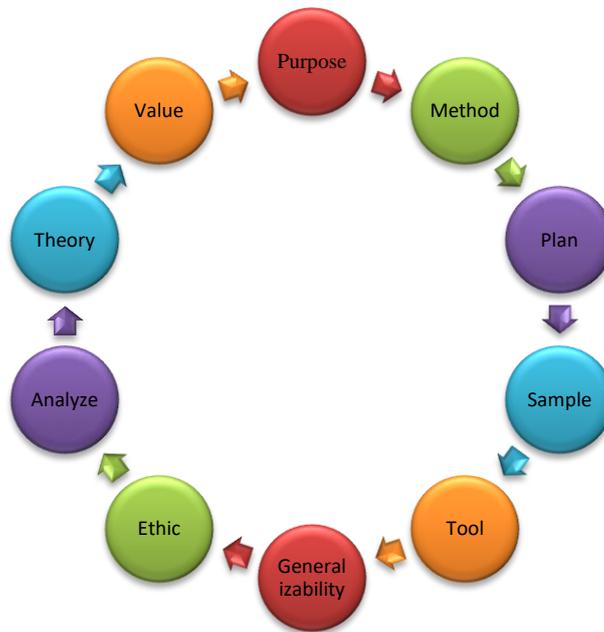


Figure 5. The criteria for the critical evaluation process

Table 2. The process of determining the components of corporate bankruptcy causes

	Content causes of corporate bankruptcy	Ethical causes of corporate bankruptcy	Legal and Institutional Causes of Bankruptcy	Economic causes of corporate bankruptcy	Structural causes of corporate bankruptcy
International researches	Nagel and Aviles (2021)	✓	-	✓	✓
	Nguyen and Huynh (2020)	-	✓	✓	-
	He et al. (2020)	-	-	✓	✓
	Lohmann and Ohliger (2019)	✓	-	-	-
	Nishi and Peabody (2019)	✓	✓	-	-
	Farooq and Jibran (2018)	✓	-	✓	-
Internal researches	Jandaghi et al. (2021)	-	✓	✓	-
	Hashemi and Heidarpour (2021)	✓	-	✓	✓
	Pour Tabarestani et al. (2019)	-	-	-	✓
Total	5	3	3	4	5

Frequency distribution of components in validated studies

Table 3. The process of determining the causes of corporate bankruptcy

		7-point score scale							
		7	6	5	4	3	2	1	
Bankruptcy Causes Components	Content Dimensions of Firm Bankruptcy	Lack of company environmental awareness of changes and social expectations							Corporate Bankruptcy Assessment Statements
		Lack of company size reduction strategies based on product life cycle							
		Instability of administrative technologies in various sectors, such as finance							
		Lack of attention to the business life cycle							
		Lack of review of the company's competitive position							
	Failure to review the organizational culture based on market requirements and expectations								
	Recognize the large organizational structure in the company.								
	Existence of structural complexities in the company								
	The high focus on decision making at the top of the organization by the CEO								
	Lack of organizational knowledge due to disregard for company personnel ratios								
Structure Dimensions of Firm Bankruptcy	Lack of focus on research and development to develop innovation and creativity								
	Failure to review direct and indirect production costs								
	The tension of fixed assets with high depreciation								

In the next step, in order to determine the consensus of experts to fit the research propositions with the main components, Delphi analysis based on two criteria of mean and coefficient of agreement is used. Therefore, to perform this section, according to the scale of 7 evaluation options, according to Table (4), the results of Delphi analysis are presented. After two rounds of analysis in the Delphi step, the results showed that 5 propositions were removed because they had an agreement coefficient below 0.5 and a mean below 5. Therefore, a total of 8 statements based on two main components were approved as an analytical basis for the causes of corporate bankruptcy. In this section, as a final step in qualitative analysis, a theoretical research model for analyzing the dimensions of corporate bankruptcy is presented.

Table 4. The Delphi process

		The first round of Delphi		The second round of Delphi		Result	
		Mean	Coefficient of Agreement	Mean	Coefficient of Agreement		
Bankruptcy Causes Components	Content Dimensions of Firm Bankruptcy	4	0.35			Delete	Bankruptcy Assessment Statements
		5.20	0.60	5.30	0.65	Confirm	

	3	0.20			<i>Delete</i>	Instability of administrative technologies in various sectors, such as finance
	6	0.80	6.20	0.85	Confirm	Lack of attention to the business life cycle
	5	0.50	5.10	0.55	Confirm	Lack of review of the company's competitive position
	5.30	0.65	5.50	0.75	Confirm	Failure to review the organizational culture based on market requirements and expectations
Structure Dimensions of Firm Bankruptcy	4	0.35			<i>Delete</i>	Lack of organizational knowledge due to disregard for company personnel ratios
	6	0.80	6.20	0.85	Confirm	Recognize the large organizational structure in the company.
	4	0.30			<i>Delete</i>	Lack of focus on research and development to develop innovation and creativity
	5.20	0.60	5.30	0.65	Confirm	The high focus on decision making at the top of the organization by the CEO
	5.30	0.65	5.50	0.75	Confirm	Failure to review direct and indirect production costs
	2	0.15			<i>Delete</i>	Existence of structural complexities in the company
	5.20	0.60	5.30	0.65	Confirm	The tension of fixed assets with high depreciation

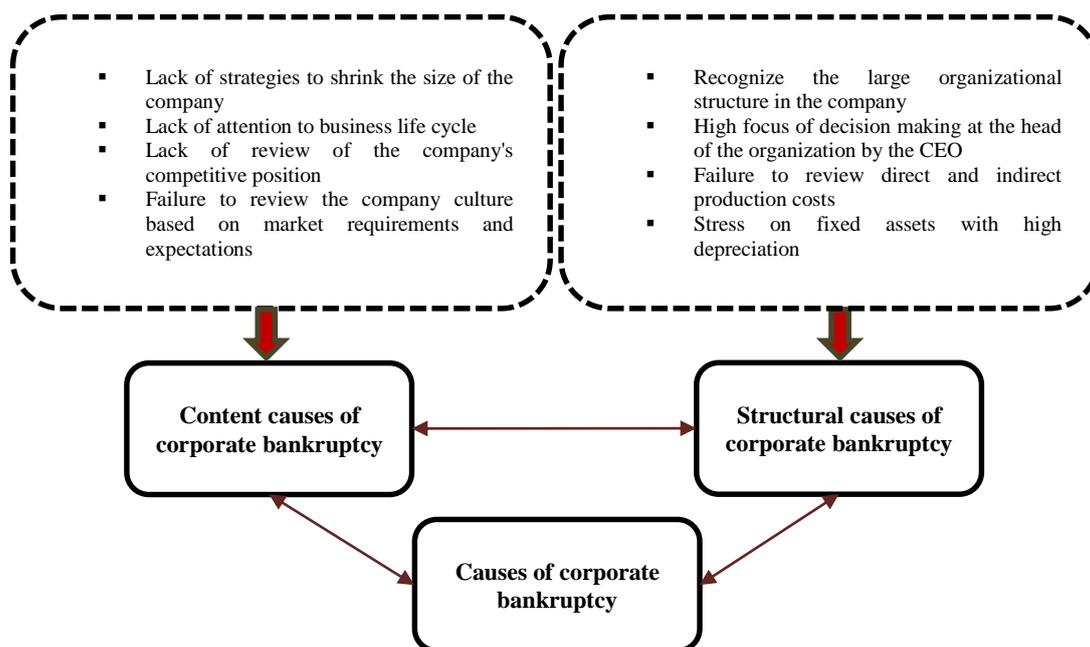


Figure 6. The theoretical framework

4.2. Qualitative section analyzes

As further explained in this section, the research seeks to assess the themes of capital market firm bankruptcy through a total interpretive structural model. First, the propositional contents of each of the main components must be coded randomly.

After assigning specific codes, a matrix should be formed with the participation of 25 managers of the top 50 companies. This matrix performs a pairwise comparison process based on rows and columns, and according to the "Mode" index, the highest frequency distribution of rows and columns is placed at the intersection of two propositional themes. After comparing the pairs of rows and columns of research propositions, the achievement matrix is formed. In other words, in this step, the symbols of the structural matrix in relation to the numbers zero and one can be formed as the achievement matrix based on Table 6.

Table 5. Coding the themes of the causes of corporate bankruptcy

Themes of the Causes of Corporate Bankruptcy	
V1	Lack of review of the company's competitive position
V2	Lack of company size reduction strategies based on product life cycle
V3	Lack of attention to the business life cycle
V4	Failure to review direct and indirect production costs
V5	The tension of fixed assets with high depreciation
V6	Recognize the large organizational structure in the company
V7	The high focus on decision making at the top of the organization by the CEO
V8	Failure to review the organizational culture based on market requirements and expectations

Table 6. Achievement matrix

		The themes of corporate bankruptcy							
		V1	V2	V3	V4	V5	V6	V7	V8
Lack of review of the company's competitive position	Proposition themes in line "j"	V1	1	0	0	0	0	1	1
Lack of company size reduction strategies based on product life cycle		V2	1	1	0	0	0	1	1
Lack of attention to the business life cycle		V3	0	0	1	0	1	1	1
Failure to review direct and indirect production costs		V4	0	0	0	1	0	0	1
The tension of fixed assets with high depreciation		V5	0	0	0	0	1	0	1
Recognize the large organizational structure in the company.		V6	0	0	0	0	0	1	1
The high focus on decision making at the top of the organization by the CEO		V7	0	0	0	0	0	0	1
Failure to review the organizational culture based on market requirements and expectations		V8	0	0	0	0	0	0	1

In the continuation of the analysis to determine the indirect relationship between the contents of corporate bankruptcy statements, the pairwise comparison of the first statement is compared in pairs with all elements from (i + 1) to nth. For each connection, the answer is yes, "Y" or "N", and the reason is stated in case of a positive answer. But if the answer is "N", the participants must comment on the pair of variables.

Table 7. The paired comparison between themes based on the matrix

Cross matrix V1... V6														
	V1	V2	V1	V3	V1	V4	V1	V5	V1	V6	V1	V7	V1	V8
	- V2	- V1	- V3	- V1	- V4	- V1	- V5	- V1	- V6	- V1	- V7	- V1	- V8	- V1
V1		✓		✓		✓	✓			✓		✓		✓
Cross matrix V2... V6														
	V2	V3	V2	V4	V2	V5	V2	V6	V2	V7	V2	V8		
	- V3	- V2	- V4	- V2	- V5	- V2	- V6	- V2	- V7	- V2	- V8	- V2		
V2		✓		✓	✓		✓			✓				
Cross matrix V3... V8														
	V3	V4	V3	V5	V3	V6	V3	V7	V3	V8				
	- V4	- V3	- V5	- V3	- V6	- V3	- V7	- V3	- V8	- V3				
V3	✓		✓		✓					✓				
Cross matrix V4... V8														
	V4	V5	V4	V6	V4	V7	V4	V8						
	- V5	- V4	- V6	- V4	- V7	- V4	- V8	- V4						
V4		✓						✓						
Cross matrix V5... V8														
	V5	V6	V5	V7	V5	V8								
	- V6	- V5	- V7	- V5	- V8	- V5								
V5		✓												
Cross matrix V6... V8														
	V6	V7	V6	V8										
	- V7	- V6	- V8	- V6										
V6	✓	✓												
Cross matrix V7... V8														
	V7	V8												
	- V8	- V7												
V7														

Table 8. Describes the relations of the pairwise matrix

Cross matrix	Cross-matrix description
Lack of review of V1's competitive position	
V2 → V1	The lack of strategies to shrink company size based on product life cycle is a reason to reconsider the company's competitive position.
V3 → V1	Lack of attention to the business life cycle is a reason not to reconsider the company's competitive position.
V4 → V1	Failure to review direct and indirect production costs is a reason not to review the company's competitive position.
V1 → V5	Lack of review of the company's competitive position is a reason for the stress of fixed assets with high depreciation.
V6 → V1	Recognition of the large organizational structure in the company is a reason not to reconsider the competitive position of the company.
V7 → V1	The CEO's high concentration of decision-making at the top of the organization is a reason not to reconsider the company's competitive position.
V8 → V1	Failure to review the organizational culture based on market requirements and expectations is a reason not to review the company's competitive position.
Lack of strategies to reduce the size of the company based on the life cycle of "V2" products	
V3 – V2	Lack of attention to the business life cycle is a reason not to reconsider strategies for downsizing a company based on the product life cycle.
V4 – V2	Failure to review direct and indirect production costs is a reason not to review strategies to downsize the firm based on the product life cycle.
V2 – V5	The lack of strategies to shrink firm size based on product life cycle is a reason for the tightness of fixed assets with high depreciation.
V6 – V2	Recognizing the large organizational structure in the company is a reason not to reconsider the strategies of downsizing the company based on the product life cycle.
V7 – V2	The CEO's high concentration of decision-making at the organisation's top is a reason not to reconsider strategies for downsizing the company based on the product life cycle.
Lack of attention to the "V3" business life cycle	
V3 – V4	Lack of attention to the business life cycle is a reason not to reconsider direct and indirect production costs.
V3 – V5	Lack of attention to the business life cycle is a reason for the stress of fixed assets with high depreciation.
V6 – V3	Recognizing the large organizational structure in the company is a reason for not paying attention to the business life cycle.
V8 – V3	Failure to review the organizational culture based on market requirements and expectations is a reason for not paying attention to the business life cycle.
Failure to review direct and indirect production costs of "V4."	
V5 – V4	Failure to review the direct and indirect production costs is a reason for the tightness of fixed assets with high depreciation.
V8 – V4	Failure to review organizational culture based on market requirements and expectations is a reason not to review direct and indirect production costs.
The tension of locked fixed assets with high depreciation "V5."	
V6 – V5	Recognition of the high organizational structure in the company is a reason for the stress of fixed assets with high depreciation.
Recognize the large organizational structure in the company "V6."	
V6 – V7	Recognizing the high organizational structure in the company is a reason for the CEO to focus on decision-making at the top of the organization.
V7 – V6	The high concentration of decision-making at the top of the organization by the CEO is a reason to recognize the large organizational structure in the company.
The high focus on decision-making at the top of the organization by the CEO of "V7."	
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Based on the pairwise comparison matrix, in this section, the reciprocal matrix relationships of each approved theme from the qualitative stage of the research are described to establish the necessary transitional relationships (Cross matrix) in the final model.

Next, the structural self-interaction matrix "SSIM" should be formed based on pairwise comparisons of corporate bankruptcy themes according to the results in the table above. Therefore, for each connection in which the answer "Y" or "N" is given, stating the reason, the cell with the option "Yes" is placed as "1*" at the intersection of row "i" and column "j". This matrix is obtained by converting the structural interaction matrix itself into a zero and one binary matrix.

Table 9. The achievement matrix in terms of the degree of transferability of propositional themes

		The themes of corporate bankruptcy								
		V1	V2	V3	V4	V5	V6	V7	V8	
Lack of review of the company's competitive position	Proposition themes in line "j"	V1	1	0	0	0	0	0	1	1*
Lack of company size reduction strategies based on product life cycle		V2	1	1	0	0	0	0	1	1*
Lack of attention to the business life cycle		V3	0	0	1	0	1	0	1	1*
Failure to review direct and indirect production costs		V4	0	0	0	1	0	0	0	1
The tension of fixed assets with high depreciation		V5	0	0	0	0	1	0	0	1
Recognize the large organizational structure in the company.		V6	0	0	0	0	0	1	0	1
The high focus on decision-making at the top of the organization by the CEO		V7	0	0	0	0	0	0	1	1
Failure to review the organizational culture based on market requirements and expectations		V8	0	0	0	0	0	0	0	1

As seen in Table 9, the conceptual symbols assigned according to the fashion proposition have been converted to 0, 1, and 1* points according to the definition of the conceptual relation to the numbers according to the previous table. In the following table, specify the penetration power (1 point obtained from the row) and the dependency power (1 point obtained from the column):

Table 10. Process of determining the influence and dependence

		Influence power	Dependency power	
Bankruptcy Assessment Statements	Lack of review of the company's competitive position	V1	3	The sum of the rows "i" and the column "j" are the contents of the proposition.
	Lack of strategies to reduce the size of the company based on the life cycle	V2	4	
	Lack of attention to the business life cycle	V3	4	
	Failure to review direct and indirect production costs	V4	2	
	The tension of fixed assets with high depreciation	V5	2	
	Recognize the large organizational structure in the company	V6	2	
	The high focus on decision making at the top of the organization by the CEO	V7	2	
	Failure to review the organizational culture based on market requirements and expectations	V8	1	

By determining the penetration and dependence power, the output set forms a conical matrix,

forming common inputs and elements to determine the most influential priorities of propositional themes. Here the goal is to get to know the most effective propositions.

Table 11. Conical matrix of propositional themes

		Reachability set	Antecedent set	Intersection		
Determining the first level of impact						
Themes of bankruptcy statements	Lack of review of the company's competitive position	V1 1,7,8	1,2	1	Leveling the effectiveness of propositional themes	
	Lack of strategies to reduce the size of the company	V2 1,2,7,8	2	2		
	Lack of attention to the business life cycle	V3 3,5,7,8	3	3		
	Failure to review direct and indirect production costs	V4 4,8	4	4		
	The tension of fixed assets with high depreciation	V5 5,8	3,5	5		
	Recognize the large organizational structure in the company	V6 6,8	6	6		
	The high focus on decision making at the top of the organization by the CEO	V7 7,8	1,2,3,7	7		
	Failure to review the organizational culture based on market requirements and expectations	V8 8	1,2,3,4,5,6,7,8	8		I
Determining the second level of impact						
Themes of bankruptcy statements	Lack of review of the company's competitive position	V1 1,7	1,2	1	Leveling the effectiveness of propositional themes	
	Lack of strategies to reduce the size of the company	V2 1,2,7	2	2		
	Lack of attention to the business life cycle	V3 3,5,7	3	3		
	Failure to review direct and indirect production costs	V4 4	4	4		II
	The tension of fixed assets with high depreciation	V5 5	3,5	5		II
	Recognize the large organizational structure in the company	V6 6	6	6		II
	High focus on decision making at the top of the organization by the CEO	V7 7	1,2,3,7	7		II
Determining the third level of impact						
Themes	Lack of review of the company's competitive position	V1 1	1,2	1	III	
	Lack of strategies to reduce the size of the company	V2 1,2	2	2		
	Lack of attention to the business life cycle	V3 3	3	3	III	
Determining the fourth level of impact						
Themes	Lack of strategies to reduce the size of the company	V2 2	2	2	IV	

The results of the similarity of outputs and common elements showed that the most influential theme of the causes of bankruptcy is the lack of strategies to reduce the company's size, which is in the fourth level of this model.

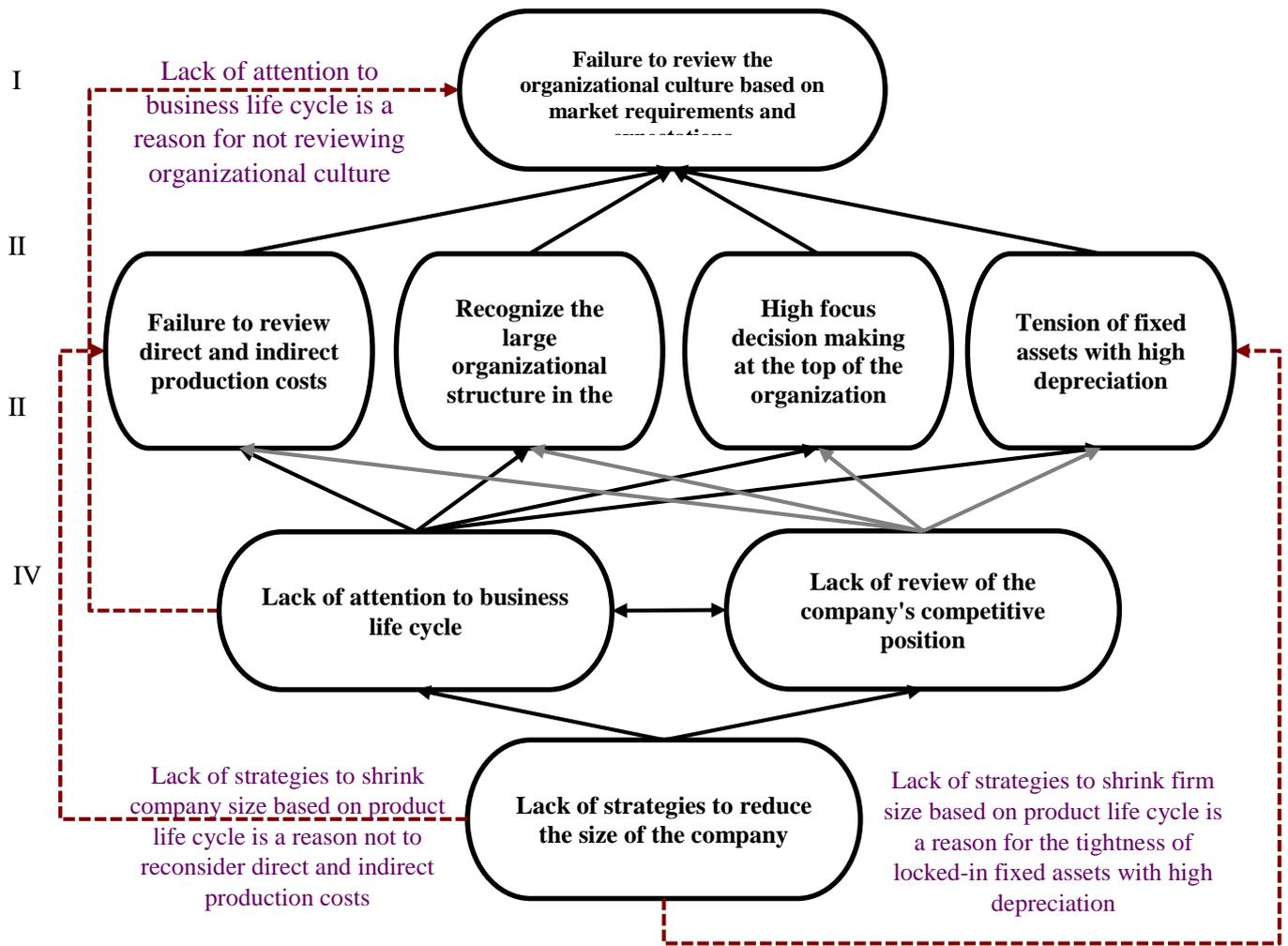


Figure 7. The model for prioritizing the causes of bankruptcy

5. Conclusion

This study aimed to design a model of intangible causes of bankruptcy of capital market companies. In this study, as the research analysis process showed, through the analysis of the qualitative part, first, an attempt was made to identify the intangible components and themes of corporate bankruptcy. For this purpose, the meta-synthesis was first determined in several stages of research related to the nature of the research and then re-screened based on the critical evaluation of the research. Finally, the results in this section indicate the determination of two components and 13 propositional themes to measure it. Delphi analysis was then used to determine the theoretical consensus. Based on the two criteria of mean and coefficient of agreement, 5 themes of elimination propositions and 8 themes to measure the evaluation of the most effective reasons for companies' bankruptcy were included in the quantitative analysis. The results in this section showed that the most influential theme of capital market company bankruptcy is the lack of strategies to reduce the company's size. This result means that companies that are large and based on the product life cycle as the basis for their competitive position do not have the plan to shrink their size, or they do not use dual-core structuring strategies, gradually losing their effective competitive capacities due to the intensification of environmental changes and the gaining of competitors, and with bankruptcy, it is

first marginalized and then out of the market, because this process stems from the open and free flow of the market, large and long companies that do not think about the agility of their structure, will face bankruptcy and financial crisis. Most capital market companies gradually withdraw from the market because they do not have suitable evaluation indicators for their restructuring and size, and they lose their competitive capacities, increasing the probability of company bankruptcy.

On the other hand, in the third level of the impact of corporate bankruptcy themes, the two themes of lack of attention to the business life cycle and lack of review of the company's competitive position are identified as factors that upset the corporate balance and corporate bankruptcy. This result shows that the lack of attention to the business life cycle means not reviewing the various stages of the company, from the entry to the consolidation stage and possibly the company's decline. Usually, companies have to review their life cycle assessments at a specific time and re-engineer their structural term or term accordingly.

In other words, reviewing the competitive position is a cross-cutting issue in line with business life cycle assessments, which reflects the company's insight into competitors and the target market environment. Therefore, ignoring such continuous and periodic evaluations can cause the company not to have the necessary capabilities in terms of competitive functions and therefore be doomed to fail and leave the competitive market because they cannot respond to rapid changes. Results from the research of Nagel and Aviles (2021); Lohmann and Ohliger (2019); Nishi and Peabody (2019); Farooq and Jibrán (2018) and Hashemi and Heidarpoor (2021) correspond. The results indicate that the causes of corporate bankruptcy are substantive. This means that companies need to focus on drivers such as strategies, and the environment, update the technology and size of the company, its functions and structure in line with environmental changes, and anticipate possible disruptions to control them to prevent gradual company bankruptcy. Based on these results, it is suggested that by examining the return on assets ratio and in line with the competitive position, capital market companies make the company structure more agile in two processes (two cores). A structure that is large in proportion to the organizational structure and, in terms of process, plans and delegates relations and functions in horizontal relations. This function of the organization in terms of size can lead to the sustainable development of product production commensurate with the capacities of the market and major customers, and while increasing the company's market share in the long run, prevent the company from declining within the business cycle. Through constant reviews, companies can gain a more coherent understanding of their competitive performance and not lose market share with the slightest unpredictable pervasive change.

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