



Research Paper

Recognition and Ranking the Effective Factors on Audit Quality via the TOPSIS Technique

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ABSTRACT

Audit quality is one of the most important issues in the field of auditing and the capital market. Defining a framework for determining the quality of audit is important so the present study seeks to rank and compare the factors affecting audit quality from the perspective of different groups using a multi-attribute TOPSIS technique. In this research, first, 15 influencing factors were selected as quality indicators using library studies, and then these indicators were analysed using TOPSIS multi-attribute technique by distributing questionnaires among four groups including: researchers and faculty members, audit institutes, chartered accountants, members of the audit committee, and financial managers of the companies listed on the Tehran Stock Exchange and they were rated and compared. From the view point of the of researchers and faculty members, auditing institutes, auditing committee members and chief financial managers, the most important effective factors on the audit quality are professional level of the auditor in the industry expertise, number of employed chartered public accountants and quality control score, respectively. The results of index comparison test indicate that from the view point of the four studied groups, there is a sensible difference between 15 abovementioned indicators.

1 Introduction

The accounting profession, as any other profession, requires public trust to maintain and survive. Indeed, auditors can continue their work in the light of people's trust in this profession. Therefore, in order to obtain public trust, auditors are required to estimate institute's expectations. What institute expects from the auditing profession is to provide audit quality report. In general, achieving the quality of financial reporting depends on the correctness of each of the financial reporting chains. One chain, in support of financial reporting, is the independent auditor. From the perspective of agency theory, the issue of independent audit quality plays an important role in decreasing information asymmetry and reducing

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agency problems between managers and owners. Therefore, it should be noted that the importance of audit quality is rooted in this fact that there is information asymmetry between the preparers of financial statements and their users. The validity of the financial statements is to be determined, and this cannot be done by an independent audit [1]. Jensen and Meckling by stating agency theory emphasized the existence of an agreed relationship between one or more parties owning the company (principles). The agent is expected to perform some services on behalf of the principal. In a company, agency relationship is the relationship between shareholders (principals) and company management (agents) or managers. A representative is a person authorized to manage and make decisions about the company on behalf of the shareholders. The difference in interests between managers and agents due to information asymmetry leads to conflict of agency within the company. Representatives know more about the company's internal information and vision than the CEO. Therefore, it is necessary to disclose information through an audit program by an independent auditor. Independent auditors who are responsible for the audit program are required to act independently and are prohibited from advocating one of the parties such as the principal or the agent. The information contained in the independent auditor's audit report will be used by the CEO in determining the basis for making decisions about the short-term and long-term interests of the company's ownership [2].

In general, auditing plays three important roles, which include monitoring management actions (monitoring hypothesis), creating a better information environment (information hypothesis) and creating security for companies against risks (insurance hypothesis). If the audit operation is not of high quality, it cannot confirm the reliability of the information published by the owners, and this issue can cause losses to many investors. A high audit quality improves the accuracy of the provided information and gives the users of financial statements the opportunity to more confidently assess the company's financial position and financial performance results. On the other hand, improving the audit quality increases the status of the auditing profession in institute [3].

This research helps to expand research literature for two reasons. First, the present study tries to expand the research literature on audit quality in Iran by stating the factors affecting audit quality. The research conducted in the field of audit quality mostly refers to the impact of some audit variables on the audit variables, while the present research includes a wide range of audit information. Second, in the current research, fifteen qualitative and quantitative factors were selected and validated by experts, independent auditors and university professors, then it was determined which of these quantitative and qualitative factors have a significant impact on the audit and through the TOPSIS method and information asymmetry and representative conflicts play a significant role in reducing them. Studies have shown that auditing is an important mechanism in corporate governance. Researchers have provided evidence that audit reduces the probability of information asymmetry between investors and managers, Palmeros found that audit report is a key factor in market reaction. However, this reaction depends on the audit quality. When agency costs increase due to lack of ownership concentration and effective monitoring by owners, the demand for higher audit quality increases [2]. For the audit quality, various indicators such as the size of the audit firm, the auditor's expertise in the industry, the auditor tenure, the auditor independence and the reputation of the audit have been examined in various research and have shown that the increase in reputation, independence, the use of the big four auditors and auditor industry expertise improve the quality of audits [3] [4]. Regarding auditor tenure, there are two competing views to increase or decrease audit quality. Previous research mostly used the indicators mentioned in audit quality, while in the current research, in addition to the mentioned indicators, the variables of the number of tasks, annual income, quality control score, ratio of partners to employees, workload of partners

and employees, number of chartered accountants under employment and the number of professional staff have used. These indicators are among the important factors of audit quality that have been less discussed in previous research. Various factors affect audit quality, each of which can be effective for increasing the quality level of financial reporting. High-audit quality has high ability to identify and discover important deviations due to their high expertise and experience in most businesses. Therefore, it is important to identify such effective factors in advance. This research tries to answer the following questions: To what extent do the factors affecting audit quality influence the audit quality from the different groups' point of view?

The most important innovation of this research is identification and classification of fifteen audit quality indicators from the interested groups' point of view using the TOPSIS multi-indicator technique. The indicators used in this research were not completely evaluated in previous studies.

2 Review of Literature

Nowadays the development of the business world requires an audit process since the ownership of a business unit consisting of shares and investments can be owned by different parties. Separation between shareholders and company managers (management) requires that the financial reports prepared and presented by management to shareholders are checked for accuracy and fairness by the relevant regulations. The Statement of Fundamental Concepts of Auditing defines auditing as a systematic process conducted for collecting and objectively evaluating evidence related to assertions of various economic actions or events to determine the level of conformity between these assertions. Audit activities are performed by third parties or external parties who are independent and this is very important for a company [4]. Independent auditor's reports are used by three groups of stakeholders, the directors of the audited company, the company's shareholders, and third parties or external parties such as potential investors, creditors, and suppliers. It can be said that an audit is an inspection process carried out by an independent person to reduce the possibility of non-alignment of information in the manager and the holders of financial statements. Users of financial statements, especially shareholders, will make decisions based on the audit report issued by independent auditors regarding the fairness of the presentation of the company's financial statements. This indicates that independent parties play an important role in approving a company's financial statements.

The factors of work experience and professionalism requirements of external auditors by applicable auditing standards are used for strengthening audit quality along with learning about observing and adapting to changes in the audit field. Moroney and Carey [5] state that sufficient work experience can improve a person's performance in completing tasks. The more experience an external auditor has, the better the quality of the audit. Then, professionalism affects audit quality and auditor quality, which affects auditor performance as a primary indicator [6]. Apart from the experience and professionalism of external auditors, the quality of external auditors' performance is also influenced by time budget pressure and audit tenure. Findings show that time budget pressure reduces audit quality performed by Swedish auditors [7]. Nasser et al. [8] stated that the auditor's loss of independence due to involvement in personal relationships with clients can affect their attitudes and subjective opinions. Davis et al. [9] suggested that the longer the audit engagement period (tenure) between the auditor and the client company, the lower the quality of the audit report on financial statements. There are various phenomena in the form of irregularities or violations regarding audit quality, including the case of Enron at the end of 2001 with the independent accounting firm Arthur Andersen as its independent accountant services. Enron's bankruptcy was considered the result of poor audit quality. In Arthur Andersen, the independent

accountant was found guilty of conspiring with company management to manipulate Enron's financial data. The incident was motivated by the problem of the independence of Arthur Andersen's auditing firm, which was undermined because it had an audit tenure that lasted 20 years with its client, Enron. An important factor in the failure of the Enron project was lack of sufficient experience on the part of some audit teams at times of the year, who were not able to report the important mistakes and distortions made by the managers and for this reason the finger of accusation was directed at these auditors in the public court. The research conducted on the auditor's experience by Molyadi [10] shows that the auditor's experience has a positive and significant effect on the audit quality. The results of the research on the experience of auditors by Nirmala et al. [11] Volendri et al. [12] are similar to the research of Molyadi[10] stating that auditor experience has a positive and significant effect on audit quality. This result is different from Foutri and Jurialsa [13] which contradicts previous research because it shows that auditor experience has no effect on audit quality. Molyadi's [10] research on the auditor's professionalism indicated that the auditor's professionalism has a positive and significant effect on audit quality. At the same time, according to Foutri and Jurialsa's[13] research, the auditor's professionalism has no effect on audit quality.

Studies have shown that auditing is an important mechanism in corporate governance. Researchers have provided evidence that audit reduces the probability of information asymmetry between investors and managers [5], Palmeros found that audit report is a key factor in market reaction. But this reaction depends on the audit quality [14]. DeAngelo has defined audit quality as the probability of discovering and reporting material misstatements in the fair presentation of accounting information [15]. According to this definition, independence and competence are the two main characteristics of audit quality. When agency costs increase due to ownership decentralization and lack of effective monitoring by owners, the demand for higher audit quality increases [2]. Auditor quality is defined as the overall quality of audit services of an audit firm, while audit quality must be defined for the audit work and for each project separately, because all audits of an audit firm may not be at the same quality level. Therefore, the audit quality is based on the concept of the qualitative nature of audits of the auditing institute, while the audit quality is based on the concept of the real quality of each audit work.

In general, stakeholders have a different understanding of the level of audit quality, and this understanding depends on their familiarity with audit reports and their view of audit work. Audit Quality Center [16] organized a group work in 2012 with the aim of discussing and investigating current auditing issues. It was decided to research the views of different stakeholders in the discussion of audit quality and its indicators. The result of the training group was a report in which the views of five groups of stakeholders including: audit institutes, investors and creditors, managers, audit committee and supervisors were presented. The Public Company Accounting Oversight Board (PCAOB) [17] is a non-profit organization established by the US Congress after the approval of the Sarbanes-Oxley Act, which was established with the purpose of monitoring the accounting and auditing of public companies. This board has provided indicators related to audit quality. In the framework presented in this research, audit quality is defined as the meeting point of the needs of different users of the audit report, including investors, lenders, actual and potential creditors, audit committees in three areas including inputs, processes and results (consequences). Each area is provided with more detailed indicators. In total, forty indicators were introduced as audit quality indicators in this framework.

The International Auditing and Assurance Standards Board [18] published a framework for audit quality in 2013. Based on this framework, audit quality is achieved when it is possible to rely on the auditor's opinion that is based on appropriate and sufficient audit evidence and with the help of a team including

interactions, outputs and inputs. In implementing the provisions of Article 31 of the Charter and conducting professional supervision, the Iranian Institute of Chartered Accountants (IICA) of Iran must review the quality of audits at the levels of the audit institute and the audit work of its members at least once a year and publish the results in the information base of the institute. Therefore, the Iranian Institute of Chartered Accountants (IICA) will measure the audit quality in the member audit institutes and publicize it through the quality control working group colleagues visiting the member audit institutes and completing the quality control questionnaire including the measurement of 36 relevant indicators, based on 1000 points and publishing the obtained points [19].

Necessity of Research: Measure audit quality is difficult because the credit that is given to financial statements is not easily observable (De Find and Zhang). The role of auditor in quality of financial reporting is to provide reasonable assurance regarding compliance of financial statements with accepted principles and accounting standards.

The approach of a comprehensive study of audit quality requires a deep understanding of the complexities and subtleties of this issue. Some researchers have a zero and one approach in audit quality. Adopting the zero and one approach causes that the scope of auditing is divided into two simple classes, including auditor's negligence and lack of auditor's negligence. Accordingly, in this approach, if lawsuits are filed against the auditor in court, we will observe the auditor's malpractice and, in fact, the low quality of the auditor. However, it should be kept in mind that many lawsuits against auditors are resolved before reaching a conclusion. Therefore, the shortcomings of the auditor are greatly underestimated in this approach. Thus, zero and one approach regarding audit quality is not useful. It is appropriate to consider audit quality as a scope.

During the past years, various organizations have made efforts to provide indicators for evaluating audit quality. Therefore, in general the level of alignment and unity among these indicators was small.

Audit services are formed by existence of a supply and demand force like any service and in fact, this supply and demand force that determines the type of service and its quality.

2.1 Necessity of Audit Quality from the Audit Service Providers' Point of View

From the perspective of audit service providers, achieving audit quality requires spending time and money. In this regard, if there is no commitment to audit quality, we will witness provision of low quality services by auditors. Commitment to audit quality means that to what the managers and responsible partners consider themselves committed to providing high quality audit services.

The supply of audit services is resulted from two sources:

- a) Internal: Commitment to audit quality includes religious beliefs and adherence to ethics, human values and professional obligations. In fact, an important part of the reasons for providing high quality audit services should be sought in these cases, since if the ethical and professional obligations in the audit are violated, the auditor's report will no longer be valuable.
- b) External: Commitment to audit quality consists of concern about the consequences and damage caused by the supply of poor quality services as well as desire to obtain more benefits and rewards.

2.2 Necessity of audit quality from the audit service requester point of view:

From the audit services requester point of view, it is a service that is formed by legal requirements or the need of the requester to obtain reliable information and it has different stakeholders with sometimes

different interests. Auditor selector is one of the stakeholders who play an important role regarding audit quality strategies.

Request for audit: usually the request for audit is subject to legal requirements.

The demand for audit quality is resulted from two sources:

a) Internal: It is caused by professional beliefs and commitments or by creating transparency and meeting information needs.

b) External: Suffering damages due to low quality audits, existence of accountability and receiving more benefits due to the demand for high quality audits.

All of this depicts that a specific indicator should not be considered as the main effective factor on audit quality. Since the stakeholders have a different understanding of the level of audit quality, and this understanding depends on how familiar they are with audit reports and how they look at audit work.

2: Mathematical stages of TOPSIS

Mathematics of the TOPSIS method:

1. Formation of data matrix based on m options and n indicators:

$$A_{ij} = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}$$

2. Standardizing the data and form the standard matrix through the following relationship

$$r_{ij} = \frac{a_{ij}}{\sqrt{\sum_{k=1}^m a_{kj}^2}}$$

3. Determining the weight of each index (w_i) based on $\sum_{i=1}^n w_i = 1$

In this regard, more important indicators have a higher weight. In fact, the matrix (v) is the product of the standard values of each index in its respective weights

$$V_{ij} = \begin{bmatrix} w_1 r_{11} & w_2 r_{12} & \dots & w_n r_{1n} \\ w_1 r_{21} & w_2 r_{22} & \dots & w_n r_{2n} \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ w_1 r_{m1} & w_2 r_{m2} & \dots & w_n r_{mn} \end{bmatrix}$$

6. Determining distance criteria for alternatives (S_i^*) ideal and minimum alternative (S_i^-)

$$S_i^- = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^-)^2}$$

$$S_i^* = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^*)^2}$$

7. Determining the coefficient that is equal to the distance of the minimum alternative, divided by the sum of the distance of the minimum alternative S_i^- and the distance of the ideal alternative S_i^* , which is represented by C_i^* and calculated from the following relationship

$$C_i^* = \frac{S_i^-}{S_i^- + S_i^*}$$

8. Ranking alternatives based on the value of C_i^*

In this research, various factors have been identified in the field of audit quality based on previous research and studies. These factors are summarized in Table 1.

Table 1: Factors Affecting Audit Quality Dimensions

1	Auditor expertise in the industry: The total assets of all owners of a particular audit firm in a particular industry divided by the total assets of all owners of that industry
2	Auditor reputation (auditor size): The result of dividing the total assets of all the owners of a particular audit firm in the entire stock exchange by the total assets of the companies admitted to the stock exchange
3	Auditor tenure: The year in which the auditor was employed by the business entity should be available.
4	Auditor independence: To measure auditor independence, profit management (optional accruals) will be used as an inverse indicator of audit quality.
5	Detection of distortions: Annual adjustments will be used to measure the detection of distortions.
6	Audit fee: The independent auditor's fee is measured by the natural logarithm of the audit fee.
7	Diversity of employers: The existence of many owners, the number of industries, skills in a particular industry
8	Number of tasks: the amount of work per year and comparing it to previous years
9	Annual income: Annual income of the entire institute from audit services
10	Quality control score: Annual quality control score
11	Republishing of financial statements: Renewal or non-renewal of financial statements
12	Ratio of partners to employees: This index shows the number of employees that each partner manages and supervises. If the partners of an audit firm have too many employees under their supervision, they may not have enough time to conduct or supervise or properly review the audit processes, which can affect the audit quality.
13	Workload of partners and employees: This index measures the number of hours that partners and employees work outside of the usual amount. If the partners and employees have too much workload, they may not have enough time to perform or properly supervise and review the audit processes, which will affect the audit quality.
14	The number of chartered accountants under employment: The number of chartered accountants under employment to the total staff.
15	Number of professional employees: Number of professional employees to total employees.

3 Research Background

3.1 International Research

Alqadasy and Abdini [20] showed that companies with high concentration of ownership are less likely to need extensive audits, in addition, their findings indicate a positive relationship between corporate governance and audit costs. The findings of Kee et al. [21], Salehi and Alinya [22] and Beisland and Mersland [23] confirm that there is a positive and significant relationship between corporate governance and the quality of inspection. Abdin and Zaluki [24] investigated the relationship between the auditor's expertise in the industry and the timeliness of the audit report. The results of their research showed that the companies whose auditor is an expert in the industry do not have a more timely audit report than other companies whose auditor is not an expert, so the auditor's expertise in the industry does not affect the timeliness of the audit report. Also, they concluded that the size of the auditor increases the speed of the audit report.

Dunn and Mayhew [25] found that the owners of industry-specific audit firms were ranked higher by financial analysts in terms of disclosure quality. In 2011, Xuewen [26] studied the relationship between board of directors' specifications and high audit quality. In this study, the audit fee was considered as a representative of the audit quality. The results showed that the independence of the board of directors, gender diversity of the board of directors, and the efforts of the board of directors have a significant positive relationship with the audit fee, however the size of the board of directors has a significant negative relationship with the audit fee. Jeff P.B and Raman [27] examined the audit quality of four big audit firms and second-tier audit firms for the period 2003-2006. The results of their research indicated that the level of non-normal accrual items of the owners who were audited by the four big institutes is similar to the owners who were audited by the second level auditors.

Kaluka and Hervinyanti [28] identified the factors affecting audit quality. The purpose of this research was to identify, analyze and show the effects of the relationship among experience, auditor professionalism, time budget pressure, audit tenure and error detection knowledge on audit quality. The research population consisted of all auditors of a public accounting firm in Jakarta. The results of this study showed that the auditor's experience and knowledge of error detection has a positive and significant effect on audit quality, while auditor professionalism, time budget pressure have a positive but significant effect on audit quality, while auditor tenure has a negative effect on audit quality.

Sedigi et al. [29] investigated the factors affecting audit quality. The purpose of this research was to investigate the effect of education level, competence, motivation, remuneration, professionalism and audit experience on audit quality. The common problem in this research was that the users of the financial report make their decision based on the result of the audited financial report, so the information in the financial report should be free of false content and not misleading. The variables of this research include education level, competence, motivation, remuneration, professionalism, audit experience, and audit quality. The results indicated that (1) education level affects audit quality, (2) competence depicts audit quality, (3) remuneration is also an influencing factor on audit quality, (4) motivation has no effect on audit quality, (5) professionalism does not affect audit quality, and (6) audit experience is not a factor to affect audit quality.

Dong Hai [30] investigated the factors affecting audit quality. The aim of this research was to develop a theoretical model of factors affecting audit quality in the context of the Covid-19 pandemic with the qualitative research method, based on the study of related scientific works. This article examines the potential impact of the Covid-19 pandemic on five aspects related to audit quality, such as: audit fee assessment, continuous assessment of operational capability, audit evidence, human capital audit and

personnel audit. In this way, the author proposes models and hypotheses for empirical studies. At the same time, this study provides experiences and implications for auditors and audit firms for managing audit quality during future crises and pandemics.

3.2 National Research

Alavi and Parsaei [31], in a research in 2018 entitled "Relationship between audit quality and corporate transparency in companies listed on the Tehran Stock Exchange" showed that there is a positive and significant relationship between auditor tenure and corporate transparency, however, there was no significant relationship between the audit quality control score and corporate transparency. Badiei et al. [32], in a research entitled "Audit quality test and corporate governance mechanisms" depicted that the variables of board size, non-executive directors and the effectiveness of the audit committee/number of meetings have a positive effect and have a significant effect on the audit fee rate, and the variables of role duality (CEO), financial literacy of the audit committee managers, concentration of ownership and the type of company's field of activity have a negative and significant effect on the audit fee, as well as the variables of non-executive directors, the size of the audit committee and the size of the company/ total assets have a positive and significant effect on the audit report delay, and the variables of the size of the board of directors, role duality (CEO) and company profitability have a negative and significant effect on the audit report delay, and the variables of the independence of the board of directors and the existence of an internal auditor have a positive and significant effect on the size of the auditor. Jodi and Mansourfar [33], in a research entitled "Information asymmetry, internal and external dimensions of corporate governance quality: improving or weakening audit quality" showed that the existence of information asymmetry compared to the quality of corporate governance, the impact has more influence on the audit adequacy process and causes the positive relationship between corporate governance and audit quality to be distorted. Kurdestani et al. [34], in a research entitled "Evaluation of the impact of audit market concentration on audit fees and audit quality", the results of the research showed that audit market concentration reduces audit fees and audit quality.

Imani et al. [35], in a research entitled "Identifying the factors that determine audit quality in Iran from the perspective of chartered accountants" showed that among the input factors, the auditor's experience factors, and the work implementation factors, among the output factors, and in environmental factors, the existence of internal controls, the existence of corporate governance, have had the greatest effect on increasing audit quality. Alavi et al. [31] in a research entitled "Evaluation of effective factors on audit quality in audit institutes, members of the IICA" discussed the results of the hypothesis test and showed a positive and significant relationship between the variables of audit quality including chartered employee, the number of professional employees and the auditing firm with the audit quality control rating. They found a significant negative relationship between the variables of the number of partners and the number of audit firm works with the audit quality control rating. Also, the result of the fifth hypothesis test indicated lack of a meaningful relationship between the audit institute's annual income and the audit institute's quality control score.

Sepasi and Rezayt [36] in a research entitled "Identifying and ranking factors affecting social audit using the TOPSIS technique" depicted that the appropriate leadership of the organization is the most important factor on social audit. Nasirpour et al. [37] identified and ranked the dimensions and components affecting audit quality based on spirituality and ethical climate in the work environment using the Delphi method and Shannon's entropy technique. This research was conducted in 2019 through the Delphi method and the theories of fifteen experts and professors were collected in two stages in the

form of interviews and questionnaires. The data were analyzed in the final stage with the help of Shannon's entropy technique. The findings showed that the most important dimension affecting the improvement of audit quality is the leadership dimension, with the components of spiritual leadership and leadership style, followed by organizational, psychological and individual dimensions. Finally, 4 dimensions, 12 components and 52 indicators were identified, the weight of the dimensions and the order of their importance were shown.

Lotfi Sheikh Reza and Azadi [38] identified and ranked the effective factors of breaking public expectations from auditing. In this research, firstly, 13 factors affecting the lack of understanding of auditing concepts and the lack of social trust in creating a gap in public expectations from auditing were determined by studying the background and theoretical literature of auditing, and experts were interviewed in the form of a questionnaire and finally, by combining it with the opinions of experts 16 factors were identified and 24 audit experts who were selected through purposive sampling were asked for their opinions using a pairwise comparison questionnaire, then the 16 factors effective in creating a gap in public expectations from auditing were ranked. According to the subjects, the weighted ranking of the factors, "failure to transfer the concepts considered in auditing" on the lack of understanding of auditing concepts and "competition in the financial market, auditing and offering competitive prices of some institutions" on the lack of social trust compared to other factors were identified and there is more in creating a gap in the public expectation of auditing. According to audit experts, all 16 identified factors are effective in creating a gap in public expectations from auditing between auditors and users of financial statements, which in accordance with the theoretical foundations indicates this issue.

Esmailpour Zanjani et al. [39] investigated the dimensions of optimal supervision of auditors in Iran's capital market. After conducting the research, the components of the dimensions of the three-pronged model in Iran were compiled and compared with sample countries including the United States, England, Germany, Australia, and Malaysia, and the results of the research in Iran were at a good and more than satisfactory level. Also, this research shows that the level of auditor supervision components in Iran and sample developed countries is more than satisfactory level and there is a significant relationship between the dimensions of the three-pronged model of auditor supervision in Iran and sample developed countries.

3 Methodology

The operational goal of the current research is to answer the question of how the ranking and comparing the factors affecting audit quality, from the perspective of different groups (researchers and faculty members, audit institutes that are members of the ICA, members of the audit committee, financial managers of Tehran Stock Exchange companies) should be done. So the type and method of conducting research is applied based on purpose and descriptive (evidential) based on nature. On the other hand, this research is field study in terms of form and data collection, which means that a major part of the data has been collected through questionnaires by groups that influence the audit quality. In order to prepare the questionnaire in the first stage, the factors influencing the audit quality were examined based on previous external and internal research, and finally 15 factors were selected based on the opinion of experts as well as the conditions governing the audit quality conditions in the country, as indicators of audit quality.

After sending and receiving the questionnaire, the identified factors were prioritized based on the TOPSIS multi-attribute technique. Therefore, based on the above research as well as previous research, the statistical population of this research includes four groups as follows

1: Researchers and faculty members 2: Audit institutes, members of the Chartered Public Accountants Institute 3: Audit committee members 4: Financial managers of Tehran Stock Exchange companies
In this research, based on the sent questionnaires, according to the limitations of access to the information of all groups, it was done as follows

Table 2. Statistical population

Statistical population	Number of sent questionnaires	Number of received questionnaires
Researchers and faculty members	130	118
Audit institutes	235	220
Audit committee members	240	210
Financial managers	280	240

3.1 Research Hypothesis

Considering that the first part of this research is descriptive in identifying the factors affecting audit quality and the importance of each factor from the perspective of different groups (researchers and faculty members, audit institutes, members of the chartered accountants' community, members of the auditor committee and the financial managers of Tehran Stock Exchange companies) therefore, the first hypothesis of the research has been developed in the form of a question as follows:

1) To what extent do the factors affect audit quality from the point of view of different groups?

According to the published literature, the factors affecting audit quality include: auditor's expertise in the industry, auditor's reputation (auditor's size), auditor tenure, auditor independence, detection of distortions, audit fees, diversity of employers, number of auditor's tasks, annual income, quality control score of the institute of chartered accountants, republishing of financial statements, ratio of partners to employees, workload of partners and employees, the number of employed accountants, the number of professional employees. Finally, in order to compare the views of different groups, the second hypothesis has been formulated:

2): There is a significant difference between the viewpoints of different groups regarding the factors affecting audit quality.

3.2 Research Model

In this section using the data extracted from the questionnaire of four research groups, the identified indicators were weighted and ranked using the TOPSIS multi-attribute technique, and the weights and rankings were calculated as follows:

Multi-criteria decision making technique of TOPSIS

The TOPSIS technique or prioritization based on the similarity of the solution to the ideal solution is one of the methods of multi-criteria decision making. This technique can be used to rank and compare different options and choose the best option and determine the distances between the options and the group and their classification. One of the advantages of this method is that the criteria or indicators used for comparison can have different measurement units and positive and negative aspects. In other words, negative and positive indicators can be used in a mixed form in this technique. In this m options (in this research, m options include factors affecting audit quality) are evaluated by n indicators. In total, the TOPSIS process includes following steps:

1. Quantification and de-scaling of the decision matrix (N): For de-scaling, inflation de-scaling is used.

2. Obtaining the weighted unscaled matrix (V): the unscaled matrix (N) is multiplied by the diagonal matrix of weights ($W_{n \times n}$). ($V = N * W$). In order to obtain the balanced incomparable matrix, it was necessary to calculate the weights of the indicators, which was done using Shannon's entropy method.
3. Determining the positive ideal solution and the negative ideal solution:
4. Obtaining the distance of each option to positive and negative ideals
5. Measuring the relative proximity (cl) of each option to the ideal solution (calculation of similarity index):
6. Any option with bigger cl is better. In other words, the ranking is based on the similarity index. So that the value of the similarity index changes between zero and one. The more similar the option is to the ideal, the closer the similarity index will be to one [32].

3.3 Determining the Weights of Indicators by Entropy Method

The basis of the entropy method is that the greater the dispersion in the values of an index, the more important that index. After de-scaling the values related to each index, the relative importance of the indicators should be determined [26].

Before starting the entropy steps, it is necessary to determine how to scale the questionnaire as shown in the Table below. Table 3 shows the 5-point scales with the distance scale method.

Table 3. Ranking of the 5-point scale

Very week	weak	No opinion	High	Very high
1	3	5	7	9

To implement entropy, first, the decision matrix is defined as Table 4. In this matrix, the options consist of faculty members, audit institutes, audit committee members, and chief financial managers of companies. The average score given by the options to each of the selected indicators of the research through the questionnaire is summarized in the Table below.

Table 4. Index weights matrix

Indicators items	Auditor expertise	Auditor size	Auditor tenure	Auditor independence	detection of distortions	Auditing fee	Employer diversity	Number of works	annual income	Score in quality control	Republishing of financial statements	Ratio of partners to employees	Workload of partners and employees	Number of chartered accountants	The number of professional employee
Faculty members	8.898	8.712	3.407	5.051	8.424	8.559	3.593	6.847	6.847	8.763	4.254	8.525	8.576	8.661	8.695
Faculty members	6.889	6.277	5.162	7.391	5.885	7.000	7.026	5.979	5.340	7.102	4.277	5.936	6.089	7.996	7.970
Auditing committee	7.010	6.914	5.200	7.276	4.971	7.971	7.952	7.781	4.000	7.829	4.076	8.762	8.695	8.848	8.724
Chief managers	7.317	6.642	3.858	5.783	3.842	3.900	6.883	6.142	3.833	8.158	6.983	3.742	6.800	6.217	7.283

In the entropy method, the index weights are calculated as follows: Step 1. In the decision matrix, m options and n criteria for each component related to an index P_{ij} are defined as follows:

$$P_{ij} = \frac{a_{ij}}{\sum_{i=1}^m a_{ij}}$$

Step 2. Calculation of entropy E_j (confidence measure) for each index (m is the number of options and k is a fixed number and is defined by the following formula):

$$E_j = -K \sum_{i=1}^m p_{ij} \ln p_{ij} \quad K = \frac{1}{\ln m} = \frac{1}{\ln(4)} = 0.721$$

Step 3. In this step, the degree of deviation (d_j) or the measure of uncertainty is calculated, which states how much useful information the relevant index (j) provides to the decision maker. The closer the measured value of an index indicates that the competing options do not differ much from each other in terms of that index. Therefore, that index in decision-making should be reduced by the same amount.

$$d_j = 1 - E_j$$

Step 4. Calculation of weights for each index W_j :

$$W_j = \frac{d_j}{\sum_{j=1}^n d_j}$$

After implementing the steps related to the entropy method, the Table below shows the final weight of each of the 15 indicators

Table 5. Index weights matrix

Indicators items	Auditor expertise	Auditor size	Auditor tenure	Auditor independence	detection of distortions	Auditing fee	Employer diversity	Number of works	annual income	Score in quality control	Republishing of financial statements	Ratio of partners to employees	Workload of partners and employees	Number of chartered accountants	The number of professional employees
Confidence measure E_j	0.970	0.994	0.988	0.980	0.998	0.998	0.979	0.996	0.994	0.973	0.996	0.991	0.992	0.964	0.973
Non-confidence measure (d_j)	0.030	0.006	0.012	0.020	0.002	0.002	0.021	0.004	0.006	0.027	0.004	0.009	0.008	0.036	0.027
Index weight W_j	0.140	0.028	0.055	0.095	0.009	0.010	0.096	0.019	0.030	0.128	0.019	0.042	0.038	0.167	0.126

In Table 5, the degree of importance of each index is determined by the entropy method. In terms of the selected options, the measure "number of chartered accountants" with a weight of 0.167, the measure of "auditors' expertise in the industry" with a weight of 0.140 and the measure of "quality control score" with a weight of 0.128 have the highest relative importance and the index of "discovery of significant distortions" with a relative weight of 0.009 and audit fee index with a weight of 0.010 have the least relative importance.

3.4 The Weight of Indicators Based On Each of the Options

With the soft Euclidean method, a decision matrix can be converted into anunscaled matrix or homogeneous weights with the help of the following relation:

$$r_{ij} = \frac{x_{ij}}{(\sum_{i=1}^m x_{ij})^{1/2}}; (j = 1, \dots, n)$$

Table 6. Weight of indicators based on each option

Indicators	Faculty members	Auditing institute	Auditing committee	Chief financial managers
Auditor expertise	0.308	0.274	0.249	0.314
Auditor size	0.302	0.249	0.246	0.285
Auditor tenure	0.118	0.205	0.185	0.166
Auditor independence	0.175	0.294	0.259	0.248
Detection of distortions	0.292	0.234	0.177	0.165
Auditing fee	0.296	0.278	0.284	0.167
Employer diversity	0.124	0.279	0.283	0.295
Number of works	0.237	0.237	0.277	0.264
Annual income	0.237	0.212	0.142	0.165
Score in quality control	0.303	0.282	0.279	0.350
Republishing of financial statements	0.147	0.170	0.145	0.300
Ratio of partners to employees	0.295	0.236	0.312	0.161
Workload of partners and employees	0.297	0.242	0.309	0.292
Number of chartered accountants	0.300	0.318	0.315	0.267
The number of professional employees	0.301	0.317	0.310	0.313

The ranking of each audit quality factor is based on 4 research groups according to the output of the TOPSIS technique steps as described in Table 7.

4 Findings

The results of comparison of indicators in the four studied groups (researchers and faculty members, members of the accountants' institute, members of the audit committee, chief financial managers) have been mentioned as follows:

For this comparison, one-way analysis of variance was used. Also, if the analysis of variance is significant, pairwise comparisons have been made with Duncan's test. The zero assumption in variance analysis is the equality of the mean of the dependent variable at all levels of the independent variable (four studied groups). If the significance level of the test is less than 0.05, the null hypothesis will be rejected. The results of variance analysis show that all the indicators of auditor independence, quality control score, republishing of renewal of financial statements and its effect on the market, auditor's expertise in the industry, number of chartered accountants under employment, number of professional employees, number of works, diversity of employers, workload partners and employees, audit fee, annual income, auditor tenure, reputation of the auditor, detection of distortions, the ratio of partners to employees in four groups of researchers and faculty members, members of the accountants institute, members of the audit committee, chief financial managers have a significant difference ($p < 0.05$).

The results of Duncan's test are presented in Table 8. To simplify the results and ease of comparisons, English letters have been used. The largest average is marked with the letter "a", followed by the next

letters. Non-common English letters (difference of views) indicate significance at the 5% level and common English letters (similarity of views) indicate non-significance.

Table 7. Ranking of indicators based on their weight from the point of view of each group

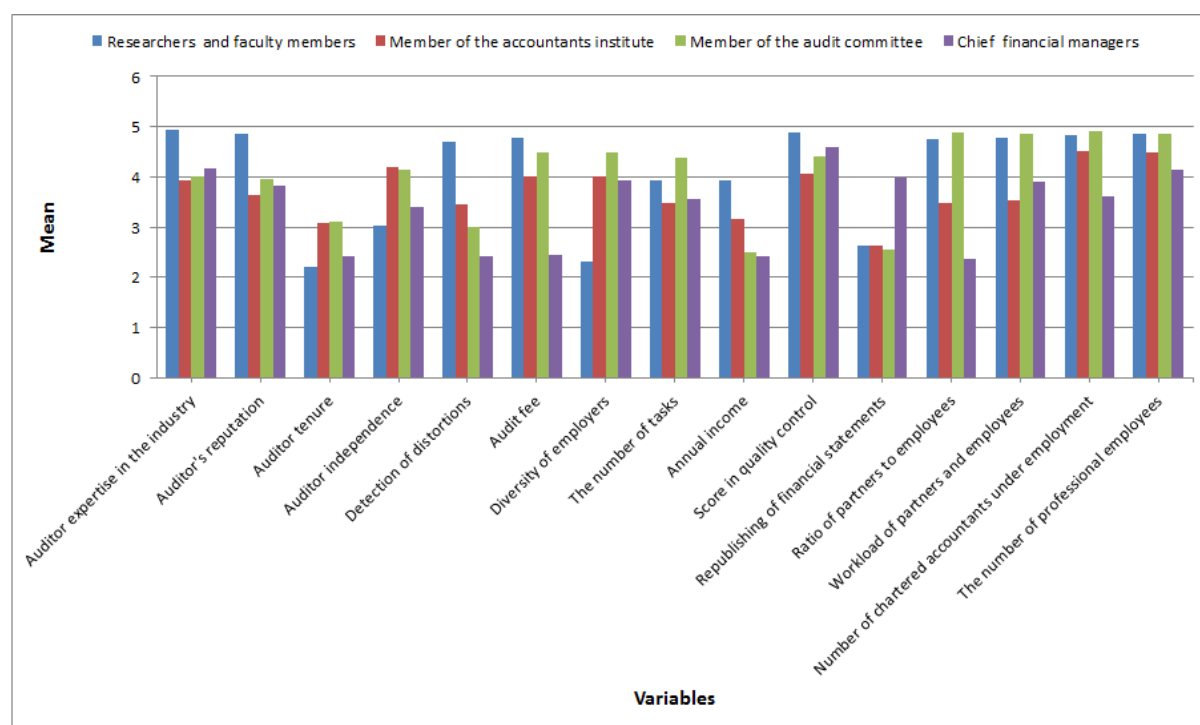
Indicators	Index rank based on the opinion of chief manager	Index rank based on the opinion of auditing committee	Index rank based on the opinion of auditing institute	Index rank based on the opinion of faculty member
Auditor expertise	2	10	7	1
Auditor size	7	11	8	3
Auditor tenure	12	12	14	15
Auditor independence	10	9	3	12
Detection of distortions	13	13	12	9
Auditing fee	11	5	6	7
Employer diversity	5	6	5	14
Number of works	9	8	10	10
Annual income	14	15	13	11
Score in quality control	1	7	4	2
Republishing of financial statements	4	14	15	13
Ratio of partners to employees	15	2	11	8
Workload of partners and employees	6	4	9	6
Number of chartered accountants	8	1	1	5
The number of professional employees	3	3	2	4

5 Conclusions and Proposition

Considering that the independent audit report is one of the financial reporting chains, it is very important to identify the diverse factors affecting the audit quality. Therefore, this research as tried to rank the factors affecting audit quality from the perspective of different groups using the TOPSIS multi-attribute technique. In this research, four groups of researchers and faculty members, members of the chartered accountants institute, members of the audit committee and chief financial managers were selected as the beneficiaries of audit quality. Fifteen factors were selected for audit quality and tested via various tests. The results showed that the auditor's expertise index in the industry, the number of professional employees and the number of employed charteredaccountants are more important in

improving audit quality. Also, the findings indicated that the index of discovering significant distortions, the auditor tenure and the republishing of financial statements are less important.

Professional auditors are able to detect and report any material misstatements in financial statements due to their specific knowledge and experience in the industry. This feature offers them the opportunity to minimize any agency conflicts between the company and the auditors. Due to the mastery of the audit work process and having an effective role on operational audit dimensions, the number of professional employees has a greater ability to review financial information with quality. Official accountants under employment are also trying to reduce the gap between national and international standards due to their high reputation and independence as well as adherence to international standards. Therefore, this group is more prepared to discover any significant distortions and mistakes in financial statements. Also, the findings indicate that the index of discovering significant distortions, the auditor's tenure and the reissue of financial statements are less important. In fact, the discovery of significant distortions does not only mean that the quality audit process is disrupted and may be caused by other factors. Hence, in the rest with other factors they are less important. Tenure is a factor that has a dual role on audit quality. Some are in favor of increasing the long-term relationship between the auditor and the employer, while others are against increasing the long-term relationship. Therefore, this index has become less important in this research due to the existence of a rule by the Tehran Stock Exchange that there is no connection for more than 4 years. Finally, the reissue of financial statements is merely a supplementary and warning information to investors regarding the quality of the audit of financial statements, which suggests that investors prefer other sources to the reissue of financial statements.



The results of the general findings showed that according to the nature of the concept of audit quality, there is a different understanding of audit quality by different groups, and the results of this research are consistent with the research of Mojtahedzadeh and Aghaei [40] and Alavi et al. [31].

Table 8. Variance analysis results to compare indicators in the four studied groups

Variables	group	The result of Duncan's test	No.	Mean	s.d	F statistics	Sig
Auditor expertise in the industry	Researchers and faculty members	A	118	4.95	.221	309.163	.000
	Member of the accountants institute	C	235	3.94	.335		
	Member of the audit committee	C	210	4.00	.207		
	Chief financial managers	B	240	4.16	.388		
Auditor's reputation	Researchers and faculty members	A	118	4.86	.439	135.703	.000
	Member of the accountants institute	D	235	3.64	.686		
	Member of the audit committee	B	210	3.96	.246		
	Chief financial managers	C	240	3.82	.638		
Auditor tenure	Researchers and faculty members	C	118	2.20	.578	98.057	.000
	Member of the accountants institute	A	235	3.08	.545		
	Member of the audit committee	A	210	3.10	.359		
	Chief financial managers	B	240	2.43	.835		
Auditor independence	Researchers and faculty members	C	118	3.03	.577	189.484	.000
	Member of the accountants institute	A	235	4.20	.670		
	Member of the audit committee	A	210	4.14	.346		
	Chief financial managers	B	240	3.39	.546		
Detection of distortions	Researchers and faculty members	A	118	4.71	.571	209.614	.000
	Member of the accountants institute	b	235	3.44	1.362		
	Member of the audit committee	c	210	2.99	.249		
	Chief financial managers	d	240	2.42	.551		
Audit fee	Researchers and faculty members	a	118	4.78	.455	939.737	.000
	Member of the accountants institute	c	225	4.00	.299		
	Member of the audit committee	b	210	4.49	.547		
	Chief financial managers	d	240	2.45	.569		
Diversity of employers	Researchers and faculty members	c	118	2.30	.696	557.858	.000

Table 8. Variance analysis results to compare indicators in the four studied groups

Variables	group	The result of Duncan's test	No.	Mean	s.d	F statistics	Sig
	Member of the accountants institute	b	235	4.01	.172		
	Member of the audit committee	a	210	4.48	.537		
	Chief financial managers	b	240	3.94	.481		
The number of tasks	Researchers and faculty members	b	118	3.92	.456	121.337	.000
	Member of the accountants institute	c	235	3.49	.565		
	Member of the audit committee	a	210	4.39	.603		
	Chief financial managers	c	240	3.57	.529		
Annual income	Researchers and faculty members	a	118	3.92	.492	150.874	.000
	Member of the accountants institute	b	235	3.17	1.036		
	Member of the audit committee	c	210	2.50	.520		
	Chief financial managers	c	240	2.42	.542		
Score in quality control	Researchers and faculty members	a	118	4.88	.526	72.143	.000
	Member of the accountants institute	d	235	4.05	.239		
	Member of the audit committee	c	210	4.41	.591		
	Chief financial managers	b	240	4.58	.692		
Republishing of financial statements	Researchers and faculty members	b	118	2.63	.814	335.743	.000
	Member of the accountants institute	b	235	2.64	.524		
	Member of the audit committee	b	210	2.54	.554		
	Chief financial managers	a	240	3.99	.475		
Ratio of partners to employees	Researchers and faculty members	b	118	4.76	.565	1210.136	.000
	Member of the accountants institute	c	235	3.47	.500		
	Member of the audit committee	a	210	4.88	.391		
	Chief financial managers	d	240	2.37	.509		
Workload of partners and employees	Researchers and faculty members	a	118	4.79	.487	233.055	.000
	Member of the accountants institute	c	235	3.54	.593		

Table 8. Variance analysis results to compare indicators in the four studied groups

Variables	group	The result of Duncan's test	No.	Mean	s.d	F statistics	Sig
	Member of the audit committee	a	210	4.85	.465		
	Chief financial managers	b	240	3.90	.742		
Number of chartered accountants under employment	Researchers and faculty members	a	118	4.83	.459	344.731	.000
	Member of the accountants institute	b	235	4.50	.501		
	Member of the audit committee	a	210	4.92	.300		
	Chief financial managers	c	240	3.61	.568		
The number of professional employees	Researchers and faculty members	a	118	4.85	.384	93.519	.000
	Member of the accountants institute	b	235	4.49	.542		
	Member of the audit committee	a	210	4.86	.443		
	Chief financial managers	c	240	4.14	.568		

Non-common English letters indicate significance at the 5% level and common English letters indicate non-significance.

Based on the findings of the research, practical suggestions are proposed as follows:

1. Based on the obtained results, it is suggested that companies use the presence of expert auditors in the industry to determine the suitability of financial statements and accounting documents, because these auditors have more knowledge and expertise in the relevant industry and help to increase the audit quality. It is also suggested to the Tehran Stock Exchange Organization to adopt new regulations for the proper use of chartered accountants for companies admitted to the stock exchange. These requirements include increasing the number of chartered accountants in audit institutes in order to increase audit quality.
2. It is recommended that the audit institutes to use more specialized employees with work experience in the field of accounting. These employees have a great influence in increasing audit quality. Sufficient attention and precision in the financial field by professional employees and proper analysis in the field of financial issues and discovering possible distortions are important factors in the field of the efficiency of the audit work process.
3. It is suggested that IICA to evaluate the audit quality of audit institutes based on the importance of ranking the indicators identified in this research.

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