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Article

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Cogent Business & Management

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Taylor & Francis Group

Suggested Citation: Al-Ansi, Ali Ali (2022) : Is the impact of audit effort on quality of auditors' performance contingent on virtual audit proficiency? An auditors' perspective during the COVID-19 pandemic, Cogent Business & Management, ISSN 2331-1975, Taylor & Francis, Abingdon, Vol. 9, Iss. 1, pp. 1-18,
<https://doi.org/10.1080/23311975.2022.2144704>

This Version is available at:

<https://hdl.handle.net/10419/289353>

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To cite this article: Ali Ali Al-Ansi (2022) Is the impact of audit effort on quality of auditors' performance contingent on virtual audit proficiency? An auditors' perspective during the COVID-19 pandemic, Cogent Business & Management, 9:1, 2144704, DOI: [10.1080/23311975.2022.2144704](https://doi.org/10.1080/23311975.2022.2144704)

To link to this article: <https://doi.org/10.1080/23311975.2022.2144704>



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Received: 23 August 2022
Accepted: 03 November 2022

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Is the impact of audit effort on quality of auditors' performance contingent on virtual audit proficiency? An auditors' perspective during the COVID-19 pandemic

Ali Ali Al-Ansi^{1*}

Abstract: In this study the researcher aims to investigate the effect of virtual audit proficiency on both audit effort and quality of auditors' performance during the COVID-19 pandemic. Moreover, the researcher investigates the effect of audit effort on the quality of auditors' performance during the COVID-19 pandemic. In addition, he examines the moderating effect of virtual audit proficiency on the association between audit effort and quality of auditors' performance. Furthermore, the author examines the moderating effect of the audit firm between virtual audit proficiency and quality of auditors' performance. To examine the hypotheses, the author utilises quantitative research. The researcher collects the data using a questionnaire survey to which 193 Saudi external auditors responded. He employs the partial least squares in structural equations modelling approach. The results demonstrate that virtual audit proficiency positively affects both audit effort and quality of auditors' performance. Moreover, the results show that audit effort positively affects the quality of auditors' performance. Significantly, the results also show the significant role of virtual audit proficiency as a moderating variable between audit effort and the quality of auditors' performance. However, the results indicate that audit firm type has no moderating effect on the relationship between virtual audit proficiency and quality of auditors' performance. The originality of this paper, based on the researcher's knowledge, is that it is the first evidence on audit practices during the COVID-19 crisis that has several theoretical and practical implications.

Subjects: Business, Management and Accounting; Accounting; Auditing

Keywords: Audit effort; virtual audit proficiency; audit firm; quality of auditors' performance; COVID-19 pandemic

1. Introduction

The COVID-19 pandemic has greatly influenced humanity. It has changed the lifestyle of individuals, corporate businesses, organisations, and governments. The World Health Organization (WHO; 2022) reported that there have been 6.4 million deaths, which indicates that people worldwide have been highly affected; in Saudi Arabia, there have been 810,394 confirmed cases of COVID-19, with 9,255 deaths. During the pandemic period, many countries imposed a ban, resulting in restrictions on social activities among societies, as well as disruptions to supply chains, which led to the bankruptcy of a large number of businesses. The pandemic has presented many

difficulties and challenges for most types of business. One of these challenges is how individuals can work remotely and achieve quality performance. The audit profession, as other professions, has faced these challenges, with external auditors forced to change their style of work (Safari et al., 2022); therefore, external auditors have been encouraged to transfer to remote auditing (PCAOB, 2020).

The pandemic has raised the possibility of corporate fraud and provision of financial misstatements, consequently disrupting most business operations and supply chains and increasing the risks of falsified financial reporting. Despite these circumstances and challenges, external auditors have professional responsibilities in carrying out audit work accurately in accordance with standards and regulatory requirements. Therefore, one of the critical issues that arises concerns the quality of audit work during the pandemic (Christ et al., 2021), specifically in terms of the audit effort and virtual audit proficiency, to increase the quality of auditors' performance. This researcher provides empirical evidence from the perspective of external auditors in relation to factors influencing the quality of auditors' performance.

This author aims to provide evidence from the auditors' perspective during the COVID-19 pandemic. First, he investigates the impact of virtual audit proficiency on both audit effort and quality of auditors' performance during the COVID-19 pandemic. Second, he investigates the impact of audit effort on the quality of auditors' performance during the COVID-19 pandemic. Third, he examines the moderating effect of virtual audit proficiency between audit effort and quality of auditors' performance. Finally, he examines the moderating effect of audit firm between virtual audit proficiency and quality of auditors' performance. Achieving these objectives may generate a better understanding of the auditing profession during COVID-19, given the uncertainties over the ability of external auditors to conform with standards of auditing regarding collecting sufficient evidence, applying physical testing, practising professional scepticism, evaluating internal controls successfully, and finally forming appropriate audit opinions (Arnold, 2021). Empirical researchers of the effect of effort and virtual audit proficiency on quality of auditors' performance have generally found a significant effect in terms of enhancing individual performance (Appelbaum et al., 2020; Dalwai et al., 2022). For example, the PCAOB reported that although the current health crisis presents unique and ongoing challenges, auditors are still responsible for performing audits in accordance with the standards and rules set by regulatory authorities. It also observed in its audit firm inspection during COVID-19 that the pandemic had resulted in new risks of fraud, requiring auditors to modify their assessment risks and procedures to detect this fraud (PCAOB, 2020). In the same way, the International Federation of Accountants (IFA) declared that COVID-19 has considerably increased the challenge of obtaining sufficient and appropriate audit evidence and forming an independent view about the reasonableness of management's estimates and judgements (Arnold, 2021). In this study, the researcher focuses on virtual audit proficiency and how this approach affects audit effort and quality of auditors' performance. Christ et al. (2021) mentioned that the COVID-19 pandemic offered a good opportunity for auditors and the audit profession to alter their methods to enhance their performance. COVID-19 first appeared at the end of 2019, before becoming acute in 2020, which created an urgent need to use virtual audit proficiency in auditing and forced auditors to switch from regular auditing to remote auditing within a short period of time. The utilisation of virtual audit proficiency has long been recommended by several researchers such as Al-Ansi et al. (2013), Baatwah and Al-Ansi (2022), and Tetteh et al. (2022), even though its adoption has still not been widespread and is largely confined to primary technologies such as email (Bennett & Hatfield, 2018; Teeter et al., 2010). Virtual audit proficiency can offer several opportunities to conduct effective and efficient audits during the pandemic. However, these technologies are novel and controversial in the audit profession and require auditors to be technically competent and able to quickly learn their use (Appelbaum et al., 2020). People know little about virtual audit proficiency and how external auditors conduct virtual audits, particularly in this unprecedented time, and evidence on how it supports external auditors will be interesting to several stakeholders.

This study makes several original contributions. First, the researcher investigates the external auditors' performance and their effort during an unprecedented pandemic. Larrinaga and Garcia-Torea (2022) noted that the COVID-19 crisis offers an exceptional empirical context to examine accounting-related issues. In the auditing context, the COVID-19 pandemic has raised doubts about the ability of auditors to conduct their activities in an effective way, including the assessment of risks, internal control system assessment, obtaining audit evidence on certain high-risk fraudulent assets, and practising professional scepticism (Appelbaum et al., 2020). Second, this researcher documents that virtual audit proficiency has a positive and significant impact on audit effort and quality of auditors' performance. Teeter et al. (2010) and Christ et al. (2021) speculated on the near future of audit, using virtual audit as an effective and efficient audit approach. To the best of the researcher's knowledge, this paper is the first empirical evidence on how virtual audit proficiency affects audit effort and quality of auditors' performance. This study expands the results of Eulerich et al. (2021), who examined the perception of internal auditors in terms of differences in their quality and users' confidence between traditional and virtual audit. The findings of this study suggested that the contribution of virtual audit proficiency to auditors' good performance is not minor during the COVID-19 crisis. Third, this author finds that virtual audit proficiency has a significant moderating role between audit effort and quality of auditors' performance. This evidence expands on previous research showing that virtual audit proficiency plays a moderating role between other independent variables and performance. The interaction between audit effort and virtual audit proficiency enhances the relationship between audit effort and quality of auditors' performance. Saudi Arabia offers a suitable context for investigating this relationship. Given the sudden shock of COVID-19, it may be possible that audit effort in the absence of an appropriate factor such as virtual audit proficiency could not be helpful in achieving goals or reaching required performance.

2. Theoretical background, prior research, and hypothesis development

2.1. Virtual audit proficiency and quality of auditors' performance

Virtual audit proficiency involves conducting some or all audit activities off-site using technology. Teeter et al. (2010) considered it as an auditor combining information and communication technology with analytical procedures to collect audit evidence, interact with clients, and report on the accuracy of financial information and internal controls without a physical presence. Virtual audit proficiency offers several advantages that may motivate audit firms to invest more in Arnold, C. 2021. Summary of Covid-19 audit considerations. International Federation of Accountants 2020 [cited March 1 2021]. Available from <https://www.ifac.org/knowledge-gateway/supporting-international-standards/discussion/summary-covid-19-audit-considerations>. Arnold, C. 2021. Summary of Covid-19 audit considerations. International Federation of Accountants 2020 [cited March 1 2021]. Available from <https://www.ifac.org/knowledge-gateway/supporting-international-standards/discussion/summary-covid-19-audit-considerations>. Arnold, C. 2021. Summary of Covid-19 audit considerations. International Federation of Accountants 2020 [cited March 1 2021]. Available from <https://www.ifac.org/knowledge-gateway/supporting-international-standards/discussion/summary-covid-19-audit-considerations>. technologies (Appelbaum & Nehmer, 2017; Raschke et al., 2018). For example, Teeter et al. (2010) stipulated that virtual audit proficiency is associated with effectiveness and efficiency because it allows the auditor to cover a wider range of audit tests at low cost and eliminates costs related to travel and entertainment. It also deters audit clients from committing fraud, improves the quality of audit, and enhances the auditor's relationship with the client (Teeter et al., 2010). Thus, continuous use of virtual audit proficiency will increase reliability and efficiency in the audit process (Raschke et al., 2018). Typically, virtual audit proficiency involves the use of technologies such as email, video conferencing, first-person view cameras, and drones (Appelbaum et al., 2020; Teeter et al., 2010). However, virtual audit proficiency requires competency in technology usage and continuous training for auditors as technology advances (Teeter et al., 2010), presenting a new challenge for most auditors (Appelbaum et al., 2020) who need to enhance their audit efforts.

There is little empirical evidence on the use of virtual audit proficiency (Eulerich et al., 2021) because current use involves old-fashioned technology (e.g., email; Christ et al., 2021). For example, Brazel et al. (2004) found that face-to-face reviews of auditors' working papers were associated with better performance than electronic or long-distance reviews. Saiewitz and Kida (2018) examined how clients responded to auditors' inquiries using email and found that their responses were more biased towards the accounting position of the client than audio or visual responses. They also reported that the professional tone of email affects the response quality of clients, indicating the necessity of being proficient in the use of virtual audit proficiency. Bennett and Hatfield (2018) found that auditors use computer-based communication (email) to contact clients, but this is preferred more by audit staff than by partners and managers. However, they reported that email is less likely to make auditors sceptical than face-to-face methods and concluded that overuse of this method impedes high-quality auditing. Saiewitz (2018) confirmed these findings and reported that in-person inquiry is more important and urgent than email inquiry.

Although this stream of research provides new insight into the use of virtual audit proficiency, it depicts a negative side in that it limits auditors in detecting deception cues, which are readily noticeable in in-person communication. However, Christ et al. (2021) suggested that new virtual audit proficiency tools such as video conferencing (e.g., Zoom or Skype) enable auditors to interact in real time and visually with the client, especially as COVID-19 makes in-person audit functions impractical and forces auditors to conduct audit remotely (Appelbaum et al., 2020; Arnold, 2021; Christ et al., 2021). Eulerich et al. (2021) observed internal auditors shifting to virtual audit to conduct most regular activities and reported that the auditors and users perceived no difference in the effectiveness and efficiency. This perception increases as the auditor's experience in virtual audit improves. The movement restrictions under COVID-19 will make virtual audit proficiency more necessary, which calls for examination of this approach's impact on auditors' performance (Christ et al., 2021; Dalwai et al., 2022). Virtual audit proficiency may lead to auditors investing more effort in performing well. In this unprecedented situation, the results on virtual audit proficiency from limited research may not apply or be completely valid as more advanced technologies come into use and the associated culture is increasingly accepted. Thus, this researcher extends the literature by examining how virtual audit proficiency affects the audit effort and quality of auditors' performance during COVID-19. Ultimately, as concluded by Dalwai et al. (2022), the implementation of virtual audit proficiency processes is a complement to an auditor's job and not a substitute.

2.2. Audit effort and quality of auditors' performance

Abbiss et al. (2015) defined effort as "the amount of mental or physical energy being given to a task" (p. 2). The relationship between efforts and performance has been supported by various previous studies (Aucejo et al., 2022; Usmany, 2021; Vagner, 2022). Organisations seek to motivate individuals to exert more effort to achieve the desired outcomes. The relationship also increases confidence in facing challenges and difficulties in fulfilling the required tasks and reaching the necessary outcome. In other words, individuals who put in a lot of effort to reach the set goals are more likely to achieve a high level of performance. Thus, it is predicted that effort is positively associated with performance. There are a large number of studies from different disciplines that show empirical support for the association between performance and efforts (e.g., Aucejo et al., 2022; Dissanayake et al., 2019; Krishnan et al., 2002; Usmany, 2021; Vagner, 2022).

Within this context, when auditors are making more effort and contributing to high-level audit quality, this would lead to an insistence on performing their work effectively and efficiently. For example, an auditor with high levels of effort is confident that they are capable of providing high-quality audit in high-misstatement-risk audit engagements. Although several studies provide fresh insight into the association between efforts and performance, the use of highly specific audit settings or tasks limits their application to other audit tasks in particular situations or times. In this study, the researcher considers the effect of auditors' effort on the quality of their performance during COVID-19. The pandemic has created an unprecedented and challenging environment in

which auditors are unable to conduct their normal activities. Arnold (2021) reported that COVID-19 complicates audit engagements and imposes new challenges on auditors. He added that there is greater uncertainty about the ability of auditors to collect sufficient and appropriate audit evidence and to reach an objective audit opinion. PCAOB (2020) warned that the COVID-19 crisis increases the risk of fraud and requires stronger audit procedures. However, auditors are required to use virtual audit techniques, which is a further challenge to auditors at this time (Appelbaum et al., 2020), and are still responsible for performing audits in accordance with the standards and rules set by regulatory authorities (PCAOB, 2020). Therefore, this study offers an original contribution to the limited literature on audit effort by the researcher examining the effect of audit effort on quality of auditors' performance in the challenging environment of COVID-19.

2.3. Hypotheses

This researcher proposes an association between virtual audit proficiency and audit effort and quality of auditors' performance. According to Teeter et al. (2010), virtual audit proficiency is an important practice to achieve high-quality auditor performance because it reduces auditing costs and increases the auditor's ability to cover a wider range of auditing activity, albeit requiring considerable experience and competence with the technology. Virtual audit proficiency refers to the extent and competency of incorporating new technologies such as video conferencing, first-person view cameras and drones, and other intelligent technologies in conducting regular audit procedures (Appelbaum et al., 2020; Teeter et al., 2010). Thus, this author posits that auditors with a high level of proficiency in using virtual audit proficiency are more likely to achieve a high level of audit quality during COVID-19. This is because the risk of irregularity in financial reports and ineffective internal control systems are generally expected during COVID-19 (Arnold, 2021; PCAOB, 2020). In high-risk engagements, an auditor needs to expend greater effort and perform well to make financial reports credible and to minimise litigation and reputation risks (Caramanis & Lennox, 2008; DeFond & Zhang, 2014). Further, COVID-19 forces external auditors to use virtual audit proficiency for collecting evidence of the most fraudulent items in financial statements (e.g., inventory, cash, and fixed assets), which were traditionally physically tested (Appelbaum et al., 2020; Christ et al., 2021). Thus, an auditor without virtual audit proficiency is less likely to allocate the required effort, obtain appropriate and sufficient audit evidence, and reach reliable conclusions. Furthermore, research on the proficiency of using technologies suggests that experienced individuals show better performance and effort in accomplishing their duties during COVID-19 than those with low or no technology expertise (e.g., Dalwai et al., 2022; Limniou et al., 2021; Sardar et al., 2021; Shirish et al., 2021; Yarberry & Sims, 2021). Therefore, this researcher proposes the following hypothesis:

H_{1a}: Virtual audit proficiency positively impact audit effort of external auditors during the COVID-19 pandemic.

H_{1b}: Virtual audit proficiency positively impact quality of auditors' performance during the COVID-19 pandemic.

This researcher also proposes an association between audit effort and quality of auditors' performance. Therefore, he supplies specific evidence on the effect of audit effort on quality of auditors' performance during the COVID-19 pandemic. Auditors in each audit engagement are more likely to be vulnerable to litigation and reputation risks and need to exert more effort and perform all activities effectively (DeAngelo, 1981; DeFond & Zhang, 2014). Caramanis and Lennox (2008) considered audit effort as essential for auditors to detect existing misstatements and for fruitful quality of auditors' performance. The greater effort an auditor devotes to audit procedures, the better is the overall audit quality. Fogarty and Kalbers (2006) reported that individual auditor performance is crucial for audit quality, and those auditors showing high

performance fulfil their responsibilities more fully. The COVID-19 pandemic has imposed challenges on auditors in relation to higher risk of misstatement and ineffective internal controls (Arnold, 2021; PCAOB, 2020), requiring even greater effort and high-quality performance. However, COVID-19 makes impossible most audit procedures, such as inventory and fixed assets physical tests, walkthrough inspections, and face-to-face interviews, consequently casting doubt on the appropriateness and sufficiency of audit evidence and conclusions (Appelbaum et al., 2020; Arnold, 2021). The association between efforts and performance has been supported by various previous studies (Aucejo et al., 2022; Usmany, 2021; Vagner, 2022).

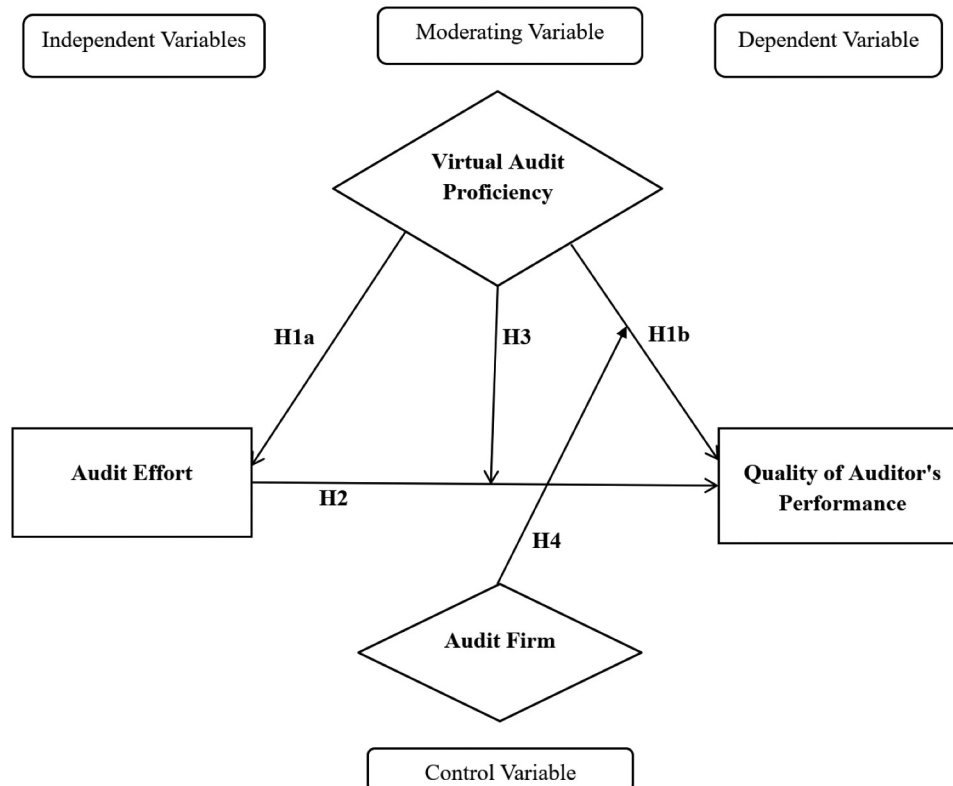
Within this context, when auditors are applying more effort, contributing to high-level audit quality, this would lead to insistence on performing their work effectively and efficiently. For example, an auditor with high levels of effort is confident that they are capable of providing high-quality audits in high-misstatement-risk audit engagements. Although several studies provide fresh insight into the association between efforts and performance, the use of highly specific audit settings or tasks limits their application to other audit tasks in particular situations or times. Consistent with this, the emerging research on effort from different fields demonstrates greater performance during COVID-19 for individuals with higher effort. In this study, the researcher considered the effect of auditors' effort on their quality of performance during COVID-19; however, auditors are obliged to use virtual audit techniques, which is a further challenge to auditors at this time (Appelbaum et al., 2020), and are still responsible for performing audits in accordance with the standards and rules set by regulatory authorities (PCAOB, 2020). Therefore, this researcher examined the effect of audit effort on quality of auditors' performance in the challenging environment of COVID-19. Hence, he proposes the following hypothesis:

H₂: Audit effort positively affects quality of auditors' performance during the COVID-19 pandemic.

Given the sudden shock of COVID-19, it may be posited that audit effort in the absence of an important factor such as virtual audit proficiency could not be helpful in achieving goals or reaching required performance. Therefore, this researcher developed a moderating hypothesis on the relationship between audit effort and quality of auditors' performance. Although the theory generally assumes a positive effect of audit effort on performance, Tetteh et al. (2022) argued that interaction between virtual audit proficiency and other variables will enhance the performance, and their results confirm the significant moderating role of virtual audit proficiency, which supports their argument. This researcher contends that the effect of audit effort on auditors' performance during the COVID-19 pandemic would be moderated by virtual audit proficiency. Dalwai et al. (2022) argued that virtual audit proficiency affects auditors' performance and leads to effective and value-adding decision-making by auditors. However, auditors are still responsible for performing audits in accordance with the standards and rules set by regulatory authorities (PCAOB, 2020). That is, although virtual audit proficiency is necessary, COVID-19 is an insufficient condition for implementing audit procedures as usual because auditors need to increase their effort to obtain skills in utilising virtual audit proficiency. Further, the onset of COVID-19 and the associated measures to combat it were sudden and unexpected, giving auditors a very short period in which to develop skills in practising virtual audit proficiency. This implies that audit effort is merely having less influence on quality of auditors' performance during COVID-19 if the auditor has not yet acquired competency in using virtual audit. Therefore, this author proposes the following hypothesis:

H₃: The positive impact of audit effort on quality of auditors' performance during the COVID-19 pandemic is moderated by virtual audit proficiency.

Figure 1. The research model.



Prior research has indicated that adoption of virtual audit proficiency varies among audit firms (Al-Ansi et al., 2017; Tetteh et al., 2022). The Big 4 audit firms have plentiful resources that may qualify them to purchase virtual audit proficiency and exploit IT experts to a greater extent than non-Big 4 firms. As a consequence, the Big 4 auditors are capable of providing greater quality audits and financial statements in comparison to small firms (Al-Ansi et al., 2013; Janvrin et al., 2008). Moreover, the Big 4 audit firms have more resources to stave off litigation and are thus motivated to use virtual audit proficiency and provide a higher-quality audit job (Al-Ansi et al., 2017; Janvrin et al., 2008). In fact, regulators imply that small audit firms are unable to compete with their bigger counterparts when it comes to IT investment because of the differences in size between the clients that they service and the corresponding IT requirements (Al-Ansi et al., 2017; Janvrin et al., 2008). Several researchers have used audit firm type (AF) as a control variable such as Embong et al. (2012) and Tetteh et al. (2022); meanwhile, numerous scholars have used AF as a moderating variable such as Al-Ansi et al. (2013), Al-Ansi et al. (2017), and Saragih and Hendrawan (2021). This study's author uses audit firm as a control variable and at the same time tests it as a moderating variable between virtual audit proficiency and quality of auditors' performance. Thus, the researcher proposes the following hypothesis:

H₄: The positive impact of virtual audit proficiency on quality of auditors' performance during the COVID-19 pandemic is moderated by AF.

Based on the aforementioned discussion, the research framework of this study, illustrated in Figure 1, shows the relationship among all variables.

3. Research methods

3.1. Sample selection and instruments

The population of this study is all auditors of registered audit firms in Saudi Arabia. Saudi Arabia implemented rigorous measures to combat the COVID-19 pandemic, including the closing of borders and cities, full or partial curfews, social distancing, and excessive fines for violating these measures (Sayed & Eledum, 2021). People, including employees, were restricted in entering their organisations' buildings and conducting their regular tasks. Despite these measures, COVID-19 caused panic among people and businesses; several businesses closed down or were charged substantial fines for noncompliance with the measures. This situation presented health, social, and financial challenges to Saudi auditors in conducting their duties in offices and on-site. Their experience in the COVID-19 crisis is comparable to those in more developed and mature markets.

Following prior research, with modification of some items, this author developed an online questionnaire (Google Form) to collect demographic information and details of the interested constructs. This questionnaire was originally written in English and translated by professional translators and auditing experts into Arabic. Before distributing it, the researcher piloted the questionnaire to check its face validity, suitability, and understandability. This check was done by four auditing professors and 10 practitioners including partners, senior auditors, and auditors. Accordingly, the researcher revised the questionnaire to accommodate the suggestions and comments. Then, using a list of registered audit firms from the Saudi Organisation for Chartered and Professional Accountants (SOCPA),¹ the researcher identified all auditors from 25 firms as the respondents (417 auditors). Because the email address for each audit firm was available in the list, the questionnaire was distributed to everyone who was working as an external auditor by email. This process began at the beginning of April 2021 and continued for 4 months, with two reminder emails to external auditors to complete the survey.² This process resulted in a total of 193 usable responses for data analysis, representing a response rate of 46%.

The researcher conducted the analysis using partial least squares structural equation modelling (PLS-SEM), Smart PLS version 3.3.3. This approach offers several advantages over other approaches in analysing questionnaires (see, Hair et al., 2011 for more details). First, PLS-SEM is a more powerful causal modelling approach in social science research because it maximises the explanation of variance in latent dependent variables. Second, PLS-SEM produces more reliable estimation and prediction because it is less likely to be affected by non-normality assumption and sample size. Third, PLS-SEM is flexible in considering constructs with fewer items. Finally, this approach is convenient and powerful in business research for analysing complex relationships such as those between moderators and mediators (Sarstedt et al., 2020). Thus, this approach is suitable to test the study's hypotheses. In doing so, the author adopted two-stage analysis using PLS-SEM. The first stage represents an assessment for reliability and validity of the measurement model, including discriminant validity, convergent validity, indicator reliability, and internal consistency reliability. The second stage involved evaluation of the structural model using measures such as R^2 and the path coefficient and significance level.

3.2. Measurement of variables

3.2.1. Quality of auditors' performance

How auditors perform their duties is not obvious to the public. This researcher sought to measure their performance at the individual level during COVID-19. Thus, he could not use common audit outcomes such as audit opinion and earnings quality to proxy audit quality. The author adopted seven items with modification from Fogarty and Kalbers (2006) and Kalbers and Cenker (2008). These items ask respondents to rate their performance during COVID-19 in comparison with their performance prior to the pandemic, using a 5-point Likert scale (from 1 = much less to 5 = much higher). Samples of these items include "How do you rate yourself in terms of the quantity of audit work you

accomplish?”, “How do you rate yourself in terms of the quality of your audit scepticism and objectivity?”, and “How do you rate yourself in terms of your ability to reach your planned audit activities?”.

3.2.2. *Virtual audit proficiency*

Virtual audit proficiency is the use of technologies in executing audit tasks. To measure this, this researcher developed six items based on the analytical framework on virtual audit proficiency suggested by Teeter et al. (2010). These items evaluate the auditor’s use of more advanced technologies in conducting financial statement audits on a 5-point Likert scale (from 1 = rarely to 5 = always). Samples of these items are “I use virtual teams, web conference and/or electronic workpaper system to discuss and assign audit planning”, “I use client system over the network and closed-circuit video to conduct substantive tests”, and “I use web conferencing with employees in charge, management, and audit committees for audit decisions and reporting”.

3.2.3. *Audit effort*

Audit effort is the amount of time and audit activities that an auditor commits to in auditing financial statements on a regular basis. In the audit literature, audit effort is commonly captured by either actual audit hours or audit fees for a particular audit engagement (DeFond & Zhang, 2014). However, these measures are used for the overall audit engagement and not the individual auditor level, which is the case in the context of this study. Thus, this researcher developed a measure adapted from research on effort (Krishnan et al., 2002) that contains three items comparing the level of audit effort during COVID-19 with the effort prior to the pandemic. This assessment is based on a 5-point Likert scale (from 1 = much less to 5 = much higher) for the points “Compared to a year prior to COVID-19, the overall effort I put into the audit activities is”, “Compared to a year prior to COVID-19, the number of hours I spend on audit activities is”, and “Compared to a year prior to COVID-19, the number of audit tests is”.

3.2.4. *Control variable*

This researcher added a control variable for other possible explanations of variance in the main dependent variable (quality of auditors’ performance). The author chose AF as the control variable using the category of audit firms in the audit profession, which are classified as Big 4 audit firms and non-Big 4 audit firms. Several researchers have used AF as the control variable such as Embong et al. (2012) and Tetteh et al. (2022); meanwhile, numerous others have used AF as the moderating variable such as Al-Ansi et al. (2013), Al-Ansi et al. (2017), and Saragih and Hendrawan (2021). This researcher indicated AF as the control variable and at the same time tested it as a moderating variable between virtual audit proficiency and quality of auditors’ performance. The researcher expected this control variable to play a moderating role between virtual audit proficiency and auditors’ performance.

4. Empirical results

4.1. *Descriptive statistics*

This researcher identified all auditors from 25 audit firms as the respondents (417 auditors). Because the email address for each audit firm was available in the list, the researcher distributed the questionnaire to everyone working as an external auditor by email. This process started at the beginning of April 2021 and continued for 4 months, with two reminder emails sent to firms to encourage their auditors to complete the survey. This process resulted in a total of 193 usable responses for data analysis, representing a response rate of 46%. Of these respondents, 32.6%, 54.4%, and 13% were partners, senior auditors, and junior auditors respectively. In terms of education level, this researcher observed that 3.1% and 27.5% held a doctorate and master’s degree respectively, while 68.4% and 1% had a bachelor’s degree and diploma respectively. The education major of 97.4% of these respondents was accounting. Regarding their auditing experience, 32.6% had 16 or more years; 10.4% had 11–15 years; 17.6% had 6–10 years; and 39.4% had 1–5 years of auditing experience. Table 1 shows the demographic variables. As for the AF, 25% of

Table 1. Descriptive statistics			
Panel A: Sample Demographics			
Variable		Frequency	%
Occupation in the audit firms			
Partner		63	33%
Audit manager		36	18%
Senior auditor		69	36%
Junior auditor		25	13%
Gender			
Male		176	91%
Female		17	9%
Age			
20–29		54	28%
30–39		537	30%
40–49		40	20%
50–above		42	22%
Audit experience (years)			
1–5		76	39%
6–10		34	18%
11–15		20	10%
16–above		63	33%
Type of audit firms			
Big 4		48	25%
Non-Big 4		145	75%
Involvement in auditing during COVID-19			
Yes		169	88%
No		24	12%

(Continued)

Table 1. (Continued)				
Panel B: Statistics for Variables				
Variable	Quality of Auditors' Performance	Virtual Audit Proficiency	Audit Effort	
Mean	3.375	3.094	3.435	
ST.DEV	0.846	1.241	0.952	
VIF	1.228	1.508	1.292	
Skewness	-0.062	-0.006	-0.261	
Kurtosis	0.064	0.633	0.204	

Table 2. Results for convergent validity analysis

Constructs	Items	Loadings	Cronbach's Alpha	Composite Reliability ^a	AVE ^b
Audit Effort	AE1	0.730	0.759	0.852	0.656
	AE2	0.857			
	AE3	0.837			
Quality of Auditors' Performance	QAP1	0.683	0.797	0.851	0.503
	QAP2	0.788			
	QAP3	0.653			
	QAP4	0.698			
	QAP5	0.686			
	QAP6	0.771			
	QAP7	0.643			
Virtual Audit Proficiency	ÀAI1	0.653	0.857	0.893	0.587
	ÀAI2	0.639			
	ÀAI3	0.794			
	ÀAI4	0.864			
	ÀAI5	0.831			
	ÀAI6	0.838			

a: $CR = (\sum \text{factor loading})^2 / ((\sum \text{factor loading})^2 + \sum (\text{variance of error}))$.
b: $AVE = \sum (\text{factor loading})^2 / (\sum (\text{factor loading})^2 + \sum (\text{variance of error}))$.

the respondents declared their affiliation with Big 4 audit firms, while 75% of these auditors were affiliated either with international audit firms other than Big 4 or with local audit firms. In terms of involvement in auditing financial statements during the pandemic, 88% of the respondents were engaged, suggesting that most of the respondents experienced the challenges associated with COVID-19 in performing their audit activities and may provide relatively actual assessments for the constructs.

Furthermore, Table 1 shows some statistical assessments for our main constructs. The results show the mean (standard deviation) for all constructs is 3.375 (0.846) for quality of auditors' performance, 3.094 (1.241) for virtual audit proficiency, and 3.435 (0.952) for audit effort. These results are based on the level of agreements among the respondents in respect to these constructs. The statistics also provide assessments on the normality assumption as evaluated by the ratio of skewness and kurtosis. The results in general indicate normal distribution for all constructs because the values of skewness range between -0.062 and -0.261 and the values of kurtosis are in the range of 0.064–0.633. In this study there is no issue of multicollinearity because the variance inflation factor (VIF) for all variables is in the range of 1.228–1.508; most researchers consider that $VIF < 5$ is acceptable.

Table 3. Results for constructs discriminant validity

Constructs	Virtual Audit Proficiency	Audit Effort	Quality of Auditors' Performance
Virtual Audit Proficiency (VAP)	0.766		
Audit Effort (AE)	0.173	0.810	
Quality of Auditors' Performance (QAP)	0.288	0.302	0.673

Table 4. Testing direct, moderating hypotheses and prediction relevance of the model

Hypothesis	Beta	T-value	P-value	Confidence Interval		Decision
				Lower	Upper	
H1a VAP → AE	0.175	2.095	0.036	0.029	0.367	Supported
H1b VAP → QAP	0.242	2.845	0.004	0.037	0.102	Supported
H2 AE → QAP	0.281	2.522	0.012	0.027	0.269	Supported
H3 AE * VAP → QAP	0.101	1.989	0.047	0.014	0.119	Supported
H4 AF * VAP → QAP	0.045	0.583	0.560	-0.107	0.194	Not Supported
SRMR = 0.067						
R ² = 0.225						
Q ² = 0.165						

VAP = Virtual audit proficiency; AE = Audit effort; QAP = Quality of auditors' performance; AF = Audit firms.

*** <0.01; ** <0.05; * <0.10.

4.2. Results for measurement model

4.2.1. The assessment of convergent validity and discriminant validity

Convergent validity illustrates the extent to which a set of variables converges in measuring the construct concept (Hair et al., 2011). To be assessed, the researcher used the factor loadings, composite reliability (CR), and average variance extracted (AVE), with results reported in Table 2. This researcher observes that the values for these tests are above the recommended thresholds (0.50 for factor loadings, 0.70 for CR, and 0.50 for AVE), indicating that the measurement model possesses a sufficient level of convergent validity.

Furthermore, this researcher used the Fornell and Larker criterion for discriminant validity to assess the level of how one construct is discriminated from other constructs in the model. Thus, the AVE square root of latent construct should be higher than the correlation with other latent constructs (Hair et al., 2011). Table 3 shows that the measurement model illustrates sufficient discriminant validity.

4.3. Model fit and predictive quality of the model assessment

This researcher applied several approaches to evaluate the quality and the model fit. The author used the standardised root mean square residual (SRMR) to assess the model's fitness; Table 4 displays the SRMR value as 0.067, which indicates a good model fit because the SRMR value is less than 0.08 (Al-Swidi et al., 2021; Henseler et al., 2015). In terms of predictive relevance of the model, this researcher used R², which indicates the variance magnitude among endogenous variables explained by exogenous variables. Table 4 shows R² equal to 0.225, which is an acceptable level (Cohen, 1988). In addition, the author enhanced these results by a blindfolding procedure, namely cross-validated redundancy. The primary premise behind this technique is that original data are resampled, omitting and predicting each data point of the reflective measurement model items of the endogenous variables. Table 4 shows that Q² is equal to 0.165, which confirms the relevance of the model because the Q² is more than zero (Al-Swidi et al., 2021; Fornell & Cha, 1994; Hair et al., 2011; Tajudeen et al., 2018).

4.4. Results for structural model and hypothesis testing

Prior to testing the hypotheses, this researcher established the construct validity and reliability, which included the assessment of multicollinearity in the measurement model before estimating the path. The author estimated the VIF and observed that all values for the independent variables were less than 5, which indicated that there was no issue of multicollinearity (Hair et al., 2011). Results in Table 4 present the path results for direct and interactive effects of interested variables.

The researcher used the 5,000 bootstrapping samples technique to estimate the significance level to test the hypotheses (Hair et al., 2011). As shown in Table 4, virtual audit proficiency has a positive and significant impact on audit effort and quality of auditors' performance ($\beta = 0.175$ and $p < 0.05$ for audit effort; $\beta = 0.242$ and $p < 0.01$ for quality of auditors' performance). These findings support the hypotheses (H1a and H1b). Similarly, the results show that audit effort positively and significantly influences quality of auditors' performance ($\beta = 0.281$ and $p < 0.05$). This result supports the hypothesis H2.

In this analysis, the researcher tests the moderating effect of virtual audit proficiency on the relationship between audit effort and quality of auditors' performance. The result in Table 4 shows a positive and significant moderating effect of virtual audit proficiency on the impact of audit effort on quality of auditors' performance ($\beta = 0.101$ and $p < 0.05$). These results support H3. As for the last hypothesis, results suggest that AF does not significantly moderate the association between virtual audit proficiency and quality of auditors' performance ($\beta = 0.045$ and $p > 0.10$), rejecting hypothesis H4.

5. Discussion, implications, limitations, and conclusion

5.1. Results discussion

The COVID-19 pandemic has greatly challenged the lives of both human beings and businesses, and interesting questions have emerged about auditors in relation to the quality of performing audit activities. These questions suggest that auditors in the time of COVID-19 need strong internal and external capabilities to exert the required effort and to deliver high-performance audit. Based on these questions, the current author developed hypotheses concerning the performance of auditors during the pandemic in terms of virtual audit proficiency, audit effort, and quality of auditors' performance. Particularly, the study provides evidence of the external auditors' perception in the COVID-19 environment in relation to the impact of audit effort and virtual audit proficiency on performance, and whether virtual audit proficiency directly affects audit effort and moderates the impact of audit effort on auditors' performance. In addition, this author investigated whether AF plays a moderating role in the relationships between virtual audit proficiency and quality of auditors' performance.

The results indicate that virtual audit proficiency positively and significantly influences both audit effort and quality of auditors' performance. This denotes that in the challenging time of the pandemic, external auditors who have developed knowledge and skills in using virtual audit are best able to conduct standard audit procedures and collect appropriate and sufficient evidence in the same way as prior to the pandemic. Put differently, as COVID-19 increases the risk of financial reporting misstatements, the auditors are required to expand and conduct comprehensive tests to reduce this risk, which also needs greater efforts. This is in line with the arguments that auditors with virtual audit qualifications are empowered to make greater audit efforts (Appelbaum et al., 2020; Christ et al., 2021). These results are consistent with Teeter et al. (2010) and Tetteh et al. (2022), who argued that virtual audit proficiency is more likely to improve the auditors' performance and ultimately improve the quality of the audit job. The results also reveal that audit effort positively and significantly influences quality of auditors' performance. This indicates that in the challenging time of the pandemic, external auditors who have a high degree of audit effort are more likely to exhibit a high level of persistence and intensity in their audit job to increase their performance. These results are in line with several studies (e.g., Aucejo et al., 2022; Bandura, 1986; Satata, 2021) that imply that these individuals are more likely to exert more effort and achieve higher levels of performance.

Interestingly, the results show that virtual audit proficiency positively and significantly moderates the impact of audit effort on quality of auditors' performance. These findings give emphasis to the moderating role of virtual audit proficiency in facilitating an auditor's progress towards delivering audit activities during the COVID-19 pandemic as normal. This result is consistent with

those of prior researchers such as Tetteh et al. (2022), suggesting that virtual audit experience plays a moderating role in the performance. Finally, the results unexpectedly suggest that the AF has no moderating effect on the relationship between virtual audit proficiency and quality of auditors' performance. It might be argued that the sudden shock of the COVID-19 pandemic created an urgent need to use virtual audit proficiency in auditing among all types of audit firms and forced their auditors to switch from regular auditing to remote auditing within a short period. Thus, auditors lack the related experience with appropriate audit approaches during COVID-19, and consequently their confidence is shaken in conducting audit activities with relative quality. Although Big 4 audit firms are known to be more oriented towards using advanced technologies in auditing, the results suggest a growing attention of non-Big 4 audit firms to the investment in technology and training their auditors in advanced audit technologies. Overall, the results support the developed hypotheses, except the hypothesis of moderating effect of AF on the association between virtual audit and audit performance.

5.2. Theoretical and practical implications

The study's results have several invaluable theoretical and practical implications. In terms of theory, this study contributes to the audit literature by incorporating the virtual audit proficiency and effort variables as an important determinant of audit quality, given the limited research on how both variables influence the performance (Tetteh et al., 2022). In addition, this study expands this domain by providing empirical evidence confirming that virtual audit proficiency leads to greater effort and improves the quality of auditors' performance, filling the knowledge gap identified by other authors (Christ et al., 2021; Teeter et al., 2010; Tetteh et al., 2022). The study also contributes to an in-depth understanding of the impact of COVID-19 on audit quality in that it presents new challenges and increases audit risks. To the researcher's knowledge, this study is the first to provide a comprehensive assessment of how auditors perform their work during this unprecedented time. An additional important theoretical contribution is that the study advances the virtual audit proficiency literature by highlighting the moderating role of virtual audit proficiency on the relationship between audit effort and quality of auditors' performance.

In terms of practical implications, this study provides valuable information for users, practitioners, and regulators. For users, it fuels discussions concerning how auditors during COVID-19 perform audit and whether they can deliver high-quality audit, which are the major concerns raised by users (Arnold, 2021). Moreover, this study provides audit firms with new insights into the importance of virtual audit proficiency, including the virtual audit at the current time and in the future (Christ et al., 2021). The general view of these stakeholders is that virtual audit threatens the quality of audit (Bennett & Hatfield, 2018; Saiewitz, 2018). Therefore, the results highlight the need to establish a virtual audit culture within audit firms and at all levels of auditor. This necessitates sufficient investment in new technologies and better knowledge and skills of audit staff in running complex systems. The results also provide practical insights for audit regulators about using virtual audit proficiency. Currently, there are no formal guidelines on how and when auditors should use virtual audit activities to collect appropriate and sufficient evidence and come to appropriate audit conclusions (Appelbaum et al., 2020; Arnold, 2021). Such guidelines would assist auditors to plan their activities and perform them in an efficient and effective manner; at the same time this study will open the discussion of ethical and social issues surrounding virtual audit proficiency.

5.3. Research limitations and future research opportunities

This study, like any research, has some limitations that need careful consideration when interpreting the results, although these limitations provide stimulating avenues for future research. First, this researcher relied on Fogarty and Kalbers (2006) and Kalbers and Cenker (2008) to measure auditors' performance, which is based on self-reported scores. Although this is common in studies of individuals' performance, future researchers could examine this issue by using an independent assessor or specific measures such as audit hours and audit outcomes. Moreover, future researchers might use different measurements such as earnings quality to proxy audit quality at the

organisational level instead of individuals. Second, the results are based on a survey of auditors from Saudi Arabia, a developing country. Although this country is currently advanced in technology and strongly encourages its use, the generalisability of the results to more developed countries require caveats. Thus, it would be interesting to replicate this study in other settings. Finally, this researcher did not investigate the ethical implications of the utilisation of virtual audit proficiency, which is important in providing an overview of auditors' performance. In reality, although this is highly complex, a clear picture should be obtained. Thus, to gain a deeper understanding of virtual audit proficiency and the issues surrounding it, it is important for future researchers to investigate beyond these issues in terms of the responsibility for emerging technologies' governance and policy.

5.4. Conclusion

Regardless of the impacts of virtual audit proficiency on audit effort and auditors' performance, this study confirmed that virtual audit proficiency contributes significantly to generating a better understanding of the auditing profession and its procedures during COVID-19 or any other similar crisis. In addition, it also contributes by reducing the challenges facing the auditors and suggesting that they work remotely in such circumstances to perform more efficiently and effectively. Particularly, the study confirms that virtual audit proficiency positively and significantly affects both audit effort and quality of auditors' performance. Moreover, it also confirms that audit effort positively affects the quality of auditors' performance. Importantly, this study also reveals that virtual audit proficiency has a significant role as a moderating variable between audit effort and the quality of auditors' performance. Finally, it indicates that AF has no moderating effect on the relationship between virtual audit proficiency and quality of auditors' performance. This study provides several contributions and important practical and theoretical implications.

Funding

The author received no direct funding for this research.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Citation information

Cite this article as: Is the impact of audit effort on quality of auditors' performance contingent on virtual audit proficiency? An auditors' perspective during the COVID-19 pandemic, Ali Ali Al-Ansi, *Cogent Business & Management* (2022), 9: 2144704.

Endnotes

1. The latest list on 1 April 2021 was used to determine the population of external auditors in Saudi Arabia (<https://socpa.org.sa/SOCPA/files/94/94e43641-0c1b-459d-abfc-a9535bf0cb1c.html>).
2. Following Armstrong and Overton (1977), in the analysis the researcher checked for non-response bias by comparing first and last month respondents as the late and early subjects. Using a two-tailed t-test, the results indicated no significant differences between the late and early respondents, indicating that non-response bias is not an issue.

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