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## THE DETERMINANTS OF E-COMMERCE AUDIT PROCESS EFFECTIVENESS: DOES AUDIT TECHNOLOGY MATTER?

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## THE DETERMINANTS OF E-COMMERCE AUDIT PROCESS EFFECTIVENESS: DOES AUDIT TECHNOLOGY MATTER?

### Abstract

This paper examines the impact of audit planning, audit strategy, and audit documentation on the effectiveness of the audit process of e-commerce companies, along with the moderating role of audit technology on these associations. Data was collected through a questionnaire filled by 106 auditors who are members of the Lebanese Association of Certified Public Accountants. Results showed that audit planning and audit documentation have a positive significant impact on the effectiveness of the audit process, while audit strategy has no impact. The outcome also confirmed the association between audit technology tools and the effectiveness of the audit process. Moreover, the results showed that there is a moderating effect of audit technology tools on the association between audit strategy and the effectiveness of the audit process, but in contrast, there is no significant moderating effect of audit technology tools on the relationships between audit planning, audit documentation, and the effectiveness of the audit process.

### Keywords

Audit planning, audit strategy, audit documentation, audit technology, audit process, e-commerce

## 1. INTRODUCTION

Audit planning, audit strategy, and audit documentation are addressed in literature as important components of the audit process, and that they affect the audit quality results. In this concern, Bertin and Godowski (2012) argued that without a strong interaction between these elements, the effectiveness of the audit process is negatively influenced. The authors argued that auditors must organize their tasks to conduct an effective audit, develop an action plan to address risks, and document evidence that is critical to demonstrating that the audit was carried out in accordance with the fundamental principles.

Technological developments in auditing have increased the responsibility and the difficulties of the auditing process. Whereas, the audit process is increasingly dependent on technology, which requires audit firms to diversify their technical expertise and auditors to use technology efficiently (Mali et al., 2021). Computer-aided audit tools and techniques (CAATTs) are effective in enhancing audit productivity and reducing costs, although audit firms in developing countries and small firms, as reported by Siew et al. (2020) rarely use them. As a result, the audit profession is facing a critical turning point due to technological advances that have increased the level of the audit process and changed tools from basic spreadsheet programs to complex databases and business intelligence solutions. As newer technologies have facilitated a shift away from the historical paradigm towards a more proactive approach, some of the audit approaches and methods that were useful in the past are now seem outdated. Thus, auditors must understand what and how a future audit will begin to visualize the logical progression of such a case (Byrnes et al., 2018).

The importance of e-commerce is increasing in Lebanon as a result of technological progress, digital growth, and the transformation of the internet from a source of communication and information into a profitable tool. The United Nations Conference on Trade and Development (UNCTAD) reported that Lebanon's performance as of business-to-consumer e-commerce in 2018 was ranked as sixth among 19 Arab countries and 16<sup>th</sup> among 39 middle-to-high-income countries (Bunn et al., 2020). Online sales have risen steadily and outpaced traditional retail stores during the coronavirus pandemic, giving e-commerce an unexpected boost and acceleration (Mekdessi et al., 2021). Hamada (2021) reported that the percentage of e-commerce in Lebanon grew during the COVID-19 pandemic as a result of the quarantine and the tendency of people to restrict interaction.

Lebanon was affected by the technological revolution that created the concept of e-commerce, which posed a major challenge to the application of the effective audit process, as the essence of the problem lies in the audit practices that must be followed in the absence of a special audit model capable of dealing with e-commerce. Moreover, no empirical research has evaluated the determinants of the effectiveness of the audit process for e-commerce companies in Lebanon. There is a need to first evaluate the current audit process of Lebanese e-commerce companies by examining the impact of audit planning, audit strategy and audit documentation on the effectiveness of the audit process. It is also worth focusing on studying the impact of audit technology on the effectiveness of the audit process of e-commerce companies to check whether audit firms can handle the modern auditing process, and to what extent these companies need to adopt it.

Due to the lack of research in Lebanon and the limited number of previous studies that highlight the importance of this topic in developing countries, this study aims to answer research questions related to the separate effects of audit planning, audit strategy, and audit documentation on the effectiveness of the auditing process and the mediating role of adopting audit technology tools on the three aforementioned associations. In addition, adds to the existing body of literature by providing an empirical understanding of how the use of audit technology tools affects how e-commerce companies' audits process. Furthermore, this study is the first that examines the moderating effect of adopting audit technology tools on the associations between audit planning, audit strategy, audit documentation and the effectiveness of the audit process of the Lebanese e-commerce companies. Moreover, this research provides insights to the Lebanese auditors while setting appropriate policies to mitigate risks arising from the improper use of audit technology tools and gives policy makers guidance on the opportunities and challenges of using these tools in the audit process of e-commerce companies.

The rest of this paper includes a theoretical background in section one, a literature review and hypotheses development in section two, data collection and methodology in section three. The paper ends with the conclusion.

## **2. THEORETICAL BACKGROUND**

In this section, the researchers discuss the effectiveness and quality of the audit process and then the theories behind the effectiveness of the audit process, in addition to audit planning, audit strategy, audit documentation, and the adoption of audit technology in e-commerce companies.

### **2.1. Effectiveness and Quality of Audit Process**

The ability of the audit function to achieve a desired outcome that affects business operation, risk management and good governance is known as audit effectiveness (Lenz et al., 2017). Evaluating the auditor's performance, such as compliance with International Standards on Auditing (ISA) or readiness to implement the audit plan, is essential to determine the success of the audit (Wang et al., 2021). It plays an essential role in enhancing the reliability and integrity of financial statements, and their role in business operations must be considered (Haa and Minhb, 2020). In this regard, auditing is important to check the accuracy of financial accounts and audit quality is what ultimately gives audit reports their credibility. Whereas, audit quality refers to the effective application of the audit process in accordance with auditing standards, including the detection of inaccuracies and errors as well as meeting the demands and needs of consumers of financial statements (Nurjannah, 2019).

According to Hayes et al. (2005), there are four basic theories that explain the effectiveness of the audit process. First, the policeman theory, which asserts that the auditor is responsible for seeking out, detecting, and preventing any fraudulent behavior. Secondly, the lending credibility theory; which supports that the main service that auditors provide to clients is enhancing the credibility and reliability of financial statements. Third is the theory of inspired confidence, which deals with both supply and demand of audit services. This theory leads to a need for a reliable independent audit arises because third parties are unable to check for any significant error or bias in financial reporting. It is reasonable to assume that the societal advantage of auditing ends if society loses faith in the audit opinion. Finally, agency theory suggests that the auditor is appointed for the benefit of both the third parties as well as management Agency problems and the problem of risk sharing are the two challenges that agency theory attempts to address.

### **2.2. Audit Planning**

Audit planning is a mandatory step for auditors because it enables them to plan for gathering sufficient relevant audit evidence to obtain a fair summary of their conclusion in the audit report. It consists of an audit program and time budget, and helps to determine the relative costs of different audits. The nature, time and extent of the audits to be performed by members of the audit team are included in the audit plan (Arens et al., 2016). Audit planning maintains the effectiveness of audit methods, functions, and activities. In addition, it determines auditors' expectations regarding the potential for the existence of inaccurate accounts in the financial statements. Thus, the auditor develops audit plan that is appropriate to the situation (Fortvingler and Szivos, 2016). In the planning process, consideration should be given to assessing reasonable and scientific risks of material misstatement in the financial statements (Nguyen et al., 2020). When financial statements are fundamentally incorrect, audit risks leading to an erroneous auditor opinion can be avoided in part by careful audit planning (Niemi et al., 2018). It is very important to consider the risk of significant errors during the audit, especially during the planning stage, as it greatly affects the quality of the audit (Nguyen et al., 2020).

### **2.3. Audit Strategy**

The auditor's strategy to create an audit that is cost-effective and to provide sufficient certainty to identify critical errors that assist users of financial statements in their decision-making is known as audit strategy. It contains general guidelines

and assists the auditor in taking appropriate action, selecting methods for more effective risk identification and assessment, selecting team members with appropriate qualifications and experience, setting clear audit objectives, and allocating necessary audit resources (Eilifsen et al., 2020). Once the overall audit strategy is in place, an audit plan can be created to address the many concerns it raises while keeping in mind the need to achieve audit objectives through optimal use of the resources available to auditors. Audit plan and strategy are closely related and are not always separate or sequential actions because changes in one may lead to changes in the other.

#### **2.4. Audit Documentation**

Audit documentation serves as a record of the audit techniques performed, relevant audit evidence, and the auditor's judgments. It plays an important role in completing the audit objective, both in terms of obtaining data to support the auditor's conclusion and understanding the actions taken by the client (Franca and Mariana, 2015). Audit documentation should contain all the data that the auditor considers necessary to properly conduct the audit and support its report. External evidences are more trustworthy than photocopies or documents that have been digitized and documentary evidence - whether paper or electronic - is more reliable than evidence itself obtained orally. Although audit documents are usually contained in electronic files, they are sometimes referred to as "working documents", as they are prepared or obtained by the auditor and used in connection with the conduct of his or her audit. The documentation may also include other relevant records, such as minutes of meetings created by the entity's employees and approved by the auditor. It is not just the material created by the auditor (Safonova et al., 2018).

#### **2.5. Adoption of Audit Technology**

The use of traditional audit techniques is no longer necessary because so many data points are now saved electronically and the traditional system can no longer support the role of auditors in confirming the accuracy of financial records. The way auditors perform their work will need to adapt to this phenomenon (De Freitas et al., 2020). In addition, traditional information system audit techniques entail sampling; whereas only a fraction of the population examined and making assumptions about the entire population. One type of audit techniques used to increase the effectiveness and efficiency of audits is Computer Aided Audit Techniques (CAATs) (Ahmi et al., 2016). Using this technology allows auditors to become more convinced of the audit evidence they collect during audits. For large classes of transactions and account balances, they are increasingly adopting CAATs to support their assessments of risks of significant misstatement at the assertion level. As a result, CAATs assist auditors in choosing where to focus further audit procedures (Pedrosa et al., 2020). Auditors can now predict the stages of their audits due to continuous developments in technology and software (Omitogun and Al-Adeem, 2019).

### **3. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT**

In this section, five literature-based streams are presented, and then a research framework is proposed, in which seven hypotheses are developed to be tested and analyzed.

#### **3.1. Audit Planning and the Effectiveness of Audit Process**

The effect of audit planning on the effectiveness of the audit process or audit quality has been investigated in a number of studies. According to Al-Salami and Taha (2021), the most important factors in audit planning in multi-branch businesses are risk and materiality. Pritama et al., (2018) and Phornlaphatrachakorn and Kalasindhu (2020) assert that audit planning has a significant impact on audit quality. Auditors can allocate audit resources under different risk scenarios and make appropriate decisions about the planned program throughout the audit planning phase. They can efficiently introduce pre-defined audit methods; create sample sizes for pre-defined procedures, set budgeted engagement hours

per pre-defined procedure, and assign reviewer rank level (Phornlaphatrachakorn, 2020). Because of this, the effectiveness of the audit process, the standard of financial reporting, and the validity of the audit report will all correlate strongly with the results of appropriate planning. Therefore, if the audit planning is not successful, the next stages of the audit will be unsuccessful; thus, the audit process as a whole will also be unsuccessful. In light of these findings, the first hypothesis of this research is as follows:

**Hypothesis 1:** There is a positive significant impact of audit planning on the effectiveness of audit process.

### **3.2. Audit Strategy and the Effectiveness of Audit Process**

The auditing strategy assists in ensuring that a company's objectives, strategies, and policies are consistent with its strategic choices by examining and testing the processes of its internal and external surroundings (Baltos et al., 2018; Fleming et al., 2018). A number of authors and academics has stressed the significance of audit strategy as a crucial element of an effective audit process. For example, Yu and Yang (2021) proved an intrinsic correlation between the auditor's audit strategy and the business risk of the organization, while Karim et al., (2020) shaded the light on the critical importance of implementing an audit strategy in enhancing the audit quality. In their research, Djanegara and Iriyadi (2017) considered audit strategy, auditor competency, and independence as factors affecting audit quality. They expected this to be the subject of further investigation and discourse. According to Fonrouge and Bolzani (2019), the audit strategy is the most important stage in the audit process because it serves to assess the strategic direction of companies and ensure the successful implementation of operational processes. According to the authors, audit strategy is the second factor that influences and explains audit quality and helps the audit process to be effective. As a result, the research puts forward the following second hypothesis for this study:

**Hypothesis 2:** There is a positive significant impact of audit strategy on the effectiveness of audit process.

### **3.3. Audit Documentation and the Effectiveness of Audit Process**

The importance of audit documentation for the effectiveness of the audit process and audit quality has caught the attention of academics, as evidenced by the numerous studies that have been conducted. For example, McNellis et al., (2021) showed that legal professionals only see improved audit quality and reduced auditor liability when work performance is documented, as required by AS3. According to Christ et al. (2021), auditors can maintain or increase audit effectiveness and reduce error rates from 0.15 percent to 0.03 percent while producing good quality audit documents. In order to express the final audit opinion, Niktaba and Aslani (2015) emphasized the importance of audit evidence, quality characteristics, and professional judgment used in its measurement and evaluation. They also showed that reliable audit evidence has a significant impact on the auditor's report.

These studies indicate that the third factor affecting audit quality and aiding in the achievement of effectiveness in the audit process is audit documentation. In accordance with these arguments, the researchers put forward the following third hypothesis:

**Hypothesis 3:** There is a positive significant impact of audit documentation on the effectiveness of audit process.

### **3.4. Adoption of Audit Technology Tools and the Effectiveness of Audit Process**

Several previous studies have addressed the question of whether the auditor should use computer-assisted audit techniques (CAATTs) to improve audit quality, and doing so has been shown to increase the effectiveness and efficiency of audit decision-making (Burton et al., 2012; Janvrin et al., 2008). The quality of audit methods and audit results can be improved through auditors' use of technology. Vasarheli and Romero (2014) found that audit team attributes had a significant impact on levels of technology use. The use of CAATTs and audit quality are positively correlated, as shown by Oni (2015). According to

Serpeninova et al., (2020), auditors must be aware of alternative tools and techniques for collecting and analyzing data from electronic records as well as checking the functionality of computerized systems. Based on these arguments, the research formulates the following hypothesis:

**Hypothesis 4:** There is a positive significant association between the adoption of audit technology tools and the effectiveness of audit process.

### **3.5. The Moderating Role of the Adoption of Audit Technology Tools**

As mentioned in the previous section, a number of recent empirical studies have investigated how audit technology tools affect audit effectiveness and quality. In a similar vein, Alrabei et al., (2022) discovered that the relationship between audit quality and accounting information quality is moderated with information technology. In their investigations, Mohd-Nassir et al. (2021) showed how audit technique and task structure directly affect the performance of fraud risk judgments. Underlying factors affecting the acceptance and use of CAATTs, according to Pedrosa et al., (2020) are the perceived benefit of CAATTs, the expected effort, the enabling environment, and the number of reviewers. In this concern Hiyari et al., (2019) reported that Policymakers can encourage internal auditors to use CAATTs by teaching them the advantages of doing so, allocating more money for investments in technology infrastructure, and enhancing their skills by expanding CAATTs training programs.

Based on the arguments of the studies that showed that the effectiveness of the audit process is affected by audit planning, audit strategy, and audit documentation. In addition to the studies that revealed the usage of audit technology tools affects the quality and effectiveness of the audit process, the researchers suggest that adopting audit technology tools moderates the associations between audit planning, audit strategy, audit documentation and the effectiveness of the audit process. Therefore, three hypotheses were derived based on the arguments of these studies:

**Hypothesis 5:** There is a statistically significant moderating effect of adopting audit technology tools on the relationship between audit planning and effectiveness of audit process.

**Hypothesis 6:** There is a statistically significant moderating effect of adopting audit technology tools on the relationship between audit strategy and effectiveness of audit process.

**Hypothesis 7:** There is a statistically significant moderating effect of adopting audit technology tools on the relationship between audit documentation and effectiveness of audit process.

### **3.6. Research Framework**

The research framework depicted in Figure 1 seeks to explain the relationship between audit planning, audit strategy, audit documentation and audit process effectiveness. In addition, by examining the moderating effect of the adoption of audit technology, the purpose of the study, which is to enhance the understanding of the usage of audit technology, will be achieved.

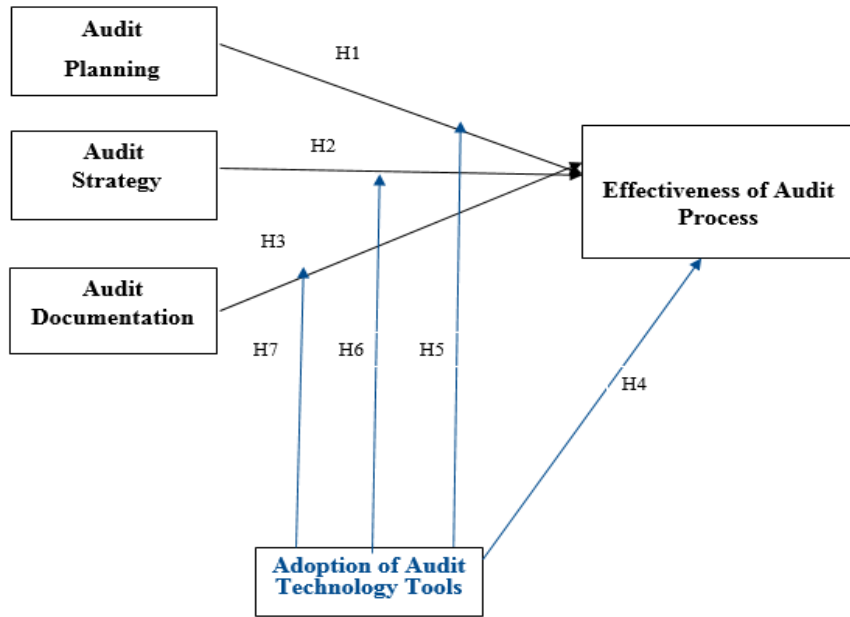


Fig.1: Conceptual Framework

#### 4. DATA AND METHODOLOGY

This section covers the research methodology adopted and the research methods used in order to explore the auditors' perceptions of the topic under investigation. It also presents the data collection sources used in this research, sampling techniques, sample size, and target population. In addition to discussing the survey's questionnaire and the measurements of research variables.

##### 4.1. Population and Data Collection

The population of this study consists of certified public accountants who are members of the Lebanese Association of Certified Public Accountants (LACPA). The researchers selected the participants who could be reached using the convenience sampling method. The sample consisted of 106 auditors working in Lebanon. Data were obtained from primary sources via email and text message questionnaire in order to meet the nature and objectives of this study. The demographic data are mentioned in the first section of the questionnaire. Section two focuses on the perceptions of auditors in Lebanon regarding auditing Lebanese e-commerce companies (this section covers elements related to three variables: audit planning, audit strategy, and audit documentation). The objective of the third section is to assess the level of agreement among auditors regarding the use of audit technology tools to audit e-commerce companies in Lebanon. Section four reflects the level of agreement of auditors regarding the effectiveness of the audit process for e-commerce companies in Lebanon. Before handing out the questionnaire to the respondents, the researchers checked its validity by asking four academic experts to review and assess its content. After review, the experts considered the questionnaire valid to conduct this research and agreed that the questions used to measure variables were representative, relevant, and reliable.

##### 4.2. Measurement of Variables

The measurement tool is based on measuring one dependent variable (the effectiveness of the audit process), three independent variables (audit planning, audit strategy, and audit documentation), and one moderator variable (adoption of audit technology tools). To measure the variables of this research, the researchers relied on the studies of Al-Shurairi (2016) and Abou-El-Sood et al. (2015). Nine items were used to assess audit planning, eleven items for measuring audit strategy, and ten items for measuring audit documentation. Four items were selected to measure the adoption of audit technology tools.



### 4.3. Model Development

The researchers used a multiple regression analysis to test the research hypotheses and to investigate the individual impact of each of the explanatory variables on the dependent variable. The moderating analysis is examined using variables interactions. The model's regression equation is formulated as:

$$EAP = \beta_0 + \beta_1AP + \beta_2AS + \beta_3AD + \beta_4AATT + \beta_5(AP*AATT) + \beta_6(AS*AATT) + \beta_7(AD*AATT) + \epsilon_{it}$$

In this model, four types of variables are used to test the hypotheses:

**1- Dependent Variable:**

Effectiveness of Audit Process (EAP)

**2- Explanatory Variables:**

- Audit Planning (AP)
- Audit Strategy (AS)
- Audit Documentation (AD)
- Adoption of Audit Technology Tools (AATT)

**3- Moderating Effect**

- Interaction Term 1 (AP\*AATT)
- Interaction Term 2 (AS\*AATT)
- Interaction Term 3 (AD\*AATT)

## 5. EMPIRICAL RESULTS

This section studies the relationship between the dependent and independent variables using IBM SPSS version 24.0. It presents descriptive statistics, reliability and validity tests, correlation analysis, multiple linear regression, and moderation regression analysis.

### 5.1. Descriptive Statistics

According to Table 1, the highest mean is 4.26, which is related to audit documentation process in e-commerce, followed by the adoption of audit technology, which has a mean value of 4.24. The means of audit planning, audit strategy, audit documentation and audit technology tools indicate a value greater than four, which means that most of the respondents agreed on the importance of these variables with respect to e-commerce companies in Lebanon.

**Table 1: Descriptive Statistics**

	N	Min	Max	Mean	Std. Deviation
Audit Planning	106	2.89	5.00	4.1887	.57401
Audit Strategy	106	2.91	5.00	4.2041	.61271
Audit Documentation	106	2.80	5.00	4.2651	.68661
Adoption of audit Technology Tools	106	2.00	5.00	4.2429	.71669
Effectiveness of Audit Process	106	2.82	5.00	4.2196	.59274
Valid N (listwise)	106				

Source: SPSS Report

### 5.2. Reliability and Validity of Variables

The researchers checked the reliability of the research variables through Cronbach alpha test, the result revealed that all the variables are reliable since the Cronbach's alpha values are above 0.7 (Pavot et al., 1991), which means that the internal consistency of all variables is met. In addition, all Kaiser-Meyer-Olkin (KMO) values for all constructs are greater than 0.6, and have significant Bartlett's test of sphericity values (p-values<0.05).

This means that the analysis provides evidence of convergent validity, which indicates that the scales are valid and reliable (Russell, 1978).

### 5.3. Correlation Analysis

Table 2 denotes a significant positive correlation between audit planning and audit strategy ( $r=0.665$ ;  $\text{sig}<0.01$ ); a significant positive correlation between audit documentation and audit planning ( $r=0.602$ ;  $\text{sig}<0.01$ ), and audit documentation and audit strategy ( $r=0.822$ ;  $\text{sig}<0.01$ ). However, there is no significant correlation between the audit technology and other variables at significant level 0.01. A positive and significant correlation exists between effectiveness of the audit process and each of audit planning, audit strategy, and audit documentation where the values are respectively ( $r=0.608$ ;  $\text{sig}<0.01$ ), ( $r=0.656$ ;  $\text{sig}<0.01$ ) and ( $r = 0.771$ ;  $\text{sig}<0.01$ ). Nevertheless, there is no significant correlation between the effectiveness of audit technology and adoption of audit technology at significant level 0.01.

**Table 2: Correlation Matrix between the Variables**

	Variables	1	2	3	4	5
1	Audit Planning	1				
2	Audit Strategy	0.665**	1			
3	Audit Documentation	0.602**	0.822**	1		
4	Adoption of audit Technology Tools	0.178	0.354	0.379	1	
5	Effectiveness of the Audit Process	0.608**	0.656**	0.771**	0.489	1

\*\* Sig<0.01, significant correlation at the level of 0.01

Source: SPSS Report

### 5.4. Multiple Linear Regression

Table 2 revealed that the values of correlation coefficients reflect an absence of multicollinearity problem among the explanatory variables (values are less than 0.8), except for the correlation between audit documentation and audit planning, where the coefficient is above 0.8 (0.822). However, the VIF between audit documentation and audit planning as presented in Table 3 is below 10; therefore, there is no severe multicollinearity problem between these two variables (Hair et al., 2010). Regarding the other variables, there is no multicollinearity detected, as there are no VIF values above 10.

When multiple linear regression is performed, the R-Squared value ( $R^2$ ) is frequently reported. It measures the amount of variance of the dependent variable due to the variance of the explanatory variables, also known as the proportion of variance explained (Karch, 2020). As revealed in Table 3, the R-squared adjusted is 0.636, which means that explanatory variables explain 63.6% of the variations in effectiveness of audit process. The Durbin-Watson value is  $2.332 > 1.76$  which shows no autocorrelation problem (Krämer, 2011). Table 3 also reveals that the regression model as a whole is appropriate and significant ( $F=46.836$ ;  $p \text{ value}=0.000 < 0.05$ ). A higher F value indicates that the group means are significantly different from each other when compared to the difference of individual observations in each group (Kim, 2014).

The first hypothesis ( $H_1$ ) that predicts a positive significant impact of audit planning on the effectiveness of the audit process is supported. The outcomes in Table 3 show a significant and positive relationship between the variables, ( $\text{sig}=0.004 < 0.01$ ). This finding is consistent with the assumption that adequate audit planning ensures an effective audit process and that any unplanned audit activity leads to an audit that does not meet its audit objectives. It also agrees with Pritama's et al., (2018) assertion that better audit planning enhances the effectiveness and quality of the audit. Additionally, this outcome is consistent with Meliyev's (2017) study, which revealed a positive relationship between audit planning and audit quality.

The second hypothesis (H2) that predicts a positive significant relationship between audit strategy and the effectiveness of the audit process is not supported. The results stated in Table 3 reveal no significant relationship between the two variables ( $\text{sig}=0.740>0.1$ ). According to the literature, an audit strategy helps ensure that the company's goals are achieved. This outcome failed to support previous studies regarding the importance of audit strategy as a critical factor in determining the effectiveness of audit activities in terms of process efficiency and output performance. This result contradicts the outcomes of a study conducted by Karim et al. (2020), who concluded that adopting an audit strategy plays a significant role in improving audit quality and the overall audit process. Despite the fact that developing an audit strategy is a critical step in the audit process, the results unexpectedly indicated the need for more work to design an audit strategy in Lebanese e-commerce companies in order to achieve international auditing standards. Lebanese e-commerce auditors lack a critical component that may help them perform their duties effectively. As the volume of e-commerce in Lebanon increases, auditors must take corrective actions to develop successful audit strategies that allow e-commerce companies to better allocate resources and manage their time in order to prevent the audit process from becoming less effective.

The third hypothesis (H3) that predicts a positive significant impact of audit documentation on the effectiveness of the audit process is supported. The results as provided in Table 3 indicate that there is a significant positive relation between the variables ( $\text{sig}=0.000<0.1$ ). This finding confirms that audit documentation is a crucial prerequisite for conducting an effective audit and that the requirements for compliance with this requirement are specified in ISA 230 (Muydinov and Mamazhonov, 2021). The results also agree with the study conducted by McNellis et al., (2021), which indicated that when audit documentation is well prepared as required, legal professionals perceive enhanced audit quality.

The fourth hypothesis (H4) that predicts a positive significant association between the adoption of audit technology tools and the effectiveness of the audit process is supported. The results as shown in Table 3 indicate a significant positive relation between the two variables, ( $\text{sig}=0.001<0.1$ ). This finding is consistent with Marie and Iskandar (2019) asserting that auditors who adopt new technology will benefit from significant increases in audit efficiency and effectiveness when they move from computer-generated audit programs to an audit program capable of testing the entire client data set. It also agrees with the outcome of Dauod et al., (2021), who confirmed that the use of CAATTs improve the overall audit process of audit firms.

**Table 3: Result of Regression Analysis**

Hypothesis	Variable	VIF	Unstandardized Coefficient Beta	t	P-value
	Constant B <sub>0</sub>		4.088	1.177	0.242
H1	Audit Planning	1.819	0.293	2.918	0.004***
H2	Audit Strategy	3.405	0.035	0.333	0.740
H3	Audit Documentation	2.936	0.502	5.240	0.000***
H4	Adoption of Audit Technology Tools	1.108	0.487	3.453	0.001***
R <sup>2</sup> = 0.650    Adjusted R <sup>2</sup> = 0.636    F-value= 46.836 (Sig.=.000)    DW=2.332					

\* significant at 10% level; \*\*significant at 5% level; \*\*\*significant at 1% level, dependent variable: effectiveness of audit process.

Source: SPSS Report

### 5.5. Moderation Regression Analysis

Following Hayes (2017), the moderation analysis was conducted to test the moderating role of the adoption of audit technology tools on the relationships between audit planning, audit strategy, audit documentation, and the effectiveness of the audit process.

The fifth hypothesis (H5) that predicts a statistically significant moderating effect of adopting audit technology tools on the relationship between audit planning and effectiveness of audit process is not supported. The result in Table 4 indicates that there is no significant moderating effect as the interaction between the adoption of audit technology and audit planning is not significant ( $p=0.227>0.1$ ). This result contradicts the study of Marei and Iskandar (2019), who argued that the computer auditing team effectively maintains the quality and efficiency of their auditing job if the planned computer auditing operations can be executed on time and to the expected quality. It is also inconsistent with the study of Pedrosa (2020) that supports the moderating effect of adopting audit technology tools to enhance the relationship between audit planning and the effectiveness of the audit process. Failure to gain the advantage of audit technology tools in audit planning indicates that e-commerce in Lebanon has not benefited from them, which allows auditors to manage risk effectively. These companies should consider certain attentions when preparing the audit plan and ensure adequacy when using audit technology tools, particularly with regard to audit engagement and key activities that can be enhanced using these tools. The use of audit technology tools by auditors reduces the chance of errors occurring in audit assignments and increases the chance of detection, which reduces audit risk. In order to produce high-quality reports, it is essential to create an environment that improves the auditor's performance in Lebanese e-commerce companies during audit planning. This will increase the effectiveness of the audit process while reducing the time and effort spent on auditing.

**Table 4: Moderating Role of Adopting Audit Technology Tools (Audit Planning and Effectiveness of Audit Process)**

Model Summary							
	R	R-Sq	MSE	F	df1	df2	P
	0,6860	0,4706	23,1689	30,2203	3,000	102,000	0,000
Model	Coeff	Se	T	P	LLCI	ULCI	
Constant	-19.148	22.147	-0.8646	0.3893	-63.07	24.78	
Audit Planning	1.37	0.577	2.387	0.018	0.23	2.52	
Adoption of Audit Technology Tools	2.34	1.29	1.80	0.073	-0.22	4.91	
Int-1	-0.04	0.033	-1.21	0.227	-0.107	0.025	

Source: SPSS Report

The sixth hypothesis (H6) that predicts a statistically significant moderating effect of adopting audit technology tools on the relationship between audit strategy and effectiveness of audit process is supported. According to Table 5, the result indicates that there is a significant moderating effect as the interaction between types of technology and audit strategy is significant ( $p=0.096<0.1$ ). For Dauod et al., (2021), the use of CAATTs enhances the audit process and improve its overall output. Moreover, the result of H6, confirms the outcome of Mališ et al., (2021) that considers integrating the adoption of audit technology tools as an important part of the audit strategy.

**Table 5: Moderating Role of Adopting Audit Technology Tools  
(Audit Strategy and Effectiveness of Audit Process)**

<b>Model Summary</b>							
	<b>R</b>	<b>R-Sq</b>	<b>MSE</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>P</b>
	0.724	0.525	20.78	37.59	3.000	102.00	0.000
<b>Model</b>	<b>Coeff</b>	<b>Se</b>	<b>T</b>	<b>P</b>	<b>LLCI</b>	<b>ULCI</b>	
<b>Constant</b>	-20.09	17.92	-1.12	0.265	-55.64	15.46	
<b>Audit Strategy</b>	1.20	0.377	3.19	0.0019	0.4570	1.95	
<b>Types of Technology</b>	2.35	1.05	2.21	0.028	0.250	4.45	
<b>Int-1</b>	-0.036	0.0220	-1.677	0.096	-0.080	0.0067	

Source: SPSS Report

The seventh hypothesis (H7) that predicts a statistically significant moderating effect of adopting audit technology tools on the relationship between audit documentation and the effectiveness of the audit process is not supported. Based on Table 6, the result indicates that there is no significant moderating effect as the interaction between adopting audit technology tools and audit documentation is not significant ( $p=0.54>0.1$ ). As described in the ISA 230, the auditor must comply with certain documentation standards (Lapiřkaia and Leahovcenco, 2020). According to Jawad (2019), the use of modern techniques and tools can have a significant impact on audit documentation. Therefore, the result of H7 contradicts the outcome of Jawad (2019). The Lebanese e-commerce companies are aware of the imperfections of digital files because of the failure of the auditing software system, the various risks associated with its use, and the loss of data saved on such software and systems. In addition, auditors still face significant challenges when using information technology because they are not familiar with creating all audit documents digitally and still find it more convenient and safer to create them manually. Moreover, audit software is not available in many Lebanese CPA firms, and purchasing it from outside the country is generally expensive and costly, making the digital transformation of audit documentation difficult to attain.

**Table 6: Moderating Role of Adopting Audit Technology Tools  
(Audit Documentation and Effectiveness of Audit Process)**

<b>Model Summary</b>							
	<b>R</b>	<b>R-Sq</b>	<b>MSE</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>P</b>
	0.7820	0.6116	16.998	53.53	3.00	102.00	0.000
<b>Model</b>	<b>Coeff</b>	<b>Se</b>	<b>T</b>	<b>P</b>	<b>LLCI</b>	<b>ULCI</b>	
<b>Constant</b>	0.942	15.74	0.059	0.952	-30.28	32.17	
<b>Audit Documentation</b>	0.880	0.364	2.41	0.017	0.158	1.60	
<b>Adoption of Audit Technology Tools</b>	1.03	0.941	1.09	0.275	-0.833	2.899	
<b>Int-1</b>	-0.013	0.0214	-0.614	0.540	-0.055	0.029	

Source: SPSS Report

## 6. CONCLUSION

The purpose of this paper is to examine the impact of audit planning, audit strategy, and audit documentation on the effectiveness of the audit process of the Lebanese e-commerce companies. In addition to investigating the moderating role of adopting audit technology tools on the three mentioned associations. The sample included in this research is 106 auditors and

accountants, who are members of the Lebanese Association of Certified Public Accountants (LACPA), and a questionnaire sent via email and text message to members of the association was used as a primary research tool. The results showed that audit strategy is the only variable that does not have a significant positive impact on the effectiveness of the audit process. However, this result changed when the adoption of audit technology tools was considered a moderator variable. E-commerce transactions significantly increase the amount of work required during the audit planning phase as they present several characteristics that the auditor must evaluate and understand. In addition, the results showed that auditors in e-commerce companies comply with the documentation requirements of the ISA 230 standard.

It is clear that e-commerce has taken advantage of CAATTs in its transactions, and this is shown in the positive and significant association between the adoption of audit technology tools and the effectiveness of the audit process. Moreover, the results revealed that audit technology tools succeed in moderating the relationship between audit strategy and the effectiveness of the audit process. By contrast, audit technology tools do not influence the relationships between audit planning, audit documentation and the effectiveness of the audit process of e-commerce companies. This means that audit technology tools acceptance in these two stages needs to be improved while auditing the Lebanese e-commerce companies. It is worth mentioning that sales and accounting software is critical to the success of any e-commerce company, as it helps managers track and summarize orders, receivables, and creditors in detail. Thus, without good sales and a standard accounting system, the auditor's job may turn into a nightmare, and audit planning is difficult to be implemented. Additionally, in e-commerce transactions, efforts must be made to ensure that electronic records are not destroyed or altered and are safely stored for the required time.

E-commerce auditing is an important activity due to the complexity and diversity of information technologies. Thus, in order to increase its efficiency, e-commerce companies in Lebanon to adopt the best technological tools in the audit process, including standardizing legal settlements and conducting continuous training courses on audit technology tools for auditors, must follow some procedures. In addition, e-commerce heavily relies on electronic and computerized infrastructure for its existence and operation, so it is recommended to look into the status of this infrastructure. For the smooth running of e-commerce, such companies must have networked computers and a proper implementation of various software, information and communication systems where auditors can be aware of and familiar with the e-commerce infrastructure. The main limitation of this research is related to the sample size due to the low response rate from the auditors. Thus, having a large sample size can lead to more results that are accurate.

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