

A STRUCTURAL MODEL FOR AUDIT QUALITY

نموذج بنائي لجودة التدقيق

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Abstract:

Audit quality had been studied using different approaches but understudied using a structural model. This study hypothesizes a causal relationship between audit quality, auditor independence, audit mission characteristics and auditor's qualifications and abilities. Data were collected using an electronic Email survey, sent to external auditors (n=52). Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to test the study hypotheses.

The results show two positive significant relationships, first, between audit mission characteristics and auditor independence, second, between auditor's qualifications and abilities and audit quality, while the model fails to establish a significant relationship between auditor independence and audit quality. The study suggests that audit mission characteristics play a major role to guarantee the independence of external auditors, and audit quality can be achieved by enhancing auditor's qualifications and abilities.

Keywords: Audit Quality, Auditor Independence, Audit mission, Auditor's Qualifications, and Abilities.

JEL Classification Codes: M42, M48.

ملخص:

تم دراسة جودة التدقيق وفقا لعدة مناهج على الرغم من عدم تناولها بشكل كاف من خلال

نموذج بنائي. تفترض هذه الدراسة علاقة سببية بين جودة التدقيق، إستقلالية المدقق، خصائص مهمة

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التدقيق ومؤهلات وقدرات المدقق. جمعت البيانات باستعمال استبيان وزع إلكترونياً باستخدام الإيميل على عينة من المدققين الخارجيين (n=52). تم استعمال النمذجة بالمعادلات البنائية بطريقة المربعات الصغرى الجزئية (PLS-SEM) لاختبار فرضيات الدراسة.

أظهرت النتائج علاقتين موجبتين ومعنويتين، الأولى بين خصائص مهمة التدقيق واستقلالية المدقق والثانية بين مؤهلات وقدرات المدقق وجودة التدقيق. تقترح الدراسة أنه لخصائص مهمة التدقيق دور محوري في ضمان استقلالية المدقق الخارجي وعليه فإن جودة التدقيق يمكن تحقيقها من خلال تحسين مؤهلات وقدرات المدققين الخارجيين.

كلمات مفتاحية: جودة تدقيق، إستقلالية مدقق، مهمة تدقيق، مؤهلات وقدرات مدقق.

تصنيفات JEL: M42، M48.

1. INTRODUCTION

For several reasons, states impose on companies to examine their financial statements by an External Auditors, to provide a reasonable assurance that the financial statements are free from anomalies. Many users of company's financial statements expect that those financial statements are audited and credible for making good decisions. But after the Enron/Arthur scandal, users became worried a lot about audit quality.

This study examines how auditor independence, audit mission characteristics and auditor's qualifications and abilities effect audit quality. Numerous studies post Enron/Arthur scandal have investigated the effect of various variables on audit quality such as auditor independence, audit office size, audit pricing, audit tenure and non-audit services (Choi, Kim, Kim, & Zang, 2010; Deis Jr & Giroux, 1992; Lennox, 1999; Libby & Tan, 1994; Zalailah, Jenny, & Stuart, 2006).

Empirically, previous studies examine the effect of different variables on audit quality with different measures, and relied on first generation methods of analysis, using multi-regression analysis and correlation analyses. However, this study suggests a second generation method of analyses which is Partial Least Square Structural Equation Modeling. This method of analyses allows studying complex models with many

relationships. Therefore, this study envelops a lot of variables that could affect audit quality at the same time and highlights the possible relationships between all the variables in the model.

Based on the background, the research questions in this study are: (1) Is there an effect of auditor independence on audit quality?; (2) Do audit mission characteristic affects auditor independence?; (3) Do auditor independence mediates the relationship between Audit mission characteristic and audit quality?; and (4) Is there any effect of auditor's qualifications and abilities on audit quality?.

The contribution of this paper to the literature is organized as follows. We present our theory, evidence from prior research in the next section. The third section envelops our hypotheses. The fourth section describes our data and measurement method. The fifth section provides empirical results and a brief discussion of our findings and implications. The last section is the conclusion.

2. Theoretical Background

The separation of ownership and control create a big debate on the agency problems that could arise (Akerlof, 1970; Berle & Means, 1932; Jensen & Meckling, 1976). The agency problems create a demand for mechanisms that could treat those problems and reduce the agency cost, those mechanisms took the name of corporate governance defined by Cadbury as the system by which the firms are run and controlled (Cadbury, 1992).

External audit is one of the very important corporate governance mechanisms that ensure the conformity of financial statements with IAS/IFRS norms and that these statements are stated fairly and reflect the 'true' economic condition and operating results of the firm.

External audit quality is defined by DeAngelo, 1981 as the probability that a given external auditor will discover a breach of the financial statements, and then report it to the users of these statements. The discovery of the anomaly is a matter of experience, knowledge and ability of the auditor but the probability of reporting the anomaly is a matter of independence. It is obvious that the audit quality is a multi-dimensional concept and can be affected by a set of factors, such as independence, experience, knowledge, auditor size, and auditor tenure. Empirically, for measuring independence the

ratio of non-audit service fees to total auditors' fees was used as a proxy for impaired auditor independence (Piot & Janin, 2005; Rahmina & Agoes, 2014) and for the auditor size many studies used brand name of big four/five/six... auditors (Becker, DeFond, Jiambalvo, & Subramanyam, 1998; Choi et al., 2010; DeAngelo, 1981; Deis Jr & Giroux, 1992; Libby & Tan, 1994), findings were mixed while some studies find a positive correlation between those factors and audit quality (Choi et al., 2010), other studies fail to report such findings.

Aghaei Chadegani (2011) indicates that there are two groups of studies that measure audit quality, (1) Direct measures studies, in this group researchers used financial reporting compliance with GAAP, quality control review, bankruptcy, desk review and SEC performance. Direct measures of audit quality have posed empirical challenges due to difficulty generalizing results, low occurrence rates, and the proprietary nature of the data. (2) Indirect measures studies, researchers from; this group used audit size, auditor tenure, industry expertise, audit fees, economic dependence, reputation and cost of capital are used as a measure for audit quality.

Audit quality is not primarily about auditing standards but about the quality of people, their training and ethical standards (Aghaei Chadegani, 2011). auditor quality is determined by audit personnel skills, personal qualities, and the training given to them. A large and varying body of literature exists (ALSMAIRAT, Yusoff, & SALLEH, 2018) proves that behavioral perspectives is directly related to Audit quality. Thus, this study adopts indirect measures of audit quality.

Duff (2004); (Duff, 2011) developed a questionnaire to measure Audit Quality, the instrument consists of 56 items scored on five-point Likert scale. The overall scale subdivided into four categories, (1) Audit firm factors, (2) Engagement partner factors, (3) Audit team factors and (4) Other factors. Similarly, (Butcher, Harrison, & Ross, 2013; Christensen, Glover, Omer, & Shelley, 2016) conduct a study aimed to obtain auditors' and investors' views, definitions, and indicators of audit quality. they found that auditor characteristics is the most important determinants of audit quality, and restatements is the most readily available signal of low audit quality.

Empirical studies used mixed methodology to measure audit quality and its effect, the most frequent are Ordinaire Least Square regressions (Sari & Susanto, 2018), panel data (Afza & Nazir, 2014), factor analysis (Duff, 2004, 2011) and partial least square structural equation modeling (ALSMAIRAT et al., 2018).

3. Hypothesis development

3.1 Auditor independence and audit quality

According to audit standers, auditors should be neutral and avoid conflicts of interests. The auditor independence debate arises after the Enron scandal, where the main cause was the non-audit services offered by Arthur and Anderson to Enron, which hamper the auditor independence (Chu & Hsu, 2017). Empirically, studies refer to auditor independence by the existence or not of non-audit services(Gaynor, McDaniel, & Neal, 2006; LIM & TAN, 2008), Literature argued that auditor's independence is linked to audit Quality (Chu & Hsu, 2017; LIM & TAN, 2010; Rahmina & Agoes, 2014). Therefore, we hypothesized:

H1: the auditor's independence affects positively audit quality.

3.2. Audit mission characteristic and auditor independence

Lim, Tan and Cheng (2010), posed a question about the relationship between audit turnover, industry specialization, audit fees and audit quality. If we considered audit turnover and industry specialization as an audit mission characteristics, an indirect positive relationship was found between audit mission characteristics and audit quality, and this relationship is negatively moderated by auditors' fee dependence (LIM & TAN, 2010).

Similar findings were found, show that in general auditor independence, industry specialization, audit tenure, and audit fee have a positive influence on audit quality (Dunn & Mayhew, 2004; Firth, Rui, & Wu, 2012; Mayhew & Wilkins, 2003; Rahmina & Agoes, 2014). Therefore, we hypothesized:

H2: Audit mission characteristic affects positively auditor independence.

H3: the auditor independence mediates the relationship between Audit mission characteristic and audit quality.

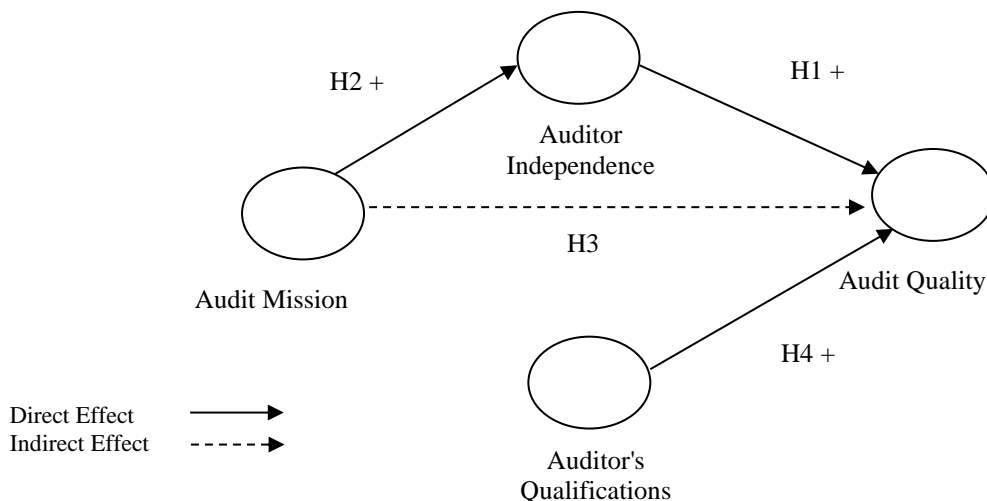
3.3. Influence of auditor's qualifications and abilities on audit quality

In this paper we define auditors' qualifications as the auditors' ability to detect an anomaly whatever the audit mission. Studies refer to auditors' qualifications and abilities by various variables such as Auditors size (Choi et al., 2010; DeAngelo, 1981), Ethnicity (Zalailah et al., 2006), Auditors ability to work under stress (Yan & Xie, 2016), self-efficacy and professional development (Lee, Su, Tsai, Lu, & Dong, 2016).

Previous studies find mixed results concerning the relationship between audit quality and auditors' qualifications and abilities, while (Choi et al., 2010; DeAngelo, 1981; Sari & Susanto, 2018) and (Yan & Xie, 2016) find a positive relationship the other fail to find a relationship. It is hypothesized: *H4: the auditor's qualifications and abilities affect positively audit quality.*

Figure 1 displays the research model based on the preceding discussion. According to this model, Audit mission characteristic affects positively auditor independence (H2+); and the auditor's independence affects positively audit quality. (H1+). Moreover, it is conceptualized that auditor independence mediates the relationship between Audit mission characteristic and audit quality (H3). From another side, the auditor's qualifications and abilities affect positively audit quality (H4+).

Figure 1. The research model



4. Methods

4.1 Data collection

Data for this study were collected using an electronic Email survey, an email invitation with a questionnaire was sent to 293 External Auditor who has a license to practice the external audit profession within the Est Area of Algeria. Sixty-one (n=61) response were received within a 15 days period, indicating a response rate of (21%), while a response rate of 11 % is reasonable using an electronic mail survey. Nine (09) irrelevant responses excluded because of incomplete questioners, which makes our data limited to fifty-tows (n=52) observations. This sample size is considered enough to

produces parameter estimates with PLS-SEM (Joseph F Hair, Hult, Ringle, Sarstedt, & Thiele, 2017).

4.2 Respondent's Profile

Table 1 provides the demographic profile of the respondents. As the External audit profession is considered a male dominated profession, a high participation of males (96.2 %) in the present study was not surprising. Since the majority of respondents were aged above 50 years old (75 %) it is a result that the majority of responses (69.2 %) had an experience more than 15 years.

Table 1. Demographic Profile of the Respondents (*n* =52)

Demographic Variables	Category	Frequency	Percentage %
Gender	Male	50	96.2
	Female	2	3.8
Age (years)	<30	2	3.8
	30-50	11	21.2
	>50	39	75
Qualification	applied studies	14	26.9
	Master degree	28	53.8
	PhD	10	19.2
Experience (years)	<5	2	3.8
	5-15	14	26.9
	>15	36	69.2

4.3 Measurements

Most previous studies used different measures for Audit Quality, Audit Independency, Auditor Qualifications and abilities and Audit Mission, such as Discretionary-Accruals, or referred to Audit Quality by other correlated variables like Audit Fees, Non-Audit Fees, Auditor Size. In the case of Algeria, detailed data is not available, and firms are not obliged to disclose their information. I used an electronic questionnaire. Respondents were asked to record their responses on a 5-point Likert-type scale ranging from *Strongly Disagree* (1) to *Strongly Agree* (5). The total items in the first questionnaire were (21) items, and then the scale was modified to enhance the convergent validity statistics tests to (11) items. All items are listed in the Appendix.

Audit Quality: A 3-item scale.

Audit Independenceor: A 3-item scale.

Auditor Qualifications and abilities: A 2-item scale.

Audit Mission: A 3-item scale.

5. Findings & Discussion

5.1 Assessment of measurement model

The Structural equation modeling (SEM) and statistical software Smart PLS 3 was used to estimate the hypothesized model. PLS-SEM is a non-parametric, multivariate approach used to estimate models with latent variables, it allows authors to test complete theories and concepts (Joe F Hair, Sarstedt, Ringle, & Mena, 2012).

In this study, PLS-SEM was used for several reasons. First, the exploratory nature of the research (Memon, Salleh, & Baharom, 2017) as the study investigates the relationship between auditors independence, audit mission characteristics, auditor's qualifications and abilities and audit quality. second, the SEM can handle the complicated relations between the study variables.

There are two sub-models in a structural equation model; the inner model (structural model) specifies the relationships between the independent and dependent latent variables, whereas the outer model (measurement model) specifies the relationships between the latent variables and their observed indicators (Wong, 2013).

The measurement model was assessed by examining the internal consistency reliability, convergent validity (CV), and discriminant validity (DV) (Joseph F Hair et al., 2017; Memon et al., 2017). Internal consistency reliability measures the degree to which the items measure the latent construct, it was assessed through Cronbach's alpha as the lower bound of the internal consistency reliability and composite reliability as the upper bound for the (unknown) true reliability.

The results indicate that the Composite Reliability scores of all constructs (Audit Quality=0.887; Auditor Independence=0.824; Audit Mission=0.804; Auditor's Qualifications and abilities =0.897) exceeded the recommended criterion of 0.7 (Joseph F Hair, Ringle, & Sarstedt, 2013).

To check convergent validity, the Average Variance Extracted (AVE) and factor loadings are evaluated. And it is found that the AVE values are greater than the acceptable threshold of 0.5 (Joe F Hair, Ringle, & Sarstedt, 2011; Wong, 2013), In this study, all factor loadings show values greater than

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0.7 which considered acceptable (Joseph F Hair et al., 2017; Joe F Hair et al., 2011), so convergent validity is confirmed.

Table 2. Results of Measurements Model- Convergent Validity

Constructs	Items	Loadings	Average Variance Extracted (AVE)	Composite Reliability	Cronbach's Alpha	Convergent Validity
Audit Quality	Q1	0.897	0.723	0.887	0.810	Yes
	Q2	0.855				
	Q3	0.795				
Auditor Independence	IN1	0.715	0.611	0.824	0.680	Yes
	IN2	0.841				
	IN3	0.784				
Audit Mission	AM1	0.726	0.579	0.804	0.641	Yes
	AM2	0.828				
	AM3	0.725				
Auditor's Qualifications and abilities	AQ1	0.907	0.813	0.897	0.771	Yes
	AQ2	0.897				

Discriminant validity is “the extent to which a construct is truly distinct from other constructs by empirical standards”(J.F. Hair, 2013) , Fornell and Larcker (1981) suggest that the square root of AVE in each latent variable can be used to establish discriminant validity, if Each construct’s AVE should be higher than its squared correlation with any other construct (Fornell & Larcker, 1981). The result in Table 3 Indicates that discriminant validity is not very well established, and all the corrections applied leads to a singular matrix.

Table 3. Fornell-Larcker Criterion

	Audit Indipende nce	Audit Mission	Audit Quality	Auditor's Qualificatio ns and abilities
Audit Indipende nce	0.782			
Audit Mission	0.942	0.761		
Audit Quality	0.155	0.224	0.850	
Auditor's Qualifications and abilities	0.132	0.216	0.972	0.902

5.2 Collinearity assessment

To examine multi-collinearity which means the extent to which a latent variable can be explained by the other latent variables in the analysis, the variance inflation factors (VIF) used and table 4 shows the VIF values which should not be more than 5 (J.F. Hair, 2013). In this study, the VIF values were below the standard criteria.

Table 4. Collinearity Statistic

Items	VIF
AM1	1,170
AM2	1,343
AM3	1,328
AQ1	1,647
AQ2	1,647
IN1	1,151
IN2	1,617
IN3	1,592
Q1	2,129
Q2	1,697
Q3	1,724

5.3 Assessment of structural model

The structural model was assessed to test the study hypotheses. To determine how well the data support the study hypotheses, the coefficient of determination (R^2 values) and the path coefficients (beta values) were performed through a bootstrapping process of 5000 interactions to generate t-values.

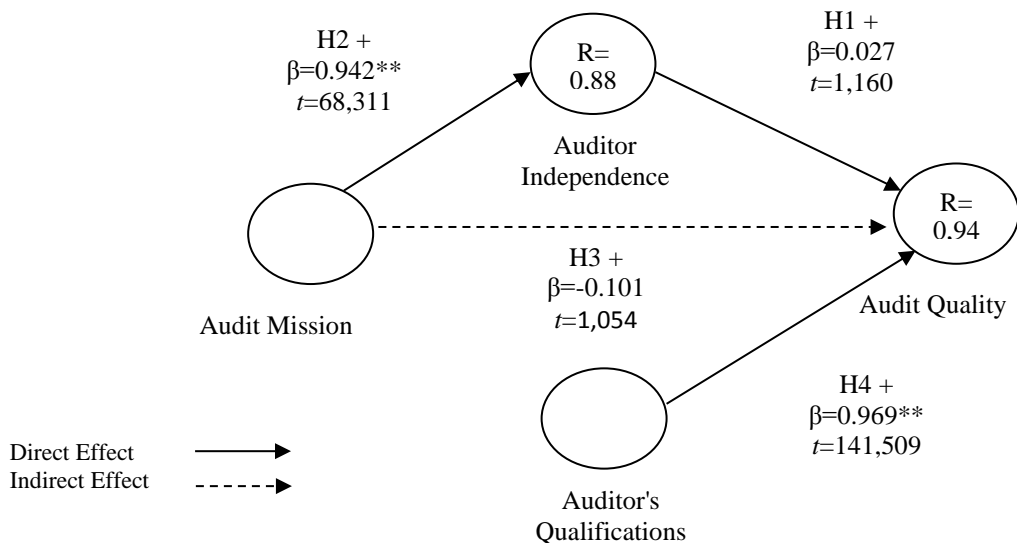
Table 5. Path coefficients of the Research Hypotheses Testing

Hypo	Relationship	Std. Beta	Standard Deviation	T Statistics	P Values	Decision
H1	Auditor Independence -> Audit Quality	0.027	0.023	1.160	0.247	Not supported
H2	Audit Mission -> Auditor Independence	0.942	0.014	68.311	0.000	Supported**
H3	Audit Mission -> Audit Quality	-0.101	-0.102	0.096	1.054	Not supported
H4	Auditor's Qualifications and abilities -> Audit Quality	0.969	0.007	141.509	0.000	Supported**

Significant at $p^{**}>0.05$

As shown in Table 5, the path coefficients for relationships between (Audit Mission -> Auditor Independence; Auditor's Qualifications and abilities-> Audit Quality) were statistically significant ($p < 0.05$) while the relationship between (Auditor Independence -> Audit Quality) is not significant at ($p < 0.05$). The results indicate a positive relationship between Audit Mission and Auditor Independence ($\beta=0.942$) supporting H2. Likewise, the positive relationship between Auditor's Qualifications and abilities and Audit Quality was tested, the results ($\beta=0.969$) was statistically significant and supports H4. Introducing Auditor Independence as a mediator variable to test H3 show a non-significant beta value ($\beta=-0.101$), therefore, H3 and H1 are not supported.

Figure 2. Structural Model



As shown in Figure 2, Audit Mission explains about 89% of the variance in Auditor Independence ($R^2 = 0.888$), whereas, Auditor Independence with Auditor's Qualifications and abilities explains 94.6% of the variance in Audit Quality ($R^2 = 0.946$).

It appears from the empirical results shown in Figure.2 that the coefficient of the relationship between audit mission and audit quality is not meaningful. Therefore, there is no intermediating role for the auditor independence.

Besides the basic parameters, researchers are recommended also to report on the predictive relevance (Q^2) and effect size (f^2) (J.F. Hair, 2013; Memon et al., 2017), table 5 shows f^2 values, whereby 0.02, 0.15 and 0.35, indicate small, medium and large effects, respectively (Memon et al., 2017). Results show small effect of Auditor Independence on Audit Quality ($f^2 = 0,013$), large effect of Audit Mission on Auditor Independence ($f^2 = 0,7918$) and medium to large effect of Auditor Qualifications and abilities on Audit Quality ($f^2 = 0,16999$).

According to (Memon et al., 2017) Q^2 value larger than 0 indicates that model has predictive relevance for a certain dependent construct.

As shown in Table 6, the Q^2 values of 0.503 and 0.631 represent Auditor Independence and Audit Quality, demonstrating good predictive relevance.

Table 6. R^2 , f^2 , and Q^2

	R^2	Predictive Relevance (Q^2)	Effect Size (f^2)	
Auditor Independence	0.888	0.503	0.013	Small
Audit Mission			0.7 918	Large
Audit Quality	0.946	0.631		
Auditor Qualifications and abilities			0.16 999	Medium to large

5.4 Discussion and Implications

This study examines the causal relationships between audit mission characteristics, auditor independence, auditor's qualifications and abilities and audit quality.

The findings of this study indicate that audit mission characteristics have a significant positive effect on auditor independence (H2), similar results were found by Lim and Tan (LIM & TAN, 2008, 2010). But this study fails to establish a significant findings concerning the effect of auditor independence on audit quality (H1), and it didn't support the mediation role of auditor independence between audit mission characteristics and audit quality (H3), while many studies found a positive correlation(Chu & Hsu, 2017; Deis Jr & Giroux, 1992; Lennox, 1999).

As expected, the structural model assessment confirm that auditor's qualifications and abilities has a positive influence on audit quality, this result supports the findings of previous studies (Choi et al., 2010; Dunn & Mayhew,

2004) which reported that auditor size, industrialization, self-efficacy and professional development has a positive effect on audit quality.

This study recommends external auditors to choose audit missions regarding to their industrialization and to give audit turnover more importance to ensure their independence. This study recommends also companies' managers to put conditions on the size of auditors, formations and special training of auditors when they launch a tender offer of audit services in order to ensure more audit quality.

6. Conclusion

The Main goal of this paper is to assess a structural model link between audit mission characteristics, auditor independence, auditor's qualifications and abilities and audit quality in aim to test causal relationships between those variables. The results indicate that there is a positive significant influence of audit mission characteristics on auditor independence and auditor's qualifications and abilities on audit quality.

As an important implication, auditors should choose carefully their audit missions, taking into consideration their specialization and turnover in order to respect international audit standers by gaining more independence.

The large effect size of auditor's qualifications and abilities ($f^2=0,16999$) on audit quality in comparison with low effect size of auditor independence ($f^2=0,013$) on audit quality indicates that firms should give a high importance to auditor's profile, when they launch a tender offer of audit services to get a reasonable assurance of audit quality.

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8. Appendices

Appendix 1. Items of Measurement

Audit Quality	Q1	Full, accurate, neutral, and concise audit report sufficient to guarantee audit quality.
	Q2	The information contained in the audit reports enhances financial statements users' decision.
	Q3	Independent, qualified auditor with sufficient experience can guarantees audit quality.
Auditor Independence	IN1	Provision of non-auditing services would undermine auditor independence
	IN2	The benefits received from clients will not affect auditor independence.
	IN3	Auditing firms outside industry specialization affect the independence of the auditor.
Audit Mission	AM1	Auditing firms outside the auditor industry specialization affect auditor independence.
	AM2	Large companies have difficult and complex audit process which affect audit quality.
	AM3	Auditor size affects auditor independence and audit quality when the clients firms are too large.
Auditor's Qualifications and abilities	AQ1	Professional knowledge and work experience are very important for auditors.
	AQ2	Auditors from large audit firms received better training