

# IT Governance Frameworks and their Impact on the Efficiency of External Audits: Evidence from Companies When Audit Client Adoption

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**ABSTRACT:** This research examines the effect of Information Technology (IT) governance through audit clients on external auditing efficiency. To analyze the auditing efficiency of these contracts and to test the hypotheses that the Authors have set for this study, The study seeks to cover the research gap that the current literature has not adequately addressed regarding the impact of IT governance on the efficiency of external audits, concerning audit clients and giving priority to companies that can conduct audits quickly and cost-effectively, the Authors conducted a study of 30 audit contracts that were carried out by two auditing firms operating in Syria as an experiment and considered Syria adopts the IT governance framework in the Mediterranean basin and used data envelopment analysis to measure the auditing efficiency of these contracts. Furthermore, survey questionnaires were given to the audited companies to determine the extent of their compliance with IT governance, based on some of the principles of the Qubit 5 model. The data was analyzed, and the hypotheses were tested using regression analysis by employing SPSS software. The study establishes a positive correlation between the use of IT governance by audit clients and external audit efficiency based on two efficiency measures, CRS and VRS.

**Keywords:** information technology, IT governance, COBIT 5, auditing.

## I. INTRODUCTION

Technological advancement and globalization in the recent past influenced most organizations to interaction with various data and information in their operations. It has become significant in constructing effective organizations since the importance of ICT increases user, manager, and decision decision-making dimensions [1,2]. The evolution of information technology (IT) has also driven the accounting profession to modernize its tools and methodologies, ensuring the continued provision of high-quality services [3]. This modernization has spurred the urgent need for implementing IT governance in companies, particularly in response to financial and economic scandals of the early 21st century and the global shift toward corporate governance [4]. The growing awareness among management of the risks associated with IT underscores the necessity for aligning corporate strategy and goals through IT governance [5]. IT governance originated in 1998 and is described by its proponents in the Information Technology Governance Institute (ITGI) as the corporate governance subset of any comprehensive program. This includes the leadership and governance policies, program mechanisms, and frameworks that guarantee IT sustainability and strategic positioning in

organizations [6, 7]. Concurrently, audit firms offering various services, including consulting, taxation, and assurance, play a critical role in external audits. These audits aim to offer an impartial technical opinion on the fairness of financial statements [8]. The use of IT has become paramount, especially in the financial reporting of the listed companies. Therefore, implementing an IT governance mechanism is crucial in providing responsive controls to support the financial reporting processes. Nevertheless, the absence or the inconsistent implementation of these mechanisms poses risks to the audit firms such as the possibility of material misstatements of financial information. This could result in the auditors facing legal repercussions or the implementation of time-consuming and expensive audit processes to check the accuracy of the information submitted by the client.

The adoption of IT governance by clients of audit firms carries significant implications for the audit process. Studies by Authors such as Ibrahim have demonstrated that IT governance influences audit technology performance, while research by Alsaleem & Husin highlighted its role in reducing audit risks [9], [10]. Al-Dabboos et al. explored its impact on the independence of external auditors. However, existing literature has not adequately addressed the effect of IT governance on the efficiency of external audits, particularly considering that audit clients often prioritize firms that can perform audits quickly and cost-effectively [11]. In return, audit firms attempt to issue opinions on financial statements and prepare audit reports with minimum cost and time, although they are functioning in a highly competitive environment; moreover, to retain the level of assurance given. Consequently, this study aims to investigate the impact of audit clients' adoption of IT governance on the efficiency of external audits, specifically seeking to answer the question, "Does the adoption of IT governance by audit clients affect the efficiency of external auditing?"

## 1. THE BACKGROUND AND CONTEXT OF IT GOVERNANCE FRAMEWORK ADOPTION IN THE MEDITERRANEAN BASIN

In recent years, the Mediterranean basin has witnessed a growing adoption of IT governance frameworks as organizations increasingly recognize the importance of aligning information technology with business objectives [12]. These frameworks such as COBIT, ITIL, and ISO/IEC 27001 – provide structured approaches to managing IT resources, ensuring data integrity, mitigating risks, and enhancing overall operational efficiency. Within this region, organizations are motivated by regulatory pressures, competitive market dynamics, and the need for transparency in financial reporting to adopt robust IT governance practices [13].

## 2. SYRIA'S EXPERIENCE IMPLEMENTING IT GOVERNANCE GRADUAL DIGITAL TRANSFORMATION

Syrian companies, especially those operating in the financial services and banking sectors, have begun to adopt basic digital systems to enhance information and data management. Despite the challenges posed by the economic and political situation, organizations have realized the importance of improving IT systems to improve operational efficiency and transparency [14].

### 2.1 Adoption of Governance Frameworks

Some Syrian companies have started implementing IT governance frameworks such as COBIT and ISO / IEC 27001, although their implementation is still in its early stages compared to developed countries. These efforts are aimed at improving its control, ensuring data integrity, and minimizing the associated risks [15].

### 2.2 Challenges and Limitations

Syrian companies face major challenges such as a lack of financial resources, limited investments in technology, as well as an unstable regulatory environment. These factors influence how quickly and effectively the IT governance is implemented. Also, the lack of specialized experience in this area may lead to partial or incomplete application of the approved frameworks [14, 16].

## II. LITERATURE REVIEW

### 1. CONCEPT, OBJECTIVES, AND IMPORTANT OF IT GOVERNANCE UNDER COBIT 5

Governance can be defined as the strategies and procedures that a firm or an organization adopts as it sets plans for its strategies and the way it operates to achieve the goals that have been realized [17]. In

comparison, IT governance refers to the framework of processes, rules, structures, and reporting related to information technology management to enhance the organization's decision-making processes [18]. A study by Abohatem has defined a difference between governance in general and IT governance in particular, where governance defines who is supposed to be in charge of managing, deciding, and implementing. In contrast, IT governance focuses on which decision to make and how information technology will be utilized. It has been acknowledged as a component of corporate governance and as one of the organizational leadership and management frameworks responsible for IT support processes [19]. The focus is on corporate IT resources as well as on managing IT assets such as corporate governance and how to manage them to add value to the company as well as reduce the risks associated with these assets; the objective of IT governance is to manage IT initiatives to ensure that the company's performance meets the objectives set by management, as well as aligning IT objectives with the overall strategy [20]. The ITGI stated that IT governance should cover the five areas of alignment with enterprise strategy, performance measurement, resource management, risk management, and adding value to the company [21]. The mechanisms for implementing IT governance are also represented by the organizational units or entities necessary for IT quality, the organizational structure of the IT department, duties, responsibilities, processes, effective communication mechanisms, and relationships [22]. The significance of IT governance as an essential aspect of a company's strategic and operational activities is underscored by its substantial role in driving organizations toward achieving their objectives [23]. This is done through the flexibility of information technology, establishing the framework of information systems operations, and improving the management and control of IT activities to gain an improved understanding of risks related to such activities [3]. In the same context, IT governance makes people more familiar with the organization's competitiveness and less dependent on its investment [24]. Further, it helps organizations to define acceptable standards, facilitate, communicate, involve and monitor stakeholders, and prevent abuse in management [25].

It is expected that the adoption of IT governance will enable efficient management of operations and supply chain processes thus enhancing the performance of the company. It also helps to reduce risks, generate IT business value, and manage technology properly as the following companies with good practices for IT governance [9, 26]. As stated in the audit setting, proper IT governance structures should improve the audit processes hence the functionality and productivity regarding the audit technology [27]. It also fosters desirable behavior within audit firms bearing in mind the role of IT is to support in enhancing the quality of audit opinions. In addition, governance mechanisms that are backed by the senior management as well as clear policies are very essential in containing the company activities and also in the exploitation of the Audit Technology [28, 29]. In terms of fraud prevention and enhancing critical internal controls, IT governance contributes to flagging material accounting mistakes and safeguarding common audit risks and audit firms to embrace the trends in technology [30, 31]. IT governance is actively involved in every step of the audit process ensures that client data is audited thoroughly and aids in improving the efficiency of the audit process [32]. The IT governance frameworks that exist include, the COSO, COBIT, ISO 9001, ISO 27002, ISO 38500, and ERM. Among all these frameworks, COBIT is considered the most appropriate framework for governance, enterprise management, and IT which has been established by the IT Governance Institute (ITGI) [33, 34]. COBIT was first introduced in 1996 and it has evolved in the past years to be the IT governance framework [35]. Specifically, the focus is on COBIT 5, which is an operational model built with 34 processes that can provide organizations with comprehensive policies and practices in the sphere of information security and IT control, bringing many benefits, such as compliance with the necessary requirements, the alignment of business and IT objectives, and higher financial outcomes due to effective management of risks [18, 34]. COBIT 5 seeks to assess the appropriate application of IT, minimize risk, and maximize utility for companies and their stakeholders [36]. In this regard, it is important to note that the constituents of COBIT 5 span across all types of organizations for-profit, non-profit, and government. The framework encompasses seven objectives: of information controls and technologies; that is, its IT specialists value the technical strengths of their information system solutions in terms of efficacy, speed, secrecy, and soundness and compliance with relevant norms [37, 38]. In other words, integrating business risks, control objectives, and IT enabling technologies, which is conducted by COBIT 5, is fundamental to improving audit monitoring and efficiency. It is recommended that auditors utilize the control objectives outlined in COBIT

5 to strengthen security control in the IT environment to ease the evaluation of internal IT controls and examination of regulatory compliance [7, 35].

Five major COBIT 5 dimensions include Planning and Organization, Possession and Enforcement, Support and Delivery, Monitoring and Evaluation, and Guidance and Control, these dimensions are deemed crucial for the establishment of a strong foundation for IT governance. Strategic management and administration prepare a foundation for IT governors to follow as it responds to organizational requirements and objectives [17]. Possession and enforcement define IT requirements in the firm and the implementation of these requirements while support and delivery concentrate on the value addition of IT systems and the provision of information flow [39, 40]. Monitoring and evaluation ensure continuous improvement of IT processes, and guidance and control ensure transparency, benefit realization, and risk and resource optimization [24].

## 2. AUDIT EFFICIENCY AND ITS MEASURING METHODS

Audit efficiency was defined as the reduction of the time and cost of audit tasks and the International Standard on Auditing for Supreme Audit Institutions ISS300 clarified that "efficiency means making the most of available resources and explained that the principle of efficiency is concerned with the relationship between the resources used and the outputs reached in terms of quantity, quality and timeliness [41, 42]. Many factors affect the efficiency of the audit, the most important of which are those factors associated with the audited entity, as a study by Xiao showed that "the presence of branches of the client requires greater work and more effort, which negatively affects the efficiency of the audit, while the automation of the company's operations has a positive impact on the efficiency of the audit", and most Authors and writers differed in the methods of measuring the efficiency of the audit and how to determine the inputs and outputs of audits. However, most Authors adopted practical inputs [43].

Furthermore, an audit is the cost of audit effort from the number of hours worked multiplied by the actual hourly wage for each level of human resources involved in the audit process, along with other expenses [44]. Audit outputs are divided into intermediate outputs, expressed through the number of hours worked according to audit activities, and final outputs, expressed through the level of assurance or the number of material misrepresentations discovered. One of the most famous methods of measuring efficiency is the analysis of the data envelope [45, 46]. Audit outputs are one of the most effective statistical measures in measuring efficiency and suit the auditing profession. Furthermore, this method does not require the availability of large samples as it is suitable for small samples [44, 47].

## III. DEVELOPMENT OF HYPOTHESES AND STUDY FRAMEWORK

To achieve the objectives of this study and answer its question, the Authors developed the following main hypothesis:

- **H<sub>0</sub>**: Audit clients' adoption of IT governance has no impact on audit efficiency.  
To test this hypothesis, the following sub-null hypotheses were formulated:
- **H<sub>1</sub>**: No impact of audit clients adopting IT governance on audit efficiency according to the Constant Volume Return Index (CRS)
- **H<sub>2</sub>**: No impact of audit clients adopting IT governance on audit efficiency according to the variable volume return index (VRS).

### 1. THEORETICAL FOUNDATION OF IT GOVERNANCE (ITG)

IT governance (ITG) is the study's independent variable as it refers to the frameworks, processes, and structures that ensure an organization's IT investments support its overall business strategy and objectives. It encompasses decision rights, accountability, risk management, and performance measurement in the IT domain. According to Weill and Ross [48], effective IT governance aligns IT strategies with business goals and enhances organizational performance by ensuring that IT resources are efficiently managed and deployed. This alignment is critical, particularly in audit clients, where IT governance can significantly

influence the quality of financial reporting and audit outcomes. Frameworks such as COBIT, ITIL, and ISO/IEC 27001 have been widely adopted to provide best practices in IT control, risk management, and service delivery. These frameworks not only facilitate operational efficiency but also contribute to the overall transparency and reliability of IT systems used in financial reporting [49].

ITG refers to the framework, structures, and processes that ensure an organization's IT investments support and align with its overall business strategy. It involves decision rights, accountability, risk management, and performance measurement in the IT domain [19].

Below is a detailed explanation of the key constructs in Information Technology Governance (ITG) along with their definitions and potential applications in research [50]:

#### *1.1 OP: Organization and Planning*

This dimension covers the strategic alignment of IT with business objectives, including planning processes, resource allocation, and setting IT goals and policies. It can be accessed via surveys that evaluate how well an organization integrates IT planning with its overall strategic planning and the clarity of its IT roadmap [51].

#### *1.2 AI: Acquire and Implementation*

This dimension focuses on how organizations procure, develop, and implement IT systems and solutions. It covers both the acquisition process (e.g., vendor selection, purchasing) and the implementation phase (e.g., deployment, customization).and measurement Indicators might include the efficiency of the procurement process, time-to-implementation, and the degree of integration with existing system [52].

#### *1.3 DS: Delivery and Support*

DS pertains to the effective delivery of IT services and ongoing support to end users. This includes service management, helpdesk support, and maintenance of IT systems Performance can be measured by service level agreements (SLAs), user satisfaction scores, system uptime, and responsiveness of the support team [53].

#### *1.4 ME: Monitoring and Evaluation*

This dimension involves tracking and assessing IT performance against established objectives. It includes monitoring IT operations, evaluating system performance, and ensuring continuous improvement through feedback and metrics including the frequency and quality of IT audits, key performance indicators (KPIs) for system performance, and the regularity of performance reviews [49].

#### *1.5 GC: Guidance and Control*

General leadership includes control and control mechanisms that ensure the functioning of IT systems within specific policies and regulations. This includes internal controls, risk management practices, compliance monitoring, and guidance provided by IT leadership, and as part of the measurement, this can be assessed by examining the robustness of internal controls, the frequency of compliance checks, and the existence of formal IT Governance Committees [54].

## **2. EXTERNAL AUDIT EFFICIENCY**

The efficiency of external audits is influenced by multiple factors, including the quality of financial information, the strength of internal controls, and risk management practices within the organization. The audit risk theory suggests that better-controlled environments reduce the likelihood of material errors, thereby simplifying the audit process, and the authors argue that the efficiency of an external audit can be measured by (CRS)and (VRS) [55]:

#### *2.1 Constant Returns of Scale (CRS)*

A constant return of scale (CRS) is an economic condition where a company's inputs, like capital and labor, increase at the same rate as their outputs, or the value of their goods. Returns to scale are long-run measurements, which refer to a period within a company when their production factors are variable. In the short term, a company's variables, like capital, are fixed. Working over the long run allows companies to

achieve constant returns to scale because it allows them time to adjust their variables and processes so they can produce their desired output levels at the lowest costs [56, 57].

### 2.2 *Variable returns to scale (VRS)*

Variable returns to scale (VRS) are a type of frontier scale used in data envelopment analysis (DEA). It helps to estimate efficiencies whether an increase or decrease in input or outputs does not result in a proportional change in the outputs or inputs respectively. This method includes both increasing and decreasing returns to scale. Hence, VRS may exhibit increasing, constant, and decreasing returns to scale when working in the Data Envelopment Analysis Program (DEAP) [58, 59].

## 3. *IT GOVERNANCE AND EXTERNAL AUDIT EFFICIENCY*

The relationship between IT governance and external audit efficiency is grounded in several theoretical perspectives. Audit risk theory posits that the quality of internal controls directly influences audit risk and, consequently, audit efficiency [60]. A well-implemented IT governance framework is expected to reduce information risk by ensuring data integrity and effective risk management practices. Moreover, the resource-based view (RBV) suggests that an organization's IT capabilities can be a source of competitive advantage if effectively managed [61].

### 3.1 *Understand Governance and Audit Efficiency*

The adoption of IT governance by audit clients does not inherently enhance audit efficiency. Factors such as incomplete adoption and other complications are considered [62].

### 3.2 *Focus on IT Governance*

IT governance can improve internal controls and security, but not necessarily the efficiency of external audits. External auditors often use consistent procedures that are not affected by IT governance. Also, how recent adoption may delay the benefits of IT governance and how aspects such as an audit firm's expertise, regulatory requirements, and organizational complexity can overshadow the IT governance impacts [63].

### 3.3 *IT Governance Impact Assessment*

IT governance frameworks, which strengthen its Management and controls, may not significantly enhance the efficiency of external audits due to the auditors' dependence on various information sources and other influencing factors [64].

## 4. *AUDIT CLIENT'S ADOPTION OF IT GOVERNANCE AND ITS IMPACT ON AUDIT EFFICIENCY*

The implementation of IT governance frameworks by audit clients—despite the improvement of internal controls, data security, and Management in general—does not lead to measurable improvements in the efficiency of external audits. This may be due to several factors [65].

### 4.1 *Partial or Incomplete Adoption*

Even if audit clients adopt IT governance frameworks (such as Cobit, ITIL, or ISO/IEC 27001), integration may be incomplete or not applied uniformly throughout the organization. This partial dependence may lead to minor changes in the basic processes that directly affect the efficiency of the audit [61].

### 4.2 *Limited Impact on External Audit Procedures*

External auditors often follow standardized procedures and rely on multiple sources of information. While IT governance can strengthen internal control environments, its impact may be weakened if auditors do not take full advantage of improved IT processes during the audit. In other words, the efficiency of an external audit may be more strongly driven by factors such as the auditor's experience, the audit firm's methodologies, or regulatory requirements than the client's IT governance practices [66].

### 4.3 *Compensation of costs and complexity*

The implementation of IT governance may involve significant investments in technology, training, and process restructuring. These additional costs and complications can offset potential efficiency gains. For

example, while the quality of data may improve, auditors may need to carry out additional procedures for checking and verifying new IT systems, thereby neutralizing time savings [67, 68].

#### 4.4 Other Influencing Factors

Audit efficiency is influenced by various factors that go beyond IT governance. Factors such as the complexity of audit involvement, the size of the enterprise, the industry in which the client works, and changes in regulatory environments may have a more pronounced effect on the efficiency of the audit. If these factors prevail, the increased benefit from IT governance may be statistically insignificant [62, 69].

#### 4.5 Measurement Issues

There may be challenges in accurately measuring improvements in audit efficiency that are attributable solely to IT management. Variability in reporting practices, differences in auditor approaches, and the effects of delays in monitoring efficiency gains can obscure the direct impact of IT governance adoption. In summary, while IT governance is designed to enhance overall organizational performance and data integrity, its direct impact on the efficiency of external audits may be limited or balanced by other factors. Therefore, the hypothesis assumes that in the empirical analysis, no significant improvement in audit efficiency will be observed only due to the audit client's adoption of IT governance [70].

### 5. AUDIT E CLIENT'S ADOPTION FOR QUALITY AND RISK REDUCTION

While the direct relationship between IT governance and audit efficiency is conceptually sound, several intermediate factors can influence this relationship [71]. For instance, audit quality and control risk are potential mediators. Enhanced IT governance may lead to higher audit quality, which in turn reduces audit risk and improves efficiency [72]. Additionally, external regulatory frameworks, such as those enforced by the Financial Fair Play (FFP) regulations in sports, might moderate the effect of IT governance on audit efficiency by ensuring that organizations adhere to best practices in IT control and financial reporting [73, 74].

### 6. EVIDENCE FROM IT GOVERNANCE PRACTICES AND REGIONAL PERSPECTIVES

Studies conducted in various regions have provided mixed evidence regarding the impact of IT governance on audit efficiency. In developed markets, the positive effects of IT governance on financial transparency and audit quality have been well-documented [12, 75]. However, in regions with emerging regulatory environments, such as the Mediterranean basin, the benefits may be less pronounced due to partial or inconsistent implementation. In this context, audit clients in countries like Syria face unique challenges that may impede the full realization of IT governance benefits, necessitating further research to explore regional differences and best practices [14, 76]. To achieve the development of the study hypotheses in line with its methodological framework, the authors designed the study model through Figure 1.

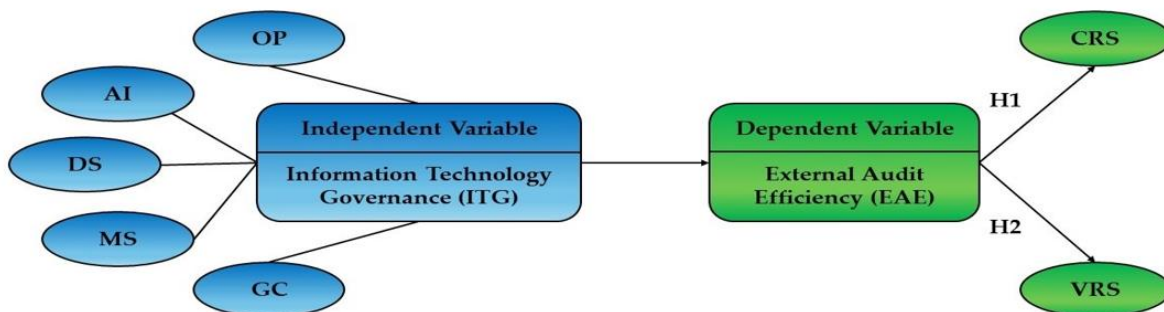


FIGURE 1. Study model.

## IV. METHODS

### 1. DATA COLLECTION

To test the study's hypotheses, the Authors collected data from two audit companies operating in the Syrian Arabic Republic and licensed by the Syrian Markets and Securities Commission. These data included 30 audit contracts implemented during previous periods, where the Authors were briefed on those contracts in terms of the cost of those contracts (inputs to audit operations) represented by all wages and expenses paid to complete the audit task and the number of hours spent in implementing audit procedures for those contracts from the date of the client's engagement until a report is issued Audit (intermediate outputs of the audit process), and estimated number of internal auditors working in companies and external auditors through audit offices were interviewed about the IT governance frameworks and their impact on the efficiency of external audits: evidence from companies when audit client adoption.

**Table1.** Input and outputs of the audit processes of the study sample.

Audits	Input (\$) (Cost of Audits)	Output (Hours of Audit)
X1	1971	351
X2	1806	327
X3	1609	270
X4	2610	355
X5	1820	303
X6	1860	340
X7	2100	374
X8	1700	295
X9	1787	300
X10	1890	350
X11	2590	350
X12	1941	320
X13	1558	260
X14	1950	346
X15	2630	397
X16	2500	420
X17	2440	390
X18	2550	435
X19	2395	332
X20	2390	310
X21	2490	410
X22	2715	445
X23	2230	355
X24	2412	388
X25	2390	380
X26	1990	300
X27	2115	339
X28	2700	455
X29	2335	392
X30	2200	315
MAX	2715.00	455.00
MIN	1558.00	260.00
Mean	2189.1333	353.4667
Std	346.50837	50.34620



Table 1 shows the intermediate inputs and outputs of these contracts to use these data to measure the dependent variable represented in the efficiency of auditing those contracts using data envelope analysis (DEA) according to the efficiency indicators (CRS and VRS) using the (DEAP) program.

**Table2.** Evaluation and Measurement of IT Governance for Audit Clients (X1).

Evaluation%	Not Applicable	Applied	Axis(20% per axle)	Number
Planning and organization (4% per phrase)				
4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	There is a specific, clear, precise long-term strategic plan for the company's information systems.	1
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management develops a plan to manage the expected risks related to information systems.	2
0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The company has a committee specialized in planning and managing information systems	3
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company has the financial capabilities and resources necessary to operate information systems.	4
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management defines standards and procedures to ensure compliance with the security of information systems.	5
16%	Total Axis (OP)			
Ownership and execution (4% per phrase)				
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company has the necessary infrastructure to implement the IT system effectively.	1
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	IT staff are scientifically and practically qualified and highly skilled	2
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management carries out periodic procedures to maintain the IT infrastructure.	3
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company has all the requirements to use IT operations	4
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company has a clear policy to deal with the expected risks of IT implementation.	5
20%	Total Axis (AI)			
Support and delivery (4% per gateway)				
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management determines the level of services from the information systems provided to customers.	1

4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management provides adequate and necessary support to implement the IT system effectively.	2
<hr/>				
<b>Evaluation%</b>	<b>Not Applicable</b>	<b>Applied</b>	<b>Axis (20% per axle)</b>	<b>Number</b>
<hr/>				
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management applies appropriate mechanisms to protect data and information.	3
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management determines each user's need for data from its information system.	4
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management adopts effective practices and procedures to manage and maintain data.	5
20%			Total Axis (DS)	
Monitoring and evaluation (4% per statement)				
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management adopts targeted procedures to ensure the achievement of IT objectives.	1
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management applies the appropriate mechanism to evaluate the performance of the information technology system.	2
0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Customer satisfaction with the company's IT system is evaluated periodically	3
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company has appropriate IT security controls	4
0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The company's management measures the level of information systems available in the company on a regular basis.	5
12%			Total Axis (ME)	
Guidance and control (4% per gateway)				
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management conducts the process of evaluating the outputs of the information technology system.	1
0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The compliance of the results of the implementation of the IT system with external requirements is monitored and evaluated	2
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management evaluates the efficiency of its internal control systems.	3
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The company's management adopts targeted procedures to ensure the correctness of the information transparently communicated to shareholders.	4

0                  The Company's management shall comply with the relevant rules and regulations issued by the regulatory bodies.      5

12%      Total Axis (GC)

Total Axis Rating (ITG) = 80%

**Source:** Prepared by the researcher based on studies [10, 24, 38].

As shown in Table 2, the Authors also obtained the necessary data to measure the independent variable represented in information technology governance by distributing a survey list to the companies that were audited, through which it was shown that the process of measuring the independent variable for each company was carried out separately. Afterward, the Authors used the (SPSS) program to test the study's hypotheses and achieve its objectives by conducting a simple regression test between dependent and independent variables.

## 2. DATA ANALYSIS

**Table 3.** Measurements of study variables.

Audits	Efficiency		IT Governance (some of the principles of the Qubit 5 model)					ITG %
	CRS	VRS	OP	AI	DS	ME	GC	
X1	0.962	0.963	16	20	20	12	12	80
X2	0.978	1	20	20	16	20	20	96
X3	0.906	0.991	20	20	20	16	12	88
X4	0.734	0.739	12	12	4	8	8	44
X5	0.899	0.943	16	16	12	16	8	68
X6	0.987	0.996	20	16	16	20	16	88
X7	0.962	0.988	20	16	20	20	8	84
X8	0.937	0.992	20	20	16	16	16	88
X9	0.907	0.954	16	12	20	16	16	80
X10	1	1	20	20	16	20	20	96
X11	0.730	0.730	12	8	12	12	4	48
X12	0.890	0.917	20	12	16	12	8	68
X13	0.901	1	20	16	20	16	20	92
X14	0.958	0.962	20	16	16	12	12	76

X15	0.815	0.856	16	8	8	12	8	52
X16	0.907	0.972	16	20	16	16	16	84
X17	0.863	0.901	16	16	20	8	4	64
X18	0.921	0.998	16	16	20	20	20	92
X19	0.749	0.761	8	12	16	8	4	48
X20	0.700	0.729	8	8	12	8	4	40
X21	0.889	0.945	16	20	16	12	12	76
X22	0.885	0.966	20	16	12	12	16	76
X23	0.860	0.865	16	12	8	16	8	60
X24	0.869	0.905	20	16	16	12	8	72
X25	0.859	0.888	16	8	16	12	8	60
X26	0.814	0.857	12	12	8	8	12	52
X27	0.866	0.874	12	16	8	20	4	60
X28	0.910	1	20	20	20	20	16	96
X29	0.907	0.948	20	16	12	16	8	72
X30	0.773	0.800	8	8	8	12	8	44
MAX	1.00	1.00	20.00	20.00	20.00	20.00	20.00	96.00
MIN	0.700	0.729	8.00	8.00	4.00	8.00	4.00	40.00
Mean	0.8779	0.9147	16.4000	14.9333	14.6667	14.2667	11.2000	71.4667
Std	0.07866	0.08766	3.97926	4.19304	4.61880	4.16002	5.29411	17.44298

Source: Prepared by the Author's based on the outputs of the program (DEAP & SPSS)

Table 3 shows the Author's measurement of the dependent variable of audit efficiency of the study sample using data envelope analysis by the DEAP program, which resulted in two efficiency indicators: return on fixed volume (CRS) and return on variable volume (VRS) "with input guidance, which helps in measuring audit efficiency". Table 3 also shows the Authors' measurement of the independent variable IT governance for the study sample using survey lists, as shown in Table 2.

As seen in Table 3, the audit contract (X10) has obtained full efficiency (100%) according to the efficiency indicators (CRS, VRS), and the degree of application of IT governance applied to the client (X10) is equivalent to (96%). In comparison, the audit contract (X20) has obtained low efficiency of (70%) according to the Fixed

Volume Efficiency Index (CRS) and (72.9%) according to the Variable Volume Efficiency Index (VRS), and the degree of application of IT governance to the customer (X20) was equivalent to (40%), meaning that technology governance mechanisms are not sufficiently applied, which may be considered an indicator that the customer's failure to adopt IT governance may affect the efficiency of the audit. The study's hypotheses were statistically tested using simple linear regression analysis to confirm this.

### 3. TESTING HYPOTHESES

The Authors used SPSS to test the sub-hypotheses of the study based on Multivariate regression analysis and simple linear regression, to see if there were the IT governance frameworks and their impact on the efficiency of external audits: evidence from companies when audit client adoption.

Multivariate regression analysis and simple linear regression analysis have been used and a statistical method used to test the effect of independent variables on the dependent variable and aim to model how the dependent variable changes as a function of the independent variable[77].

#### 3.1 Model Equation

To test the hypotheses the authors, use the multivariate regression analysis and the simple regression analysis model as follows:

##### 3.1.1 Multivariate regression analysis

Multivariate regression analysis was chosen for this study due to its ability to analyze the relationship between multiple independent variables and a dependent variable while controlling for confounding factors. This method is particularly relevant for assessing the impact of IT governance adoption on external audit efficiency, as it allows for a comprehensive examination of various influencing factors [78]. The Multivariate regression analysis model is expressed as [79]:

$$Y_i(CRS + VRS) = \beta_0 + \beta_1 ITG_{i,t} + \beta_2 OP_{i,t} + \beta_3 AI_{i,t} + \beta_4 DS_{i,t} + \beta_5 ME_{i,t} + \beta_6 GC_{i,t} + \beta_7 Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

- $Y_i(CRS + VRS)$  = Dependent variable (External auditing efficiency).
- $ITG_{i,t}$  = Independent variable (IT governance).
- $OP_{i,t}$   $AI_{i,t}$   $DS_{i,t}$   $ME_{i,t}$   $GC_{i,t}$  = Individual dimensions of IT governance
- $Controls_{i,t}$  = Control variables (firm size, audit complexity)
- $\varepsilon_{i,t}$  = Error term.

Table 4 shows the results of the Multivariate regression analysis results:

**Table 4.** Multivariate regression analysis results.

Variable	Coefficient	Std. Error	t-Statistic	p-Value
<b>Independent Variable: ITG Governance</b>	<b>0.212**</b>	<b>0.099</b>	<b>2.55</b>	<b>0.000</b>
Organization and Planning (OP)	0.156*	0.090	1.26	0.010
Acquire and Implementation (AI)	0.143*	0.080	1.84	0.010
Delivery and Support (DS)	0.078	0.055	2.11	0.014
Monitoring and Evaluation (ME )	0.122*	0.039	2.04	0.022
Guidance and Control (GC)	-0.068	0.066	2.07	0.003
<b>Dependent Variable: Efficiency</b>	<b>0.119*</b>	<b>0.081</b>	<b>2.07</b>	<b>0.001</b>
CRS	0.254***	0.070	2.61	0.000
VRS	0.213**	0.081	2.59	0.012
<b>Control Variable</b>	<b>0.130*</b>	<b>0.017</b>	<b>2.20</b>	<b>0.002</b>
Audit Complexity	0.071	0.023	2.30	0.009
Firm Size	-0.133*	0.069	2.33	0.020
R-squared	0.443			
Adjusted R-squared	0.416			

J-statistic	4.691 (p=0.30)
Standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

As shown in Table 5, the regression results address homogeneity concerns, which may arise from Inverse causality or omitted variables. It provides consistent and unbiased results, as evidenced by the important Henson J. statistic (p>0.05), which confirms the correctness of the tools used [77]. The squared value of 0.443 indicates that the included factors explain 44.03% of the variation, and the Adjusted R-squared is (0.416). Also valuable J-statistic is 4.691 (p=0.30). The IT governance independent variable components refer to the coefficient of (0.212)(P > 0.005). The dependent variable's components indicate the external audit's efficiency by a coefficient of (0.119) (P >0.005). The components of the control variable are shown with a coefficient of (0.130) (P >0.005).

The authors conclude from Table 4, that the variable Organization and planning (OP) with a coefficient of (0.156) (P > 0.005) indicates confirmation of the impact on the efficiency of external audit, which is measured by (CRS) with a coefficient of (0.254) (P > 0.005) and (VRS) with a coefficient of (0.213) (P >0.005). Acquire and Implementation (AI) with a coefficient of (0.156) (P > 0.005) indicates confirmation of the impact on the efficiency of external audit, which is measured by (CRS) with a coefficient of (0.254) (P > 0.005) and (VRS) with a coefficient of (0.213) (P >0.005). Delivery and Support (DS) with a coefficient of (0.078) (P > 0.005) indicates confirmation of the impact on the efficiency of external audit, which is measured by (CRS) with a coefficient of (0.254) (P > 0.005) and (VRS) with a coefficient of (0.213) (P >0.005). Monitoring and Evaluation (ME) with a coefficient of (0.122) (P > 0.005) indicates confirmation of the impact on the efficiency of external audit, which is measured by (CRS) with a coefficient of (0.254) (P > 0.005) and (VRS) with a coefficient of (0.213) (P >0.005). Guidance and Control (GC) with a coefficient of (0.068) (P > 0.005) indicates confirmation of the impact on the efficiency of external audit, which is measured by (CRS) with a coefficient of (0.254) (P > 0.005) and (VRS) with a coefficient of (0.213) (P >0.005). Moreover, the study includes control variables at the (Audit Complexity) with a coefficient of (0.133) (P > 0.005), and the (Firm Size) with a coefficient of (0.071) (P > 0.005), It also contributes to the efficiency of external audit. This is also what studies have indicated [7, 15]. Multivariate regression enables the testing of control variables (Firm Size), (Audit Complexity), providing deeper insights into how IT governance works differently across different organizational contexts [78].

The authors see from the data of Table 4 that the variables(OP),(AI),(DS),(ME),(GC)The broader IT governance framework was formed in the study, and the assessment of its impact using regression showed a significant impact on the efficiency of external audit measured by (CRS), (VRS), and from above the null hypothesis (H01) and (h02) discussed in the hypothesis development section of the study is rejected, becoming the first hypothesis: There is an impact of audit clients adopting IT governance on audit efficiency according to the Fixed Volume Return Index (CRS). As for the second hypothesis: There is an impact of audit clients adopting IT governance on audit efficiency according to the variable volume return index (VRS). This is also confirmed in the table (5) and (6) sequentially.

### 3.1.2 Simple linear regression analysis

The simple linear regression model is expressed as[79]:

$$y = \beta_0 + \beta_{1x} + \varepsilon_{i,t} \quad (2)$$

Where y is the dependent variable, x is the independent variable,  $\beta_0$  is the intercept (the expected value of y when x = 0),  $\beta_1$  is the slope coefficient (the change in y for a one-unit change in x),  $\varepsilon$  is the error term, representing the deviation of the observed values from the predicted.

- **H1:** No impact of audit clients adopting IT governance on audit efficiency according to the Constant Volume Return Index (CRS).

Table 5 shows the results of the simple linear regression analysis test for the following null sub-hypothesis. Table 5 shows the results of the regression model test for the first sub-hypothesis using (SPSS) and notes that the relative level of significance (F) is less than the accuracy level of 5% (Sig = 0.00). It can be concluded that IT

governance significantly impacts audit efficiency according to the fixed volume return index (CRS), as it reached ( $R = 0.896$ ). That is, there is a strong positive impact, and therefore the more audit clients apply and adopt IT governance, the more this leads to an increase in the efficiency of the audit according to the (CRS) index, and the coefficient of determination reached a value of (0.802), which indicates that the independent variable (ITG) contributes to the interpretation of 80.2% of the variation or change in audit efficiency according to the efficiency index (CRS.) while 19.8% of the variance is due to other random factors, and the model levels indicate that the p-value is less than the significance level of 5%, and therefore we conclude that there is a significant impact of IT governance on audit efficiency according to the efficiency index (CRS), and based on the previous table, the following model ( $y = 0.589 + 0.404x + \varepsilon$ ) The analysis shows that changing the degrees of adoption of IT governance to one degree leads to a rise of 0.404 in audit efficiency according to the index (CRS) and 0.589 due to other reasons, and from the above the null hypothesis ( $H_01$ ) is rejected and the following hypothesis is accepted.

**Table 5.** Hypotheses (1) testing - simple linear regression analysis.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.896a	0.802	0.795	0.03560

a. Predictors: (Constant), ITG

**ANOVA a**

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	0.144	1	0.144	113.529	0.000b
	Residual	0.035	28	0.001		
	Total	0.179	29			

a. Dependent Variable: Efficiency CRS

b. Predictors: (Constant), ITG

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.589	0.028		21.154	0.000
	ITG	0.404	0.038	0.896	10.655	0.000

a. Dependent Variable: Efficiency CRS

There is an impact of audit clients adopting IT governance on audit efficiency according to the Fixed Volume Return Index (CRS). Table 6 shows the results of the simple linear regression analysis test for the following null sub-hypothesis:

- **H2:** There is no impact of audit clients' adoption of IT governance on audit efficiency according to the variable volume return index (VRS).

**Table 6.** Hypotheses (2) testing- simple linear regression analysis.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.947a	0.896	0.892	0.02878

a. Predictors: (Constant), ITG

ANOVA a						
Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	0.200	1	0.200	241.068	0.000b
1	Residual	0.023	28	0.001		
	Total	0.223	29			

a. Dependent Variable: Efficiency VRS

b. Predictors: (Constant), ITG

**Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.575	0.023		25.525	0.000
	ITG	0.476	0.031	0.947	15.526	0.000

a. Dependent Variable: Efficiency VRS

Table 6 shows the results of the regression model test for the first sub-hypothesis using (SPSS) and notes that the relative level of significance (F) is less than the accuracy level of 5% (Sig = 0.00) and from it we conclude that there is a significant impact of IT governance on audit efficiency according to the variable volume return index (VRS), as it reached (R = 0.947) That is, there is a strong positive impact, and therefore the more audit clients apply and adopt IT governance, the more this leads to an increase in the efficiency of the audit according to the VRS index, and the coefficient of determination reached a value of (0.896), which indicates that the



independent variable (ITG) contributes to the interpretation of 89.6% of the variation or change in audit efficiency according to the efficiency index (VRS.) while 10.4% of the variance is due to other random factors, and the levels of the model indicate that the probability value of the levels is less than the level of significance of 5% and therefore we conclude that there is a significant impact of IT governance on the efficiency of auditing according to the efficiency index (VRS), and based on the previous table can be concluded the following model ( $y = 0.575 + 0.476x + \varepsilon$ ) The analysis shows that changing the degrees of IT governance adoption to one degree leads to a rise of 0.476 in audit efficiency according to the index (VRS) and 0.575 due to other reasons, and from the above the null hypothesis H2 is rejected, and the following hypothesis is accepted:

There is an impact of audit clients adopting IT governance on audit efficiency according to the variable volume return index (VRS).

## V. DISCUSSIONS

The theoretical side of this study showed the importance and objectives of applying IT governance in general and the benefits and objectives of applying the (COBIT5) framework. The results of this study demonstrated that the adoption of IT governance by companies positively influences the efficiency of external auditing, as indicated by the efficiency metrics of constant returns to scale (CRS) and variable returns to scale (VRS)[39]. Furthermore, related research has shown that IT governance positively impacts the performance of banks significantly [2] Moreover, the study by Syed Ibrahim highlighted the positive effects of IT governance on audit technology performance [9]. In comparison, research by Al-Dabboos demonstrated a favourable impact on auditor independence, while Alsaleem and Husin found that IT governance contributes to reducing audit risk. From the Authors' perspective, the results of this study further emphasize the enhancement and improvement of efficiency indicators, such as constant returns to scale (CRS) and variable returns to scale (VRS) [10, 11]. Based on the results of this study, the positive impact of IT governance on audit efficiency can be attributed to the fact that the more rigorously a client adheres to IT governance mechanisms, the better-equipped auditors are to conduct their work efficiently. This conclusion is consistent with a study Alsaleem & Husin conducted, which stated that ITG reduces audit risk and considers "control risk a component of audit risk"[7, 80]. Similarly, other literature references explained that "the process of evaluating the internal control system and the client's control risk has significant importance and impact on the audit strategy [81]. While ISA 315 clarified that "the control risk assessment process helps auditors design the nature, timing, and extent of audit procedures" [8] Thus, audit clients adopting an effective IT governance system led auditors to assess the risk of control at a low level. Thus, auditors can reduce detailed auditing tests, audit sample size, and the extent of audit procedures.

The results of statistical tests according to the study sample (30 audit contracts) showed that the independent variable (ITG) contributes to the interpretation of (80.2%) of the change in the variable dependent on audit efficiency according to the (CRS) index and (89.6%) of the change in audit efficiency according to the (VRS) index. This strong correlation highlights the importance of IT governance as a pivotal factor in enhancing audit efficiency. IT governance mechanisms together with auditing practices can be integrated and enhanced in order to have a better quality of financial reporting and to reduce costs for audits. These findings indicate that research into the nature of IT governance practices that affect audit efficiency the most could offer useful information to audit firms and their clients. The study's findings have significant implications for audit practice. The positive correlation between IT governance and audit efficiency suggests that robust IT governance frameworks lead to more efficient audits. As clients adopt and adhere to IT governance practices, auditors can conduct their work with greater efficiency. This is likely because well-implemented IT governance systems help in assessing control risks more accurately, reducing the need for extensive auditing tests, and streamlining audit procedures.

Furthermore, through this study, Audit firms and clients are encouraged to prioritize IT governance to enhance audit effectiveness and efficiency. By doing so, companies can potentially reduce audit costs and improve the overall quality of financial reporting. The strong impact of IT governance on audit efficiency underscores the need for audit clients to integrate IT governance practices fully to support efficient and effective auditing. Therefore, this study contributed to the literary aspect by adding a new factor to the factors affecting

the efficiency of the audit and related to the audited entity, as information technology governance has become one of those factors affecting the efficiency of external audit.

The limits of this study were represented by the time limits for conducting the research, as the results of the research were reached based on the data of audit contracts carried out during the years 2023-2022, while the spatial limits of the search were in obtaining audit contract data carried out in the Syrian Arab Republic only by two audit firms committed to applying international auditing standards when providing audit services. The Authors recommend conducting more studies in different environments with larger sample sizes to support the results of this study, The authors explored through the applied aspect of the study the importance of other IT governance frameworks for example, ITIL, ISO/IEC 27001, and their impact on Audit efficiency, The results of the study also emphasized the great importance of specific IT governance mechanisms and their direct impact on Audit efficiency. The Authors recommend that the direction of future studies be to know the impact of the adoption of IT governance by audit clients on the effectiveness of audits due to the importance of the effectiveness of auditing for all parties and the risks and damages resulting from the lack of effectiveness in auditing for users of audited financial statements and audit firms.

## VI. CONCLUSION AND RECOMMENDATIONS

Recommendations Based on the study, based on the impact of the adoption of IT governance on the efficiency of external audits, you can make actionable recommendations to audit firms, companies, and regulatory bodies in Syria. Here are some suggestions and recommendations on the following points:

In the aspect of strengthening IT governance frameworks, companies should implement structured IT governance frameworks such as Cubit, ITIL, or ISO 27001 to ensure unified IT management. In this, we agree with both studies [14, 66], gular IT risk assessments should also be carried out to identify weaknesses that affect the reliability of the audit. In addition to enhancing the auditor's competence in the field of information technology, mandatory IT training is necessary for external auditors to improve their ability to assess their controls and cybersecurity risks in line with companies in the Mediterranean basin countries. The authors also see the need for cooperation between audit firms and IT specialists to enhance the capabilities of digital forensics [67]. In the aspect of the adoption of audit technology, the authors consider that Audit firms should use AI-powered audit tools to improve fraud detection and reduce human error, as well as encourage the use of computer-aided audit techniques (cats) to analyze data faster, according to a study [68]. In the aspect of cybersecurity and data protection, the authors believe that companies should adopt strict cybersecurity policies in line with international standards to minimize the risk of data manipulation. Regular penetration tests and security audits should also be carried out to ensure that IT systems remain secure.

On the regulatory and policy support side, the authors argue that government and financial regulators should develop IT compliance guidelines for companies to follow. Regulators should also require external auditors to report on compliance with IT governance in audit reports, The study also confirmed the necessity of other IT governance frameworks for example, ITIL, ISO/IEC 27001 and their impact on Audit efficiency ., Finally, the authors believe that digital transformation should be encouraged in Syrian companies, and government and private institutions should invest in modern IT infrastructure to facilitate audit efficiency and provide incentives (such as tax benefits) to companies that incorporate Governance Best Practices [65]. In conclusion, this research underscores the significant role of IT governance in improving audit efficiency. The study provides valuable evidence for organizations and audit professionals seeking to optimize their audit processes by focusing on the Constant Returns to Scale (CRS) and Variable Returns to Scale (VRS) indices. The study employed robust statistical methods to examine the relationship between IT governance practices and audit performance, revealing significant findings with substantial implications for both theory and practice. The findings highlight the need for ongoing commitment to IT governance and offer a foundation for future research in this crucial area to explore specific IT governance elements for further advancements in this domain [16, 65].

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### Author Contribution

Author (1) wrote the original draft, methodology, formal analysis, funding acquisition, project administration, software, supervision, validation, and investigation, Funding acquisition, author (2) wrote the original draft, Investigation, Resources, Investigation, Methodology, Funding acquisition, author (3) writing original draft, Data curation, Investigation, Methodology, Funding acquisition, author (4) Resources, Resources, Supervision, Corresponding, And the adjustments of the auditors. All the authors have read and approved the published copy of the manuscript.

### Conflicts of Interest

The authors declare no conflicts of interest

### Data Availability Statement

Data is available from the authors upon request.

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