IRAQI Academic Scientific Journals
العراقية المجلات الاكاديمية العلمية
Al-Kut University College Journal
ISSN (E) : 2616 - 7808 II ISSN (P) : 2414 - 7419
www.kutcollegejournal.alkutcollege.edu.iq
Special Issue for Researches of the 5th International Scientific Conference for Administrative and Economic Sciences "Towards Modern Trends and Advanced Management in Building a Contemporary Economic System" on 26-27 Mar. 2022

The Effect of Integration, Flexibility, Reliability, Relevance & Timeliness on Internal Audit Effectiveness: A Measurement Model

Dr. Oday Jasim Almaliki [1]

Abstract

The study aims at Effectiveness of the accounting information system and internal audit 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 efficiency of the accounting information system and internal audit relation was not examined in the former studies. The major goal of this study is to develop a measurement model for the influence of accounting information system characteristics on internal audit effectiveness, while taking into account 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. Finally, the study provides a basis for researchers conduct more researches in the future on the relation between experience AIS and IAE.

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

Affiliation of Author
[1] College of Administration & Economic, University of Misan, Iraq, Amara, 62001
[1]odayalmaliki@uomisan.edu.iq

[1] Corresponding Author

Paper Info.
Published: Aug. 2022

تأثير التكامل، المرونة، الموثوقية، الملاءمة والتوقيت المناسب لفعالية التدقيق الداخلي: نموذج قياس

د.عدي جاسم المالكي [1]

الخلاصة

تهدف الدراسة إلى مساعدة فعالية نظام المعلومات المحاسبية والتدقيق الداخلي الإدارات في عملية صنع القرار. قد تحسن خبرة المراجعين والمحاسبين عملية اتخاذ القرار. ومع ذلك، لم يتم فحص تأثير التجربة على كفاءة نظام المعلومات المحاسبية وعلاقة التدقيق الداخلي في الدراسات السابقة. الهدف الرئيسي من هذه الدراسة هو تطوير نموذج قياس لتأثير خصائص نظام المعلومات المحاسبية على فعالية التدقيق الداخلي، مع الأخذ في الاعتبار التأثير المعتدل للخبرة. يتم تمثيل الخصائص من خلال خمسة هياكل مختارة تشتمل على المرونة والملاءمة والتوقيت والموثوقية والتكامل. لتحقيق هدف البحث، تم استخدام نهج كمي عبر استبيان مع 365 مستجيبًا من مدققي حسابات ومحاسبين في عدد من الشركات في البورصة العراقية. يتم تنفيذ AMOS و SPSS لتحليل البيانات وإنشاء نموذج القياس. تشير النتائج إلى أن قيم نموذج القياس مقبولة وأن النموذج كافٍ لتطوير نموذج SEM لمتغيرات البحث. أخيراً، توفر الدراسة أساسًا للباحثين لإجراء المزيد من الأبحاث في المستقبل حول العلاقة بين تجربة AIS وIAE.

الكلمات المفتاحية: نظام المعلومات المحاسبية؛ فعالية التدقيق الداخلي، الخبرة.

انتساب الباحث
[1] كلية الادارة والاقتصاد، جامعة ميسان، العراق، العمارة، 62001
[1]odayalmaliki@uomisan.edu.iq

[1] المؤلف المراسل

معلومات البحث
تأريخ النشر : آب 2022

Introduction

Accounting is a significant data source for supporting decision-making, specially, administrative decisions. Several researchers pointed out that the information quality which is provided by accounting information system (AIS) assists all management levels in making the appropriate decisions that lead to the achievement of organization's goals ([1]; [2]; [3]; and [4]). [5] indicated that AISs task is to monitor, record, and analyze, and evaluate companies' financial state. Furthermore, it can improve governance process and control through risks estimation and information [6]. Effective internal audit (IA) helps the organizations in decreasing the operational risks and enhancing the financial reporting reliability that increases the trust of shareholders [7]. The IA development in AIS keeps company assets from misusage and losses. It also ensures the accuracy of organizations' financial data [8]. Account staff experience is a significant factor that enables managements to make the proper decisions for improving the IA performance. Accountants and auditors with a high experience level in an organization indicate its ability to accomplish better of what than those with a low experience level [9].

Hypothesized Conceptual Model

The Conceptual Model developed by [10] 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 respectively. The hypothesized conceptual model is illustrated as shown in Figure (1) below.

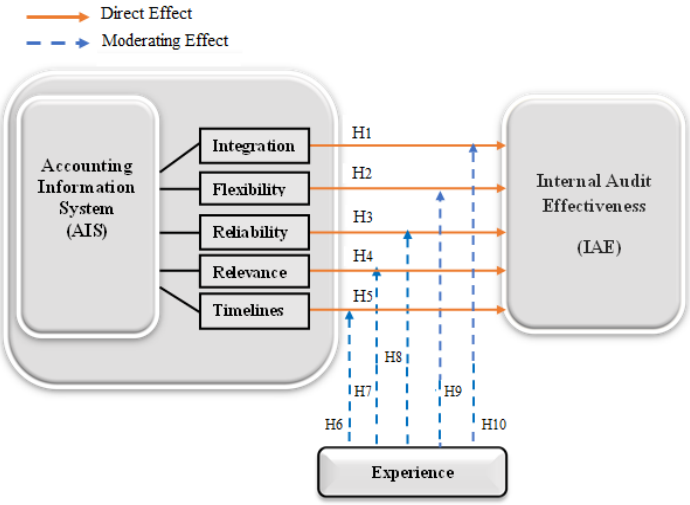

Figure (1): States the Hypothesized Conceptual Model

- Integration is the extent to which an accounting information system enables the information combination from different sources to enhance business decisions[11].
- Flexibility refers to the degree of AIS adaptation to various changing conditions and user needs [11].
- Reliability is AIS's ability to be accurate and representative, with no purposeful or systematic bias, and no substantial inaccuracy[12].

- Relevance refers to the accounting information's relevance to users' duties and tasks, as well as its ability to analyze previous, current, or future occurrences and influence users' economic decisions. [12].
- Timeliness refers to the availability of the required accounting information to the correct person at the exact time to take the proper action. It is the degree of update the information[12].

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

H_1: AIS Integration has a significant effect on the IAE.

H_2: AIS Flexibility has a significant effect on IAE.

H_3: AIS Reliability has a significant effect on the IAE.

H_4: AIS Relevance has a significant effect on the IAE.

H_5: AIS Timeliness has a significant effect on the IAE.

H_6: Experience can moderate the AIS Timelines effect on the IAE.

H_7: Experience can moderate the AIS Relevance effect on the IAE.

H_8: Experience can moderate the AIS Reliability effect on the IAE.

H_9: Experience can moderate the AIS Flexibility effect on the IAE.

H_{10}: Experience can moderate the AIS Integration effect on the IAE.

Literature Review

Researchers examined the AIS effect of organizations' performance or organizations' activities as well as investigate the AIS effect on the internal control. [13] indicated an important AIS effect on organizations internal control and internal audit. [6] 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. [14] study showed that the AIS has an effect on internal control effectiveness in the Jordanian Commercial Bank. Likewise, the study of [15] 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. [16] also asserted the AIS impact on IA systems.

[17] 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. [11] stated that flexibility, integration, formalization, and a wide range of media and accessibility are successful AIS determinants. [18] indicated that most essential AIS characteristics are efficiency, reliability, flexibility and integration respectively. On the other hand, [19] and [20] indicated that a successful AIS is determined by accomplishing four elements: reliability, accessibility, integration, timeliness and flexibility. Eventually, [21] utilized four features to identify successful and efficient AIS that are flexibility, reliability, efficiency and integration.

The sum of one's knowledge is called experience. which is acquired by individuals that assists them

in taking the appropriate decisions[22]. 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 [23], [24] and [25], a high level of experience assists managements in proper decision-making [27]. Datta & Iskandar-Datta, (2014) indicated that the experience of the audit management has a crucial effect on the strategic decisions of organizations. A high experience level has a positive effect on products and services development, companies' dynamic abilities, and the internal competitiveness [24], [25] and [23].

However, former studies didn't examine the experience effect on IAE and AIS relations. The research of [26] is one of the first studies to establish a conceptual model to explain the relationship between AIS features and IAE while taking into account the moderating influence of experience.

Methodology

A survey questionnaire was used to collect data, using a quantitative approach. 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 analysis. Cronbach's Alpha is used to test the data internal consistency. On the other hand, AMOS is executed on the total number of respondents (365) to construct the measurement model.

Results and Discussion

Demographic Information

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 as shown in Table (1) below.

Table (1): State the Respondents Age

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

Reference : Results of Program SPSS

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 as shown in Table (2) below:

Table (2): State the 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

Reference : Results of program SPSS

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 as shown in Table (3) below:

Table (3): State the 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

Reference : Results of program SPSS

Table 4 below shows that the experience between 1-10 years' percentage is (41.09%), followed by (38.35%) of that has 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 provides better findings as shown in Table (4) below:

Table (4): State the 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

Reference : Results of program SPSS

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. 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 as shown in Table (5).

Table (5): States the Mean and Standard Deviation of all Constructs

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
IAE	365	1.00	5.00	2.95	1.026
Experience	365	1.00	5.00	2.39	1.270
Valid N (listwise)	365	-	-	-	-

Reference : Results of Program SPSS

The Reliability Test

The reliability test ensures the questionnaire's stability and consistency. According to[27], 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 ([28] [29]. 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[30]. The minimum standard of KMO is 0.5, medium values range between 0.5 and 0.7, Good values are between 0.7 and0.8, great values are between 0.8 and0.9, and values over 0.9 are considered excellent. are excellent[27] and [31]. Bartlett's test indicates the matrix which is not an identity matrix and therefore, it must be significant if it is less than 0.05 ([32] and [33]**.**

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 as shown in Table (6).

Table (6): State the Reliability Test of All Constructs Deviation 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

Reference : Results of Program AMOS

Table 7 below 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 as shown in Table (7) below:

Table (7): State the KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.928
Bartlett's Test of Sphericity	**Approx. Chi-Square**	35520.698
	df	2278
	Sig.	.000

Reference : Results of program AMOS

Measurement Model Development

The measurement model or confirmatory factor analysis (CFA) is a statistical method that helps 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 does the measurement model fit the sample data as shown in Figure (2)..

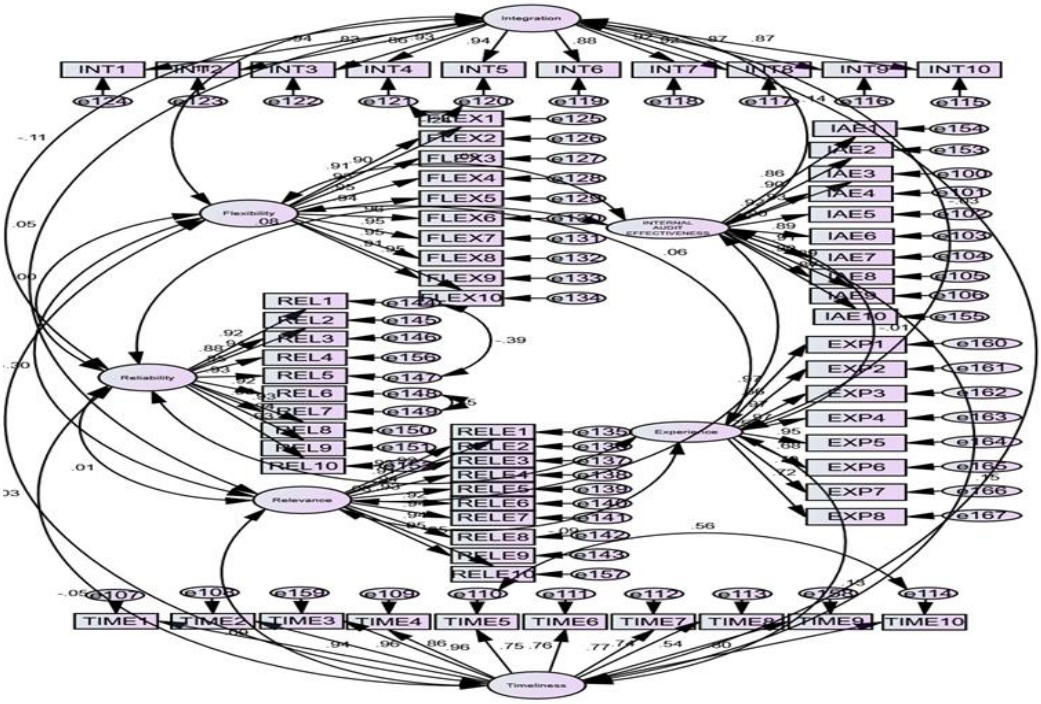

Figure (2): State the Measurement Model for All Items

As shown from Table 11, 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, As shown from Table (10) below:

Table (10): State the Final 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)

Reference : Results of program AMOS

The final measurement model is introduced as shown in Figure (3).

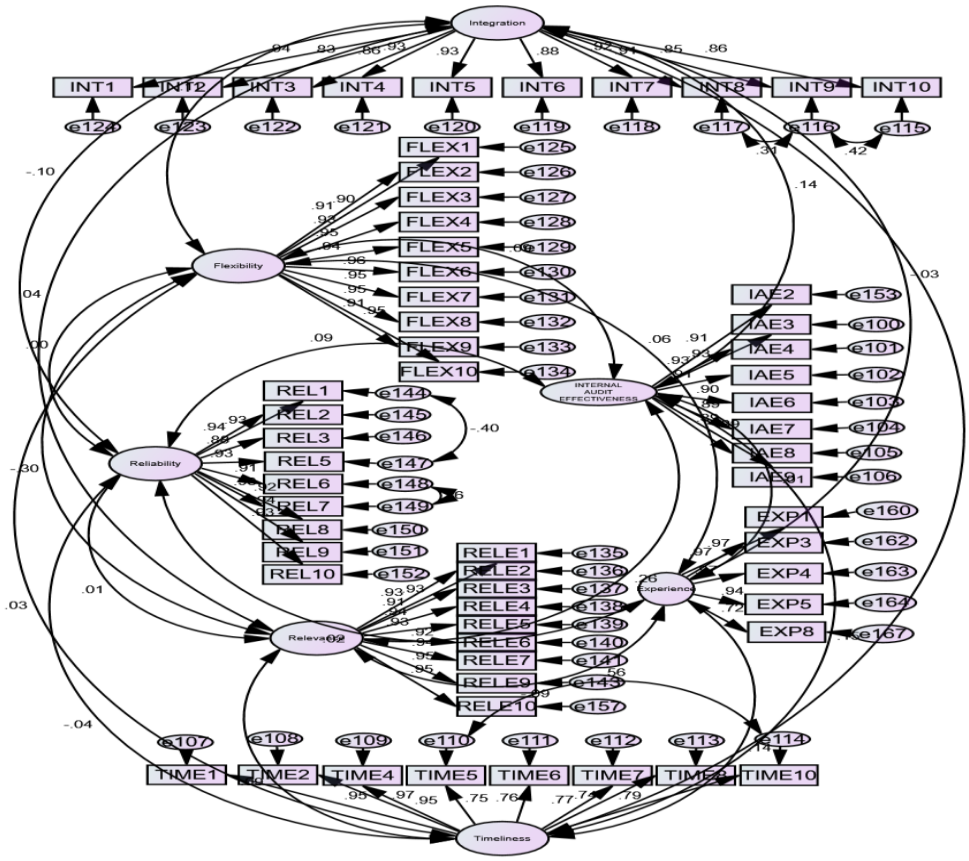

Figure (3): State of the Final Measurement Model

The goodness of fit is conducted to test the model validity. The statistic results of goodness of fit indices introduced the values of all indices of all constructs which are within the satisfactory values after removing the low factor loadings items. This demonstrates that the model closely matches the sample data and indicates the need for the construction of a structural model as shown in Table (11).

Table (11): State the 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

Reference : Results of Program AMOS

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 the 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 make use of the study findings because better performance of IA leads to increase the GDP and citizens' income. Finally, the study provides a basis for researchers who conduct more researches in the future on the relation between experience AIS, IAE.

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