



THE EFFECT OF ACCOUNTING INFORMATION SYSTEM ON INTERNAL AUDIT EFFECTIVENESS WITH MODERATING EFFECT OF EXPERIENCE: A MEASUREMENT MODEL

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Abstract

Accounting information system and internal audit effectiveness help managements in the decision-making process. The auditors and accountants' experience might improve the process of decision-making. Yet, the experience impact on the accounting information system and internal audit effectiveness relation was not examined in former studies. The research main objective is to construct a measurement model for the impact of accounting information system characteristics on internal audit effectiveness considering the moderating effect of experience. The characteristics are represented by five selected constructs comprising flexibility, relevance, timeliness, reliability and integration. To attain the research aim, a quantitative approach via a questionnaire has been utilized with 365 respondents comprising auditors and accountants in a number of corporations in Iraqi stock exchange. AMOS and SPSS are implemented for data analysis and to establish the measurement model. The findings indicate that the values of the measurement model are acceptable and the model is sufficient to develop the SEM model for the research variables.

Keywords: Accounting information system; Internal audit effectiveness; Experience.

1. Introduction

Accounting is a significant data source for supporting decision-making, specially, administrative decisions. Several researchers pointed out that the information quality provided by accounting information system (AIS) assists all management levels in making the appropriate decisions that lead to achievement of organization's goals (Nicolaou, 2000; McGilvray, 2008; Sri Mulyani 2009; Bazley et al., 2015). Soudani (2013) indicated that AIS task is to monitor, record, analyze, and evaluate companies' financial state. Furthermore, it can improve governance process and control through risks estimation and information (Tan, 2016). Effective internal audit (IA) helps organizations in decreasing the operational risks and enhancing the financial reporting reliability that increases the trust of shareholders (Abbas & Iqbal, 2012). The IA development in AIS keeps company assets from misusage and losses. It also ensures the accuracy of organizations' financial data (Jones & Rama, 2003). Account staff experience is a significant factor that enables managements to make proper decisions for improving the IA performance. Accountants and auditors with a high experience level in an organization indicate its ability to accomplish better than those with a low experience level (Classen, Van Gils, Bammens, & Carree, 2012).

2. Literature Review

Researchers examine the AIS effect of on organizations' performance or organizations' activities as well as investigate the AIS effect on internal control. Moorthy et al. (2011) indicated an important AIS effect on organizations internal audit and internal control. Tan (2016) examined AIS effect on internal auditors in Turkey.

He indicated that the IA major role is performing transaction processes of financial reports and AIS assisted in accomplishing tasks.

AISs can analyze, identify, assemble, classify, review, report and record events that assist internal auditors to accomplish their objectives. Al-Qudah & Ahmed (2011) study showed that the AIS has an effect on internal control effectiveness in the Jordanian commercial bank. Likewise, the study of Shanti (2013) indicated that AIS implementation in industrial sector of Jordan increases the compliance with predetermined policies and laws, and provides the essential data on time for decision-making leading to effective internal auditing. Hussein study (2005) also asserted the AIS impact on IA systems.

Neogy (2014) mentioned that effective IA system in an organization can sustain accounting information qualitative characteristics. Good audit control gives the management of organizations more trust to use information for the purpose of performing proper business activities, as well as measuring the organization's performance. Hiedmann et al. (2008) stated that flexibility, integration, formalization, media richness and accessibility are successful AIS determinants. Romney (2009) indicated that most essential AIS characteristics are efficiency, reliability, flexibility and integration. On the other hand, Wixom and Todd (2005) and Ong et al. (2009) indicated that a successful AIS is determined by accomplishing four elements: reliability, accessibility, integration, timeliness and flexibility. Eventually, Napitupulu et al. (2016) utilized four features to identify successful and efficient AIS that are flexibility, reliability, efficiency and integration.

Experience is the combined knowledge acquired by individuals that assists them take the appropriate decisions (Vera-Munoz et al., 2011). Experience allows persons to have the expertise to manage their work, develop important information, and take the proper decisions. Experience in business researches is still in the early stages. According to (von den Driesch et al., 2015; Saatcioglu et al., 2012; Vasudevan & Chawan, 2014), a high level of experience assists managements in proper decision-making. Datta & Iskandar-Datta, (2014) indicated that the experience of the audit management has a crucial effect on strategic decisions of organizations. A high experience level has a positive effect on products and services development, companies' dynamic abilities, and the internal competitiveness (Saatcioglu et al., 2012; Vasudevan & Chawan, 2014; von den Driesch et al., 2015).

However, former studies didn't examine the experience effect on IAE and AIS relation. The research of Almaliki et al. (2018) is considered one of first researches that developed a conceptual model to explain the relation between AIS characteristics and IAE with deeming the moderating effect of experience.

3. Hypothesized Conceptual Model

The conceptual model developed by Almaliki, Rapani, Khalid & Sahaib, (2019) is adopted by this research with some modification. The direct AIS impact on IAE is abolished, since the characteristics' impacts of AIS are deemed. The same characteristics of AIS are applied including flexibility, reliability, integration, timeliness and relevance. The hypothesized conceptual model is illustrated in Figure 1.

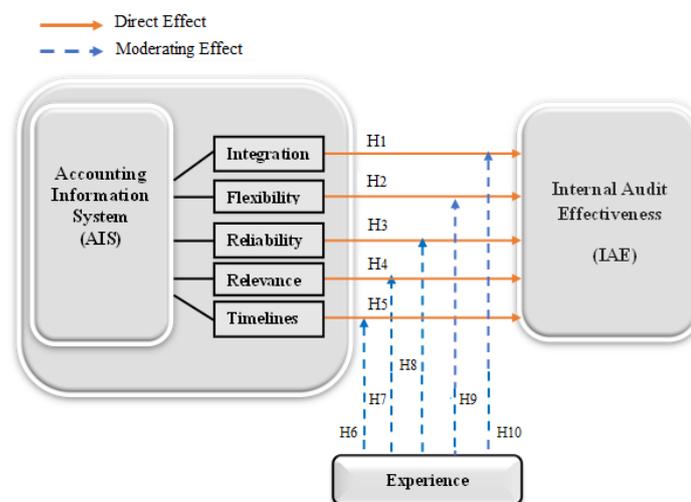


Figure 1: Hypothesized Conceptual Model

- Integration is the extent to which an accounting information system enables the information combination from different sources to enhance business decisions (Hiedmann et al., 2008).
- Flexibility refers to the degree of AIS adaptation to various changing conditions and user needs (Hiedmann et al., 2008).
- Reliability is the ability of AIS to be representational and faithful with no deliberate or systematic bias, and material error (Bukenya, 2014).
- Relevance refers to the relevancy of accounting information to users' responsibilities and tasks and its ability to evaluate previous, current or future events, and to affect economic decisions of users (Bukenya, 2014).
- Timeliness refers to the availability of required accounting information to the correct person at the exact time to take the proper action. It is the degree of update the information (Bukenya, 2014).

The following hypotheses utilized are developed based on the hypothesized conceptual model:

- H₁: AIS Integration has a significant effect on IAE.
 H₂: AIS Flexibility has a significant effect on IAE.
 H₃: AIS Reliability has a significant effect on IAE.
 H₄: AIS Relevance has a significant effect on IAE.
 H₅: AIS Timeliness has a significant effect on IAE.
 H₆: Experience can moderate the AIS Timelines effect on IAE.
 H₇: Experience can moderate the AIS Relevance effect on IAE.
 H₈: Experience can moderate the AIS Reliability effect on IAE.
 H₉: Experience can moderate the AIS Flexibility effect on IAE.
 H₁₀: Experience can moderate the AIS Integration effect on IAE.

4. Methodology

A quantitative method was utilized to collect data through a survey questionnaire. The questionnaire consists of two parts. The first one is assigned to demographic characteristics, while the second part is dedicated to the independent and dependent variables. The independent variables are reliability, flexibility, integration, timeliness and relevance. Each variable contains (10) items. The dependent variable is the effectiveness of internal audit; it contains ten (10) items. The moderator variable is the experience; it includes eight (8) items. The main target of the questionnaire is auditors and accountants of 120 organizations in the Iraqi stock exchange. A simple random sampling technique is utilized. Around 400 survey questionnaires were distributed and 375 were collected, while the valid responses for the analysis are 365, earning a 91% response rate. The SPSS was utilized for the analyzation of the data collected. To facilitate data analysis, all construct items are coded. The demographic information of respondents is explored, and descriptive statistics including standard deviation and mean are utilized for data analyzation. Cronbach's Alpha is used to test the data internal consistency, while KMO and Bartlett's test is used to check the data sufficiency for the exploratory factor analysis (EFA). The EFA is executed on 100 respondents. On the other hand, AMOS is executed on the total number of respondents (365) to construct the measurement model.

5. Results and Discussion

5.1. Demographic Information

Table 1: Respondents Ages

Age	Frequency	Percent %	Valid Percent %
From 20-30 years	135	36.98	36.43
From 31-40 years	130	35.61	35.61
From 41-50 years	80	21.91	21.91
More than 50 years	20	5.47	5.47
Total	365	100	100

Table 1 indicates that most respondents (36.43%) are those with ages range between 20-30 years, followed by percentage of respondents (35.61%) with ages range between 31-40 years. The lowest percentage of respondents (5.47%) is for those with ages more than 50 years.

Table 2: Respondents Educational Achievement

Educational Achievement	Frequency	Percent %	Valid Percent %
High School and Vocational Education	85	23.28	23.28
Diploma	70	19.17	19.17
Bachelor	150	41.09	41.09
High Diploma	12	3.28	3.28
Master	30	8.21	8.21
PhD	18	4.93	4.93
Total	365	100	100

Table 2 indicates that highest percentage (41.09%) is for respondents with bachelor degree, followed by respondents' percentage of (23.28%) for vocational education and high school holders. The respondents' lowest percentage of (4.93%) goes for high diploma holders. These results indicate a good knowledge of the respondents that can reflect better responses and may give better research results.

Table 3: Respondents Occupation

Respondents Occupation	Frequency	Percent %	Valid Percent %
Accountant	175	47.94	47.94
Auditor	85	23.28	23.28
Account Manager	60	16.43	16.43
Audit Manager	45	12.32	12.32
Total	365	100	47.94

Table 3 indicates that accountants represent the highest respondents' percentage (47.94%), followed by auditors with a percentage of (23.28%). The lowest respondents' percentage (12.32%) are the audit managers. In general, managers constitute a good percentage of 28% (16.43% +12.32%) that can contribute to the research results due to their skills and high level of knowledge.

Table 4: Respondents Experience

Respondents Experience	Frequency	Percent %	Valid Percent %
1-10 years	150	41.09	41.09
11-20 years	140	38.35	38.35
21-30 years	60	16.43	16.43
31-40 years	15	4.10	4.10
Total	365	100	100

Table 4 shows that experience between 1-10 years' percentage is (41.09%), followed by (38.35%) of that have experience between 11-20 years. A few percentages (4.10%) represents respondents with experience between 31-40 years. In general, utmost respondents are with experience more than 10 years, which reveals good responses and provide better findings.

5.2 Descriptive Statistics

In table 5, the constructs' descriptive statistics comprising the mean and standard deviation are presented with the maximum and minimum levels of each one of them.

Table 5: Mean and Standard Deviation of all Constructs

	N	Minimum	Maximum	Mean	Std. Deviation
Integration	365	1.00	5.00	2.58	1.117
Flexibility	365	1.00	5.00	3.00	1.075
Reliability	365	1.00	5.00	2.81	1.114
Relevance	365	1.00	5.00	3.01	1.092
Timeliness	365	1.00	5.00	2.98	1.280
Internal Audit Effectiveness	365	1.00	5.00	2.95	1.026
Experience	365	1.00	5.00	2.39	1.270
Valid N (listwise)	365				

Generally, all items reveal high percentages of neutral, agree and strongly agree. This shows positive trends of most constructs items. Furthermore, the means of all the items of constructs are greater than 2.3, and the standard deviations indicate a wide range of data values. This could attain reliable findings of the content analysis of the questionnaire.

5.3 The Reliability Test

The reliability test ensures the questionnaire's stability and consistency. According to Field, (2009), reliability is the estimate of instrument consistency and stability. To test the internal consistency, Cronbach alpha is utilized. Cronbach alpha's reasonable value should surpass the minimum acceptable value of 0.7 (Wadkar et al., 2016; Zhang and Yuan, 2016). On the other hand, the inter-item correlation, KMO and Bartlett's test of sphericity is utilized for each item to examine the data sufficiency for further analysis such as factor analysis (Costa-Lobo et al., 2017). The minimum standard of KMO is 0.5, medium values range between 0.5 and 0.7, good values range between 0.7 and 0.8, great values range between 0.8 and 0.9 are and values exceed 0.9 are excellent (Field 2009; Watkins, 2018). Bartlett's test indicates the matrix is not an identity matrix and therefore, it must be significant if it is less than 0.05 (Taherdoost et al., 2014; Kaya and Bilen, 2017).

Table 6: Reliability Test of All Constructs

No	Construct	Items Number	Alpha Value
1	Integration	10	0.976
2	Flexibility	10	0.986
3	Reliability	10	0.981
4	Relevance	10	0.985
5	Timeliness	10	0.951
6	Internal Audit Effectiveness	10	0.977
7	Experience	08	0.943

Table 6 shows that Cronbach alpha of all constructs attains high values more than 0.7, which confirms a high level of internal stability and consistency of all constructs. It also means that these constructs can be relied on to attain the study objectives and results analysis.

Table 7: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.928
Bartlett's Test of Sphericity	Approx. Chi-Square	35520.698
	df	2278
	Sig.	0.000

Table 7 shows that KMO and Bartlett's Test yields the acceptable values. KMO attains 0.928 more than the minimum standard of 0.5 and Bartlett's Test is less than the minimum standard of 0.05. This indicates that the collected data is sufficient for further analysis such as EFA, which precedes the measurement model development.

5.4 Exploratory Factor Analysis

Exploratory Factorial Analysis (EFA) is used to reduce variables into a smaller set by exploring the main variables to create the model (Taherdoost et al., 2014). Factor loading is used to evaluate items, which should be 0.6 and above (Awang 2014). Any item has factor loading below 0.6 must be deleted with developing the measurement model. Factor loadings were utilized as a criterion to measure the measurement model's fit goodness (Yong & Pearce, 2013). The EFA is executed on all questionnaire construct's items, which distributed to 100 respondents. Cronbach alpha and KMO tests are also carried out to test the reliability and the data adequacy for exploratory factor analysis (Obi 2009; Field 2009).

Table 8: Reliability Test Results

No	Construct	Items Number	Alpha Value
1	Integration	10	0.949
2	Flexibility	10	0.985
3	Reliability	10	0.989
4	Relevance	10	0.986
5	Timeliness	10	0.940
6	Internal Audit Effectiveness	10	0.969
7	Experience	08	0.971

According to Table 8, all constructs attain high values of Cronbach alpha more than 0.7, which reveals high internal consistency for all constructs.

Table 9: KMO and Bartlett's Test Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.703
Bartlett's Test of Sphericity	Approx. Chi-Square	10140.442
	df	2278
	Sig.	0.000

KMO and Bartlett's Test (Table 9) yield acceptable values, where KMO attains 0.703 more than the minimum standard of 0.5 and Bartlett's Test is less than the minimum standard of 0.05. This indicates that the collected data is satisfactory for exploratory factor analysis, which precedes the measurement model development. Total variance explained is conducted and the findings revealed that and common method variance does not affect the results.

The EFA results of the items of all constructs of the questionnaire shows that factor loading values of all items of all constructs are more than the acceptable value 0.6 (Awang 2014). This confirms that the model fits the sample data. EFA for integration (0.632-0.908), Flexibility (0.890-0.967), Reliability (0.897-0.978), Relevance (0.883-0.991), Timeliness (0.733-0.966), IAE (0.779-0.927) and Experience (0.770-0.998). Generally, the results of the EFA verify that the all items of all constructs are actually measuring the proposed constructs. Moreover, this analysis confirms the applicability of the data to the presented conceptual model that interprets the relationships among constructs based on the response of the study respondents.

5.5 Measurement Model Development

The measurement model or confirmatory factor analysis (CFA) is a statistical method that helps to elucidate the relations among the study variables. AMOS is used to conduct the measurement model for all items. The model is illustrated in Figure 2. The fit goodness is conducted to test the validity of the model, and then construct the final model. Several indices are used as shown in Table 9 to determine how well the measurement model fits the sample data.

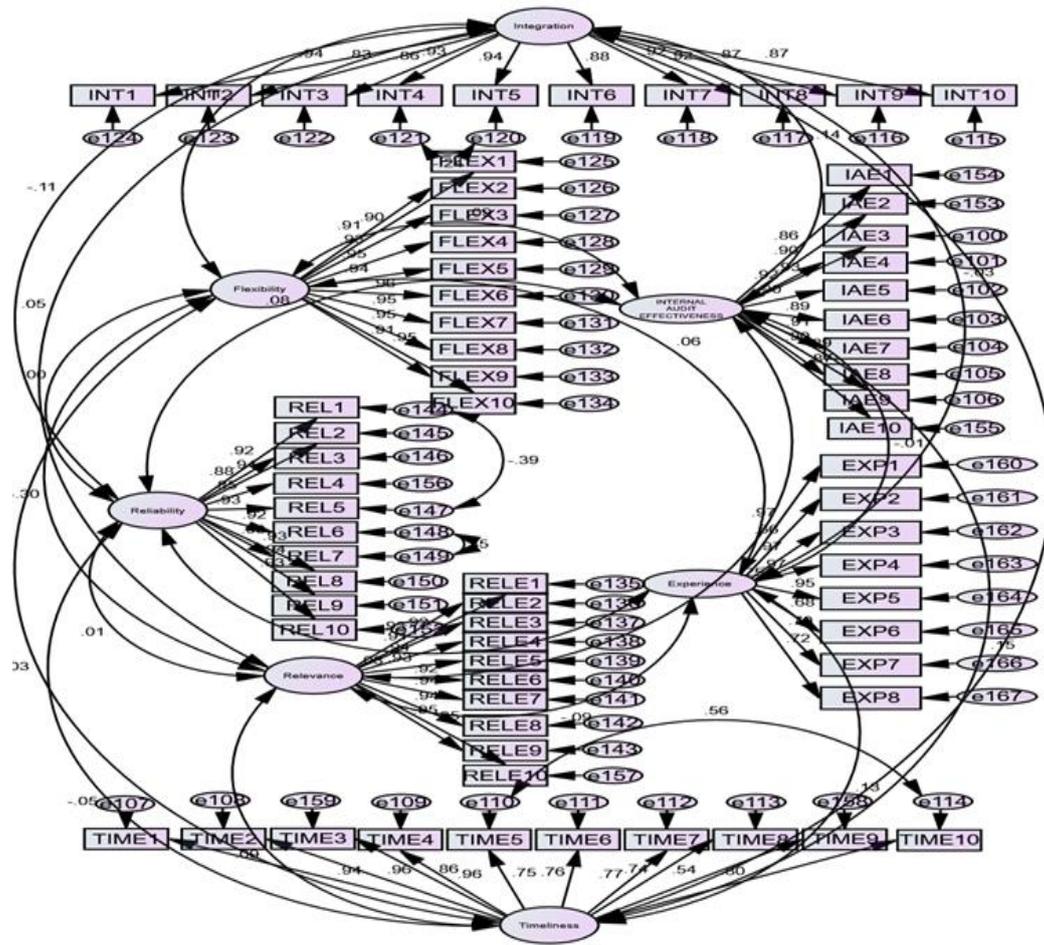


Figure 2: Measurement Model for All Items

Table 10: Statistics for Goodness of Fit indices

Fit Index	Modified Model	Recommended Values
Degree of Freedom (Df)	2185	
Chi-Squared test over Df (χ^2/df)	1.807	≤ 5.00 (Hooper et al., 2008)
Goodness-of-Fit Statistic (GFI)	0.771	≥ 0.90 (Hooper et al., 2008)
Adjusted Goodness-of-Fit Statistic (AGFI)	0.75	≥ 0.90 (Hooper et al., 2008)
Comparative Fit Index (CFI)	0.951	≥ 0.90 (Hooper et al., 2008)
Incremental Fit Indices (IFI)	0.951	≥ 0.90 (Hooper et al., 2008)
RMSEA	0.047	≤ 0.10 (Hooper et al., 2008)

As shown from Table 10, some of the fitness indices did not meet the acceptable values such as the GFI and AGFI in the initial full model. Therefore, the model should be re-run after deleting some items of factor loading less than 0.6. The deleted items are Rel4, IAE1, IAE10, EXP2, EXP6, EXP7, TIM3, TIM9, and RELE 8. The final measurement model is introduced in Figure 3.

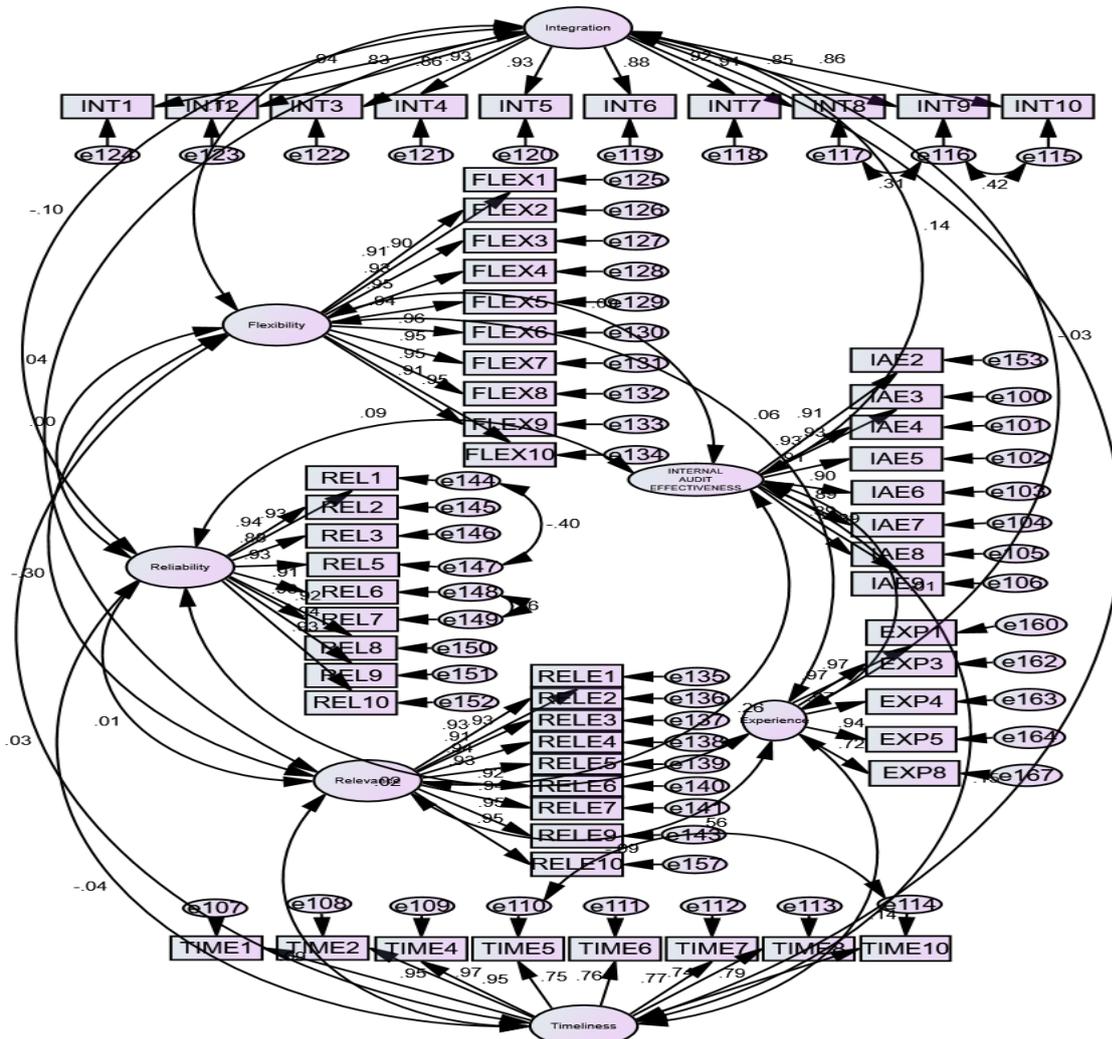


Figure 3: Final Measurement Model

The goodness of fit is conducted to test the model validity. The statistics results of goodness of fit indices are introduced in Table 11.

Table 11: Final Statistics for Goodness of Fit Indices

Fit Index	Modified Model	Recommended Values
Df	1626	
χ^2/df	1.556	≤ 5.00
GFI	0.918	≥ 0.90
AGFI	0.903	≥ 0.90
CFI	0.971	≥ 0.90
IFI	0.971	≥ 0.90
RMSEA	0.039	≤ 0.10

Table 11 shows that the values of all indices of all constructs are within the satisfactory values after removing low factor loadings items. This shows that the model fits the sample data closely and confirms the sufficiency to

develop structural model. The validity of the final measurement model should be tested in order to construct the SEM model, which will be performed in the future work.

6. Conclusion

AIS and its characteristics are essential for enhancing the IAE. This study enriches the literature by considering the moderating experience impact that is a new factor in recent studies of accounting. Thus, this study shows the measurement model's development of the target relations among the research variables. The collected data is analyzed by various tests to scrutinize its reliability. This is followed by carrying out the EFA to diminish the study variables. Some of the constructs' items are eliminated due to their inability to fit the model efficiently. The findings revealed significant effects of AIS characteristics on IAE and a moderating effect of experience on the AIS and IAE relations. The findings of goodness of fit show that the final measurement model validity is valid and adequate for the development of the SEM model. The SEM model will assert the impact of AIS on the enhancement of the audit process and help the management in making the appropriate decisions. Furthermore, the model will assert the experience importance in accounting improvement and auditing reports leading to enhance the abilities of managements in taking appropriate decision. Governments also can take advantage from the study findings because better performance of IA leads to increase the GDP and citizens' income. Finally, the study provides a basis for researchers conduct more researches in the future on the relation among experience AIS, IAE.

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