

# Digitalization of External Audit and Its Impact on Corporate Governance: A Case of the Big Four Firms of Bangladesh

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## Abstract

*Digitalization is increasingly transforming organizational functions, including audit practices, by enhancing efficiency and data-driven insights. This study examines how digitalization affects external audit practices within Bangladesh's Big Four firms and evaluates its influence on corporate governance effectiveness. Unique to this research is its focus on a developing economy, providing insights into how digital tools are shaping audit processes and governance standards in Bangladesh. A quantitative methodology, involving a survey administered over auditors in leading firms, was employed to gather in-depth perspectives. Findings reveal that digitalization enhances audit quality and relevance, broadens audit service offerings, promotes data-centric decision-making, and fosters a culture of innovation, ultimately improving governance mechanisms while curbing managerial discretion. The study recommends that audit firms integrate digital strategies aligned with evolving audit standards and regulatory expectations. However, a primary limitation is the study's focus on large firms, which may limit applicability to smaller audit entities. Practically, this research encourages audit firms to adopt digital tools for better service delivery, while theoretically, it expands understanding of digital governance impacts. Socially and managerially, it calls for skill adaptation among auditors, while policy-wise it emphasizes revising audit standards to accommodate digital progress.*

**Keywords:** big four; corporate governance; digitalization of audit

## 1. Introduction

### 1.1. Background of The Study

Audit is viewed as a governance instrument in the literature on governance to eliminate conceivable conflicts between shareholders and management and to

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ensure the dissemination of trustworthy accounting information (Carcello, Hermanson and Ye, 2011). However, audit quality has been a concern, especially since financial crises of the early 2000s, such as Enron and Tyco (Zhang, Yang and Appelbaum, 2017). Despite a new economic regulation legislation (the Sarbanes-Oxley Act of 2002 in the United States) that tightened auditors' controls, primarily through the PCAOB and audit committees, audit quality remains the primary worry of stakeholders (Beisland, Roy Mersland and Strøm, 2015); (Hope, Kang, Thomas and Keun Yoo, 2008).

Manita et al. (2020) find that, for three fundamental reasons, the audit must develop. First, it is primarily meant for shareholders who see the audit as a service that provides them with acceptable insurance. Secondly, because the audit report is created many months after the fiscal year's conclusion, it is based on historical data. It has no forward-thinking aspects. Rather than only assuring on past activities, audit needs to enclose forward-thinking dimensions. Thirdly, the standardised format of audit reports sometimes reduces its capability to add value to the decision making of external users. So, state of the art development will enhance its value relevance.

Digitalization has had a substantial influence on the labour market (Dengler & Matthes, 2018) and has revolutionized the way businesses operate in many sectors, including audit companies. The rapid adoption of blockchain, Artificial Intelligence and Blockchain technology in business processes is replacing many traditional physical labours (Brynjolfsson & McAfee, 2014). Audit firms have not been any exception to this. To remain competitive and differentiate themselves from competitors, audit firms must adapt their business strategy (Sahut, Hikkeorva and K., 2013) and service offerings by adopting new technologies to offer solutions. As a result, by giving extra data, digitalization should transform the way auditors undertake audit operations.

The constantly changing demands of audit functions to give a deeper and more robust analysis of their clientele are highlighted by digitalization. Nonetheless, auditing is a controlled service, and digitalization should without a miss take these limits into account. Several academics have attempted to comprehend the impacts of new digital technologies (mostly Big Data and Artificial Intelligence) on businesses in the aspect of data analytics (J. Donald Warren, Moffitt and Byrnes, 2015) and external auditing (Al-Htaybat & Von Alberti Al-Htaybat, 2017).

Nonetheless, research into audit companies is still in its early stages (Issa, Sun and Vasarhelyi, 2016) Some researchers have investigated the influence of digital on audit companies' competence (Krahel and Titera, 2015); (Cao, Chychyla and

Stewart, 2015). Other authors have investigated the influence of these technologies on the accuracy of auditor judgements (Brown- Liburd, Issa and Lombardi, 2015). For instance, (Vasarhelyi, Kogan and Tuttle, 2015) discovered that the use of digital and analytics is rising in the internal audit setting whereas external auditors (external audit) have not kept up. According to (Adrian et al., 2018), big data analysis has not yet been widely used, and additional research is needed to discover the benefits of adopting such technology. The effect of the digital transformation of audits on corporate governance has been studied by researchers in developed countries (Manita et al., 2020). In a developing economy like Bangladesh, where digital adoption in many sectors is still in the initial stage, a look into the potential of such transformation by Big Four firms may pave the way for other market participants.

To address that gap, this paper aims to investigate the influence of digitalization inside audit companies strengthening the role of audit as a governance instrument while limiting managers' discretionary authority. This study focuses solely on big data technology and the digitalization of Big Four audit companies' internal procedures in Bangladesh.

Furthermore, other emerging technologies, such as blockchain, may have a different influence on the audit industry. This study has a dual purpose. Based on theory, it can contribute to the existing literature on compliance and audit quality by clarifying how independent audit must develop automation and the expansion of related technologies (big data, data analysis, machine intelligence, and so on), and how this progression will enable the audit to function as a governance mechanism.

To address the impact of digitalization on corporate governance a quantitative analysis with responses obtained through the administration of a survey. Audit professionals have been reached to rate the relationship between the variables. The responses have been quantified with the Likert scale and analysed with Cronbach's Alpha, linear regression and Pearson's correlation. Findings explain that audit quality and the evolution of new audit services due to digitalization improve corporate governance significantly, whereas optimization of the audit process and change in the auditor's profile did not have a significant impact on corporate governance.

The study done in this paper should assist audit professionals in comprehending digital transformation initiatives and the development of audit processes at the managerial level. It may also assist authorities in determining the necessary changes to audit requirements. Furthermore, it should allow educational institutions to adapt their training curricula to the changing demands of audit

companies. Indeed, in this changing world, auditors must supplement their professional expertise and auditing processes by learning new ways of thinking, analysing data, and adopting new IT skills.

The article is structured as follows. First, we present the theoretical framework and literature review to develop our hypotheses. Then we proceed to the methodology, which has been followed by the detailed discussion of the statistical analysis to draw the conclusion.

## **2. Theoretical Framework and Literature Review**

Numerous concepts may be advanced to interpret the need for audit services in the context of corporate governance. The agency theory and the stakeholder theory continue to be the most often employed in the studies in this area to justify the necessity for audit services. External auditing can indeed reduce the likelihood of managers mismanaging earnings and, as a result, improve the quality of financial statements given to stakeholders.

### **2.1. Agency Theory and Audit**

When one party works (as the agent) for another, a loss in value or wealth happens, according to agency theory. In a conventional company, management (the agent) is engaged to operate a business for the satisfaction of the shareholders (the principals). Historically, the presence of an audit, whether internal or external, has been justified by the agency relationship between shareholders and management. Individuals, according to agency theory, tend to make decisions that benefit them. This is based on the non-satiation of desires economic theory. Individuals prefer more to less, according to this hypothesis, and will endeavour to maximize their own utility. Shareholders engage managers in the hopes that the managers will increase the value of the company for the shareholders.

When managers are employed to represent the interests of owners, a basic conflict of interest occurs. The management wants to make judgments that are beneficial to him or her. Any choice made by management that results in a loss of wealth or wealth forfeited by shareholders is an agency cost. Any action taken by shareholders to defend themselves from less-than-ideal actions is likewise an agency cost.

A cost trade-off is laid out to the shareholders: a loss of wealth because of management actions versus the expense of monitoring management's operations. Traditionally, the audit oversees monitoring. The audit function exists to offer feedback on manager behaviour to shareholders via the board of directors.



In theory, an audit is considered a solution to the problem of agency between company management and their shareholders (Beisland, Roy Mersland and Strøm, 2015); (Hope, Kang, Thomas and Keun Yoo, 2008). Proponents of using audit as a corporate governance tool consider it as a necessary bonding mechanism to reduce agency costs. (Jensen and Meckling, 1976; DeAngelo, Deangelo and Stulz, 2004; Becker et al., 1998)

External auditing decreases the danger of misleading information being published to shareholders and enables them to make appropriate decisions based on trustworthy information (Watts & Zimmerman, 1986). A line of authors has tried to identify the corporate governance factors that can reduce agency costs. Klein (2002) suggested that strong audit committees, regular audits, and external audit oversight contribute to improved governance and reduced agency costs. Abbott et al. (2004) show that firms with an active audit committee and independent auditors experience lower levels of earnings management, whereas Cohen, Krishnamoorthy and Wright (2010) indicates that more frequent audits and stronger audit committee oversight are associated with reduced agency costs. These studies commonly indicate that the primary goal of auditing is to improve the reliability of publicly available accounting information. The audit can improve business governance by minimizing knowledge asymmetry between these two parties and the managers' discretionary rights (DeFond & Zhang, 2014); (Beisland, Roy Mersland and Strøm, 2015)

## **2.2. Stakeholder Theory**

Stakeholder theory challenges the notion that a company's only responsibility is to its shareholders (Parmar, 2010) and instead suggests that managers should consider the firm's relationships with various stakeholders (e.g., employees, supply chain partners, and clients) when solving significant challenges or establishing the company's larger goals. Given the intricacies of the firm's connections with its many stakeholders, further compelling principal-agent issues are likely to surface. By considering all stakeholders, the stakeholder theory put out by (Freeman, 1984) broadens the application of agency theory in this situation. There have been four clusters of research relating stakeholder theory with sustainability, organizational performance, strategic management and stakeholder management. In search for the relationship between stakeholder theory and organizational performance, Barnett and Salomon (2006) found that social responsibility and financial performance have a curvilinear relationship, which dictates that investors use social screening while limiting the investment, though this relationship can be exploited for bringing investors' confidence. Gray et al. (2006) argue that the audit function must evolve to meet the needs of a

broader group of stakeholders, particularly in the context of corporate social responsibility (CSR) and sustainability reporting. In addition to that, the adoption of Integrated Reporting (IR) standards, which emphasize the reporting of non-financial information related to ESG factors, reflects a growing recognition of the need for auditors to address the interests of stakeholders beyond shareholders (Eccles & Krzus, 2018).

All stakeholders involved use accounting information to make informed decisions. In this case, the auditor's responsibility goes beyond ensuring shareholders the dependability and fairness of the financial data that management presents to all stakeholders. As a result, the auditor now represents all stakeholders, who are compensated by the audited organization rather than the shareholders, in addition to the management. The goal of auditing must change from being to satisfy shareholders' demands to being to satisfy the expectations of other stakeholders.

## **2.3. Empirical Review**

### **2.3.1. Digitalization of Audit Firms: A New Audit Function on The Horizon**

Monitoring, information, and insurance have traditionally been the three purposes of auditing as a governance instrument. (1) The monitoring job comprises evaluating the accuracy of accounting data produced by managers (agents) and limiting their freedom to reduce costs for the agency. (2) The auditor's information function comprises examining the fairness and correctness of accounting information that forms the basis for all corporate decision-making. (3) Finally, rather than solving the issue of asymmetric knowledge between shareholders and management, insurance's role is to deal with risks that could be transferred by managers to other companies to hide the company's financial position. In this situation, the auditor must make sure that these risks don't exist (Wallace, 2004).

External auditors assess a company's organization for regulatory compliance. When an auditor attests to a company's declarations, most regulators believe them. Doing the right things in the right way is the cornerstone of excellent corporate governance. Furthermore, sound corporate governance necessitates effective internal control systems, processes, and policies. The audit profession, traditionally based on manual, time-consuming procedures, is undergoing a transformation as it embraces automation, data analytics, artificial intelligence (AI), and blockchain technology. These advancements are reshaping the ways audits are conducted, offering enhanced accuracy, efficiency, and the potential for deeper insights into financial data, which in turn, enhances corporate governance.

Proponents of the use of state-of-the-art technology in the field of audit have focused on the necessary benefits availed. According to Alles et al. (2008), the use of data analytics allows auditors to shift from sampling-based testing to a more complete population-based approach, improving audit accuracy and detection of anomalies. More recent studies by Kocakulah and Petrovits (2017) and Hodge et al. (2020) argue that advanced analytics, such as predictive analytics and machine learning, enhance auditors' ability to identify high-risk areas, predict potential fraud, and improve decision-making. AI-driven tools such as natural language processing (NLP) allow auditors to analyse contracts, emails, and other textual data for inconsistencies, discrepancies, or signs of fraud (Sussman & Riley, 2019). Machine learning algorithms also support the continuous improvement of audit processes by learning from previous audit data and improving over time (Brazel et al., 2019). Pizzini et al. (2021) suggest that blockchain can enhance the reliability of financial transactions by providing an auditable, transparent, and tamper-proof record.

Several authors assert that a new audit role is emerging in terms of assurance. (Wallace, 2004); (Jeacle, 2017); (Paul, Clinton and Sivabalan, 2014). These researchers assert that the audit may be expanded to include other assurance areas, such as performance evaluations, information system dependability, e-commerce, cyberspace security, environmental and social obligations, etc., where shareholders and other stakeholders need to feel secure. Other academics, however, contend that the expansion of auditing into other industries depends on the resolve of audit firms to obtain audits in these fresh fields. This will depend on the profession's ability to adapt audit methods and programs and its ability to adopt new technologies to adapt its auditing processes (Paul, Clinton and Sivabalan, 2014).

### **2.3.2. Optimization of Audit Process and Corporate Governance**

Audit process optimization refers to the improvement of audit efficiency, effectiveness, and overall quality. It encompasses a range of activities, including the use of advanced technologies (e.g., data analytics, artificial intelligence), better audit planning, risk-based approaches, and enhanced auditor independence. Optimizing the audit process aims to reduce the risk of material misstatements and enhance the reliability of financial reporting.

Studies have shown that the optimization of the audit process can significantly improve audit quality by providing auditors with more accurate and comprehensive data, enabling them to make better-informed judgments (Alles et al., 2010). Moreover, the integration of new tools and techniques, such as continuous auditing and automated analytics, allows auditors to identify risks and

anomalies more effectively, thus increasing the quality of financial oversight and enhancing the role of auditors in corporate governance (Brown-Liburd & Vasarhelyi, 2015). According to (Manita et al., 2020), audit companies are aware that they need to change their auditing methodology and offer services that demonstrate their knowledge of digital technologies. The digitization of audit procedures is critical for saving time on low-value-added jobs and analysing all data rather than using the sampling approach. In addition, digitization lowers audit expenses dramatically.

On the other hand, a few research have highlighted the risks or challenges associated with over-reliance on technology. Puthukulam et al. (2021) believe that it is important to strike a balance between technological advancements and the exercise of professional skepticism. Digital tools in audit can attract malicious actors who target the systems used for processing sensitive financial data (Alalwan, 2020). Also, ensuring compliance with regulations becomes increasingly complex as the audit process becomes more digital (Harrison, 2021)

Despite the challenges, the time saved will allow auditors to focus on operations with a high added value, such as predictive modelling, judgment review, or estimations made by the management of the company while closing the books. They may also devote more attention to faults, discrepancies, and risk areas, reducing biases or conflicts of interest and resulting in a more efficient audit, which strengthens corporate governance (Geiger & Rama, 2003). These arguments in favour of the optimization of audit process through digitalization and its potential to enhance corporate governance, but the lack of relevant studies in Bangladesh, has led us to develop our first hypothesis-

**Hypothesis 1:** There is a significant and positive relationship between the optimization of the audit process and corporate governance.

### **2.3.3. Evolution of Audit Services and Corporate Governance**

The development of auditing services has significantly shaped the landscape of corporate governance. As business environments become more complex, organizations are increasingly adopting new audit methodologies to enhance transparency, accountability, and performance. Data mining is a key technology for the future development of financial services, helping to streamline related processes. It allows for the effective extraction of valuable information in advance. In essence, data mining involves analysing vast amounts of data in large databases to uncover hidden, potentially useful insights from seemingly random information.

Analyzing Arab studies, Mohaisen, Al-Abedi and Jothr (2023) found that data mining methods are valuable for uncovering insights, saving time and effort, predicting company performance, assessing risks, and identifying potential issues. This ultimately aids in problem-solving and supports informed decision-making. However, Sirikulvadhana (2002) has not found any proof that the data mining approach highlights important issues or offers a notable improvement over the standard audit tools. He thinks that additional research with a more comprehensive data set or in a different audit region would produce a different outcome. These conflicting findings motivated us to test how the evolution of audit services has influenced the governance of an organization.

In addition, Kogan, Sucher, and Vasarhelyi (2019) state that data analytics has transformed auditing by enabling auditors to test entire populations of transactions and providing them with deeper insights into financial statements. This shift from sample-based to full-population analysis not only enhances the reliability of audits but also improves the detection of fraud and material misstatements. Gepp and Kumar (2020) support this argument by proving that the application of forensic data analytics can greatly enhance the detection of fraud in audits, particularly in high-risk environments. The gap identified in the literature regarding the impact of the evolution of audit services with state-of-the-art technology and how it can facilitate corporate governance led us to develop our second hypothesis.

**Hypothesis 2:** There is a significant and positive relationship between the evolution of new audit services and corporate governance.

#### **2.3.4. The Enhancement of Audit Quality and Corporate Governance**

Financial crises in the early 2000s (Dibra, 2016) attested to manipulations by numerous managements and demonstrated the limitations of this governance structure. Audit quality must thus be improved in order to fulfil its potential as an instrument for governance (Colbert & John S. Jahera, 1988). The possibility that an auditor will find and notify the parties involved of any irregularities in financial accounts is what DeAngelo (1981) defines as audit quality. Higher audit quality improves the calibre of financial data and promotes more investor decision-making and management control. Several prior research have shown that there is a rising need for quality audits to eliminate informational asymmetries and manipulation of earnings. (Jere R. Francis, Edward L. Maydew and Sparks, 1999), for example, revealed that earning management is inversely associated with audit quality. Furthermore, additional studies show that greater audit quality and improved governance are required for investors, particularly foreign ones, to invest in organizations (Ashbaugh & Warfield, 2003); (Christian

Leuz, 2009). Other research has found that audit quality, when utilised as a moderating variable, has an indirect and beneficial influence on other governance systems.

In order to benefit their clients, audit firms are now digitizing, creating internal processes, and investigating new digital technologies and big data. This digitalization may improve audit quality and better satisfy stakeholders, including shareholders, by making the audit more pertinent.

Several research have clustered around how different types of technology, e.g., Big data, Blockchain technology and Artificial Intelligence have transformed the way audit was traditionally performed. Big Data is an accumulation of facts that is constantly and rapidly growing in bulk. Due to its size and complexity, no traditional data management system can store or analyse this data adequately. Yoon, Hoogduin and Zhang (2015) claim that auditors may be able to utilize big data to reduce audit costs and increase audit quality since big data may be used to make comprehensive audits – as opposed to sample audits – more cost-effective. Tiberius (2019) has even considered blockchain technology as a substitute for audit. He stated that blockchain technology has the potential to replace any transaction system currently employed by a central middleman, such as a bank or a land register, which may have an impact on audits. The need for audits may be lessened if such intermediaries confirm the accuracy of financial reporting

However, prior research has indicated a connection between corporate governance and audit quality, and the use of sophisticated tools significantly improves audit quality. Connection is necessary for this three-way research, which led to the development of our third hypothesis.

**Hypothesis 3:** There is a significant and positive relationship between the improvement of audit quality and corporate governance.

### **2.3.5. Auditors' Profile and Innovation Culture**

Fourth, to better meet the needs of audit firms and help them with their digital transformation, a new profile of auditors is emerging. Auditors will indeed need to expand their professional skills and acquire specialized knowledge, especially in data analysis and the use of new control tools. Even while they do not have to be program development specialists, auditors nevertheless need to be tech-savvy or innovative, especially in analytics and visualization, and comfortable with new, creative technologies.

Several researchers have studied the effect of an auditor's experiences and expertise on corporate governance while a few other researchers have opted for testing the relationship between an auditor's reputation and corporate



governance. Knechel and Vanstraelen (2007) suggest that the more experienced the auditor, the better the quality of audits performed, while Gul et al. (2009) find that auditors with experience in particular industries are more adept at understanding the risks and financial intricacies associated with that industry. They (Gul et al., 2009) also insert that specialized knowledge can lead to more effective governance because auditors are more likely to detect and address problems specific to the industry that may otherwise go unnoticed by generalist auditors. On the other hand, a few researchers (Craswell et al., 2002; Brennan et al., 2009) examined the fact that the reputation of the audit firms works as an external check on corporate management, assuring investors and regulators that the company's financial reporting is accurate and transparent, as they rarely offer 'low-ball pricing'. Big Four firms enjoy advantages in the role of experience, expertise and reputation in improving governance.

In recent years, a few researchers have stressed on integration of digital skills to improve auditor's effectiveness. According to Krahel & Titera (2015), audit standards describing auditor training and competence must be revised to account for the Use of technology for a comprehensive audit that requires some understanding of the nuances of audit data analytics. With the deployment of digital tools, audit companies will have to recruit new personnel with new skills, and certain specialized activities may become outdated. As a result, implementing programs dedicated to the digitization of audit operations would be one of the management concerns for educational institutions.

Finally, the digitization process will enable audit firms to embrace a culture of innovation. To meet the evolving demands of their clients, these companies must constantly innovate and improve their auditing processes and instruments. This result is in line with a study by Rao and Weintraub (2013), which shows that when a creative culture is present, employees are more inclined to adapt and take initiative. The evaluation of partners' audits and career progress will also be heavily influenced by innovation. If this innovation culture is not there, there is a possibility that other economic actors will appear to compete with audit businesses by offering their services.

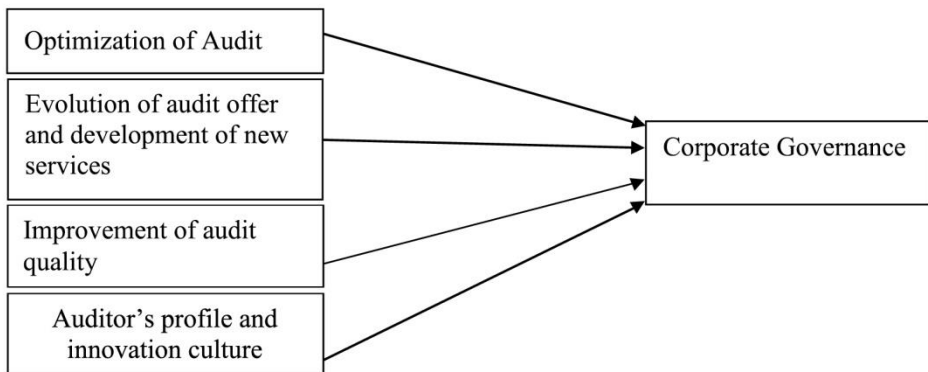
According to Richins, Stapleton, Stratopoulos, and Wong (2017), in this case, market competition may sway companies like Google or FinTech start-ups to choose to offer audit services. To counter this challenge, big audit firms are digitizing their operations, mostly to become more competitive, differentiate themselves, and adjust to a changing market. Our fourth hypothesis was inspired by the obvious necessity to spend technology and human resources in this

strategic direction, as well as the requirement to conduct research to support this commitment.

**Hypothesis 4:** There is a significant and positive relationship between auditor's profile and corporate governance.

### 3. Research Methodology

#### 3.1. Conceptual Framework



*Figure 1: Effects of Digitalization on External Audit (Source: Self-generated)*

#### 3.2. Research Design

The Big Four audit firms in Bangladesh participated in quantitative research to see how they perceive the impact of digitalizing external audits on corporate governance. Big Four firms were chosen given the limitation of Bangladesh. Such digital resources are not present among local firms. Because of compliance issues Big Four firms export firms' laptops to those countries where they are operating so that it can facilitate the firm's compliance practice. Local affiliated firms are given access to portals and websites to global level where one can educate himself by studying through their portals and also train themselves to utilize such digital resources which is not present among local firms. Local firms practice is still a lot manual.

The respondents for this study primarily comprised professionals from different levels of relevant audit firms. They have been reached in-person and through peers working in Big Four audit firms. The respondents were well-suited for this study, given their professional experience, with most having practiced for over two to three years, satisfying the required minimum of three years of attachment to a single firm for their Chartered Certification.

Data was collected through self-administered questionnaires, developed with insights from previous literature. Questions were constructed in a quantitative format, allowing respondents to select their preferred answer, thus minimizing the likelihood of unanswered questions. Initially, the questionnaire was circulated via email; however, due to a low response rate, in-person follow-ups were conducted to ensure higher participation.

### **3.3. Questionnaire Design**

The study's questionnaire was thoughtfully created to support the main research questions, goals, and hypotheses on how digitization affects corporate governance and external audit procedures. Statements on a five-point Likert scale (from "Strongly Agree" to "Strongly Disagree") are incorporated into the design in order to precisely reflect auditors' opinions. According to the hypotheses, the statements address a range of aspects of digitalization in auditing and seek to offer quantitative information that may be examined to verify these connections.

The questions in the survey were crafted to examine each hypothesis, thus providing data to assess the impact of digitalization on audit optimization, quality, new services, and auditor profiles. Each group of questions corresponds to specific hypotheses and is intended to generate insights into the following key areas:

#### **3.3.1. Optimization of Audit Processes (H1):**

Questions 1–4 focus on the role of digital tools in optimizing audit efficiency and relevance. By removing repetitive tasks, enabling auditors to focus on high-value activities, and using data mining to visualize workflows, these queries aim to measure the perceived efficiency gains and the resulting enhancement in corporate governance.

#### **3.3.2. Evolution of New Audit Services (H2):**

Questions 5–7 address how digitalization fosters new audit services that allow auditors to interpret and analyse client data more effectively. These questions test the hypothesis that advancements in data analytics and cognitive technologies will enhance the scope and quality of audit services, contributing positively to corporate governance.

#### **3.3.3. Improvement of Audit Quality (H3):**

Questions 8–9 explore how digital tools, such as cloud technologies, real-time collaboration, and comprehensive data analysis, impact audit quality. These questions directly assess whether digitalization improves audit procedures and

ultimately strengthens corporate governance mechanisms by increasing the accuracy and comprehensiveness of audits.

#### **3.3.4. Auditor's Profile (H4):**

Questions 10–12 focus on the evolving requirements for auditor skills and culture within audit firms. By gauging perceptions around digital competencies, innovation, and the adoption of new technology by auditors, these questions address how the profile and capabilities of auditors adapt to digitalization and how these changes impact corporate governance.

#### **3.3.5. Impact on Corporate Governance:**

Question 13 directly examines auditors' perceptions of how technological changes in auditing may enhance corporate governance, thus synthesizing the overall impact of digitalization across all measured dimensions.

#### **3.3.6. Validity and Reliability**

The questionnaire was designed with input from prior literature and refined through pilot testing with audit professionals to ensure content validity. Each item in the questionnaire corresponds to specific elements of the hypotheses and research questions, ensuring that the instrument captures all relevant dimensions of digitalization's impact on external audit and corporate governance.

#### **3.3.7. Measurement Scale**

A five-point Likert scale was selected as it is widely used in similar studies and provides an effective range of responses to measure perceptions. The scale offers respondents the flexibility to express degrees of agreement or disagreement with each statement, allowing for nuanced responses that can be quantitatively analysed.

### **3.4. Data Collection and Analysis**

Version 25 of the Statistical Package for the Social Sciences (SPSS) was used to analyse the data. A sample size of 200 respondents from the four major audit firms was initially targeted, although the final number of responses collected was 160. The data collected through the questionnaire have been analysed with statistical analysis, with techniques such as linear regression and Pearson's correlation used to determine the strength and direction of the relationships between digitalization dimensions and corporate governance. Reliability testing (e.g., Cronbach's Alpha), following the approach of Gliem and Gliem (2003) has been conducted to ensure that the questionnaire items consistently measure the intended constructs.

3.5. Model Development

The regression model, as demonstrated below, has been developed and was used to assess the relationship between the selected variables and employee retention.

$$CG = \beta 0 + \beta 1OAP + \beta 2ENS + \beta 3AQ + \beta 2ENS + \beta 3AQ \tag{1}$$

Where, CG: Corporate Governance, OAP: Optimization of Audit Process, ENS: Evolution of New Audit Services, AQ: Audit Quality, AP: Auditor’s Profile & Innovation

4. Research Findings and Analysis

4.1. Reliability Analysis

Internal consistency is the degree to which all the items on a scale measure the different features of the same property. Reliability is the trend toward consistency shown in repeated observations of the same occurrence. The degree to which data gathering equipment and processes yield consistent findings while the unit being measured does not vary is referred to as reliability. Dependability is the extent to which methods for collecting data or conducting analyses yield consistent outcomes. Cronbach's alpha helps determine dependability by evaluating the internal consistency of a set of elements that make up a scale. It is primarily employed when there are multiple-item concept measures in the study.

In their research, (Gliem & Gliem, 2003) concluded that when employing Likert-type scales, it is essential to compute and publish Cronbach's Alpha coefficient of internal consistency reliability for any dimension that a study employs. The data must then be analysed using these summated scales or subscales rather than individual items. Otherwise, the items' dependability is at best likely poor and at worst uncertain; hence, Cronbach's Alpha does not offer accurate estimations for single items.

Table 2: Reliability Statistics for Dependent & Independent Variables

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|------------------|----------------------------------------------|------------|
| .816             | .759                                         | 5          |

A value between 00 and 1.0 is frequently used to represent Cronbach's Alpha. Whereas a number of 1.0 signifies complete consistency in measuring, a coefficient of.00 suggests that there is no measurement dependability. The acceptable range, depending on the type of research, is 0.70 to 0.90 or above. For exploratory research, a Cronbach's Alpha of 0.70 is adequate; for fundamental research and applied scenarios, it is 0.80 and 0.90, respectively.

According to **Table 2**, the 5 items that have been analysed have a Cronbach's Alpha of 0.816 which is within the acceptable range. This indicates that the data is strongly reliable and consistently measures what it aims to.

## 4.2. Correlation Analysis

A correlation is defined as an association that cannot be explained by chance alone between events or objects, or between mathematical or statistical variables, that tend to change, be connected, or occur together. The most often reported correlation coefficient, Pearson's  $r$ , is obtained by a parametric test that needs continuous data that is normally distributed. When calculating correlation coefficients for non-normal distributions (outliers or data with extreme values), the ranks of the data should be used instead of the actual values.

The letter  $r$  stands for the relationship (or correlation) between the two variables, and a number between 1 and +1 indicates how strong it is. A correlation of one indicates a complete or perfect link, whereas a correlation of 0 indicates no association. The sign of the  $r$  indicates the correlation's direction. If  $r$  is negative, then the variables are inversely related. Correlation strength increases from 0 to 1 and from 0 to +1.

Table 3: Pearson Correlation Matrix

|            |                     | C<br>G | OA<br>P | EN<br>S | A<br>Q | AP_IN<br>N |
|------------|---------------------|--------|---------|---------|--------|------------|
| C<br>G     | Pearson Correlation | 1      | .676**  | .718**  | .750** | -.137      |
|            | Sig. (2-tailed)     |        | .000    | .000    | .000   | .085       |
|            | N                   | 160    | 160     | 160     | 160    | 160        |
| OAP        | Pearson Correlation | .676** | 1       | .755**  | .689** | -.072      |
|            | Sig. (2-tailed)     | .000   |         | .000    | .000   | .366       |
|            | N                   | 160    | 160     | 160     | 160    | 160        |
| ENS        | Pearson Correlation | .718** | .755**  | 1       | .751** | -.182*     |
|            | Sig. (2-tailed)     | .000   | .000    |         | .000   | .021       |
|            | N                   | 160    | 160     | 160     | 160    | 160        |
| A<br>Q     | Pearson Correlation | .750** | .689**  | .751**  | 1      | -.084      |
|            | Sig. (2-tailed)     | .000   | .000    | .000    |        | .290       |
|            | N                   | 160    | 160     | 160     | 160    | 160        |
| AP_IN<br>N | Pearson Correlation | -.137  | -.072   | -.182*  | -.084  | 1          |
|            | Sig. (2-tailed)     | .085   | .366    | .021    | .290   |            |
|            | N                   | 160    | 160     | 160     | 160    | 160        |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).



A test was run to check if any multi-collinearity issue exists within the variables as the correlations among the variables are seen to be very strong. Evident from the table (Appendix- Table 1), there is no multi-collinearity problem among the variables, with a mean VIF value of 2.63, which is much lower than 10. (Gujarati & Porter, 2003) Pearson’s correlation was run on the data obtained at a 1% significance level. From the Table 3 correlation matrix, it was found that the correlation of corporate governance and optimization of the audit process was strongly positive and statistically significant. ( $r=.676$ ,  $p < 0.001$ ). Corporate governance has a strong positive and statistically significant correlation with the evolution of audit offers and development of new services and the improvement of audit quality, with  $r$  values of 0.718 and 0.750,  $p < 0.01$  respectively. However, auditors’ profiles and innovation culture have a weak negative and statistically insignificant correlation with corporate governance.

4.3. Regression Analysis

The statistical method used to model the connection between corporate governance and the digitization of external audits is regression analysis. R-Squared, often referred to as the coefficient of determination, is a statistical measure used in regression models that establishes the extent to which the independent variable accounts for the variance in the dependent variable. To put it another way, r-squared shows the goodness of fit, or how well the data matches the regression model.

Table 4: Model summary

| Model                                           | R     | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics |          |     |     |               |
|-------------------------------------------------|-------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|
|                                                 |       |          |                   |                            | R Square Change   | F Change | df1 | df2 | Sig. F Change |
| 1                                               | .796a | .633     | .624              | 1.025                      | .633              | 66.859   | 4   | 155 | .000          |
| a. Predictors: (Constant), AP_INN, OAP, AQ, ENS |       |          |                   |                            |                   |          |     |     |               |

The coefficient of determination (R-squared) in Table 4 shows that 63.3% of the variation in the dependent variable is explained by the variation in the independent variables. In other words, 63.3% of the variance in corporate governance is explained by the 4 independent variables. The data is well fitted with the model.

Table 5: ANOVA<sup>a</sup>

| Model                                           |            | Sum of Squares | Df  | Mean Square | F      | Sig.  |
|-------------------------------------------------|------------|----------------|-----|-------------|--------|-------|
| 1                                               | Regression | 281.084        | 4   | 70.271      | 66.859 | .000b |
|                                                 | Residual   | 162.909        | 155 | 1.051       |        |       |
|                                                 | Total      | 443.994        | 159 |             |        |       |
| a. Dependent Variable: CORPOGOV                 |            |                |     |             |        |       |
| b. Predictors: (Constant), AP_INN, OAP, AQ, ENS |            |                |     |             |        |       |

Table 5 shows the results of ANOVA conducted on the obtained data. According to the ANOVA table, the overall model utilized in the study is significant at  $p < 0.001$ . The next part describes the regression results, as well as the summary of the accepted and rejected hypotheses.

Table 6: Coefficients<sup>a</sup>

| Model                           |            | Unstandardized Coefficients |            | Standardized Coefficients | T     | Sig. | 95.0% Confidence Interval for B |             | Collinearity Statistics |       |
|---------------------------------|------------|-----------------------------|------------|---------------------------|-------|------|---------------------------------|-------------|-------------------------|-------|
|                                 |            | B                           | Std. Error |                           |       |      | Lower Bound                     | Upper Bound | Tolerance               | VIF   |
| 1                               | (Constant) | 1.921                       | 1.199      |                           | 1.602 | .111 | -.448                           | 4.290       |                         |       |
|                                 | OAP        | .147                        | .058       | .196                      | 2.521 | .013 | .032                            | .263        | .394                    | 2.541 |
|                                 | ENS        | .164                        | .061       | .235                      | 2.715 | .007 | .045                            | .284        | .315                    | 3.170 |
|                                 | AQ         | .350                        | .062       | .435                      | 5.656 | .000 | .228                            | .472        | .400                    | 2.499 |
|                                 | AP_INN     | -.066                       | .076       | -.043                     | -.864 | .389 | -.216                           | .085        | .954                    | 1.049 |
| a. Dependent Variable: CORPOGOV |            |                             |            |                           |       |      |                                 |             |                         |       |

The first hypothesis examines whether corporate governance and audit process optimization are significantly and favourably correlated. The table showed that  $p > 0.05$  and the beta coefficient had a positive value of 0.147. This shows that the H1 was rejected even if there is a positive association since the significance threshold is higher than 0.05. There is no statistically significant correlation between corporate governance and audit process optimization.

The second hypothesis examines whether corporate governance and the development of audit offers are significantly and favourably correlated. The beta

coefficient was  $p < 0.05$  with a positive value of 0.164. H2 has been approved as the result is statistically significant and the beta value is positive. Corporate governance and the development of audit quality are positively and statistically significantly correlated.

The third hypothesis examines whether corporate governance and the enhancement of audit quality are significantly and favourably correlated. The beta coefficient was  $p < 0.05$  and had a positive value of 0.350. H3 has been approved since the result is statistically significant and the beta value is positive. Corporate governance and audit quality improvement are positively and statistically significantly correlated With Corporate governance.

The fourth hypothesis examines if corporate governance and audit innovation culture are significantly and favourably correlated. The table showed that  $p > 0.05$  and the beta coefficient had a negative value of -.066. This shows that there is a negative link, however, the H4 was rejected since the significance threshold is higher than 0.05. There is no statistically significant correlation between corporate governance and innovation culture or the profile of auditors.

## **5. Discussion and Summary of Findings**

This research looked at how the audit profession has been affected by digitization and how the audit function as a governance tool may be improved.

However, the studies showed certain facts that may be deemed important and beneficial in providing insight into the influence of digitization of audits on corporate governance. Some of the results were consistent with prior literature, however, the others were not analogous in the perspective of the Big Four associated audit firms of Bangladesh.

This study had four hypotheses, and each of them assumed a relationship between aspects of digitalization on external audit and corporate governance.

The first hypothesis “There is a significant and positive relationship between the optimization of the audit process and corporate governance” was determined based on prior studies. According to this study, the hypothesis was inconsistent in the light of the Big Four audit firms of Bangladesh. This may have been the case because time-saving in the audit process and focusing on high value adding work may not have had an impact on the discretionary power of the managers of the clientele.

The evolution of audit offers, and the development of new audit services has had a significant and positive impact on the role of audit as a corporate governance

tool. This is consistent with the prior literature. The evolution of audit offers might increase the relevance of audit to businesses.

The third hypothesis, “There is a significant and positive relationship between the improvement of audit quality and corporate governance” has also been accepted. Smarter analysis in real time and the use of new technology, along with the supervision of the advancements by the regulators will improve the role of audit as a governance tool.

The last hypothesis, “There is a significant and positive relationship between auditors’ profile and innovation culture in audit firms and corporate governance” has been rejected. This result is inconsistent with prior literature, and this may have been the case because if the majority of the clientele provides manual data, audit automation may not bring much benefit.

Table 7: Hypotheses Checklist

| Hypothesis                                                                                                                         | Beta Coefficient | P Value | Verdict         |
|------------------------------------------------------------------------------------------------------------------------------------|------------------|---------|-----------------|
| <b>H1:</b> There is a significant and positive relationship between the optimization of audit process and corporate governance.    | 0.147            | .013    | <b>Rejected</b> |
| <b>H0:</b> There is no significant and positive relationship between the optimization of audit process and corporate governance.   |                  |         | <b>Accepted</b> |
| <b>H2:</b> There is a significant and positive relationship between the evolution of new audit services and corporate governance.  | .164             | .007    | <b>Accepted</b> |
| <b>H0:</b> There is no significant and positive relationship between the evolution of new audit services and corporate governance. |                  |         | <b>Rejected</b> |

|                                                                                                                             |       |      |                 |
|-----------------------------------------------------------------------------------------------------------------------------|-------|------|-----------------|
| <b>H3:</b> There is a significant and positive relationship between improvement of audit quality and corporate governance.  | 0.350 | .000 | <b>Accepted</b> |
| <b>H0:</b> There is no significant and positive relationship between improvement of audit quality and corporate governance. |       |      | <b>Rejected</b> |
| <b>H4:</b> There is a significant and positive relationship between auditor's profile and corporate governance.             | -.066 | .389 | <b>Rejected</b> |
| <b>H0:</b> There is no significant and positive relationship between auditor's profile and corporate governance.            |       |      | <b>Accepted</b> |

## 6. Conclusion and Recommendation

The main objective of this research was to understand if digitalization could result in better corporate governance because digitalization will limit human intervention and if any change has been implied manually then it will leave a trail behind just like an audit trail. As a result, it would improve transparency and scrutiny which will help the supervisor to easily fish out possible inconsistencies. Furthermore, if such tools are used in internal audits, then when external auditors come to conduct their audit, it will be easier for them to analyse everything very efficiently and the practice of drowning external auditors on tons of paper won't be continuable hence, it resolves the issue of time constraint for the external auditors.

Companies that are considering opting for Big Four firms, companies that are already taking service from Big Four firms, local audit firms, investors of companies, if public limited then general people who invest in the stock market and Big Four firms themselves are beneficiaries of this research.

### 6.1. Social Implementation

Digitalization in Big Four firms in Bangladesh enhances organizational culture, communication, and teamwork by fostering knowledge sharing and collaboration across departments. It supports flexible work arrangements, improving work-life

balance and employee engagement, which is essential in addressing Bangladesh's commute challenges. This modernization in work practices also boosts employee retention and overall job satisfaction.

## **6.2. Practical Implementation**

Practically, digitalization provides Big Four firms with tools for data analysis, audit automation, and real-time data access, increasing productivity and accuracy. By automating repetitive tasks with AI, auditors can focus on complex issues and handle larger datasets, resulting in improved insights and client service.

## **6.3. Theoretical Implementation**

Theoretical models like the Technology Acceptance Model (TAM) and Diffusion of Innovation Theory help analyse digital adoption within these firms. Digitalization supports more data-driven and predictive audit approaches, potentially enhancing audit quality and governance, as digital tools reshape traditional auditing practices.

## **6.4. Managerial Implementation**

Digitalization requires managers to rethink workflows and adopt data-driven decision-making. Managers must be trained to understand digital tools, manage change, and align digital strategies with firm goals. They play a vital role in promoting digital adaptation, identifying training needs, and integrating technology with human expertise.

## **6.5. Policy Implementation**

Policies surrounding digitalization focus on regulatory compliance, data security, and ethical use of technology. Firms must meet both local and global standards, addressing cybersecurity, data integrity, and transparency. Collaboration with regulatory bodies helps Big Four firms in Bangladesh establish industry best practices for digital governance and audit standards. This research is subject to certain methodological limitations. Due to the sample size (200 auditors), the findings should be viewed within an exploratory context. Additionally, the methodology could be strengthened by incorporating a participatory qualitative study, which presents logistical challenges. Future research could further expand on these findings. For instance, in the context of Bangladesh's local audit firms' practices and efficiency analysis in reference to BIG Four firms, another one could be if Big Four firms take a few local firms under their wing for training and improvement purposes how positively would it result in terms of digitalization, if digitalization is ensured would the clients of local auditors accept it positively.



## **6.6. Limitations of The Research**

- (1) Usually accounting firms contain sensitive information about their clients, which makes skepticism crucial for the firm. The company being an accounting firm holds highly sensitive information that it cannot disclose.
- (2) Being one of the Big 4, it must go through more regulations than any other firm in the business. As a result, it has a very stagnant set of rules regarding confidentiality.
- (3) Since I am a very fresh employee, I have not been able to comprehend EY's services of every spectrum. There are many critical functions that are beyond my reach due to, a lack of experience and understanding of the business.

## **6.7. Recommendation for Future Research**

This study adds to the corpus of knowledge on audit, corporate governance, and audit companies' digital transformation. It highlights how the use of digital technology will limit managers' autonomy while changing the audit role as a governance instrument. It increases the calibre of audit work and restates the necessity of updating audit standards through the adoption of new technology. From the perspective of management, this study draws attention to the issue of corporate digital transformation, its impact on auditing practices, and the new constraints that accompany it for auditors and their clients.

Businesses may put a number of concepts into practice as part of their digital evolution plan. In conclusion, auditing companies could:

- (1) Use of modern technology and taking employees and associates as an investment, changing the current practices and being one of Big4, set a new bar for others to reach and maintain.
- (2) Utilize the teams of other segments other than the audit team for confidentiality purposes. The digitalization of some procedures allows for an increase in audit quality.
- (3) Create research facilities and collaborate with new businesses or other technology companies on issues like developing new data extraction and control systems, for instance.
- (4) Establish teams to focus on securing client data transfers and data collecting in a manner that complies with the firm's hardware.

## References

- Abbott, L.J., Parker, S. and Peters, G.F., 2004. Audit committee characteristics and restatements. *Auditing: A journal of practice & theory*, 23(1), pp.69-87. *Accounting Horizons*, 29(2), 381-396. *Accounting, Auditing and Accountability Journal*, 30(1), 18-37.
- Adrian, G., K.Linnenluecke, M., J.O'Neill, T., and Smith, T., 2018. Big data techniques in auditing research and practice: Current trends and future opportunities. *Journal of Accounting Literature*, 40, 102-115.
- Ahuja, M. K., Chudoba, K. M., Kacmar, C. J., McKnight, D. H. and George, J. F., 2007. IT road warriors: Balancing work-family conflict, job autonomy, and work overload to mitigate turnover intentions. *MIS Quarterly*, 1-17.
- Alalwan, A. (2020). "Cybersecurity in the Digital Transformation of Auditing." *Journal of Information Security*, 25(3), 120-134.
- Al-Htaybat, K. and Von Alberti Al-Htaybat, L., 2017. Big Data and corporate reporting: impacts and paradoxes. *Accounting, Auditing & Accountability Journal*, 30(4), 850- 873.
- Allen, D. G. and Shanock, L. R., 2013. Perceived organizational support and embeddedness as key mechanisms connecting socialization tactics to commitment and turnover among new employees. *Journal of Organizational Behavior*, 34(3), 350-369.
- Alles, M. G., Kogan, A., & Vasarhelyi, M. A., 2008. "Automated audit techniques in continuous assurance." *International Journal of Accounting Information Systems*, 9(2), 137-154.
- Alles, M.G., Teeter, R.A. and Vasarhelyi, M.A., 2010. The remote audit. *Journal of emerging technologies in accounting*, 7(1), pp.73-88.
- Andrews, D. R. and Wan, T. T., 2009. The importance of mental health to the experience of job strain: an evidence-guided approach to improve retention. *Journal of Nursing Management*, 17(3), 340-351.
- Armstrong-Stassen, M. and Ursel, N. D., 2009. Perceived organizational support, career satisfaction, and the retention of older workers. *Journal of occupational and organizational psychology*, 82(1), 201-220.

- Ashbaugh, H. and Warfield, T. D., 2003. Audits as a Corporate Governance Mechanism: Evidence from the German Market. *Journal of International Accounting Research*, 2(1), 1-21.
- Azeez, S. A., 2017. Human resource management practices and employee retention: A review of literature. *Journal of Economics, Management and Trade*, 18(2), 1-10.
- Baison, R., 2014. The Effect of Job Satisfaction to Employee Retention. 1-10.
- Barnett, M.L., Salomon, R.M., 2006. Beyond dichotomy: The curvilinear relationship between social responsibility and financial performance. *Strategic Management Journal*, 27(11), pp. 1101-1122
- Barringer, B. R., Jones, F. F. and Neubaum, D. O., 2005. A quantitative content analysis of the characteristics of rapid-growth firms and their founders. *Journal of business venturing*, 20(5), 663-687.
- Beardwell, J. and Wright, M., 2012. Recruitment and Selection: Human resource management: A contemporary approach, Harlow.
- Becker, C.L., DeFond, M.L., Jiambalvo, J. and Subramanyam, K.R., 1998. The effect of audit quality on earnings management. *Contemporary accounting research*, 15(1), pp.1-24.
- Beisland, L. A., Roy Mersland, R. and Strøm, Ø., 2015. Audit Quality and Corporate Governance: Evidence from the Microfinance Industry. *International Journal of Auditing*, 19(3), 218-237.
- Benson, G. S., 2006. Employee development, commitment and intention to turnover: a test of 'employability' policies in action. *Human Resource Management Journal*, 16(2), 173- 192.
- Brazel, J. F., Agoglia, C. P., & Hatfield, R. C., 2019. "The impact of artificial intelligence on audit efficiency and effectiveness." *Accounting Horizons*, 33(1), 1-22.
- Breur, T., 2016. Statistical power analysis and the contemporary "crisis" in. *Journal of Marketing Analytics*, 4(1), 61-65.
- Broek, T. d. and Veenstra, A. F., 2018. Governance of big data collaborations: How to balance regulatory compliance and disruptive innovation. *Technological Forecasting and Social Change*, 129, 330-338.

- Brown-Liburd, H. and Vasarhelyi, M.A., 2015. Big Data and audit evidence. *Journal of Emerging Technologies in Accounting*, 12(1), pp.1-16.
- Brown-Liburd, H., Issa, H. and Lombardi, D., 2015. Behavioral Implications of Big Data's Impact on Audit Judgment and Decision Making and Future Research Directions. *Accounting Horizons*, 29(2), 451-468.
- Brynjolfsson, E. and McAfee, A., 2014. *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. WW Norton & company.
- Cao, M., Chychyla, R. and Stewart, T., 2015. Big Data Analytics in Financial Statement Audits. *Accounting Horizons*, 29(2), 423-429.
- Carcello, J. V., Hermanson, D. R. and Ye, Z., 2011. Corporate Governance Research in Accounting and Auditing: Insights, Practice Implications, and Future Research Directions. *AUDITING: A Journal of Practice & Theory*, 30(3), 1-31.
- Chen, M., Mao, S. and Liu, Y., 2014. Big data: A survey. Mobile networks and applications. 19(2), 171-209.
- Chew, J. and Chan, C. C., 2008. Human resource practices, organizational commitment and intention to stay. *International journal of manpower*.
- Chiekezie, O. M., Emejulu, G. and Nwanneka, A. (n.d.). Compensation management and employee retention of selected commercial banks in Anambra State, Nigeria. *Archives of Business Research*, 5(3).
- Christian Leuz, K. V., 2009. Do Foreigners Invest Less in Poorly Governed Firms? *The Review of Financial Studies*, 22(8), 3245–3285.
- Clark, S. C., 2000. Work/family border theory: A new theory of work/family balance. *Human relations*, 53(6), 747-770.
- Cohen, J., Krishnamoorthy, G. and Wright, A., 2010. Corporate governance in the post-Sarbanes-Oxley era: Auditors' experiences. *Contemporary Accounting Research*, 27(3), pp.751-786.
- Colbert, J. L. and John S. Jahera, J., 1988. The Role Of The Audit And Agency Theory. *Journal of Applied Business Research (JABR)*, 4(2), 7-12.
- Craswell, A. T., Francis, J. R., & Taylor, S. L. (2002). Auditor brand name reputations and industry specializations. *Journal of Accounting and Economics*, 33(3), 313-349.

- De Silva, L. M., and Chitraranjan, C. D., 2018. Factors affecting on gaining a sustainable competitive advantage for Sri Lankan higher educational institutes. *International Business Research*, 11(4), 106-118.
- DeAngelo, H., DeAngelo, L. and Stulz, R.M., 2004. Dividend policy, agency costs, and earned equity.
- DeAngelo, L. E., 1981. Auditor independence, 'low balling', and disclosure regulation.
- DeFond, M. and Zhang, J., 2014. A review of archival auditing research. *Journal of Accounting and Economics*, 58(2-3), 275-326.
- Delecta, P., 2011. WORK LIFE BALANCE. *International Journal of Current Research*, 3(4), 186-189.
- Dengler, K. and Matthes, B., 2018. The impacts of digital transformation on the labour market: Substitution potentials of occupations in Germany. *Technological Forecasting and Social Change*, 137, 304-316.
- Dibra, R., 2016. Corporate governance failure: The case of Enron and Parmalat. *European Scientific Journal*, 12(16).
- Dumitru, C., 2016. The digital revolution and job polarization: an institutional, economic and social issue. *Intern. Audit. Risks Manage*, 11(2), 105-115.
- Eccles, R.G. and Krzus, M.P., 2018. Constructing ExxonMobil's First Integrated Report: An Experiment. *Available at SSRN 3145369*.
- El-Kot, G., and Leat, M., 2008. A survey of recruitment and selection practices in Egypt. *Education, Business and Society: Contemporary Middle Eastern Issues*.
- Ellenbecker, C. H., 2004. A theoretical model of job retention for home health care nurses.
- Fitz-Enz, J., 1990. *Human value management: The value-adding human resource management strategy for the 1990s*. Jossey-Bass Publishers.
- Frank, F. D., Finnegan, R. P. and Taylor, C. R., 2004. The race for talent: Retaining and engaging workers in the 21st century. *Human resource planning*, 27(3).
- Freeman, R. J., 1984. Definition and Evaluation of Computer Support Systems for Instruction. *AEDS Journal*, 17(4), 46-55.
- Gantz, J. and Reinsel, D., 2011. Extracting value from chaos. *IDC iview*, 1-12.

- Gberville, D. E., 2010. Strategies for employee recruitment, retention and performance: Dimension of the Federal civil service of Nigeria. *African Journal of Business Management*, 4(8), 1447-1456.
- Gepp, A., & Kumar, K. (2020). Data Analytics for Fraud Detection: Challenges and Opportunities. *Journal of Forensic & Investigative Accounting*, 12(2), 65-83.
- Ghapanchi, A. H. and Aurum, A., 2011. Antecedents to IT personnel's intentions to leave: A systematic literature review. *Journal of Systems and Software*, 84(2), 238-249.
- Gliem, J. A. and Gliem, R. R., 2003. Calculating, Interpreting, And Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales. *Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education*.
- Gray, R., 2006. Social, environmental and sustainability reporting and organisational value creation? Whose value? Whose creation? *Accounting, Auditing & Accountability Journal*, 19(6), pp.793-819.
- Gujarati, D. and Porter, D., 2003. Multicollinearity: What happens if the regressors are correlated. *Basic econometrics*, 363.
- Gul, F. A., Chen, C. J., & Tsui, J. S. (2009). Discretionary accruals, corporate governance, and corporate performance. *Journal of Corporate Finance*, 15(3), 473-485.
- Haider, M., Rasli, A., Akhtar, C. S., Yusoff, R. B., Malik, O. M., Aamir, A. and Tariq, F., 2015. The impact of human resource practices on employee retention in the telecom sector. *International Journal of Economics and Financial Issues*, 5(1), 63-69.
- Harrison, D. (2021). "Digital Auditing and Data Protection Challenges: Navigating the Complexity of Global Regulations." *International Journal of Auditing*, 25(1), 35-47.
- Hausknecht, J. P., Rodda, J. and Howard, M. J., 2009. Targeted employee retention: Performance-based and job-related differences in reported reasons for staying. *Human Resource Management: Published in Cooperation with the School of Business Administration, The University of Michigan and in alliance with the Society of Human Resources Management*, 48(2), 269-288.



- Hiltrop, J. M., 1999. The quest for the best: human resource practices to attract and retain talent. *European Management Journal*, 17(4), 422-430.
- Hodge, F. D., Kennedy, J. A., & Loughran, D., 2020. "Machine learning in auditing: A critical review of the literature." *Accounting & Finance*, 60(3), 1815-1845.
- Hope, O.-K., Kang, T., Thomas, W. and Keun Yoo, Y., 2008. Culture and auditor choice: A test of the secrecy hypothesis. *Journal of Accounting and Public Policy*, 27(5), 357- 373.
- Hsieh, C. and Kleiner, B. H., 2003. New developments in executive compensation. *Management Research News*.
- Huang, C. and Kleiner, B. H., 2005. Managing compensation in the financial service industry.
- Huang, T. C., Lawler, J. and Lei, C. Y., 2007. The effects of quality of work life on commitment and turnover intention. *Social Behavior and Personality: an international journal*, 35(6), 735-750.
- Hughes, J. C. and Rog, E., 2008. Talent management: A strategy for improving employee recruitment, retention and engagement within hospitality organizations. *International journal of contemporary hospitality management*.
- Hytter, A., 2007. Retention strategies in France and Sweden. *Irish Journal of Management*, 28(1).
- Issa, H., Sun, T. and Vasarhelyi, M. A. (2016). Research Ideas for Artificial Intelligence in Auditing: The Formalization of Audit and Workforce Supplementation. *Journal of Emerging Technologies in Accounting*, 13(2), 1-20.
- J. Donald Warren, J., Moffitt, K. C. and Byrnes, P., 2015. How Big Data Will Change Accounting. *Accounting Horizons*, 29(2), 397-407.
- Jeacle, I., 2017. Constructing audit society in the virtual world: the case of the online reviewer.
- Jeet, V. and Sayeeduzzafar, D., 2014. A study of HRM practices and its impact on employees job satisfaction in private sector banks: A case study of HDFC Bank. *International Journal of Advance Research in Computer Science and Management Studies*, 2(1).

- Jensen, M. C. and Meckling, W. H., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360.
- Jensen, M.C. and Meckling, W.H., 1976. Agency Costs and the Theory of the Firm. *Journal of financial economics*, 3(4), pp.305-360.
- Jere R. Francis, P., Edward L. Maydew, A. P. and Sparks, H. C., 1999. The Role of Big 6 Auditors in the Credible Reporting of Accruals. *AUDITING: A Journal of Practice & Theory*, 18(2), 17-34.
- Joo, B. K. and Park, S., 2010. Career satisfaction, organizational commitment, and turnover intention: The effects of goal orientation, organizational learning culture and developmental feedback. *Leadership & Organization Development Journal*.
- Jordan, M. I. and Mitchell, T. M., 2015. Machine learning: Trends, perspectives, and prospects.
- Kamalaveni, M., Ramesh, S. and Vetrivel, T., 2019. A Review of Literature on Employee Retention. *International Journal of Innovative Research in Management Studies (IJIRMS)*, 4(4), 1-10.
- Klein, A., 2002. Audit committee, board of director characteristics, and earnings management. *Journal of accounting and economics*, 33(3), pp.375-400.
- Knechel, W. R. (2013). The role of the auditor in corporate governance. *Accounting Horizons*, 27(2), 243-269.
- Kocakulah, M. C., & Petrovits, C., 2017. "Data analytics in auditing: Opportunities and challenges." *Journal of Accounting Research*, 45(4), 653-680.
- Kogan, A., Sucher, S., & Vasarhelyi, M. A. (2019). Data Analytics and Auditing: A Conceptual Framework. *Auditing: A Journal of Practice & Theory*, 38(4), 23-51.
- Kossivi, B., Xu, M. and Kalgora, B., 2016. Study on determining factors of employee retention.
- Krahel, J. P. and Titera, W. R., 2015. Consequences of Big Data and Formalization on Accounting and Auditing Standards. *Accounting Horizons*, 29(2), 409-422.

- Kundu, S. C. and Lata, K., 2017 Effects of supportive work environment on employee retention: Mediating role of organizational engagement. *International Journal of Organizational Analysis*.
- Kyndt, E., Dochy, F., Michielsens, M. and Moeyaert, B., 2009. Employee retention: Organisational and personal perspectives. *Vocations and Learning*, 2(3), 195-215.
- Laney, D., 2001. 3D data management: Controlling data volume, velocity. *META group research note*, 6(70).
- Lardner, S., 2015. Effective reward ensures effective engagement. *Strategic HR Review*.
- Loan-Clarke, J., Arnold, J., Coombs, C., Hartley, R. and Bosley, S., 2010. Retention, turnover and return—a longitudinal study of allied health professionals in Britain. *Human Resource Management Journal*, 20(4), 391-406.
- Manita, R., Elommal, N., Baudier, P. and Hikkerova, L., 2020. The digital transformation of external audit and its impact on corporate. *Technological Forecasting and Social Change*, 150.
- Mathimaran, K. B. and Kumar, A. A., 2017. Employee retention strategies—An empirical research. *Global Journal of Management and Business Research: E Marketing*, 17(1), 17-22.
- Mitchell, T. R., Holtom, B. C., Lee, T. W., Sablinsky, C. J. and Erez, M., 2001. Why people stay: Using job embeddedness to predict voluntary turnover. *Academy of management journal*, 44(6), 1102-1121.
- Mohaisen, L.H.A., Al-Abedi, L.D.T.K. and Jothr, L.O.A., 2023. Data mining and its effects on the accounting and auditing profession: A LITERATURE REVIEW. *Journal of Administration and Economics*, 48(137), pp.230-239.
- Montgomery, A. J., Panagopolou, E., Wildt, M. d. and Meenks, E., 2006. Work-family
- Motowidlo, S. J., 1983. Predicting sales turnover from pay satisfaction and expectation. *Journal of Applied Psychology*, 68(3), 484.
- Nambisan, S., Lyytinen, K., Majchrzak, A. and Song, M., 2017. DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD. *MIS Quarterly*, 41(1), 223-238.

- Narayanan, A., Bonneau, J., Felten, E., Miller, A. and & Goldfeder, S., 2016. Bitcoin and cryptocurrency technologies: a comprehensive introduction. . *Princeton University Press*.
- Nasir, S. Z. and Mahmood, N., 2016. Determinants of employee retention: An evidence from Pakistan. *International Journal of Academic Research in Business and Social Sciences*, 6(9), 182-194.
- Naz, S., Nisar, L. C., Khan, Q. A., S., M. A., Ahmad, N. and Anwar, F., 2020. A study in the relationship between supportive work environment and employee retention: role of organizational commitment and person–organization fit as mediators. 10(2).
- Numbers behind FMCG Industry at Bangladesh: Growth opportunity perspective*. 2020, August 22. Retrieved from [https://www. goldenharvestbd.com:https://www.goldenharvestbd.com/shops/foods-festival/](https://www.goldenharvestbd.com:https://www.goldenharvestbd.com/shops/foods-festival/)
- Nura, A. A. and Osman, N. H., 2013. Gauging the effect of performance management and technology based human resource management on employee retention: The perspective of academics in higher educational institutions in Sokoto State Nigeria. *Asian Social Science*, 9(15), 295.
- O’neill, J. W., Harrison, M. M., Cleveland, J., Almeida, D., Stawski, R. and Crouter, A. C., 2009. Work–family climate, organizational commitment, and turnover: Multilevel contagion effects of leaders. *Journal of Vocational Behavior*, 74(1), 18-29.
- Olaniyan, D. A. and Ojo, L. B., 2008. Staff training and development: A vital tool for organizational effectiveness. *European journal of scientific Research*, 24(3), 326-331.
- Ongori, H., 2007. *A review of the literature on employee turnover*.
- Onyango, J. W. and Wanyoike, D. M., 2014. Effects of training on employee performance: a survey of health workers in Siaya County, Kenya. *European Journal of Material Sciences*, 1(1), 11-15.
- Parmar, B., 2010. Stakeholder Theory: The State of the Art. *The Academy of Management Annals*, 3, 403-445.
- Paul, A., Clinton, F. and Sivabalan, P., 2014. The legitimacy of new assurance providers: Making the cap fit. *Accounting, Organizations and Society*, 39(2), 75-96.

- Pitts, D., Marvel, J. and Fernandez, S., 2011. So hard to say goodbye? Turnover intention among US federal employees. *Public Administration Review*, 5, 751-760.
- Pizzini, M. J., Kinney, M. R., & O'Keefe, T. B., 2021. "Blockchain technology and the audit process: Opportunities and challenges." *Auditing: A Journal of Practice & Theory*, 40(1), 89-105.
- Puthukulam, G., Ravikumar, A., Sharma, R.V.K. and Meesaala, K.M., 2021. Auditors' perception on the impact of artificial intelligence on professional skepticism and judgment in Oman. *Universal Journal of Accounting and Finance*, 9(5), pp.1184-1190.
- R. S. and Pathirana, U. G., 2019. The Impact of HR Practices on Employee Retention; A Case of BPO Sector. *International Journal of Human Resource Studies*, 9(1), 1-21.
- Ram, J. Z., 2016. The implications of big data analytics on business intelligence: A qualitative study in China. *Procedia Computer Science*, 87, 221-226.
- Rao, J. and Weintraub, J., 2013. How innovative is your company culture? *MITSloan Management Review*, 54(3), 29-37.
- Ravikiran, A. S., 2023, March 21. *What is Blockchain Technology? How Does Blockchain Work?* Retrieved from simplilearn: <https://www.simplilearn.com/tutorials/blockchain-tutorial/blockchain-technology>
- Richins, G., Stapleton, A., Stratopoulos, T. C. and Wong, C., 2017. Big Data Analytics: Opportunity or Threat for the Accounting Profession? *Journal of Information Systems*, 31(3), 63-79.
- Roberts, N. S. and Outley, C., 2002. Innovation and resourcefulness: recruit and retain a diverse staff in the 21st century. *Parks & Recreation (Ashburn)*, 37(4), 39-47.
- Roselius, W. and Kleiner, B. H., 2000. How to hire employees effectively. *Management Research News*.
- Rumberger, J. A., Feiring, A. J., Lipton, M. J., Higgins, C. B., Ell, S. R. and Marcus, M. L., 1987. Use of ultrafast computed tomography to quantitate regional myocardial perfusion: a preliminary report. *Journal of the American College of Cardiology*, 9(1), 59-69.
- Sahut, J., Hikkeorva, L. and K., M., 2013. Business Models and Performance of Firms.

- Samuel, M. O. and Chipunza, C., 2009. Employee retention and turnover: Using motivational variables as a panacea. *African journal of business management*, 3(9), 410-415.
- Sattar, S. and Ahmed, S., 2014. Factors effecting employee turnover in banking sector.
- Saunders, M., Lewis, P. and Thornhill, A., 2009. *Research methods for business students*. Pearson education. *Science*, 349(6245), 255-260.
- Sekaran, U., 2006. *Research method of business: A skill-building approach*.
- Self, J. T. and Dewald, B., 2011. Why do employees stay? A qualitative exploration of employee tenure. *International Journal of Hospitality & Tourism Administration*, 12(1), 60-72.
- Shaw, J. D., Delery, J. E., Jenkins Jr., G. D. and Gupta, N., 1998. An organization-level analysis of voluntary and involuntary turnover. *Academy of management journal*, 41(5), 511- 525.
- Singh, B., 2018. Factors Affecting Workforce Retention: A Literature Review. *International Journal of Research in Engineering, Science and Management*, 1(12).
- Sirikulvadhana, S., 2002. *Data mining as a financial auditing tool* (Doctoral dissertation).
- Sussman, B., & Riley, A., 2019. "Natural language processing and audit: A new frontier." *Journal of Information Systems*, 33(1), 67-85.
- Tiberius, V., 2019. Impacts of digitization on auditing: A Delphi study for Germany. *Journal of International Accounting*, 37.
- Vasarhelyi, M. A., Kogan, A. and Tuttle, B. M., 2015. Big Data in Accounting: An Overview.
- Wallace, W., 2004. The Economic Role of the Audit in Free and Regulated Markets: A Look Back and a Look Forward. *Research in Accounting Regulation*.
- Watts, R. L. and Zimmerman, J. L., 1986. Positive Accounting Theory. *Prentice-Hall Inc*.
- Wijesiri, N. S., Paranagama, G. S., Sirirwardhana, M. M., Thilakarathna , D. N., Weeraratna,

- Yamamoto, H., 2011. The relationship between employee benefit management and employee retention. *The International Journal of Human Resource Management*, 22(17), 3550- 3564.
- Yoon, K., Hoogduin, L. and Zhang, L., 2015. Big Data as complementary as complementary audit evidence. *Accounting Horizons*, 29(2), 431-438.
- Zhang, J., Yang, X. and Appelbaum, D., 2017. Toward effective big data analysis in continuous auditing. *Accounting Horizons*, 29(2), 469-476.
- Zhaokai, Y., 2019. Contract analytics in auditing. *Accounting Horizons*, 33(3), 111-126.
- Zingheim, P. K., Schuster, J. R. and Dertien, M. G., 2009. Compensation, reward and retention practices in fast-growth companies. *World at Work Journal*, 18(2), 22-39.

## **Appendix A**

The digital transformation of external audit and its impact on corporate governance:

### **Questionnaire:**

This questionnaire is regarding the digitalization of external audit and its probable impact on corporate governance. To what extent do you agree to the following statements? Rate using the scale given below each statement: (Strongly disagree-1, disagree-2, neutral-3, agree-4, strongly agree-5)

### **Optimization of audit process:**

- New digital technologies such as big data and analytics allow auditors to save time by removing repetitive tasks.
- Digitalization of audit enables auditors to focus on high value-added activities.
- Incorporating digital procedures in audit can help the auditors focus on risk areas and errors, thus increasing the efficiency of audit.

### **Evolution of audit offer and development of new services:**

- Data mining can increase audit relevance by visualization of data workflow to identify exceptions and analyse them.



- With the help of data analytics, auditors can easily interpret the analysis of raw data, displayed in an expected format, and draw relevant conclusions.
- Cloud and cognitive technologies increase audit relevance by assisting auditors in decision making.

**Improvement of audit quality:**

- Smart analysis with the help of digitalization of audit procedure enables auditors to gain a better understanding of the internal processes of the client and the risks associated with them.
- Digital technologies will enable audit teams to collaborate in real time which will enhance the audit quality.
- The ability to process all data instead of sampling will lead regulators to revise all audit standards by integrating the technology dimension and this will improve audit quality.

**Auditors' profile and innovation culture:**

- The digital transition of audit firms will introduce a new culture of adding value to the customer and providing satisfaction.
- The future auditors must be comfortable with digital tools and must be able to process and analyse data and develop new audit tools.
- Digitalization will enable a culture of innovation within audit firms that must constantly innovate to meet the changing needs of their customers.

*Audit process and corporate governance:*

- Technological evolution of audit will significantly improve the role of audit as a corporate governance mechanism.
- Digitalization of audit can limit the discretionary power of managers.
- The evolution of external audit will mitigate the asymmetry of information between stakeholders and managers.

## Appendix B

| Model | Dimension | Eigenvalue | Condition Index | Variance Proportions |     |     |     |        |
|-------|-----------|------------|-----------------|----------------------|-----|-----|-----|--------|
|       |           |            |                 | (Constant)           | OAP | ENS | AQ  | AP_INN |
| 1     | 1         | 4.946      | 1.000           | .00                  | .00 | .00 | .00 | .00    |
|       | 2         | .036       | 11.775          | .03                  | .04 | .07 | .02 | .07    |
|       | 3         | .009       | 23.407          | .00                  | .82 | .05 | .41 | .00    |
|       | 4         | .007       | 26.447          | .01                  | .14 | .81 | .57 | .00    |
|       | 5         | .003       | 42.666          | .96                  | .00 | .07 | .00 | .93    |

a. Dependent Variable: CORPOGOV

