Lessons from leveraging technology in auditing during COVID-19: an emerging economy perspective

Neeraj Sharma
Department of Market Research, Mukraj-Insights and Consultancy, Jabalpur, India

Garima Sharma
Department of Business, Victoria University, Melbourne, Australia, and

Mahesh Joshi and Sharad Sharma
School of Accounting, Information Systems and Supply Chain, RMIT University, Melbourne, Australia

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Abstract

Purpose – This study aims to examine the challenges posed by COVID-19 restrictions for audit processes in India and explore the perceptions of the profession on how technology was leveraged to conduct audits during this period. The opinions of auditors on future changes in post-COVID-19 audit practices and processes are also explored.

Design/methodology/approach – Semi-structured interviews were conducted with senior auditors working in various audit firms in major business centers in India and subjected to content and thematic analysis using the institutional theory perspective.

Findings – The auditing profession used technology to respond to COVID-19-imposed disruptions of established audit process and practices while maintaining the legitimacy of audit reports. The findings indicate that auditors now seem to strongly support the integration of emerging technologies into their auditing practices post-COVID to ensure data accuracy and transparency. The interviewees displayed keen interest in continuing remote and in-person audits to maintain audit quality in the future. The experience of COVID-19 appears to have forced the auditing profession to overcome their reluctance to adopt technologies that were previously used by only Big 4 and large audit companies.

Practical implications – The results will be of particular interest to various stakeholders concerned with aspects of the acceptance of technology-assisted audit reports such as legitimacy, required infrastructure, cost involvement and resistance to change. The findings will also assist professional bodies and policymakers in both developed and developing economies in devising useful strategies to promote technology-aided auditing during and after COVID-19. Limitations posed by inadequate infrastructure and resistance to changes must be overcomed before implementation of technology-aided audits.

Originality/value – As COVID-19 pandemic is a recent phenomenon, to the best of the authors' knowledge, this study is one of the first few studies that have examined the use of technology to facilitate audits during the COVID-19 period, more specifically from a developing economy perspective.

Keywords COVID 19, Audit quality, Technology, Emerging economy, Semi-structured Interviews

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1. Introduction

Since the beginning of 2020, the COVID-19 pandemic and ensuring government responses have altered health, social life and economics worldwide (Goodell, 2020; Levy, 2020). The impacts of COVID-19 extend to all aspects of human life, including travel, education, businesses and professional service industries, and the auditing profession and audit processes are no exception (ACCA, 2020; ICAI, 2020). In addition to struggling to meet normal expectations of audit quality and non-negotiable deadlines under COVID-19-related social-distancing measures and lockdowns, auditors have faced the challenge of increased scrutiny of financial reports in the wake of the negative impact of the pandemic on businesses (ACCA, 2020; ICAI, 2020). Like many businesses and professions, the future of auditing seems uncertain, as stakeholders are demanding a resolution to the impact of COVID-19 and a return to business as usual (Levy, 2020; KPMG, 2020; ACCA, 2020).

In some cases, the auditing process requires that auditors be physically present to perform the audit or confirm the content of the audit report. Although costly, the requirement for physical verification during the auditing process reflects the accumulation of experience and time-tested practices during the evolution of the profession. However, strict lockdown measures globally hampered the ability of auditors to perform audits face-to-face and forced a shift to remote work (ACCA, 2020; Albitar *et al.*, 2020; Levy, 2020; Ahn and Wickramasinghe, 2021; De Santis and D'ONZA, 2021; Rakipi *et al.*, 2021). These changes in the auditing process have raised concerns among stakeholders about the accuracy and legitimacy of audit reports. One strategy for avoiding compromises in audit report quality is to incorporate information communication technology (ICT), big data and data analytics into remote auditing (Ahn and Wickramasinghe, 2021; De Santis and D'ONZA, 2021; Rakipi *et al.*, 2021). For example, ICT is increasingly being used to collect and verify audit evidence remotely by using video and teleconferencing (Ahn and Wickramasinghe, 2021; Albitar *et al.*, 2020; Pavel *et al.*, 2020). However, digitalisation of the audit process is subject to challenges such as internet connectivity, a lack of technological awareness among auditors and the cost of implementing the required technological framework (Pavel *et al.*, 2020). Such limitations might be mitigated by adopting more advanced technology platforms, such as artificial intelligence and satellite monitoring, proper training and development of employees. COVID-19 has helped spur the progression of the profession to remote auditing, giving rise to alternative ways of auditing that might have the potential to transform the auditing profession in the future. This progress may or may not be rolled back when normalcy returns.

Previous studies of remote auditing have found that technology enhances the efficiency and effectiveness of the auditing process (Ahn and Wickramasinghe, 2021; De Santis and D'ONZA, 2021; Pavel *et al.*, 2020; Rakipi *et al.*, 2021). Remote auditing is not a new concept for big companies, such as KPMG and EY, that operate in various locations worldwide. These companies have used ICT technology for auditing processes for over a decade (Teeter *et al.*, 2010). However, COVID-19-related restrictions have forced many small- and medium-sized auditing firms to shift from established practices to the emerging technologies used by the big auditing firms. The requirements from regulatory bodies and lending institutions for timely audits of clients may also have contributed to increased reliance on technology (Appelbaum *et al.*, 2020; Albitar *et al.*, 2020; ACCA, 2020). These companies had previously resisted adopting technology due to the need for capital, training and development expenditures (A. Vasarhelyi and Romero, 2014; Alles, 2015). With increases in economies of scale, these costs may decrease, furthering the adoption of ICT in auditing. Examining the benefits of technology-aided auditing during the COVID-19 pandemic is critical for defining the potential of these tools to support audit processes in the post-COVID-19 world.

India is one of the largest and fastest-growing economies in the world, contributing approximately 3.3% to the total world economy (Eichengreen, 2010; India Today, 2019). Despite advances in ICT in India, including big bets on digitalisation, machine learning, artificial intelligence, blockchain and cybersecurity (Sinha and Sengupta, 2020), the auditing industry lacks the managerial and analytical talent needed to reap the optimal benefits of these technologies (Accountancy Age, 2020). In India, the auditing industry is dominated by the Big 4 audit firms (Deloitte, EY, KPMG and PwC) on account of assurance and quality, which independent audit firms are unable to deliver due to their poor technological infrastructure (Layak and Mehra, 2009). Even though India is a world leader in Information Technology (IT), the majority of small- and medium-sized auditing firms in India continue to use traditional methods of performing audits, such as physical checks at the premises, manual inventory counts and paper-based evidence (Susanne and Wolfgang, 2021). The infrastructure and work culture in various industries in India remain the greatest challenges to training manpower to adopt cutting-edge technologies such as big data, blockchain, digitalisation and artificial intelligence (Sinha and Sengupta, 2020). Given the strong impact of COVID-19 on the economy, business and corporations in India and the lack of exposure to modern-day innovative technologies in audit practices, it is imperative to explore the perceptions of Indian auditors to understand how Indian auditors and audit firms have leveraged the technology lessons arising from the difficulties and challenges brought by the pandemic.

Most studies of the impact of the pandemic have focused on businesses (Ahn and Wickramasinghe, 2021; Levy, 2020; Pavel *et al.*, 2020; Rakipi *et al.*, 2021), and none has examined how technology has facilitated audit functions on a global scale. The current study explores how pandemic-related restrictions have disrupted the audit process and how auditors have and will continue to leverage technology lessons. Data were collected from semi-structured interviews with senior auditors working in various audit firms in major business centres in India. The interviews were intended to gather insights on disruptions of and resulting changes in audit processes and practices during the COVID-19 pandemic. In particular, this study using the institutional theory perspective identifies challenges faced by the audit profession due to the restrictions imposed to prevent the spread of the COVID-19 pandemic and documents the possible progression of the profession. In the absence of any regulatory mandate on the profession to follow the expected changes, the normative and mimetic pressure seems to have reflected on the behavior of the profession rather than coercive pressure. We also note challenges perceived by the auditing professionals for the future if such changes in auditing processes are continued post-COVID-19.

The findings have several practical implications. First, the findings highlight the perceptions of auditors of their ability, at both the individual and organisational levels, to implement technology in the auditing process. The interviews confirmed that users have doubts about the reliability and sufficiency of audit reporting during COVID-19-related restrictions, which requires the attention of professional and the regulatory bodies to ensure the legitimacy of audit reports. The benefits of changes in auditing processes must outweigh the costs (ICAEW, 2017; Earley, 2015; Alles, 2015). Thus, the findings of this study can be used by professionals, regulatory bodies and policymakers to make changes in auditing practices and processes and anticipate the acceptability of the outcomes of such changes. Second, the study provides insights on the challenges faced by the Indian auditing profession during COVID-19 and the outcomes of the implementation of technology-aided audits. Such changes must overcome the limitations posed by inadequate infrastructure and initial resistance to change. The findings may be applied by professional bodies and policymakers in both developed and developing countries to devise useful strategies to

promote technology-aided auditing. Third, the study documents the progression of the auditing profession and practices in response to the COVID-19 crisis. Fourth the finding helps understand how in the absence of regulatory guidelines and the situation of uncertainty, the profession assimilate the behaviour of the peers that it considers a benchmark or model. As such, the findings make a unique and incremental contribution to the auditing and technology literature from a developing country perspective.

The remainder of this paper is organised as follows. Section 2 reviews the related literature. Section 3 describes the methodology, and Section 4 discusses the results. The conclusions is presented in Section 5.

2. Literature review

The Institute of Chartered Accountants of India (ICAI) is the only licensing/regulating body in the financial audit and accountancy profession in India. Such power to ICAI comes from several governing acts, for example, The Companies Act 1956, 2013; The Chartered Accountants Act 1949; The Insurance Regulatory and Development Authority Act 1999; The Banking Regulation Act 1949; The Income-tax Act 1961; Securities and Exchange Board of India (SEBI) Act 1992 (Ghosh, 2011; Perumpral *et al.*, 2009; Jacob *et al.*, 2019; Nagar *et al.*, 2021). Auditing services in India are dominated by the local audit firms (Houqe *et al.*, 2017), although the Big 4 with their local chartered accounting firm associates brings legitimacy to their audit report for the investing community and the regulator in Indian jurisdiction where the enforcement of laws is weak (Ghosh, 2011; Jacob *et al.*, 2019; Nagar *et al.*, 2021). There are adequate regulatory standards and strict penalties for non-compliance with auditory regulations in India, not many disciplinary actions were taken against companies involved in fraud and non-compliance of auditing standards (Nagar *et al.*, 2021; Layak and Mehra, 2009). Penalties for conducting fraud are generally faced by the audit partners in charge of the audit, whereas the audit firms receive the clean chit (Jacob *et al.*, 2019). Moreover, no independent reviewer's or peer review policies are in place to enhance the audit quality which is quite distinct in countries such as USA and UK. Nagar *et al.* (2021) observed that Big 4 accounting firms, because of their global operations, have incentives to practice in a way that develop and maintain a strong and uniform reputation globally.

The study uses the institutional theory perspective to explore how pandemic-related restrictions have disrupted the audit process and how auditors have and will continue to leverage technology lessons. In the absence of any regulatory requirement to adopt technology, that may have coercive pressure, the study uses the mimetic and normative processes under institutional theoretical perspective. During the COVID-19 pandemic challenging situation of uncertainty, the small audit firms and independent firms in the auditing profession assimilate the behavior of the peers that it considers a benchmark or model. While coercive process under institutional theory looks into intended or unintended pressure cast on an entity by other entities in the environment, the mimetic process brings in the situation of uncertainty and indecisiveness where the entity will follow a process that has been used by the entities that it considers benchmark (DiMaggio and Powell, 1983; Scott, 2008, 2013). The normative process relates to following professional methods and norms exhibited by their professional counterparts under a similar situation. in a particular situation. DiMaggio and Powell (1983) identified this as a normative isomorphism, which relates to pressure due to professional processes and norms, as well as professional recognition. With the current COVID-19 pandemic around the world, we argue that audit firms were under intended or unintended pressures to adopt innovative technologies to facilitate better audit services and to ensure audit quality. Studies in the different fields have used institutional pressures to explain the technology adoption, examples include Soares

et al. (2020) in hotels, cloud accounting in small and medium enterprises (SMEs) (Sastararuji *et al.*, 2021).

Over the past two decades, technological advancements and globalisation have transformed the way that big organisations in many industries work. In the auditing profession, technology-aided audit processes have reduced the time spent by auditors on clerical tasks, allowing them to spend more time on riskier areas that require greater judgement and potentially improving audit quality (Teeter *et al.*, 2010; Lowe *et al.*, 2018; A. Vasarhelyi and Romero, 2014). New-age technologies such as big data, data analytics and artificial intelligence have rapidly gained popularity due to their ability to securely enhance the quality and efficiency of audit reports (Pavel *et al.*, 2020; Lowe *et al.*, 2018; De Santis and D'ONZA, 2021; Ahn and Wickramasinghe, 2021; Earley, 2015; Alles, 2015). Although technology-supported audit systems can enhance the timeliness and accuracy of audit reports, they are also vulnerable to data manipulation and cybersecurity concerns, which necessitates careful identification of technology and heightened security measures (Witte, 2020). Overreliance on technology can inhibit learning among employees, and many auditing standards are not compatible with current technological capabilities (Witte, 2020; Vasarhelyi *et al.*, 2015; Teeter *et al.*, 2010). Moreover, the auditing standards and guidelines of governing bodies might prohibit the realisation of the expected benefits of applying technology (Earley, 2015). For example, technology cannot fulfil the mandatory requirement to check inventory physically at the client's office.

The greatest barriers to technology adoption in auditing are the lack of technological readiness among auditors and the unfamiliarity of clients with technology-supported audit processes (Alles, 2015). Nevertheless, these limitations are outweighed by the cost and time benefits of improved audit report efficiency and quality (Vasarhelyi *et al.*, 2015; Teeter *et al.*, 2010; Kotb and Roberts, 2011; AICPA, 2014). These benefits have motivated various audit firms to transition to greater automation of practices (Kotb and Roberts, 2011; Dowling and Leech, 2014; Ahn and Wickramasinghe, 2021). Compared with small audit firms, the Big 4 audit firms have greater resources to invest in technological tools to accelerate various business processes including audits (Janvrin *et al.*, 2008), and technology-aided audit processes have become an integral part of their practices (Lowe *et al.*, 2018). The adoption of technology is likely one reason that stakeholders in the auditing industry prize the quality and credibility of audit reports from Big 4 firms. By contrast, local or small audit firms have shown reluctance to incorporate these technologies due to their poor technological infrastructure and cost constraints of training and development (A. Vasarhelyi and Romero, 2014; Alles, 2015). However, to survive during COVID-19, a majority of small and medium-sized audit companies as well as those with poor technological infrastructure have been forced to invest in automating the auditing process and training employees with limited IT exposure (CAANZ, 2020; Accountancy Age, 2020; ACCA, 2020). Technological tools such as video conferencing, interactions, big data and data analytics have been adopted following normative and mimetic processes to complete audits while adhering to quality and time guidelines (Rakipi *et al.*, 2021; De Santis and D'ONZA, 2021; Albitar *et al.*, 2020; Ahn and Wickramasinghe, 2021).

In response to this transformation of the work environment, many of the standard guidelines of regulatory bodies for audit functions have been revised to reduce the risks brought by COVID-19-related disruptions, such as material misstatement and the going concern principle (ACCA, 2020; KPMG, 2020; PCAOB, 2020; Council, 2020). For instance, the guideline checking property, plant and equipment (PPE) along with inventory counts onsite has been revised to allow live streaming of the PPE and inventory count, which allows where management to put their fixed assets on camera for the auditor to verify their

existence (AICPA, 2021). Similarly, to assess risk and material misstatement, auditors need to revisit their initial risk assessment and modify planned procedures according to the evolving circumstances of the pandemic (PCAOB, 2020). Professional bodies and governing bodies across the globe have encouraged firms to make use of technology for quality assurance monitoring (ICAEW, 2020; FRC, 2020; CAANZ, 2020; IFAC, 2020; ACCA, 2020; AICPA, 2021; AUASB, 2020). For instance, Auditing and Assurance Standards Board (AUASB) revised various guidelines on auditing standards to better reflect emerging technologies for performing quality audits (AUASB, 2020). Recommendations from professional bodies to adopt technology-assisted auditing for processes such as monitoring firms' internal control systems, fraud detection, materiality, inventory checks, going concern, accounting estimates and collection of evidence have accelerated remote auditing among audit firms worldwide. The use of live video and drone technology for inventory checks, online platforms such as Zoom and Webex for meetings, and big data and data analytics for assessing client data are now common practices that allow technology-assisted auditing in real time, not after the event (Accountancy Age, 2020). As such, the pandemic has revealed that there is a need for a more proactive approach to leveraging technology in the audit process.

While studies have confirmed the impact of COVID-19 on various auditing processes under the restrictions imposed by social distancing as the COVID-19 pandemic is a recent phenomenon, few studies have examined how technology has facilitated audit functions during the pandemic. One of such rare studies is a bibliographical review by Cruz (2020) carried to investigate the audit's technological responses to COVID-19's impact and also analyse COVID-19's impact on auditing focus. Similarly, Nezhyva *et al.* (2020) also carried an analysis of publications of scientists, official reports of international organizations, regulations, etc. to understand the role of digitalisation in the financial spheres, in particular in the sphere of the audit during the COVID-19 pandemic. Beechem (2021) in her questionnaire-based study examined the perceived potential impacts of COVID-19 on the usage of common types of IT audit applications as well as productivity tools as used by auditors. Their finding confirms the adoption of technology in response to challenges posed by COVID-19 restrictions for audit processes.

The above review of the literature shows that technology has been adopted across firms during the COVID-19 crisis to ensure audit quality. These emerging technologies, such as big data and data analytics, may also reform audit procedures post-COVID-19 by redefining the new normal, mitigating security issues, and improving the quality and efficiency of audit reports.

Thus, this study is guided by the following research questions (RQs):

RQ1. How has the COVID-19 pandemic affected the quality of the audit process?

RQ2. How are digital technologies transforming audit processes in environments impacted by COVID-19?

RQ3. What are the opinions of auditors on future changes in post-COVID-19 audit practices and processes?

3. Research methodology

This paper uses qualitative data collected through semi-structured interviews with 63 Indian auditors employed by reputed audit firms to learn how technology has been leveraged to conduct audits during the COVID-19 pandemic in India. The interviews, which were 30–45 min long, were conducted online due to lockdown and social distancing restrictions during the three-month period from February 2021 to April 2021. The

geographic scope of the study included audit firms located in major business centres of India such as Mumbai, Delhi, Chennai, Kolkata, Ahmedabad, Hyderabad, Pune, Kochi and Chandigarh. The interviewees were senior auditors at the selected audit firms who were actively involved in conducting major audit processes, including checking inventory, meeting clients and conducting fraud interviews (Dowling and Leech, 2014; Seol *et al.*, 2017; Layak and Mehra, 2009), and were therefore likely to have experienced the impact of the COVID-19 situation first-hand.

Based on information available on LinkedIn, we randomly identified a cohort of 500 senior auditors at audit firms in the major business centres in India and contacted them directly by written communication via various social media platforms such as LinkedIn, Twitter and Instagram to seek their consent for the interviews. Of these 500 senior auditors, only 49 accepted the invitation to participate in interviews (response rate of 9.8%). Once the interviews commenced, we used the snowball sampling technique (Atkinson and Flint, 2004) to expand the sample by asking the initial set of interviewees for the names and contact details of senior auditors at other firms. This resulted in 14 additional interviews, giving a final sample size of 63 senior auditors at firms engaged by wide range of industries. All respondents are qualified chartered accountants, i.e. minimum requirements for auditors required by the ICAI. Most participants had over 10 years of relevant experience. Participant's background details are all contained in Table 1.

Given the exploratory nature of the study, data collection was performed online using a semi-structured qualitative research technique to gain a richer contextual understanding of the impact of COVID-19 on the audit process. Semi-structured interviews are also useful in identifying the subjective viewpoints of participants (De Santis and D'ONZA, 2021; Pavel *et al.*, 2020; Krieger *et al.*, 2021). However, semi-structured interviews are subject to bias regarding the creditability of the data collected (Creswell, 2014). To reduce the potential impact of such bias during the qualitative study, a systematic auditable process was adopted to develop meaningful themes from the qualitative data (Lillis, 1999). Questions were asked in a naturalistic and flexible manner to allow space for new themes and perspectives to emerge (Braun and Clarke, 2006).

A semi-structured interview guide was developed by drawing insights from past studies of key elements related to the audit process. To develop relevant questions for the qualitative interviews, we searched for keywords such as "COVID-19", "cutting-edge technologies", "Remote Audits", "Innovative Technologies", "Audit Quality", "Challenges", "Emerging Audit Technologies" and "Post-COVID-19 Audit". These keywords were used to conduct exhaustive searches of Google Scholar and other research databases to identify

Table 1. Participant's background details

	No. of respondents
Respondents	
Managers and senior auditors of Audit Firms	16
Audit partners	30
Individual Practicing Auditors	17
Gender	
Male	45
Female	18
Experience	
Less than 10 years (Junior Auditors)	20
More than 10 years (Senior Auditors)	43

related issues in recent journal articles, publications on websites of professional accounting bodies and published news media. The information obtained in this process was used to develop a blend of open-ended and closed-ended questions followed by why or how questions to create a dialogue around the research questions for the qualitative study, which aimed to investigate how the senior auditor interviewees perceived the potential effects of the current COVID-19 situation.

We started the interviews by discussing the key technologies used by the firm in the audit process during the pre-COVID-19 era compared with the post-COVID-19 scenario as mandated by policy and guidelines. As the interviews progressed, we probed the usage of technologies in the audit process, the approaches used by senior auditors and the challenges that senior auditors faced in implementing the audit process. Of the 63 interviewees, 35 shared their contact details for further research purposes. The written responses to the open-ended questions were subjected to content and thematic analyses. The data from the interviews were categorised into various themes and specific quotations were identified for supporting various themes developed for each research question. While doing this, we identified different kinds of statements or phrases that relate to each other or are in a contradiction to the themes developed for analysis. Finally, response patterns and supporting arguments representing the respondents' experiences were collected and answers for each element/theme of the research question were developed.

4. Analysis and discussion

In this section, the empirical findings are presented for each of the research questions. The respondents' experiences and perceptions are represented by selected quotations that are representative of statements made by other interviewees, meaningful for explaining the findings, with further support from the recent academic literature on innovative audit technologies and the impact of COVID-19.

RQ1 examines "How has the COVID-19 pandemic affected the quality of the audit process?" The interviewees agreed that the travel restrictions and lockdowns imposed in parts of India as part of the COVID-19 response led to disruptions of the audit process. One interviewee noted that, "Auditing within the time limit and in person was not possible for an auditor during a pandemic", whereas another stated that "Depending on events it affected credit, cyber, market, and liquidity risks, as well as their tolerances. For many sectors, operational, governance and process risks were also affected. Especially of concern to internal audits were questions of how exceptions to controls and risk acceptances were granted, as well as third-party risks, including supply chain disruptions". Reflecting on travel restrictions, an interviewee observed that "Vouching and verification have become harder, as the travel restrictions don't allow visits to the premises of the client", consistent with experiences reported in other jurisdictions (DeCorte and Wright, 2021; ICAI, 2020; Pavel *et al.*, 2020).

Due to the travel and social distancing restrictions, firms in India were forced to explore options such as live video, digital documentation, data analytics, project management and delegation of audit work to local audit firms for audits at distant or unreachable locations to meet expectations for audit reports (ACCA, 2020). The pressure to adopt the technology instead of coming from a specific stakeholder has come from the environment itself. Respondents were observed to be embracing emerging technologies as a solution to the using COVID 19 disruption following large audit companies and big 4 audit firms. One respondent stated "We try to use the technologies what other reputed audit firms are using. We always keep an eye on practice innovations used by large audit firms". Other respondents argued that "We are open to identifying what happens in leading audit firms

and follow them, more due to problems caused by COVID". Such behaviour by the small firms, in absence of any specific guidelines from the regulator or the government, to looks towards the large audit companies and big 4 audit firms who are considered benchmark is explained as mimetic isomorphism by DiMaggio and Powell (1983), Scott (2008) and (Scott, 2013).

Overall, the interviewees reported greater reliance on remote audits through online platforms to perform various audit functions such as inventory counts, audit evidence collection and client interviews during the COVID-19-induced lockdown phase. Respondents confirmed that this required changes to the established practices of the audit profession. As one interviewee confirmed, "Travel restrictions affected auditing, so we were fully dependent upon technology-based auditing". Another respondent stated that "The places where physical attendance is required have been affected, and because of this, opportunities to move things digitally have been explored". In response to the question aimed to identify the new technologies that are adopted during pandemic, the interviewee identified: "machine learning and artificial intelligence", "robotic process automation", "advanced analytics" as few tools that they tried during the process. A few auditors, however, raised concerns about the authenticity of evidence collected using digital tools: "Remote audits can never match the feel of doing audits physically. We couldn't verify the integrity of the documents shared online"; "Due to restrictions on movement and social distancing norms, the credibility of data gathered and provided by clients is highly doubtful". Interviewees also complained about communication gaps with stakeholders due to delayed responses when audit functions were performed in a virtual environment. Such gaps were likely due to poor networks or resource unavailability in remote areas of India, as confirmed by the statement of a respondent about "Communication gaps due to network issues". These concerns about authenticity and delays in communication might also reflect the interviewees' resistance to switching from traditional to digital ways of working and the need to invest time in training to understand the digitalisation of audit functions (KPMG, 2014; Menna *et al.*, 2017). COVID-19 restrictions forced auditors to devote more time to devising and implementing alternative methods of auditing, and some expressed keen interest in returning to traditional ways of performing various audit functions such as physical inventory: "Auditors can ask the management to share their internal count results and do the counting as and when the situation gets feasible to visit physically".

The adoption of new technologies is a considerable challenge in India due to the conventional infrastructure and work culture in place at most organisations (Sinha and Sengupta, 2020) as well as the huge investment costs associated with implementation of these technologies. Most audit firms in India are small- and medium-sized firms that received no government funding during the pandemic to support technology adoption. Over 90% of the interviewed auditors replied that there were no government support plans/stimulus packages to help their organisations. Typical comments were "Government is busy, doing nothing"; "I see no steps taken from the government to support the growth of the economy during this time"; "For the clients I have worked with, no stimulus package was provided". "There is no support at the moment except delaying some statutory deadlines". In the absence of government support, businesses and audit professionals were left to grapple with solutions. Some interviewees expected basic governance measures such as open communication with stakeholders. These responses echo previous criticisms of the Indian government's handling of the coronavirus pandemic compared with other countries (Slater, 2021). Small- and medium-sized audit firms tend to be laggards in adopting in IT in auditing processes due to the costs required and poor digital literacy of their employees (Lowe *et al.*, 2018). India is no exception, as one of the interviewees confirmed: "It has greatly

impacted small firms in automating processes and faced a lot of challenges". Another said that "COVID-19 has required that most audits be conducted as e-audits as well as many improvements in technology and resources that may not be possible for small or mid-sized firms". These responses suggest that government initiatives to support technology adoption among Indian audit firms could minimise the challenges faced by auditors to ensure audit quality. Such initiatives could include providing extra funding or stimulus packages for the adoption of new-age technologies such as big data, cybersecurity and data analytics to support the authentication of digitally collected data.

RQ2 asks "How are digital technologies transforming audit processes in environments impacted by COVID-19?" The interviewees noted higher reliance on emerging technologies to maintain and enhance audit quality during the ongoing pandemic. The need to deliver on established expectations in the face of COVID-19 restrictions seems to have helped audit professionals overcome their reservations about incorporating IT in the auditing process. The imperative to use technology motivated audit firms to address the issue of training staff, as noted by one of the interviewees: "A lot of training has been initiated for doing data analytics. This helps us a lot in doing remote audits better". The use of new-age technologies such as big data, blockchain technologies, data analytics and artificial intelligence has been shown to benefit remote auditing by enhancing efficiency and data transparency (Ahn and Wickramasinghe, 2021; De Santis and D'ONZA, 2021; KPMG, 2014; Rakipi *et al.*, 2021), as acknowledged by the interviewees: "It helps ensure we move forward in terms of automation and smart audit work while maintaining the same level of integrity and thoroughness in our audit work"; "Once again this situation has made the process a speedier one, and online communication took the place of regular communication". The interviewees seemed to recognise the value of investing in remote auditing tools in responses such as "Investment in technology has led to reduced audit risk and increased efficiency for auditors" and "Technology-led investment helps improve efficiency and effectiveness".

In addition, many interviewees acknowledged that technological tools have promoted 'effective communication' by making various audit functions such as inventory checks, fraud interviews and audit evidence collection faster and more efficient. Representative responses in this vein are "The majority of communications to stockholders are made online through email. The majority of reports are available in softcopy form on the company's website, which helps to promote paperless mobilisation of documents among all"; "Communication across the globe has become possible thanks to this new norm of working from home and working across time zones"; and "Communication and transparency increased as things were done in real time with the help of technology". In addition, the investments in IT resources required by the pandemic should help audit firms long-term, as one respondent confirmed: "From a broader respective, short-term investments will help long-term by enabling better technology, data servers and support from human resources".

Tools such as artificial intelligence, data analytics, cybersecurity and blockchain technology have been useful for performing audit functions such as inventory checks, fraud interviews and audit evidence collection more effectively, quickly and efficiently in real time without compromising audit quality. An auditor commented that "Newly installed ERP systems can help real-time report generation, and follow-up action enhances audit quality". Auditors also expressed appreciation for the ability of emerging technologies to efficiently overcome the issue of material misstatement during this difficult time. The interviewees used multiple approaches to address the major challenge of inventory valuation and verification during the COVID lockdowns. One respondent cited the use of data analytics: "We use data analytics and other mathematical methods to ascertain inventory levels and live videos of clients conducting inventory counts". Most of the respondents also used video

conferencing to verify inventory records: "We did physical inventory checks through live video calls along with inventory data". Some respondents mentioned using backward reconciliation and outsourcing of verification tasks to an outside agency: "We use reconciliation by means of the existing documentation and outsource the inventory valuation and verification job to a consultant who can do this job for us". The majority of the respondent firms verified inventories digitally from the beginning of the pandemic, but a few respondents considered digital or online audit processes a good complement for the short-term and mentioned the possibility of returning to their original practices once the COVID situation normalises.

To detect financial fraud, the interviewees noted the use of "alternative methods of fraud detection as well as video conferencing" to conduct fraud interviews with suspected staff members and witnesses. They further advised the use of internal staff to detect fraud; "if there is any suspicion of fraud, it will be brought to the notice of the auditor", who can then "perform substantive procedures and interviews through audiovisual communication channels". We observed that the use of online data analytics, social media audits, social engineering and artificial intelligence has helped audit teams minimise the possibility of fraud during the COVID-19 era.

RQ3 asks "What are the opinions of auditors on future changes in post-COVID-19 audit practices and processes?" In reflecting on future changes in audit practices and processes in the post-COVID-19 period, the auditors seemed positive about the integration of emerging technologies into their auditing practices, with the exception of some minor issues and challenges of technology adoption. The interviewees felt strongly that technology-enabled improvements in audit activities and processes during the COVID-19 period and would continue to change their operations in the post-COVID-19 period.

The interviewees advocated for continuing both remote and physical in-person audit procedures in order to maintain audit quality, in line with Tysiac's (2020) recommendation to continue both because auditors are capable of making reasonable judgments about when and how they can conduct audits remotely while maintaining audit quality. One interviewee expressed support for hybrid audit processes, stating that "It would be a dual approach where the right balance between field visits and online verification can be used to drive profitability". The continued use of both remote and physical in-person audit procedures in the post-COVID-19 phase requires attention from professional accounting bodies, audit firms and the corporate clients.

The interviewees did raise concerns about the impact of technology on the employability of auditors. One respondent emphasised that remote audits cause "reduced reliance on manpower, and increased system use may reduce office space". However, the interviewees response confirms to the recent studies that technology could create new opportunities for audit firms (Schmitz, 2020). They argued that the use of remote audits will empower auditors to focus more on high-risk areas of the audit and expand the horizons of their professional practice beyond routine audit activities for clients. Similarly, Tysiac (2020) suggested that auditors apply their skill sets to new environments of financial auditing and other areas of non-traditional financial information. The interviewees saw value additions to their profession due to the use of these technologies, specifically mentioning a need for "more focus on automated technology while updating employees for the same" and an ongoing vision to "get updated with technology and updating techniques for conducting audits". They suggested that the use of audit technologies will help them improve the quality of data analysis, e.g. "lots of data analysis through which we can give some quality reports to clients". These views were expressed by most of the interviewees, indicating the widespread acceptance of technology in future audit programs and procedures. The

respondents further emphasised that most of these procedural changes and adoption of the innovative technologies are influenced by the success or failure of a particular technology or innovative approach used by the large audit firms. Therefore, the adoption of the technology so far used successfully by the professional counterparts under a similar situation in the large audit companies and big 4 audit firms show mimetic and normative pressure in the quest of organisational legitimacy.

5. Conclusions

The responses of governments to COVID-19 brought major disruptions of audit processes and practices, and the profession has faced the challenge of adhering to expected quality and timelines in ensuring that financial statements are accurate, complete and in line with auditing standards and regulations. Audit reports are required by various stakeholders, including regulators, investors, directors and society at large, not only for various investment decisions but also for assurance of good business practices.

In this study, semi-structured interviews were conducted with senior auditors working in various audit firms in major business centres in India. Content and thematic analyses of the interviews provided insights on the challenges that COVID-19 restrictions have posed for audit processes in India and the role of IT in responding to these restrictions. The findings contribute an understanding of the perceptions of the profession on how technology has been leveraged to conduct audits and change long-established practices. The interviewees' responses confirmed that the digitalisation of audit processes facilitated inventory valuation and fraud detection under pandemic restrictions, although doubts remain about the authenticity of evidence collected using digital tools. In addition, the interviewees concluded that the benefits associated with adopting technologies for various audit processes outweigh the huge investment costs. This challenges the widely held perception that the costs associated with new technologies are the major determinants of their adoption by small- and medium-sized audit firms. However, consistent with the widespread view of the inadequacy of the Indian government's efforts during this time, the interviewees noted a lack of government support, which left the auditing profession to struggle on its own to tackle the challenges of COVID-19. Despite this lack of support, the members of the auditing community interviewed in this study were satisfied with the progress made in the audit process and practices.

The auditors confirmed that new technological tools allowed them to conduct quality audits that were accurate, complete, on time, and in line with government regulations and the expectations of the profession. In particular, various innovative technologies like blockchain and artificial intelligence have helped maintain the legitimacy and reasonable assurance of audit reports. The use of video conferencing or live video for inventory counts in real-time increased data transparency. The findings indicate that auditors now seem to strongly support the integration of emerging technologies into their auditing practices post-COVID to ensure data accuracy and transparency. They also displayed a keen interest in continuing remote and in-person audits to maintain audit quality in the future. The experience of COVID-19 appears to have forced the auditing profession to overcome its reluctance to adopt technologies that were previously used by only Big 4 and large audit companies. Such alignment with the methods and norms processes that were previously used by only Big 4 and large audit companies is adopted under normative and mimetic processes.

By documenting the progress made by the auditing profession in auditing processes, the findings provide several practical implications. Based on the experiences of their firms and their individual experiences, the interviewees emphasised the need for continuous communication among the auditing profession, professional bodies, regulators and the government. The significant progress made by the profession in responding to the current

pandemic situation will be of particular interest to various stakeholders concerned with aspects of the acceptance of technology-assisted audit reports, such as legitimacy, inadequate infrastructure, cost involvement and resistance to change. The auditing community in India was able to unleash their capability to implement technology in the auditing process. This study is the first to explore how technology has facilitated audits during the time of COVID-19. Although the study was based in India, the results can assist professional bodies and policymakers in both developed and developing economies in devising useful strategies to promote technology-aided auditing during and after COVID-19.

A potential limitation of this study is that only auditing professionals from major commercial centres in India were interviewed due to the limitations posed by COVID-19-related restrictions. There is a possibility of subjectivity in the presentation of arguments, as this study relies on the authors' judgements concerning the inclusion and exclusion of auditor responses in the paper. The participants' views may not be representative of others in the sector as the selection of the respondents was limited to auditors with social media presence or others were contacted through their referrals. We acknowledge that this is an exploratory research study, and the findings of the study may not be applicable across several jurisdictions for multiple reasons such as varying levels of COVID-19 restrictions, differences in adoption of technologies across jurisdictions and the level of support extended by their respective governments. Future studies could broaden our findings using a longitudinal approach measuring auditors' perceptions after COVID-19 restrictions are lifted to explore whether the alternative audit technologies used during COVID-19 restrictions will continue to be used in future. It would also be interesting to examine whether audit firms perceive different institutional pressures from large audit firms and their clients to adopt innovative technologies in post COVID environment. Future researchers could also expand the present research by including more dimensions depending upon the nature and structure of the auditing profession in the jurisdiction of interest.

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Appendix. Interview Questions: COVID and Audit Technologies in India

Pre-COVID audit technologies

- Which technologies were used by your audit firms for auditing processes?
- What were the benefits of the increased use of audit technology in the audit process in the pre-COVID period?
- What were the constraints of using audit technology in the audit process?

Technology related issues in auditing

- How did you decide the technologies to be used to perform the remote audit?
- What are some of the technological resources that were used during this COVID period?
- How have automated tools and techniques improved the effectiveness, efficiency and overall quality of the audit?

- Technology will broaden the audit function to garner more insight into data, allowing auditors to play a more active role. Do you agree?
- The reality is that these new technologies and expectations are evolving rapidly, requiring auditors to constantly upgrade their skills and approach. What steps your organisation has taken to ensure that your staff is ready to meet these challenges?
- What steps are taken to ensure the security, confidentiality and privacy of data during the remote audit procedures?
- What are the top challenges to implementing new technologies to support audit processes in the COVID-impacted environment?
- What benefits does your organization derive from your external auditor's use of advanced technologies?

Government and institutional support

- Has any of the professional accounting bodies in India announced a support plan for the auditors?
- Has the Government of India reduced/amended regulator audit requirements during the COVID period?
- Has any of the Government's support plans/stimulus package helped you in this challenging time?

Post-COVID audit environment

- The pandemic has pushed firms to develop more automated tools and reduce reliance on human resources. Do you think this practice will dominate in post-COVID environment?
- What are the plans of your organisation for the post-audit COVID processes?
- It seems that on-site visits will resume as the pandemic comes under control. Do you think that the evolution/transformation of audit processes will stay?

Corresponding author
Mahesh Joshi can be contacted at: mahesh.joshi@rmit.edu.au