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Comparative Study of the Impact of Critical Thinking on Fraud Risk Assessment in Public and Private Sector Auditors

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ABSTRACT

The main purpose of this study is to compare the impact of critical thinking on fraud risk assessment in public and private sector auditors. The present research is applied in terms of purpose, quantitative in terms of data type, and descriptive-correlational in terms of data collection method. To measure the variables, standard questionnaires were used, which their face and content validity, and reliability were investigated using Cronbach's alpha test. Theses questionnaires were administered in two separate statistical population of public and private sector auditors, each including 226 people. In the inferential part, the research hypotheses were tested using the structural equations modeling. In this part, the results showed that critical thinking is one of the factors affecting the fraud risk assessment among the public and private sector auditors. Further study also emphasized that despite the higher impact factor for private sector auditors, this difference was not statistically significant.

Keywords:

critical thinking, fraud risk, auditing.

1. Introduction

Auditing is a service activity which its main task is to provide useful information for making economic decisions. The existential philosophy of the accounting information system is to provide services to individuals and groups using a variety of quantitative and qualitative information to achieve their goals. In this regard, the accounting system is responsible for providing information normally of a financial nature. Performing this task and responding to the information needs of users require preparing and providing useful information in order to select a reasonable and desirable action from the various solutions available for the allocation of scarce economic resources in the process of commercial and economic operations (Nazari & Habibipour, 2017). Accordingly, it is necessary to pay attention to the information needs of individuals and groups active in the field of economics! So that the durability and survival of the accounting system depends on establishing a kind of continuous interaction and communication with the environment. Optimal decision-making to invest in business units and, in other words, the proper allocation of scarce resources in society requires clear and intact financial information (Franco et al., 2019). Lack of information or the existence of misleading information leads to unfavorable economic decisions and as a result, loss of economic resources, destruction of capital markets, and ultimately economic backwardness and poverty, and reduced public welfare. One of the basic preconditions for attracting investors and creditors to constructive economic activities and ultimately economic growth is to provide information that will be useful in making financial, economic and business decisions (Simpson, 2018). Such information, while providing the basis for labor activity and the effectiveness of capital markets, helps the government in policy-making and planning in economic affairs and the management of operations of business units. In developed countries, financial statements are now recognized as the most important source of information to reflect the results of performance and financial status and cash flows of business units, and therefore the basics of preparing financial statements are very important (Giroux, 2018).

On the other hand, many reasons, such as making profitability of company and performance of managers look good, cause managers or accountants to commit a fraud in the financial statements, reducing the quality of the financial statements (Duan & Wein, 2017).

The methods used by auditors and their reporting objectives (reviewing, analyzing and proving the balances of financial statements and extracting important misstatements) are not consistent with the detection of fraud in many cases. However, international auditing principles and standards have changed significantly in recent years due to the prevalence of corruption and fraud, and strict rules have been developed for developers of accounting standards and auditors to cover methods for dealing with fraud (Singhvi, 2017).

But with the increase of control and investigation, the methods of fraud by fraudsters have become more complex and the use of scientific and essential basics is more felt. Fraud issue is not an emerging phenomenon, because this ominous phenomenon has been present in various forms in business circles since the 1960s. Organizations and companies should be aware that committing fraud by managers and employees is due to rationalizing these actions or social pressures on them (Ashiq et al., 2018).

Of course, in the meantime, the opportunities provided by the controls also pave the way for committing fraud. It is interesting to note that due to the hidden and ingenious aspects of fraud, in addition to issues caused by poor management, fraud also occurs in systems dominated by efficient management. Therefore, organizations should take the fraud issue serious instead of instilling false hopes that there is no fraud in their organizations, and in this regard, they should work on anti-fraud programs with perseverance and hard work until it is fully detected. There is no doubt that the most important reason for committing fraud and corruption is greed (Rafat, 2017).

But having auditors with critical thinking style can reduce fraud risk assessment.

Critical thinking skills include interpretation, analysis, evaluation, inference, and self-regulation.

The first critical thinking skill for auditors is interpretation. This skill includes the ability to understand and explain the meaning of information or events. This requires having information on auditing and fraud and the application of fraud theories. In addition, the importance of the facts, as well as the possible causes and importance of the actions must be considered (Jobb & Houghton, 2016).

Another important skill of critical thinking for auditors is analyzing information, which provides an opportunity to determine the causes of problems, advantages, disadvantages, results and possible cases. Another skill is the evaluation process, which involves reviewing the information obtained during the audit.

Other skill of critical thinking is inference. A person with inference skill makes the right conclusions based on the information available. The decision of such a person is made according to reason and logic. Another critical thinking skill is the ability to explain and interpret results. The main cause of answering the questions must be discovered. The last skill is self-regulation. This skill involves examining the auditor's personal thoughts. One must re-evaluate the process ultimately leading to the conclusion. By reviewing the thought process, if necessary, it can be corrected and its weaknesses can be eliminated. Finally, it can be said that self-regulation is the recognition and correction of errors in the mental process (Raufi, 2012).

All of these skills can increase critical thinking in the auditor, ultimately leading to improved fraud risk assessment in the financial statements, but in the meantime, work environment and working conditions also affect the impact of critical thinking on fraud risk assessment. In the present study, this issue is examined in both public and private sector audit. Therefore, in the present study, we seek to answer the question what is the difference of critical thinking in fraud risk assessment between public and private sector auditors?

2. Theoretical framework and background Critical thinking

There are numerous definitions of critical thinking, some of which will be mentioned. In a definition, critical thinking is a complex but purposeful process from which the information obtained is reasonable. Critical thinking also reflects reflection and contemplation, meaning how you can focus your thinking to achieve the needed results.

Yildirim., Özkahraman & Karabudak (2011) consider critical thinking as the process of searching, achieving, evaluating, analyzing, and synthesizing, which is a guide to developing thinking in the individual through self-awareness and the ability to use it through creativity and risk-taking. Riddle believes that there are different definitions of critical thinking. He states that there are similarities in those definitions, which include reflection, identification and evaluation of hypotheses, exploration, interpretation and analysis, reasoning and judgment, and contextualization. Critical thinking is a process of reasoning and attitude, consisting of many mental skills. Critical thinking helps a person to express his/her thoughts accurately, correctly, relevantly and without bias.

Johnson (2016) refers to the following as characteristics of critical thinking and tips that can be used to evaluate critical thinkers and considers them as characteristics of critical thinkers. These characteristics include:

1) Thoughtful curiosity,
2) Objectivism, meaning the use of objective factors in decision making,
3) Wide-mindedness (open-mindedness), flexibility that shows the desire to change ideas or methods of study and research,
4) Reasonable skepticism, meaning not accepting a result as a real and correct result until sufficient evidence is provided,
5) Wise honesty, which is accepting the correct statement even if it is against the individual interest,
6) Being methodical, which is the continuous adherence to a logical policy until reaching a result.
7) Persistence and perseverance when trying to resolve disputes,
8) Determination, meaning reaching a conclusion when the evidence justifies it, and
9) Respect for other views, meaning the tendency to accept that one may be wrong and others are right.

Fraud risk assessment

Fraud covers a wide range of disorders and illegal acts that are identified and determined through intentional misrepresentation. In many respects including financial, organizational reputation, psychological and social functions, and negative effects and consequences, fraud affects the organization. According to the various studies, monetary losses due to fraud are very significant. The total cost of fraud in terms of time, productivity and reputation such as customer relationship, is limitless. Due to the severity of the losses and the financial

impact of fraudulent activities, organizations suffer irreparable damage. Therefore, having a strong and empowered anti-fraud plan is very important. This plan includes awareness and consciousness, fraud prevention and detection methods as well as the process of fraud risk assessment within the organization. According to Section 240 of the Auditing Standard on Fraud, fraud is any intentional act by one or more individuals among management, and misstatement in the financial statements may result from fraud or error (including price or disclosure) such as:

- Error in collecting or processing information based on the preparation of financial statements
- Incorrect accounting estimates resulting from ignoring or misinterpreting existing facts
- Error in applying accounting standards related to measurement, identification, classification, presentation or disclosure (Ashiq et al., 2018).

Classification of types of fraud

Fraud is generally done in the following three ways:

Financial corruption is defined as a fraud in which fraudsters misuse their influence in a financial transaction in order to work for their own or another person's personal interest, such as accepting commissions and engaging in conflicts of interest, bribery, economic extortion and coercion.

Misuse of assets is theft or misuse of an organization's assets, such as cash theft tricks, theft of goods, theft of other assets, and abuse of assets as personal property.

Financial reporting fraud is an intentional distortion of the results of financial statements to present an incorrect picture of the company, such as overstatement of assets and understatement of expenses, and elimination of prices (Yazdanpanah, 2013).

Methods for detecting and preventing fraud

In general, fraud has two fundamental drawbacks that may eventually lead to its detection: structure and predictability.

Structure: The cyclical nature of fraud indicates a structure of cohesive elements and path, such that an experienced and specialized person, even with a brief look at some aspects of this cycle, can reveal all the fraudulent tricks and their intentions and stimuli in his/her evaluations.

Predictability: Fraud is predictable as an event in both macro and micro contexts because normally there must be conditions for it to occur. At the macro level, there is a correlation between the general state of the economy and industry and the tendency to fraud. At the micro level, fraud prediction follows that most frauds have common features, and an experienced auditor can apply the rules of fingerprinting and professional care and fraud prediction when certain circumstances prevail.

Fraud auditing: Fraud auditing is different from financial statement auditing. Financial auditing is not primarily about finding and detecting fraud. Rather, it is evidence that misstatement in the financial statements as a whole is due to fraud or error. But fraud auditing is a special audit to detect fraud in the financial statement (Amiri, 2018).

Methods for detecting and preventing fraud

The focus on anti-fraud activities has evolved from detection to prevention. Anti-fraud professionals such as auditors and inspectors all agree that most victims of fraud can hardly reclaim assets stolen as a result of fraud, as fraudsters never save assets obtained through fraud (Krancher, 2017).

Fraud prevention and detection are interrelated issues. But their concepts are not the same. Fraud prevention includes policies, approaches, training, and communications that prevent fraud, while fraud detection focuses on activities and methods that detect fraud promptly and with time sensitivity or find that a fraud is about to occur (Rahimian, 2011).

As seen in Figure 1, according to the annual report of the Association of Formal Fraud Inspectors, one of the most important ways to detect fraud in organizations is informing through the establishment of telephone hotlines.

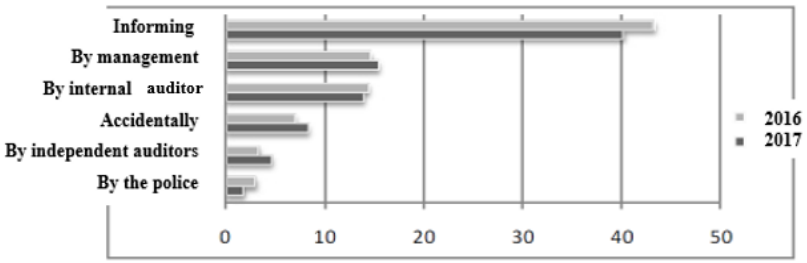

Figure 1. Fraud detection methods

So far, few studies have been done on the variables of the research subject, some of which are addressed below.

Jamei and Rostamian (2019) investigated the effect of financial expertise of the audit committee members on the characteristics of earnings forecasts and concluded that the financial expertise of the audit committee members is positively related to the accuracy of earnings forecasts. In other words, it can be said that the presence of members with financial expertise in the audit committee increases the quality of financial reporting and provides more reliable information to management and thereby earnings forecasts are estimated more accurately. The results also showed that the financial expertise of the members of the audit committee was negatively related to the dispersion of earnings forecasts.

Mohammadi et al. (2019) in a study entitled Strengthening and Developing the Critical Thinking of Auditors in Auditing Complex Estimates stated that the emphasis on the use of professional judgment is not enough to reduce the mechanical mindset of auditors. However, auditors are expected to have to adopt a systemic thinking approach to better assess the complexity of the situation and make effective professional judgments. These results show that the goal of improving professional judgment can be achieved by fundamentally changing the way auditors think.

Asadi and Ashkani (2014) examined the relationship between the quality of audit firms, professional audit opinion and earnings management. According to their findings, earnings management does not depend on auditor quality, but there is a significant relationship between audit opinion and earnings management. The increased earnings management in firms increases the likelihood of receiving adjusted audit opinions.

Lobo and Zhao (2020) in a study entitled The Relationship Between the Auditor's Efforts and Distortion in Financial Statements examined the contradiction between theoretical forecasts (the existence of a negative relationship between auditor quality and restatement of financial statements) and empirical findings (the existence of a positive relationship between auditor quality and restatement of financial statements). They believed that this contradiction was firstly due to the inability of empirical research to control the risk adjustment performed by the auditor and secondly due to the inattention of empirical research in separating the representation of the audited financial reports from the unaudited reports. Both cases caused the estimated relationship between the quality of auditor and subsequent representations to be biased towards a positive relationship. Correcting these two bias sources, they found a strong negative relationship between the audit effort and the representation of the annual report.

Jin and Myers (2017) developed a model stating that auditors' lack of commitment and non-follow-up gives managers more opportunity to cover up bad news from company stakeholders and financial statement fraud, and ultimately when bad news accumulated in the company spreads, it causes a severe and negative adjustment in stock returns or the fall in stock prices, so the presence of critical thinking in auditors can significantly affect reducing fraud.

According to the theoretical foundations and research background examined, research hypotheses can be presented as follows:

Research hypotheses

Critical thinking affects the fraud risk assessment in public sector auditors.

Critical thinking affects the fraud risk assessment in private sector auditors.

The impact of critical thinking on the fraud risk assessment for public and private sector auditors is the same.

3. Research methodology

The present study is applied in terms of purpose and descriptive-correlational in terms of data collection method. This study is also quantitative based on the type of data collected, which in this regard, questionnaires were developed to receive the opinions of public and private sector auditors. Therefore, in this study, we seek to examine the difference of critical thinking in fraud risk assessment between public and private sector auditors.

The statistical population of the present study includes two categories of public sector auditors and private sector auditors. For this purpose, the questionnaires were administered among 250 people from the statistical samples, which according to the necessity of equal sample size in both categories of statistical population to be compared, 226 questionnaires were finally collected from each statistical population. The random sampling method is clustered, in which the clusters are also audit firms and audit circles in the private and public sectors.

Library and field resources (questionnaire) were used to collect data. The research questionnaire consists of two parts. One part includes the general characteristics of the subjects such as education, age, work experience, and the other part includes Matthews' (2010) Critical Thinking Questionnaire and Raiko's (2005) Fraud Likelihood Measurement Questionnaire, having 12 and 9 items, respectively. These questionnaires were measured on a five-point Likert scale (very low = 1, low = 2, somewhat = 3, high = 4 and very high = 5).

Fornell-Larcker test was used to assess the validity of the questionnaire. According to this criterion, a latent variable should have a greater dispersion among its observables than other latent variables. The square root of the average variance extracted of each latent variable must be greater than the maximum correlation of that variable with the other latent variables of the model. This test measures the diagnostic validity at the level of latent variables. This index was obtained by combining tables of correlation values between latent variables and the average variance extracted. The following table compares the square root of the average variance extracted of each construct with the values of the correlation coefficients between the constructs.

Table 1. Comparing the square root of the average variance extracted of each construct with the values of correlation coefficients between the constructs (divergent (diagnostic) validity using Fornell-Larcker test)

Cronbach's alpha	4	3	2	1	AVE	Constructs
0.79	--	--	--	0.78	0.61	Critical thinking of the private sector
0.84	--	--	0.76	0.53	0.58	Critical thinking of the public sector
0.76	--	0.82	0.52	0.47	0.67	Assessing the fraud likelihood in the private sector
0.90	75	0.36	0.44	0.39	0.56	Assessing the fraud likelihood in the public sector

The square root values of the average variance extracted in the rows and columns are the highest, indicating the existence of divergent validity among the research variables.

In order to calculate the reliability, Cronbach's alpha coefficient was used according to the nature of the research. Composite reliability was evaluated using structural equations software and Cronbach's alpha coefficient using LISREL software. The results of the validity and reliability study showed that the calculated Cronbach's alpha coefficient for all questionnaires is equal to 84. At the same time, the calculated reliability coefficient for the dimensions of the four main constructs is above 0.7. It can be concluded that the questionnaire used has the necessary research reliability. Therefore, research questionnaires are approved in terms of reliability.

4. Research findings

In this section, quantitative analysis of data using LISREL software is done in two areas of analysis (descriptive and inferential) and interpretation of results.

Descriptive statistics of demographic characteristics and research variables

The following table describes the demographic information as well as the research variables in terms of central tendency, dispersion, and distribution shape indices.

Table 2. Demographic information and research variables

Percentage	Frequency	Class	Variable
14.2	32	BA	**Education level**
63.3	143	MA	
22.5	51	PhD	
21	47	<30 years old	**Age**
44	100	30-40 years old	
27	62	40-50 years old	
8	17	>50 years old	
62	140	Female	**Gender**
38	86	Male	
15	35	<5 years	**Work experience**
22	49	5-10 years	
27	61	10-15 years	
35	81	>15 years	

Descriptive statistics of variables		Variable
Standard deviation	Mean	
۳,۷۲	۰,۸۲۰	Critical thinking of the private sector
۳,۵۹	۰,۹۸۲	Critical thinking of the public sector
۳,۸۸	۱,۰۲۷	Assessing the fraud likelihood in the private sector
۳,۹۱	۱,۲۸٦	Assessing the fraud likelihood in the public sector

The research findings in the descriptive statistics part (characteristics of the participants) seen in the table above showed that the most age groups were between 30 and 40 years old, and the highest frequency of work experience was more than 15 years. The mean and standard deviation of all components are also given in the table.

Inferential statistics of data

Investigation of structural model of research

After testing the measurement models, it is now necessary to provide a structural model indicating the relationship between the latent variables of the research. Using the structural model, the research hypotheses can be investigated.

The strength of the relationship between the factor (latent variable) and the observable variable is indicated by the factor load. The factor load is a value between zero and one. If the factor load is below 0.3, then the relationship is considered weak and ignored. The factor load must be higher than 0.5 to be optimal. In factor analysis, variables measuring a latent variable (factor) must have a high factor load with that factor and a low factor load with other factors. To check the significance of the relationship between the variables, t-statistic or t-value is used because significance is checked at the error level of 0.05. Based on the output of this software, those observed variables, indices that did not properly measure their latent variable, will be removed from the final analysis. By removing these observed variables, all model fit indices in a measurement model are improved and reached an acceptable size. The model is modified such that in cases where the factor load between the latent variable and the observed variable is below 0.5, then the observed variable will be removed from the analysis set. Therefore, the observed variables q14 and q9 in the statistical population of public sector auditors and the observed variables q17 and q4 in the statistical population of private sector auditors have a factor load

below 0.5, and therefore after removing these variables in Figures 2 and 3, the modified models are presented to investigate the effect of critical thinking on the auditors' fraud risk assessment.

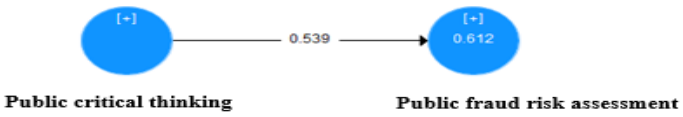

Figure 2. Conceptual model of research in the case of estimating standard coefficients and eliminating variables with low factor load in the statistical population of public sector auditors

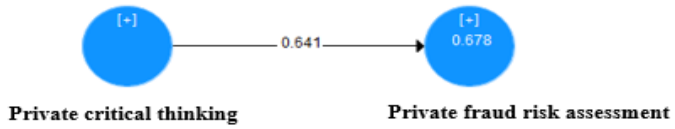

Figure 3. Conceptual model of research in estimating standard coefficients and eliminating variables with low factor load in the statistical population of private sector auditors

According to the figures and standard coefficients, it can be said that the impact of critical thinking on the fraud risk assessment in the statistical population of private sector is greater than the public sector.

The following figures show the research models in the case of significant coefficients (t-value). The models actually test all measurement equations (factor loads) and structural equations (path coefficients) using the t-statistic. According to this model, the path coefficient and factor load are significant at the 95% confidence level when the value of t- statistic is outside the range -1.96 to +1.96, and if the value of t-statistic is within this range, then the factor load or path coefficient is not significant. The path coefficient and factor load are significant at the 99% confidence level if the value of the t-statistic is outside the range -2.58 to +2.58.

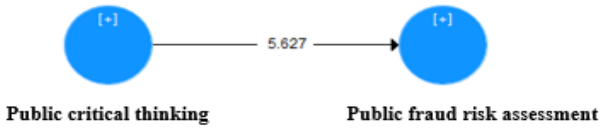

Figure 4. Significance coefficients of hypotheses in the statistical population of public sector

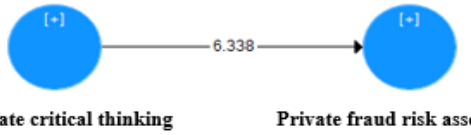

Figure 5. Significance coefficients of hypotheses in the statistical population of private sector

According to the results of t-test, all factor loads were significant at the 99% confidence level. Therefore, the results obtained from the factor loads confirm the high validity of both models.

According to the values obtained in Figures 1 to 4, we examine the first and second hypotheses of the research. The following table shows the results of the model test.

Table 3. Investigation of direct effects and t-statistic

Hypothesis result	*Sig*	t-statistic	Path coefficient (β)	Research Hypotheses
Accepted	<۰,۰۱	٥,٦٢٧	۰,٥٣٩	Critical thinking in the public sector → Fraud risk assessment in the public sector
Accepted	<۰,۰۱	٦,٣٣٨	۰,٦٤١	Critical thinking in the private sector → Fraud risk assessment in the private sector

Appropriate fit of the model is achieved when the path coefficient is significant, the explained variance is acceptable and the internal consistency is higher than 0.05 for each construct. Acceptable values of factor loads also indicate a good fit of the model. In addition, the GOF index is also a measure for examining the fit of the model to predict endogenous variables. Three values of 0.01, 0.25 and 0.36 have been introduced as weak, moderate and strong values for GOF, respectively (Davoodi & Rezazadeh, 2013). The results showed that the value of GOF in the statistical population of the public sector is equal to 0.643 and in the statistical population of the private sector 0.705, indicating the good fit of the model.

To test the third hypothesis of the research which compares the impact factors of critical thinking on fraud risk assessment in two statistical populations of public and private sector auditors, the Wald test is used as follows:

Table 4. Wald test for testing the third hypothesis of research

Probability Value	Wald statistic	
0.754	0.516	Impact factors of critical thinking on fraud risk assessment in two statistical populations of public and private sector auditors

As seen, the null hypothesis of this test, indicating the equality of the impact factors of critical thinking on the fraud risk assessment in both statistical populations of the public and private sector auditors, is accepted. Therefore, the third hypothesis of the research that the effect of critical thinking on the fraud risk assessment in the public and private sector auditors is the same, is accepted.

5. Conclusion and suggestion

Auditors are subject to cognitive limitations, so that instead of fully integrating existing facts and conditions, they rely heavily on signs, list of regulations, and perceived rules when making important audit decisions. However, critical thinking skills may help auditors overcome these limitations and increase their ability to make informed decisions based on the professional judgments clearly desirable for the regulators and leaders. The present study showed that critical thinking is one of the factors affecting the fraud risk assessment among the public and private sector auditors. Further research also revealed that despite of the high impact factor for the private sector auditors, this difference is not statistically significant and therefore the impact of critical thinking on the fraud risk assessment in auditors in both private and public sectors is statistically same. This indicates that the difficult working conditions, efficiency and knowledge of auditors are independent of the issue of critical thinking, and this kind of inherent thoughts of auditors in the financial statements of companies, regardless of the workplace and working conditions in the private and public sectors, affects fraud risk assessment in the financial statements of companies.

Thus, according to the results, it is suggested that private or public audit firms to place more emphasis on the behavioral and mental characteristics in attracting auditors and hire people who have better and more critical thinking because this ultimately leads to the increase in the audit efficiency and detection of the financial fraud.

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