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Practical Development of Forensic Accounting Paradigm Based on the Risks of Oil Companies Investors: Interpretive Ranking Process Matrix Analysis

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ABSTRACT

Forensic accounting, as a process of legal inspection of corporate accounting practices, has become an important strategy to prevent fraud and financial misconduct, creating information transparency for investors to make financial decisions. Among the capital market companies, oil companies can strengthen the forensic accounting paradigm to provide documentation and transparency of decision-making to prevent market distrust caused by investor risks and contribute to the sustainable development of its presence in advancing competitive strategies. This study aims to develop an effective forensic accounting paradigm based on the risks of investors in oil companies. In this study, the components (dimensions of forensic accounting) and research propositions (investor risk themes) were used to from a combined analysis with 15 accounting experts at the university level. In the quantitative part, the components and propositions identified in the form of matrix questionnaires were evaluated by the interpretive ranking process (IRP) by 20 financial managers of oil companies in the capital market. The results showed that the statements of inflation and credit risk as the most influential themes threaten investors in oil companies, strengthening the focus on legal mechanisms as a component of the forensic accounting paradigm. This result shows that, in the presence of inflationary and credit risks for oil companies' investors, the importance of legal mechanisms in judicial accounting can lead to increased information transparency to protect the interests of oil companies' investors.

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1. Introduction

By changing the nature of markets and increasing competition in capital markets, investors, shareholders, and analysts today attach great importance to quality and transparency in financial statements, as they see these factors as necessary to protect their interests (Kamarudin et al., 2020). In fact, in the absence of such transparency in a competitive market, it will reduce the credibility of the internal dimensions of the market and reduce the protection of shareholders, which has led to increased risk and asymmetry of information and questioned the competitive reputation of companies. (Tashdidi et al., 2019). The review of major financial failures and scandals over the past two decades has raised considerable doubts about the validity of accounting practices based on scientific paradigms, events that have necessitated a change in the accounting paradigm (Gray and Moussalli, 2006; Awolowo, 2014). One of the dimensions of changing the accounting model from traditional to modern and even postmodern paradigms is changing the forensic accounting approaches so as to increase the level of financial transparency of companies. Forensic accounting, or judicial accounting, as an institutional task, examines the compliance of accounting outputs with laws and regulations and detects financial irregularities (Pahriel and Guven-Uslu, 2019). If one is going to use accounting knowledge when violations occur and detect fraud and ways to prevent it from occurring, in addition to accounting knowledge, they must have legal skills. The study of notes and legal materials was also familiar (Kaimari, Tiwari and Dibnath, 2017). Forensic accounting is a branch of accounting that aims to increase the level of oversight of companies' financial performance in order to provide useful information about past conditions; the present and the future of the company are aimed at reducing the risks arising from the investment of shareholders (Vafaiepour, 2020; Namazi and Ebrahimi-Meymand, 2016). In other words, since risk expectations affect the investment behavior of managers and shareholders (Slovic et al., 1981), any information related to company risk is useful for investors. In this regard, it should be stated, according to previous research such as Doxey et al. (2020), Shi et al. (2014), and Miihkinen (2013), strengthening the foundation of the forensic accounting paradigm increases the effectiveness of companies' disclosure of risk information, which reduces the asymmetry between investors and corporate executives. However, studies such as Leuz and Wysocki (2016) have emphasized the economic consequences of risk disclosure, such as reduced investment efficiency, and the social consequences of capital markets, such as the mass rotation of shareholder behavior. Nevertheless, qualitative practices in the development of the forensic accounting paradigm have emphasized the cultural symbolism of investors to avoid creating excitement in the capital market. One of the theories of symbolism is the theory of homology-based on the approach of Peter Bourdieu. According to this theory, cultural diversity in any society, such as the community of investors and companies in the capital market, leads to conflict in decision-making. Homology is a social constructivist approach based on visible symbols among individuals in a society that, if properly transformed into a social value, can lead to more balanced social decision-making, and predicting individual and collective behavior becomes easier. In promoting the role of court accounting by emphasizing the symbolic interaction between the perceptual values and social expectations of investors from companies, Gabgi and Adebisi (2013) stressed the need to create symbols of culture. This is because these symbolic patterns lead to greater coherence among investors due to the recognition of the impact of court accounting on the change in the risk disclosure approach of capital market companies. In other words, investors make more confident decisions about the future of their investment in the company, even if the risk is exposed, because increased transparency due to the strengthening of judicial accounting has increased trust in the company. In other words, investors, even if the risk is exposed, decide more confidently about the future of their investment in the company because increased transparency due to the strengthening of judicial accounting has increased confidence in the company. In other words, extending the symbolism of investors' perceptions, such as the conceptualization of stock market symbols or certain terms such as the calendar effect or the January effect in the market, increases discernible patterns in the hidden part of their decisions that increase their confidence in corporate finances (Harski and Smith, 2008). Abraham and Cox (2007) also used symbolism to strengthen the coherent perception of investors in describing the importance of full disclosure of information, stating that the presence of several symbolic elements in the financial performance of companies and the stock exchange organization, while reducing litigation costs, facilitates investment and capital costs. Therefore, according to the issues raised, this study aims to develop an effective judicial accounting paradigm based on the financial risks of investors in oil companies.

2. Literature review

2.1. Risk disclosure

Company risk can be defined as the possibility of a negative impact on the company's economic position in the future. In other words, there is risk or danger in any activity that is not 100% likely to succeed (Guthrie et al., 2020). On the other hand, disclosure is one of the basic principles of accounting that has a positive effect on all aspects of corporate financial reporting to create information symmetry. According to this principle, all important facts related to the events and financial activities of the business unit should be reported appropriately and wholly based on the requirements and social norms of the required information (Salem et al., 2019). According to this principle, the basic financial statements should contain all relevant and timely information, and this type of information should be presented in an understandable and even complete way to enable informed decisions to be made by users. On the other hand, the information provided should not be in terms of quantity in such a way as to confuse users of financial statements (Sadeghi Yakhodani et al., 2020). Risk disclosures should be generated from a corporate risk management process. In the current context, risk management has become an essential part of the control of internal organizations and corporate governance and an essential element of business. The focus of risk management is on identifying and reducing risks, and its goal is to add maximum sustainable value to all activities of the organization (Molainejad and Atadi, 2014). The risk management process also generates risk information that can be made available to the public. Dissemination of this risk information is considered an equally important responsibility for managers, which ensures that shareholders and other stakeholders are well aware of the core risks and dimensions of the company. However, there is a lack of transparency in disclosing risk information due to the lack of norms and uniform measures, among other factors. The financial reporting system contributes to assisting economic decision-makers by providing and disclosing different information (Nahar et al., 2020). These reports achieve this goal by highlighting different aspects of companies. The financial aspect and disclosure of financial information have always been fully considered in the reports of the financial reporting system. Nevertheless, to identify different aspects of companies' activities, more emphasis is placed on non-financial information. Information that reveals some aspects of firms gives users a different perspective and a newer perspective on information (Hassanzadeh Brothers and Mahroomi, 2017). Disclosure of risk information and risk management is one of the non-financial data if the level of disclosure is sufficient and has a valuable contribution to processing the data received by users. Furthermore, in their value-added decision models, it will be so effective that investors believe that disclosing risk information will help them optimally select the right portfolio. Linsmier et al. (2002) argues that managers in well-performing companies use voluntary risk disclosure to signal risk management practices and attract more investors (by improving transparency). In this way, risk disclosure improves the transfer of useful information to the market and stakeholder understanding of the level of risk exposure and is essential in demonstrating the performance of companies; therefore, there is a high demand for transparent risk disclosure in annual reports (Namazi and Ebrahimi-Meymand, 2016).

2.2. Forensic accounting paradigm

Forensic accounting is a developed concept of financial law topics that includes a range from documentation to money laundering in the accounting of institutions and businesses. It is the knowledge that underlies the laws and regulations of the business world to prevent fraud and deal with offenders (James, 2010). This accounting model is based on collecting and providing financial information to institutions and investors with a high degree of legal reliability. Dong (2011) presented the dimensions of forensic accounting, as depicted in Figure 1.

The multidimensionality of forensic accounting, while it can help develop financial processes and transparent reporting disclosures and reduce information asymmetries, is also based on audit processes, financial management, and tax. Legal processes can also help raise social trust as a dimension of the social accounting function. Forensic accounting is an implicit approach in new accounting paradigms that works to integrate the role of accounting in creating value and transparency for shareholder decisions (Singleton and Singleton, 2010). In a comprehensive definition of the American Institute of Certified Public Accountants (AICPA) (2011), forensic accounting includes the application of principles and explains accounting theories and facts or hypotheses in litigation (litigation) that cover a wide range of disciplines from accounting to law. It applies accounting skills with an exploratory mentality toward a series of financial issues within the framework of laws and regulations, which is based on reliable accounting documents (Fakhari and Oskoo, 2018). The Association

of News Inspectors (ANI) (2014), in the definition of court accounting, refers to the application of specialized accounting skills in matters related to potential or actual civil rights or criminal (legal) litigation and generally includes accepted accounting principles, opportunity cost, income, assets or losses, assessment of internal controls, fraud, and any subject matter that includes accounting expertise and experience in the legal system; however, it is not a generally accepted accounting principle.

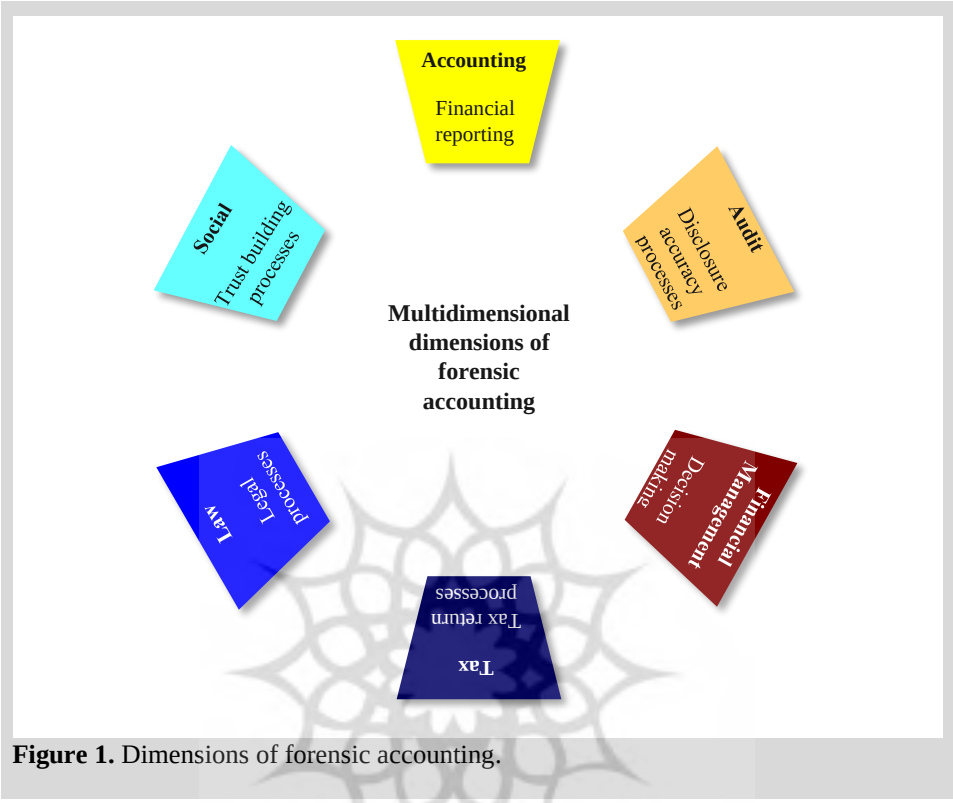

Figure 1. Dimensions of forensic accounting.

2.3. Forensic accounting paradigm and risk disclosure approach

A paradigm is considered the foundation or, in a simpler sense, the sum of the designs, whose roots and theoretical originality go back to ancient Greece (Modell, 2010). The pattern of the evolution from tradition to modernity is to cover the challenges of the past that developed scientific philosophies in the form of applied approaches. According to Kuhn (1962), modeling is an important new kind of success acknowledged by the scientific community and provides a model by which a coherent tradition of a particular phenomenon is viewed and perceived in conventional ways (Fakhari and Oskoo, 2018). Forensic accounting, in the form of a link between legal issues and the requirements and standards of accounting and auditing, is now considered a change in the basis of traditional practices to modern and socially expected practices, which examines the set of critical financial skills in the form of a series of legal and forensic issues based on evidence to prevent the rights of shareholders and investors from being squandered (Yang and Lee, 2020). Forensic accounting is considered the front line of inspecting the financial performance of companies, which, as an internal unit in companies and as an independent external body overseeing their financial performance, seeks to develop financial transparency to create information symmetry among investors (Rahmani et al., 2018). The American Institute of Certified Public Accountants (AICPA) focuses on two principles in defining forensic accounting. The first principle is adherence to rules and regulations based on valid accounting documents. The second principle is the development of accounting theories in various topics from specialized to cultural issues to link facts with social change and exit from long-term stability (Hegazy et al., 2017). The second principle is based on the inclusion and expansion of concepts that strengthen the philosophical foundation of accounting and give it meaning to create confidence and credibility among stakeholders. In other words, forensic accounting is considered a supervisory dimension by legal institutions that have legal requirements for integrating financial

reporting processes, accountability, and responsibility of companies (Dianti Deylami et al., 2018). At the same time, it includes psychological and cognitive dimensions on shareholders in respecting their rights in the competitive operations of companies. From this perspective, adherence to legal procedures and knowledge of the rules by the company can lead to greater public trust in the interaction between the company and shareholders and put the company in a better competitive position. In fact, given the role of court accounting in trying to assess the compliance of accounting outputs with laws and regulations and detect financial irregularities, it can be expected that the level of corporate risk in shareholder decision-making can be largely controlled (Brown et al., 2013). In simpler terms, forensic accounting seeks to reflect more news and information to stakeholders by matching financial and legal practices. Disclosure of risk as one of this news and information increases shareholders' decision-making power. Considering the role of valuation and management of accounting information, the disclosure of companies' risk information facilitates more accurate valuation and is a guide for evaluating companies. This is because risk transparency can reduce the information risk of investors and the company provides quality risk information; the risk of adverse selection is also reduced, preventing sudden events or reactions to a pile of news and negative information about the company's stock from investors (Shivaani and Agarwal, 2020). Accordingly, the strength of legal and judicial procedures as a basis for inspection in the performance processes of companies leads to the disclosure of risk-related cases, which reduces the information gap between managers and investors regarding business uncertainty. Nevertheless, Berggren and Bjornskov (2020) did not necessarily see the establishment of court accounting as a reason for reducing the information symmetry between investors and managers, even if the corporate risk is exposed. Because there is no obligation to disclose some financial operations, the level of corporate risk disclosure is reduced. Therefore, they proposed the development of cultural symbols and value-based symbols in the capital market. In this regard, Huber (2013) believed that the development of symbols as a tool and the development of symbols as a value should both be put on the agenda by financial scriptwriters in the long run as a strategy because there are coherent values to the greater commitment of companies in disclosure of reliable information, which helps investors. However, in the absence of such values, the lack of perceptual heterogeneity in the capital market, especially among investors, hinders the integration of decisions and can cause excitement and instability in the capital market with the slightest change. On the other hand, Ismail et al. (2020), in the form of theories about predicting changes in the financial market and strategic financial issues, discussed the lack of homology theory in the development of values commensurate with the market with investors as a reason for market inefficiency because dysfunctional markets have always suffered from massive reactions to decisions in the absence of perceptible values for investors. Accordingly, the forensic accounting model can change the approach of capital market companies' risk disclosure by developing equal value levels and symbols of confidence and trust in the capital market. On the one hand, the requirements and the existence of inspections persuade companies to disclose risk. The development of symbolism of trust and confidence through the consolidation of forensic accounting can institutionalize risk disclosure as a competitive advantage for companies.

3. Research review

Gonidakis et al. (2020) conducted a study entitled "Risk Disclosure on Greek Stock Exchange Companies in the Face of Financial Crisis". This study examined 206 companies in 10 years, from 2008 to 2019, based on multiple regression analysis. The results showed that identifying and forecasting risk and disclosing it to stakeholders, especially in times of financial crisis, while protecting the interests of shareholders, promotes the value of investors' stocks. This result showed that risk disclosure, especially in recent years due to the economic crisis, can be a strategic issue to increase business confidence. Nahar et al. (2020) conducted a study entitled "Risk Disclosure and Governance Risk Characteristics: Evidence for Developing Countries". The study surveyed 300 banks and investment companies in the capital markets of 14 developing countries. The results showed that risk disclosure has a negative and significant relationship with governance risk characteristics such as CEO duality, lack of board independence, and weaknesses of internal control, implying that risk disclosure by corporate executives, either voluntarily or compulsorily, reduces governance risks and companies display more transparent governance functions. Ohaka and Ordu (2019) reviewed forensic accounting practices on Nigerian oil and gas companies' leadership efficiency. This paper identified that forensic accounting is still minimal in Nigerian oil and gas companies. Further, the lack of professional accountants with adequate skill and technical know-how on forensic issues, political factors, and top management

involvement in fraudulent practices was identified to hinder the application of forensic accounting in Nigeria's oil and gas companies.

Thus, there is an urgent need for human resources development, the institutionalization of forensic accounting in Nigeria, and employing and allowing forensic accountants to anchor the investigative units of oil and gas companies in Nigeria. Botes and Saadeh (2018) conducted a study entitled "Evidence for the Development of Forensic Accounting Dimensions". This research, which was based on qualitative methodology and content analysis, in the form of systematic analysis of qualitative analysis methods, tried to determine the multiple nature of court accounting in the form of a coherent framework. Based on the obtained results, dimensions such as the development of the financial dimension, the legal dimension, supervisory and control dimension, tax dimension, and moral dimension, are the most important dimensions that should be considered in the definition of court accounting. Faboyede (2010) conducted a study entitled "Forensic Accounting as Panacea to Nigeria's Management Dilemma of Oil Refineries". Findings show that despite the colossal expenditure on the refineries, they could arguably be stated to be worse off today. It majorly recommends that the forensic accounting profession be conscientiously promoted in implementing proposed oil sector reforms if Nggeria's petroleum-based economy, which for too long has been hamstrung by political instability, corruption, and poor macroeconomic management, must be genuinely/substantially reformed for growth and development. Soleimani Amiri and Babaei (2012) conducted a study entitled "Forensic Accounting Training in Accounting Curriculum in Universities: Perspectives of Academics and Professionals". This research is a survey conducted by sending a questionnaire to academics and professionals and analyzing the results obtained from the collected data. The research results indicate that most respondents are familiar with the role of court accountants and consider it necessary to use their services in the country's public sector. Both groups of respondents also expect the demand for forensic accounting services to increase in the future and have highlighted the benefits of forensic accounting training at universities and the usefulness of its services in the public sector. Rahmani et al. (2016) conducted a study entitled "Investigating the Need to Pay More Attention to Legal Accounting". This study is survey-applied, and the subject was surveyed by a questionnaire and simple random sampling from 50 accounting professors in the country. The findings show that it is necessary to pay more attention to forensic accounting and add forensic accounting to the structure of accounting courses as an independent topic.

According to the explanations given, the research questions are presented in the following order:

1. What are the components of the forensic accounting paradigm as a basis for interpretive analysis of matrix homogeneity?
2. What are the themes of investors' financial risks as a reference in interpretive analysis?
3. What is the most effective dimension of forensic accounting based on the financial risks of oil company investors?

4. Methodology

In terms of outcome classification, this study is part of developmental research. The theoretical inconsistency in terms and concepts related to this field has led to this study identifying the most influential judicial accounting dimension based on the financial risks of oil companies' investors. On the other hand, based on the data type, this research is hybrid because in the qualitative part, through theoretical screening based on the meta-synthesis analysis method, this research seeks to identify the components of forensic accounting and propositional themes of investors' financial risks and then in the quantitative part through matrix analysis. Then, in a quantitative part, by analyzing the polar matrix based on the multi-criteria decision-making method, a pattern of determining the most crucial dimension of forensic accounting is examined. Usually, one of the components and propositional decision-making processes is examined in the form of matrix analysis and based on the pairwise comparison. One of the best processes is the interpretive ranking process (IRP) analysis (Sushil, 2009) which is the basis of analysis in this study. It should also be noted that the research period was six months and MATLAB performed the statistical tests.

4.1. Statistical population of the research

In the qualitative part, this research, through the basis of homogeneous sampling, selected 15 specialists and experts in the field of accounting at the university level to determine the components and propositions based on the theoretical approach to the research topic. Moreover, based on meta-synthesis analysis, this part of the research conducted in sites such as University Jihad in Iran, Iran Database of Publications, Iran Islamic

Computer Science Research Center, International Sciencedirect, Emeraldinsight, and OnlineLierary was used to determine components (dimensions of forensic accounting) and research indicators (investor risk statements). In the second phase, to conduct the interpretive analysis of prioritization, 20 financial managers of oil companies in the capital market were asked to be members of the focus group. After evaluating the components and propositions identified in the qualitative section and confirming them, we respond to the matrix questionnaires. It should be noted that since the interpretive ranking process analysis is based on matrix analysis and analysis in operations, it should be done by participants based on specific criteria such as experience or expertise. Based on this, it is limited in terms of sample size and according to studies such as Sushil (2017) and Chithambaranathan et al. (2015).

5. Research findings

In order to link the components of forensic accounting and risk statements of oil companies' investors, meta-synthesis analysis is used to enter the phase of interpretive analysis by prioritizing the components and statements identified in the form of research matrix checklists in the quantitative section.

5.1. Meta-synthesis findings

The method of meta-synthesis analysis through theoretical and research screening seeks to identify components and propositions related to the research topic. The period for analyzing similar research has been from 2017 to 2021. In other words, to find similar articles and research and use international and domestic research databases and references, research related to the research goal was identified.

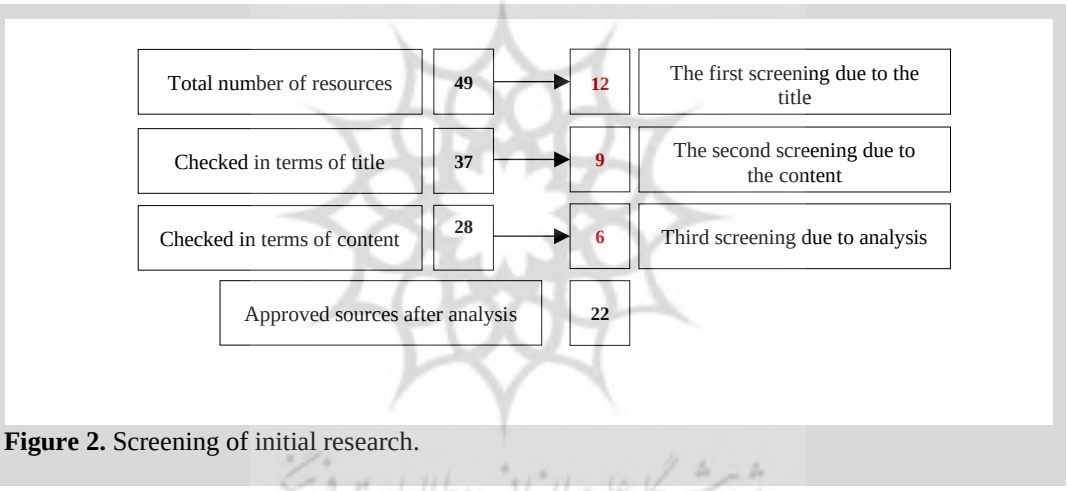

Figure 2. Screening of initial research.

Figure 5 shows that all the primary sources identified are 49. After a few stages of the screening process in terms of content, title, and analysis, 22 studies appropriate to this stuyy's content, title, and anayytical processes are selected. There are 12 studies related to determining the components of judicial accounting and 11 studies related to determining the risk statements of investors. At this stage, the concepts should be separated based on components and propositions so that the most crucial dimension of forensic accounting is determined based on the risk themes of investors in oil companies in the form of rating checklists. In fact, through the criteria of critical evaluation based on 10 criteria of research objectives, the logic of research method, research design, sampling, data collection, reflectivity, the accuracy of analysis, theoretical and transparent expression of findings, and research value, section A) determines the components of accounting paradigm and section B) determines investors' risk statements.

5.1.1. Identify the components of the forensic accounting paradigm

According to the explanations given, the components of the judicial accounting paradigm with symbol (A) are identified in this section. Table 1 evaluates the components based on a 50-point index in the form of scores from 1 to 5 based on the 10 criteria described.

Table 1. The process of critical analysis of screened research.

Critical evaluation criteria/research	Wahyuni et al. (2021)	Goh et al. (2021)	Akinbowale et al. (2020)	Nortje and Bredenkamp (2020)	Yang and Lee (2020)	Boots and Saadeh (2019)	Hamdan (2018)	Heggs et al. (2017)	Caimari Tiwari and Dibnath (2017)	Soleimani Amiri and Babaei (2020)	Rahmani et al. (2018)	Jafari et al. (2017)
Confirm ☑			☑		☑	☑	☑	☑	☑		☑	☑
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Research purposes	2	1	۴	2	4	3	3	4	3	3	3	4
The logic of the research method	1	2	3	3	3	3	4	5	4	4	4	3
Research design	2	2	4	2	4	4	3	4	3	3	3	4
Sampling	3	3	4	3	4	3	3	5	4	2	4	5
How to collect	3	1	3	3	5	4	3	5	3	3	4	5
Generalized Findings	2	3	4	2	4	4	3	4	3	2	4	5
Ethical	2	2	5	2	5	5	4	3	3	2	3	4
How statistical analysis	3	2	4	4	5	4	4	3	3	2	4	4
Theoretical capability	3	3	5	3	4	3	3	4	3	2	3	4
The value of research	2	2	4	3	4	4	3	4	3	3	3	4
Total	**23**	**21**	**40**	**27**	**42**	**37**	**33**	**41**	**32**	**26**	**35**	**41**

The scores presented based on the fashion index showed that four studies were excluded because they received less than 30 out of a total of 50 points, and according to the guidelines of good scores in this analysis, the researches that scored 30 and above were approved. The reason was removed from the investigation. Next, the components of the judicial accounting paradigm are extracted. Accordingly, the following scoring method is used to determine the mentioned components. Based on this method, all sub-criteria extracted from the text of the approved articles are written in the table column, and then the names of the approved research researchers are given in the row of each table. 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 average of the researches are selected as research components.

Based on this analysis, it was found that three components have the highest frequency and, therefore, in this study, are considered the criteria of the judicial accounting paradigm. In this section, after analyzing the theoretical foundations of the approved researches, each of the identified components has been defined according to Table 3.

Table 2. The process of determining the main components of research.

Research location	Researchers	Behavioral mechanisms	Structural mechanisms	Management mechanisms	Ultra-structural mechanisms	Social mechanisms	Legal mechanisms
International	Akinbowale et al. (2020)	-	☑	-	☑	-	-
	Yang and Lee (2020)	-	-	☑	-	-	☑
	Boots and Saadeh (2019)	-	-	☑	☑	-	☑
	Hamdan (2018)	☑	☑	-	☑	-	-
	Heggs et al. (2017)	☑	☑	-	-	☑	☑
	Caimari Tiwari and Dibnath (2017)	-	☑	-	☑	-	☑
Internal	Rahmani et al. (2018)	☑	☑	-	☑	☑	☑
	Jafari et al. (2017)	-	☑	-	☑	-	☑
Total		**3**	**6**	**2**	**6**	**2**	**6**

Table 3. Components of the judicial accounting paradigm.

Components	Symbol	Definitions
Structural mechanisms of forensic accounting	A1	Forensic accounting in the role of intra-structural functions covers areas of capacity to monitor the financial performance of companies that reduce the asymmetry in disclosure of information between internal and external stakeholders while maintaining the level of confidence-building capabilities of companies in various areas such as capital markets to make the economy more dynamic in the form of capital turnover in domestic production. Accordingly, forensic accounting, which is considered a balancing tool of the economy in a subset of the system governing different markets and institutions, seeks to prevent corruption and fraud as an institutional and public duty (Akin Bovala et al., 2020).
Ultra-structural mechanisms of forensic accounting	A2	In another area of judicial accounting duties, there must be a social environment. The cultural and economic aspects of society in accepting the role of forensic accounting for the development of transparency and financial and operational justice should be examined in this study, which is called ultra-structural mechanisms as a measurable dimension. The ultra-structural mechanisms of forensic accounting mean a level of social environment and conditions governing it from a cultural perspective, which understood the necessary sensitivities to the violation of laws and material and intellectual rights of individuals by officials and those in power. Moreover, in the financial and accounting sectors, it is trying to prevent corruption and bribery. The fight against money laundering is one of the most emphasized aspects of international institutions in the present century. Forensic accounting tries to prevent it from hitting the economy under any circumstances by inspecting and gathering evidence, by increasing solutions such as organizational whistling, disclosure of facts by individuals in the role of employee and the manager to develop the citizen, and through culture and education to ensure transparency to prevent unethical acts such as tax avoidance and worse tax evasion (Boots and Saadeh, 2019).

Components	Symbol	Definitions
Legal mechanisms of forensic accounting	A3	As the last dimension identified in the effectiveness of forensic accounting in protecting the interests of investors, there are legal mechanisms that illustrate the field of expertise and inspection of forensic accounting. In this mechanism, forensic accounting, due to its position and the definition of its role, can help speed up the proceedings based on the collection of evidence of financial violations of the accounting unit and the companies under it to settle legal disputes in the form of a speedy legal process. Forensic accounting in this role tries to determine any action contrary to professional standards and related laws such as the constitution or commercial law and deal with the negligent or intentional behavior of the perpetrators of a financial and accounting violation within the law (Kaimari Tiwari and Dibnath, 2017).

5.1.2. Identification of investor risk statements

As in the above steps and following the critical appraisal method in this section, investor risk statements of symbol (B) are identified. Table 4 evaluates the contents of a proposition based on an index of 50 points in the form of scores from 1 to 5 based on the 10 criteria described.

Table 4. The process of critical analysis of screened research.

Critical evaluation criteria / Researches	Research purposes	The logic of the research method	Research plan	Sampling	Collecting data	Reflexivity	Ethical considerations	Accuracy of analysis	Theoretical and clear expression	The value of research	Total
Stereńcza(( )))))	4	5	4	4	4	3	4	4	4	4	40
Khawaja and Alharbi (2021)	2	3	2	3	2	2	2	2	2	3	**23**
Chattha et al. (2020)	3	3	3	3	3	4	3	3	3	5	33
Koo and Chae (2020)	4	3	4	4	4	4	4	4	4	4	39
Houmes et al. (2019)	2	2	2	1	2	3	2	3	3	2	**22**
Nigam et al. (2018)	4	4	4	5	4	3	4	4	4	4	39
Pham et al. (2017)	4	5	5	3	4	4	4	4	4	4	38
Ashoori Roudposhti et al. (1400)	5	3	4	3	4	3	4	3	4	4	37
Ranjbar Shamsi et al. (2020)	5	5	4	5	4	4	4	4	4	4	43
Hassanzadeh Samani et al. (2019)	4	4	3	4	4	4	3	3	4	4	37

The scores presented based on the fashion index showed that out of a total of 10 studies related to identifying investor risk statements, 2 studies with a score of 30 and above are approved, considering that they received less than 30 out of a total of 50 scores, and according to the guideline adequacy scores of this analysis; therefore, they are removed from the review. Next, the research propositions are extracted. Accordingly, the following scoring method determines investors' risk statements. The results confirm seven investor risk statements based on information on high-frequency distribution. In this section, after analyzing the theoretical foundations of the approved researches, each of the identified propositions is defined according to Table 5.

Table 5. Investor risk statements.

Propositions	Symbols	Definitions
Credit Risk	B1	The risk of losing a principal or financial gain that arises from the borrower's failure to repay the loan or meet its contractual obligation is called credit risk. Credit risk arises when a borrower expects to use future cash flow to pay off its current debt (Chatah et al., 2020).
Default Risk	B2	The risk of default can be referred to as the risk of default and occurs when one of the parties to the transaction fails to meet its obligations on time, in which case the investor suffers a loss of time value of money due to loss of expected return (Pham et al., 2017).
Operational Risk	B3	It is a level of risk associated with corporate tax leverage that, although it may not directly affect shareholder capital, it can directly reduce shareholder expected returns in the future due to its direct impact on firm fixed costs (Sternzinka, 2021).
Financial Risk	B4	Due to the increase in corporate debt, it is a type of investment risk that directly affects the stock returns of shareholders and reduces the value of its investments in the stock of corporations with increased debt (Nigam et al., 2018).
Market Risk	B5	Market risk is a change in returns that results from general market fluctuations. This risk can be due to several factors such as recession, war, structural changes in the economy, and changes in customer preferences (Sternzinka, 2021).
Inflation Risk	B6	This level of risk refers to rising prices without support, which have increased without increasing or changing the quality and refers to the risk of purchasing power or decreasing the purchasing power of invested funds (Nigam et al., 2018).
Liquidity Risk	B7	This risk is related to the secondary market in which the securities are traded. The higher the uncertainty about the time factor and the price ambiguity, the higher the liquidity risk (Chatah et al., 2020).

6. Interpretive ranking process

In the qualitative part of the study, the components of forensic accounting (A) and investor risk statements (B) were identified. In this section, in order to affect line *i* on column *j* or vice versa, the processes related to this analysis are performed. Therefore, to create interactive matrices, the level of direct, symmetrical, or indirect communication must first be considered in line with the explanations. Thus, first, the matrix questionnaire is determined in the following order:

Table 6. Cross-matrix of forensic accounting paradigm with investors' risk.

Propositions / Components	A/B	Credit Risk	Default Risk	Operational Risk	Financial Risk	Market Risk	Inflation Risk	Liquidity Risk	
		B1	B2	B3	B4	B5	B6	B7	Forensic
Structural mechanisms of forensic accounting	A1	1	1	1	1	0	0	1	
Ultra-structural mechanisms of forensic accounting	A2	0	1	0	0	1	1	1	
Legal mechanisms of forensic accounting	A4	1	1	0	1	0	0	0	
		Investor's risks							

The following table is presented to create an interpretation of the interaction of the components of the forensic accounting paradigm with the risk to investors.

Table 7. Interpretive analysis of the cross-matrix of forensic accounting paradigm with investors' risk.

Forensic Accounting Paradigm		B1	B2	B3	B4	B5	B6	B7
	A1		The existence of the default risk is a factor in focusing on the structural mechanisms of forensic accounting.	The existence of the operational risk is a factor in focusing on the structural mechanisms of forensic accounting.	The existence of the financial risk is a factor in focusing on the structural mechanisms of forensic accounting.			The existence of the liquidity risk is a factor in focusing on the structural mechanisms of forensic accounting.
	A2		The existence of the risk of default is a factor in focusing on the ultra-structural mechanisms of forensic accounting.			The existence of the market risk is a factor in focusing on the ultra-structural mechanisms of forensic accounting.	The existence of the inflation risk is a factor in focusing on the ultra-structural mechanisms of forensic accounting.	The existence of the liquidity risk is a factor in focusing on the structural mechanisms of judicial accounting.
	A3	The existence of the credit risk is a factor in focusing on legal mechanisms of forensic accounting.	The existence of the default risk is a factor in focusing on legal mechanisms of forensic accounting.		The existence of the financial risk is a factor in focusing on legal mechanisms of forensic accounting.			
Investor's risks								

According to the obtained results, in this section, the level of effectiveness of each of the investors' risk statements is evaluated. This evaluation is a scoring method based on the development of a pairwise comparison score form, the result of which is used in the following sections of the matrix prioritization analysis.

Table 8. Parallel comparison of investors' risk statements.

Number	Parallel comparison	Yes/No	Description of how the impact
☐ B1 **Parallel comparison at the level of credit risk**			
1	B1 – B2	Yes ☒ No ☐	**Credit risk is a stimulus to create default risk for investors.**
2	B2 – B1	Yes ☐ No ☒	
3	B1 – B3	Yes ☐ No ☐	

Number	Parallel comparison	Yes/No	Description of how the impact
4	B3 – B1	Yes ☐ No ☒	
5	B1 – B4	Yes ☒ No ☐	**Credit risk is a stimulus to create financial risk for investors.**
6	B4 – B1	Yes ☐ No ☒	
7	B1 – B5	Yes ☒ No ☐	
8	B5 – B1	Yes ☐ No ☒	
9	B1 – B6	Yes ☐ No ☒	
10	B6 – B1	Yes ☐ No ☒	
11	B1 – B7	Yes ☐ No ☒	
12	B7 – B1	Yes ☐ No ☒	

This table was presented as part of the impact of relationships, which shows, for example, a paired comparison at the level of investor risks B, the two credit risk statements B1, and default risk B2 are related by the effect of *j* –*i*, indicating that credit risk is a stimulus for investors to default. To form the structural self-interaction matrix "SSIM", the parallel comparisons of the research propositions are presented in Table 9. The *i*th index was compared in pairs with all elements from (*i* + 1) to *n* for parallel comparisons. For each connection, the answer is yes, "C" or "N", and in the case of a positive answer, the reason is stated. In this case, the interpretive logic of pair relationships is presented in the form of the scientific basis of interpretive logic. For each connection, the answer is yes, "C" or "N", and in the case of a positive answer, the reason is stated. In this case, the interpretive logic of pair relationships is presented in the form of the scientific basis of interpretive logic. According to Table 8, the cells that have the option "Yes" are numbered one, and the cells that have the option "No" are numbered zero. This matrix is obtained by converting its structural interaction matrix into a zero and one binary matrix.

Table 9. Access matrix.

		Credit Risk	Default Risk	Operational Risk	Financial Risk	Market Risk	Inflation Risk	Liquidity Risk
		B1	B2	B3	B4	B5	B6	B7
Credit Risk	B1	1	1	1	1	1	1	0
Default Risk	B2	0	1	0	0	1	0	0
Operational Risk	B3	0	1	1	0	1	0	0
Financial Risk	B4	0	1	1	1	1	0	0
Market Risk	B5	0	0	0	0	1	0	1
Inflation Risk	B6	1	1	1	1	1	1	1
Liquidity Risk	B7	0	0	0	0	0	1	1

Table 10. Achievement matrix in terms of the degree of transferability.

		Credit RISK	Default Risk	Operational Risk	Financial Risk	Market Risk	Inflation Risk	Liquidity Risk
		B1	B2	B3	B4	B5	B6	B7
Credit Risk	B1	**1**	1	1	1	1	1	0
Default Risk	B2	0	**1**	0	0	1*	0	0
Operational Risk	B3	0	1	**1**	0	1	0	0
Financial Risk	B4	0	1	1	**1**	1	0	0
Market Risk	B5	0	0	0	0	**1**	0	1*
Inflation Risk	B6	1	1	1	1*	1	**1**	1
Liquidity Risk	B7	0	0	0	0	0	1*	**1**
Determination process		**Direct Effect**			**Transitional impact**			

In order to determine the level of direct and transferable impact of research propositions, in the next step, the percentages of the total level of impacts are determined, as presented in Table 11.

Table 11. The percentage scores of the level of impact of investors' risk statements at the level of oil companies.

Reference variable		Direct impact	Transferable impact	Interpretive influence	Overall impact	Percentage of interpretive impact
Credit Risk	B1	6	0	1	7	18.91
Default Risk	B2	1	1	3	5	13.51
Operational Risk	B3	3	0	1	4	10.81
Financial Risk	B4	4	0	2	6	16.21
Market Risk	B5	1	1	1	3	8.10
Inflation Risk	B6	6	1	1	۸	21.65
Liquidity Risk	B7	1	1	2	4	10.81
Total		22	4	11	37	
Percent		59.47	10.81	29.72		

The results showed that 59.47% of the correlation between investors' risk statements in oil companies is direct and only 10.81% has a transfer effect. From the total impact based on the pairwise scale between the research propositions, it is found that the percentage of influence of the inflation risk proposition (B6) is higher than the other propositions. Therefore, considering the influential role of oil companies' investors in inflation risk, according to Tables 10 and 11 in the form of Table 12, the level of effectiveness of the inflation risk proposition (B6) over the forensic accounting paradigm is determined.

Table 12. A study of the interpretive impact of the level of forensic accounting paradigm.

Forensic accounting paradigm		Structural mechanisms of forensic accounting	Ultra-structural mechanisms of forensic accounting	Legal mechanisms of forensic accounting
		A1	A2	A3
Structural mechanisms of forensic accounting	A1	1	1	1*
Ultra-structural mechanisms of forensic accounting	A2	1	1	1*
Ultra-structural mechanisms of forensic accounting	A4	1	1*	1*

As can be seen, the highest level of transferability in this statement is based on the transitional impact of legal forensic accounting mechanisms relative to the other two components. This result shows that the existence of an inflation risk statement (B6) while influencing other components is the most critical factor in establishing legal mechanisms of forensic accounting. Based on the results obtained, the table below shows the rankings related to implementing interpretive ranking processes.

Table 13. Prioritization of the level of dependence and influence of the judicial accounting paradigm.

		A1	A2	A3	Dependency level D	Difference D – B	Rank
Structural mechanisms of forensic accounting	A1	-	1	1	2	–2	3
Ultra-structural mechanisms of forensic accounting	A2	1	-	2	3	0	2
Legal mechanisms of forensic accounting	A3	3	2	-	5	2	1
Infiltration level B		4	3	3	10		

This table shows that the most effective dimension of the judicial accounting paradigm is based on the risk statements of oil companies' investors related to the legal mechanisms of forensic accounting "A3". On the other hand, the level of dependence as the sum of the most influential dimensions of forensic accounting indicates the effectiveness of other components, which is, therefore, the highest related to the effectiveness of the structural mechanism of forensic accounting from two dimensions of judicial accounting. After determining the most effective components of research in this section by referring to Tables 9–11 to determine the set of output indicators, common input and elements are used to formulate the hierarchical model "TISM", i.e., the model of structural layers.

Table 14. A set of output, input, and common elements of propositions.

Components	Abbreviation	Output component	Input component	Common elements	Level	
Credit Risk	B1	1,2,3,4,5,6	1,6	1,6	VI	Sixth Level
Default Risk	B2	2,5	1,2,3,4,6	2	III	Third Level
Operational Risk	B3	2,3,5	1,3,4,6	3	IV	Forth Level
Financial Risk	B4	2,3,4,5	1,4,6	4	V	Fifth Level
Market Risk	B5	1,2,3,4,5,6,7	1,6,7	1,6,7	II	Second Level
Inflation Risk	B6	5,7	1,2,3,4,5,6	5	VI	Sixth Level
Liquidity Risk	B7	6,7	5,6,7	6,7	I	First Level

As it turned out, the two statements of credit risk (B1) and inflation risk (B6) have the most explicit statement among other risk statements of oil companies' investors. It was also found that the least effective liquidity risk statement is "B7", which shows that they do not play much role in the decisions of oil companies' investors; thus, a conical matrix is presented to identify the most effective oil companies' investors' risk statements in Figure 3.

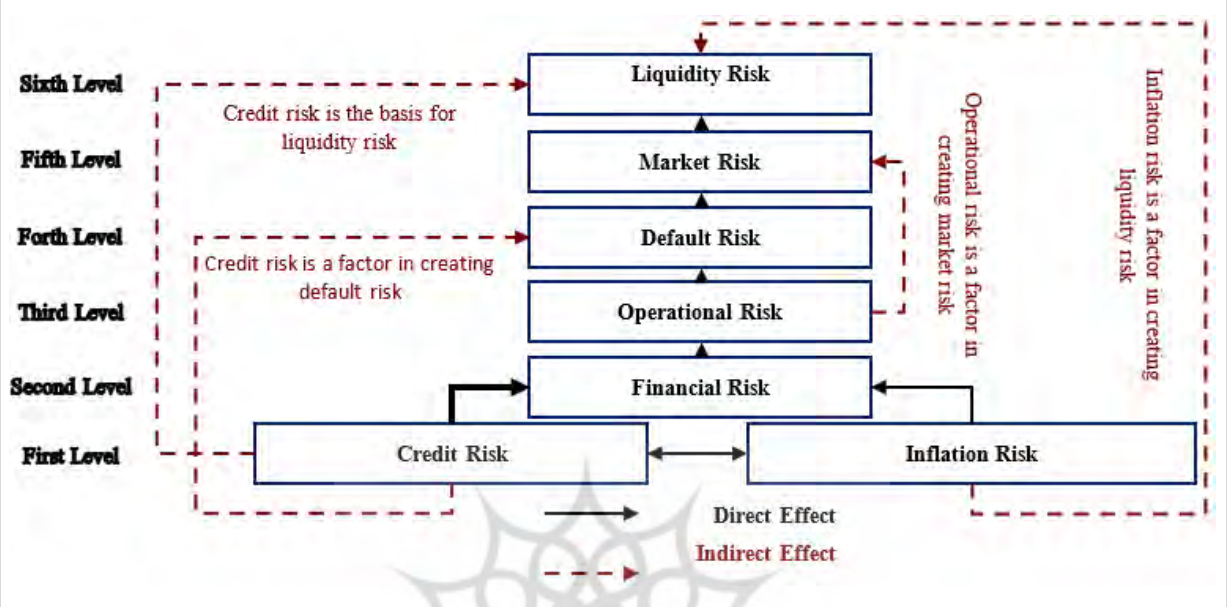

Figure 3. Risk leveling of oil companies' investors.

As can be seen, the two statements of credit risk (B6) and inflation risk (B6) are the two risk bases in oil companies' equity investments that investors are more likely to encounter because it is located at the last level of Figure 4, i.e., the fourth level. Finally, once the most influential risk statements of oil companies' investors have been identified, weights are placed on each of the research components, namely the dimensions of the forensic accounting paradigm. In other words, this section seeks to determine the most critical dimension of forensic accounting, following the determination of the level of determination of the impact of risk statements of oil companies' investors.

Table 15. Selection of the most critical dimension of the forensic accounting paradigm in the presence of investors' risk statements.

Forensic Accounting Paradigm		A1	A2	A3	Dependency Level D	Deference D − B	Rank
Structural mechanisms of forensic accounting	A1	-	0.68	1.09	1.77	–1.24	3
Ultra-structural mechanisms of forensic accounting	A2	0.54	-	2.13	2.67	–.066	2
Legal mechanisms of forensic accounting	A3	1.93	2.65	-	4.58	1.36	1
Infiltration level B		3.01	3.33	3.22			

Comparing the process of simple interpretive prioritization in Table 13 and interpretive prioritization in the above table makes the need to create the dimensions of forensic accounting paradigms clear. These results can be seen in the following table.

Table 16. Comparative ratings for the simple and weighted interpretive prioritization process.

	Structural mechanisms of forensic accounting	Ultra-structural mechanisms of judicial accounting	Judicial mechanisms of forensic accounting *
	A1	A2	A3
Interpretive weighting ranking	3	2	1
Simple interpretive ranking	3	2	1

In fact, in the analysis of interpretive ranking process weights, it should be stated that the high weight of each component indicates the greater level of importance of that component in the target population. Based on this result, it should be stated that the most effective dimension of the forensic accounting paradigm in the presence of inflation risk as the most probable risk of oil companies' investors is the legal mechanism of judicial accounting, which has the highest level of priority in the dimensions of the judicial accounting paradigm.

7. Conclusions

The growth of investment in the country and the increase in peripheral risks have led to the need to provide useful information to users, such as corporate risk disclosure. The complexities of new businesses have advanced science and technology and the increased risks of their use (Khayampour et al., 2020). The role of governments and their socio-economic, political, and strategic strategies in the course of their activities have also created proportionate risk components. On the other hand, the development of civil society and the need to establish new laws and regulations or amend old regulations to regulate socio-economic affairs in line with the paradigms emphasized by court accounting by these institutions increase the importance of aligning corporate changes with environmental changes such as market development. Money, capital, commodities have been accompanied (Akinbowale et al., 2020). By creating a determinable level of unpredictability of environmental changes, all of the above positive factors make the level of stakeholder investments more effective. Because the capital market environment is characterized by categories of market risk, liquidity risk, and credit risk, there is a risk of debt collection, and interest rate risk. Consolidating patterns such as court accounting can increase capital market transparency and create a more coherent perception of investors in the capital market (Digabriele et al., 2020). Therefore, this study aims to develop an effective forensic accounting paradigm based on the financial risks of oil company investors. Based on the research results, in response to the first and second questions of the research, three mechanisms of forensic accounting paradigm and seven risk statements of investors of oil companies were identified. Based on the results, it was found that the most probable risk of investors in oil companies are two statements of credit risk and inflation risk, which can seriously challenge the financing functions of oil companies in advancing investment projects. On the other hand, inflation risk, which refers to rising without price support, without increasing or changing the quality of profits expected by investors, causes oil companies to face a reduction in the power of investment funds in the development of their projects, and this will cause them to face the challenges of sustainability at the level of competition. Under the circumstances of these two propositions as the most probable risks of investors in oil companies, the need to pay attention to the legal accounting mechanism can be a reason to answer the third question of the research. In other words, supporting institutional rules and oversight while making companies' operating frameworks more transparent will enable investors to invest in companies' stocks with a clearer vision of their decisions. In fact, by defining its position and role, judicial accounting can help expedite the litigation process based on the collection of evidence of financial misconduct by the accounting unit of oil companies to settle lawsuits in the form of a speedy legal process. By understanding this, investors should plan their expected return on investment more purposefully. In fact, the legal dimension of judicial accounting seeks to determine any action contrary to professional standards and related laws, such as the constitution or the law on trade in oil companies. Moreover, it deals with the negligent or intentional conduct of the perpetrators of financial and accounting misconduct within the law to prevent potential harm to the interests of investors based on risk control. The results obtained by the research of Yang and Li (2020), Botes and Saadeh (2019), Hegzay

et al. (2017), Kaimari Tivari and Dibnath (2017), and Rahmani et al. (2018) correspond to our findings. Based on the obtained result, it is suggested that the institutions monitoring the legal performance of oil companies, such as the Stock Exchange Organization, inform the companies of the necessary instructions regarding the need to use more information transparency, especially risk disclosure to strengthen the level of knowledge of investors of these companies about financial decisions and the attractiveness of investing in oil companies. For example, laying the groundwork for the development of forensic accounting to influence disclosure ratings or increase risk disclosure ratios among oil companies can create more incentives for firms to develop judicial accounting dimensions. In other words, trying to inject investors with the necessary incentive to invest concerning the money markets by developing understandable and common symbols in the oil industry can cause economic dynamism and alignment of capital market oil companies with strategies and prospects for the country's economic development. It is also suggested that one of the basic strategies to improve the protection of investors' interests is to amend existing laws and standards in order to reduce administrative mazes. This should lead to an increase in the level of more effective oversight in the disclosure of oil companies' risk by changing the provisions of the commercial code, the code of civil procedure, and other related laws under the legal mechanisms of forensic accounting. These fundamental reforms can also be done in the form of laws called legal and forensic functions of corporate governance based on corporate structural mechanisms that include the adoption of rules in corporate governance so as to enhance the effectiveness of oversight of information functions.

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