Audit practice – a straightforward trade or a complex system?

Karin Barac, Kato Plant*, Rolien Kunz, Marina Kirstein

Faculty of Economic and Management Sciences, University of Pretoria, Pretoria, South Africa

***Correspondence**
Kato Plant, Faculty of Economic and Management Sciences, University of Pretoria, Lynnwood Road, Hatfield 0002, Pretoria, South Africa.
Email: kato.plant@up.ac.za

Abstract

Auditors' skills and ways of working must adapt to persistently changing conditions in the workplace, but the COVID-19 pandemic has brought further complexity. This paper uses a complexity theory lens to investigate changes in audit practice in recent years. A qualitative research method, using semi-structured interviews, was applied: first, to investigate how audit practice (skillsets and ways of working) needs to be reformed, and second, to suggest implications for audit practice stemming from a disruptive macro-level event like the currentCOVID-19 pandemic. It was found that audit firms were framed as complex adaptive systems and new skillsets and ways of working in audit practice are eminent for their adaptation, co-evolution and emerging behaviours, which include virtual audits and remote working being brought about by the COVID-19 pandemic.

Key words:

Audit practice, complex adaptive systems, complexity theory, COVID-19, skillsets, technology, ways of working

Introduction

In the midst of the ongoing debate on how auditors should change their skillsets and ways of working – and efforts to identify those practices that will enable them to remain relevant and functional in an ever-changing environment – the COVID-19 pandemic (Buheji, 2020) is an added complexity. This paper draws on complexity theory and investigates changes in audit practice. It has a twofold objective: first, to investigate how audit practice (particularly skillsets and ways of working) needs to be reformed to remain fit for the landscape, and second, to suggest implications for audit practice stemming from a disruptive macro-level event like the current COVID-19 pandemic.

Academic literature already reports that audit practice is changing and will continue to do so, most notably in its greater use of technology (Appelbaum, Kogan, & Vasarhelyi, 2017; Gepp, Linnenluecke, O'Neill, & Smith, 2018). These changes (Moll & Yigitbasioglu, 2019), and those emanating from increasing complexity in the business environment (Lander, Koene, & Linssen, 2013), are challenging auditors' present skillsets and ways of working (Barac, Gammie, Howieson, & Staden, 2016; Turley et al., 2016). Most recently, professional literature shows that the COVID-19 pandemic is influencing ways that auditors work (AASB−AUASB, 2020; CEAOB, 2020; Europe, 2020; FRC, 2020a, 2020b; IAASB, 2020; PCAOB, 2020), as enforced 'lockdown' protocols make it difficult to visit client sites and/or access evidence and people in order to conduct fieldwork in support of their audit opinion (Radigan, 2020). While the literature has reported on skillsets of future auditors (ACCA, 2016; AICPA, 2015; Huerta & Jensen, 2017; Richins, Stapleton, Stratopoulos, & Wong, 2017) and how technology developments are changing and continue to change their ways of working (e.g. (Appelbaum, Kogan, & Vasarhelyi, 2018; Earley, 2015; Kokina & Davenport, 2017), little is known about the audit practice implications arising from the COVID-19 pandemic, a vacuum which this study is intended to fill.

The paper draws on complexity theory, which studies how complex adaptive systems (CAS) form, adapt and change in various fields (Grobman, 2005). Viewing audit firms as CAS, the theory posits that they can create new order and, just as in human systems, 'the creation of new order is taken to mean the ability to create and innovate, within a broad range' (Mitleton-Kelly, 2006, p. 224). Emerging behaviour in audit firms

as CAS includes the development of new digital skillsets and new ways of working. A qualitative approach was followed for this paper, which is based on two datasets. Dataset 1 is comprised of 44 semi-structured interviews with informed individuals conducted during 2017 and 2018 about changes in audit practice (their skillsets and ways of working). Dataset 2 is based on a case study (Yin, 2014) and is comprised of ten interviews conducted during 2020 and 2021 with partners and senior managers at a specific Big 4 firm (referred to as Alpha) on the audit practice implications arising from the COVID-19 pandemic.

The study found that audit firms can be framed as CAS and new skillsets and ways of working in audit practice are eminent for their adaptation, co-evolution and emerging behaviours. The findings revealed that virtual audits and remote working are brought about by the COVID-19 pandemic and lessons learnt open up opportunities for innovations in audit practice. These include the use of even more technology to improve efficiencies, introducing more flexible work conditions to improve staff members' work life balance, nurturing a more overt care orientation and using technology to introduce equitable and novel global approaches (such as virtual secondments and quality reviews).

The paper offers three contributions. First, it is one of the first attempts to view audit firms as CAS, thereby enriching the transdisciplinary nature of complexity theory in organisational studies. By adding an audit focus to the mix of complexity theory perspectives, the paper contributes to the application of theories in auditing literature. Second, the paper contributes insights on an under-researched topic to auditing literature by suggesting implications for audit practice (digital skillsets and ways of working) arising from the COVID-19 pandemic. Third, the paper makes a practical contribution. Professional bodies and regulators can adjust their education and training programs to allow for COVID implications on auditors' competencies and ways of working. These could be used to inform audit firms' resource allocations, skills development interventions and communication practices.

The remainder of the paper is structured as follows: the next section discusses complexity theory, and is followed by a presentation of literature on changes in audit

practice (skillsets and ways of work, focusing on technology and COVID-19). Thereafter, the research method is discussed and findings are presented. This is followed by a discussion of the findings that frame audit firms as CAS. The paper concludes with suggestions for future research.

Complexity theory

This paper draws on what is commonly known as complexity theory[1] (e.g. Mitleton-Kelly (2003); Stacey (1996); Waldorp (1992)), as it views audit firms as CAS. While CAS span a wide variety of fields (e.g. physical, biological, and social sciences), they are defined by a set of common and interrelated concepts (Zimmerman, Lindberg, & Plsek, 1998). Scholars have used these concepts to study how organisations (when seen as CAS) adapt to their environments and cope with conditions of uncertainty (e.g. Burnes (2005); Eppel and Rhodes (2018); Klijn and Snellen (2009); McElroy (2000); Mitleton-Kelly (2003); Tsoukas and Dooley (2011). Table 1 provides descriptions of six key concepts inherent in a CAS.

Table 1: Concepts inherent in a CAS

Concepts	Description
Multiple interacting component parts or agents	A CAS requires a holistic understanding because the whole differs from the sum of the component parts or agents (Stacey, 1996; Waddock, Meszoely, Waddell, & Dentoni, 2015). All component parts or agents are connected, interact, and influence each other (Mitleton-Kelly, 2003) and their collective actions produce complex patterns of behaviour and outcomes that are difficult to predict (Lizier et al., 2018).
Interaction and interconnected -ness	Complex behaviour arises from interactions between and inter-connectedness of component parts/agents within a CAS and its environment (Mitleton-Kelly, 2003). All component parts/agents interact with each other according to sets of rules (called schemas) and through feedback loops (Anderson, 1999; Mitleton-Kelly, 2003) whereby they improve their individual behaviours and that of the system which they comprise (Stacey, 1996). Positive (reinforcing) and negative (balancing and monitoring) feedback loops balance a CAS at the edge of chaos (Klijn & Snellen, 2009; Mitleton-Kelly, 2003).
Adaptation, emerging behaviour and co-evolution	CAS are learning systems (Stacey, 1996). They are influenced by the environment, while simultaneously influencing that environment in a reciprocal process (Mitleton-Kelly, 2003). With its ability to learn, a CAS (or agents) can respond actively to events and seek opportunities from any situation, usually through adaptation and co-evolution with other systems (Klijn & Snellen, 2009); thus they learn and create their "way into the future"

[1]Complexity theory is a collection of different theories arising from studying CAS in various natural sciences fields. There is no single complexity theory; different perspectives have different focal points, whilst sharing the interrelated concepts of a CAS has come to be known as complexity theory (refer to Mitleton-Kelly (2003) for a more detailed explanation).

	(Stacey, 1996). Interactions of individuals create new patterns of thought at an organisational level and the organisation adapts and evolves when learning leads to new behaviours (Mitleton-Kelly, 2003). Through many repeated non-linear interactions among component parts/agents within a CAS macro forms and patterns (without design or direction) emerge (Eppel & Rhodes, 2018).
Self-organisation	A CAS has the capacity to spontaneously self-organize into greater states of complexity (Waldorp, 1992). Self-organisation is part of the process that creates/enables emergence of a new order (Mitleton-Kelly, 2003). Self-organisation in an organisation is a spontaneous process; component parts/agents remain unconscious of the process and no one outside the process provides direction (Mitleton-Kelly, 2003).
Embrace paradoxes	CAS are unpredictable and have inherently conflicting patterns or paradoxes (MacLean & MacIntosh, 2003). Paradoxes are not seen as problems, but rather tension-creating conditions from which new creative solutions can emerge (Grobman, 2005; Stacey, 1996).
Edge of chaos	An initial pattern can transform into some new pattern when it is disrupted by internal processes or external events (Eppel & Rhodes, 2018). Poised on the boundary between order and chaos (Kauffman, 1995) is itself a quasi-equilibrium state (Grobman, 2005). It is the best point for creativity and innovation, and thus prosperity during times of uncertainty and rapid change (Brown & Eisenhardt, 1997).

When organisations are viewed as CAS, they are seen as dynamic (not static), being composed of a large number of interacting, interrelated component parts or agents that typically respond to one another in nonlinear fashion or change, using self-organisation, in response to their external environments (Anderson, 1999; Kauffman, 1995; Waldorp, 1992). While audit firms have been viewed as business organisations (Edgley, Sharma, & Anderson-Gough, 2016; Picard, Durocher, & Gendron, 2014), auditing literature has not portrayed them as CAS. This paper bridges the gap by framing audit firms as CAS.

Change in audit practice

Complexity theory posits organisations co-evolve with their constantly changing environments (Mitleton-Kelly, 2006). The literature identifies how audit firms have co-evolved and continue to evolve by adapting their skillsets and their ways of working.

Skillsets: Auditors have adapted their skillsets to enable performance of high quality audits in a complex business environment (Barac et al., 2016; Turley et al., 2016). The future requires skillsets that are able to cope in an increasingly disruptive, unpredictable and complex environment (Voogt & Roblin, 2012). Inter-personal skills will manifest differently because future auditors need to be adaptable and flexible, and become innovative and creative problem solvers (ACCA, 2016). Future auditors require digital skills that enable them to be more predictive, apply data analytic

techniques (Huerta & Jensen, 2017; Richins et al., 2017), perform continuous auditing, use data extraction tools and statistics, and master technical skills such as enterprise resource planning (ERP) and programming (AICPA, 2015). General practice auditors' current skillsets are inadequate, leaving them ill-equipped to perform more advanced statistical techniques and to mine non-financial data (Moll & Yigitbasioglu, 2019).

Technology-enhanced ways of working: The emergence of big data (Vasarhelyi, Kogan, & Tuttle, 2015) is expanding the data domain to embrace more unstructured data (Cao, Chychyla, & Stewart, 2015; Griffin & Wright, 2015; Vasarhelyi et al., 2015). Auditors are starting to use data science applications to perform more effective audits (Appelbaum et al., 2018; Gepp et al., 2018). Sampling will be replaced by data analytics (Cao et al., 2015; Gepp et al., 2018) that enables auditors to use computerised data and file interrogation audit software to test the complete population and simultaneously analyse and visualise it to make data patterns more salient (Rose, Rose, Sanderson, & Thibodeau, 2017). These developments have triggered a shift from the historical audit paradigm towards a more proactive approach where audits become more predictive (Kuenkaikaew, 2013). Developments such as more advanced ERP systems, the increased use of on-line transactions and the cloud, and the exponential increase in use of data now set the scene for continuous auditing, an area still under-explored in external auditing (AICPA, 2015). Auditors are starting to embrace artificial intelligence (AI), due to its promised beneficial impact on future auditing practice (Appelbaum et al., 2018; Earley, 2015; Kokina & Davenport, 2017), but this is not yet widespread (Kuenkaikaew, 2013). Robotic process automation (RPA) facilitates automation of the audit process (Cohen & Rozario, 2019). Reconciliations and internal control or detail testing (seen as repetitive, structured, and labour-intensive audit tasks) can now be done by means of RPA (Huang & Vasarhelyi, 2019), although concerns about risk and regulation have constrained its wider application in audit (Moffitt, Rozario, & Vasarhelyi, 2018).

COVID-19 pandemic and audit practice: CAS are balanced at the "edge of chaos" (Kauffman, 1995, p. 26) with elements of both order and disorder in play (Holland, 1992; Kauffman, 1995). When an external event, such as the COVID-19 pandemic, significantly disturbs the behaviour of a CAS, it is no longer stable and is said to have

reached a critical threshold, the bifurcation point (MacLean & MacIntosh, 2003). Then the status quo can no longer be sustained: innovation takes place to establish a new status quo, and a new order comes into being (Mitleton-Kelly, 2006).

The socioeconomic and legal reactions to the COVID-19 pandemic are influencing the ways that auditors work. Lockdown arrangements and social distancing place restrictions on mobility of auditors, and by prohibiting otherwise routine visits to client sites force them to work remotely (Radigan, 2020). In these circumstances auditors have to embrace digital platforms (Lavina, 2020) (e.g. sharing documents via the cloud (Drew, 2020)) and can encounter difficulties that compromise their access to evidence and people required to conduct fieldwork in support of their audit opinions (Radigan, 2020). Additionally, remote auditing requires consistent remote connectivity, technology support and consideration of client confidentiality issues (Amato, 2020).

Technology already makes it possible for auditors to work remotely in a globally connected world. They use computing and communications devices to function in virtual teams and leverage individual skills across geographic borders and multiple audit engagements (AICPA, 2015). The cloud, offering data-sharing abilities and mobility (Moll & Yigitbasioglu, 2019), makes it possible to deconstruct audit procedures into tasks for individual virtual team members (AICPA, 2015), a practice currently used for offshore audit centres (Downey, 2018).

Whilst working remotely auditors have to comply with regulatory standards and deliver quality audits (Tysiac, 2020). Regulators, professional and oversight bodies have provided guidance to assist auditors to apply the standards and deliver quality engagements affected by COVID-19 (AASB−AUASB, 2020; CEAOB, 2020; Europe, 2020; FRC, 2020a, 2020b; IAASB, 2020; PCAOB, 2020). Even though audit teams hold virtual meetings, and access to files is facilitated through technology, structured processes for direction, supervision and review should be followed and these should coincide with open and frequent communication within audit teams (FRC, 2020b). !

Remote work may require auditors to modify or design new procedures. These require enhanced direction and supervision, increased involvement of more senior or

experienced members and others with specialized skills and knowledge (PCAOB, 2020). The attendance of a stock take may not be possible (IAASB, 2020; PCAOB, 2020) and professional bodies have issued further guidance in this regard (ICAEW, 2020a, 2020b; ICAS, 2020; Ireland, 2020). An alternative is virtual attendance (e.g., video-streaming or using drones or similar technology), but this should be done with caution, as damaged or obsolete stock may be hidden from view (ICAEW, 2020b; Ireland, 2020). The auditor might ultimately be required to employ roll forward or roll back procedures, or as a last resort, to modify the audit opinion (Dohrer, 2020).

In summary, it is apparent that as audit firms change due to external and internal influences, complexity increases, auditors' skillsets evolve and the ways of working adapt. Digital acumen, flexibility and adaptability are important skills to facilitate change in audit practice.

Methodology

A qualitative approach, using a pragmatic worldview, was adopted for this paper. It is based on two datasets. Dataset 1 is comprised of interviews conducted during a comprehensive research project focusing on auditor skillsets and ways of working. The aim of this project was to revise the competency frameworks of the South African Institute of Chartered Accountants (SAICA) and the Independent Regulatory Board of Auditors in South Africa (IRBA). Dataset 2 is comprised of interviews pertaining to a case study (a specific Big 4 firm referred to as Alpha) and focuses on the implications for audit practice (skillsets and ways of working) stemming from the current COVID-19 pandemic. Ethics approval from the university originating both the research projects, was obtained for both datasets. All participants gave their consent, and their anonymity was assured.

Semi-structured interviews were guided by broad and open-ended questions which were informed by a review of relevant literature, feedback from the steering committee of the comprehensive research project (dataset 1), and the findings of this project (dataset 2). The average time of interviews was approximately 60 minutes, and these were recorded, transcribed, checked and sent to interviewees for final review. The lead author analysed the interviews, using Atlas.ti qualitative data analysis software. This

process involved identifying meaningful topics, categories and themes and this analysis was independently reviewed by the other authors.

The research met trustworthiness criteria (Babbie & Mouton, 2001; De Vos, Delport, Fouche, & Strydom, 2011). Credibility of the findings is attributed to triangulation (different participants of dataset 1 and using two datasets), reference material (audio recordings, verbatim transcriptions and electronic open-coding of interviews), participant checks of interviews, and the research process (logical, well-documented and auditable). Transferability of the results was promoted by means of purposive sampling (involving different informed individuals for dataset 1 and a specific Big 4 firm for dataset 2). Nearly all interviews were held by more than one author. While the lead author conducted initial data analysis, the transcripts and related interpretations were discussed and shared with the other authors for assessment and to confirm that interpretations in fact emanated from the data. These aspects improved the confirmability of the research.

Participants

Dataset 1 participants were identified by the SAICA and the IRBA. A total of 44 interviews were held between November 2017 and November 2018. Dataset 2 participants were selected by means of a case study approach (Yin, 2014). They worked at Alpha, a Big 4 firm purposefully selected because these firms are known for their innovative audit practices (Humphrey, Loft, & Woods, 2009), have global reach and are viewed as worthy of study in their own right (Carter et al., 2015). Ten participants (four partners and six managers) were interviewed between October 2020 and January 2021. Two of the partners conducted audits, one partner worked in the firm's technical division and the other was in the firm's training and development unit. Managers were selected as participants because they are responsible for a whole range of activities (e.g., project management, managing client relationships and staff, and working closely with partners) and focus on the smooth functioning of the audit firm (Kornberger, Justesen, & Mouritsen, 2011). The selection was based on manager profiles: gender (three males, three females), race (two Black, one Indian, and three White), experience in different industries (more than five years after traineeship) and

office representation (from offices in three main cities in South-Africa). In total 54 participants were interviewed, as described in Table 2.

Table 2: Description of participant categories and the number of participants

Categories	Description	Number
Dataset 1		44
Assurance providers (AP)	Big 4 partners	6
	Non-Big 4 partners	10
	Auditor General South Africa	4
Technology experts (TE)	Experts in audit firms, also working in consulting divisions	7
Executive and high-level management (EM)	Financial services	4
	Other industries	4
Futurists (F)	Individuals with a speciality or interest in futurology	2
Academia (A)	Private and public higher education institutions	3
Other prominent figures (OPF)	Governance experts	4
Dataset 2		10
Engagement partners at Aplha (P1 & P2)	One new participant, one participant from dataset 1	2
Partner in Aplha's training/development unit technical division (P3)	A follow-up interview with a participant from dataset 1	1
Partner in Aplha's technical division (P4)	New participant	1
Managers (MC, MD, MH, ML, MR, MS)	New participants - managers at the Big 4 firm	6
TOTAL		54

Findings

Reforming skillsets and ways of working (dataset 1)

Three prominent themes pertaining to reforming auditors' skillsets and ways of working emerged from analysis of dataset 1 and the findings are accordingly presented: (1) complexity of the audit environment, (2) digital transformation and skills, and (3) ways of working.

Complexity of the audit environment: Participants commented on external factors complicating the audit environment. They mentioned interconnectedness ('we are living in a world that is getting more and more connected' (EM)), globalisation, the

‘convergence of industries’ (AP), and the ‘migration of the physical world of business to digital’ (TE). Furthermore, there was widespread recognition that ‘the fact that our profession is regulated plays such a big role in day-to-day changes’ (AP). Participants perceived the regulator to have ‘a certain way’ that auditors ‘have to do things’ in order to be assessed as compliant, ‘otherwise we are going to get into trouble’ (AP). As training offices audit firms answer to SAICA: ‘I often have a debate with SAICA and I say I’m a business first, I’m a training office second’ (AP). Adding to these influences and tensions is the auditors’ ‘public interest responsibility’ (AP).

Participants also recognised particular internal factors as complexities apparent within audit firms. Participants mentioned the co-existence of audit and consulting divisions and involvement of specialists in audits of complex businesses (‘I’m counting on my hands here: there are seven specialists that we currently use and we need those people, otherwise we wouldn’t be able to deliver on the audit’ (AP)), mainly situated in the firms’ consulting divisions. The use of service centres which are often located off-shore was also discussed (‘We’re in the process of setting up a talent hub in Mauritius which lends itself to the attractiveness from a skills perspective, cost perspective, quality; it ticks a number of boxes’ (AP)).

Digital transformation and related skills: A further aspect that dominated participants’ complexity perspectives was the digital transformation occurring in business. Businesses are evolving; they have to ‘adapt, reskill, redeploy, go into something new’ (AP) to fit into the dynamic digital landscape and this has strategic impact. Two EM participants explained: ‘If I look at the way we have to adapt every year, it’s actually a resilience. … You’ve always got a position and think where the future is and start positioning yourself today,’ (EM); and ‘A strategy is not a ten-year thing anymore … strategy is basically [continuously] changing. You learn extremely quickly,’ (EM). Changes in audit practices were closely connected with digital transformation in business. Participants referred to audit firm clients’ investments in digital transformation: ‘In technology, in computers, ERP systems or AI capabilities or big data’ (AP); and ‘as the clients are investing in technologies, ideas, tools and new thinking, auditors are equally going to have to be at the forefront of that’ (EM). AP participants believed these developments ‘will have a great impact on the auditing

profession, going forward' (AP), but questioned auditors' skillsets: 'We will have to refine our own skills around and understanding our confidence around these systems' (AP). There was also consensus that audit practices are lagging: 'The whole digitalisation of the world, the crypto currency that we spoke about, the fact that everything is run off the cloud these days … [audit firms] haven't evolved and if we don't do something soon [auditors] will definitely be doomed' (TE). Table 3 presents quotes in support of these views on how digital transformation is influencing auditors' current and likely future practices.

Table 3: Digital transformation impact on audit practices

Technology and related matters	Supporting quotes
Data	'We don't have the time to be nit-picking every item, so now you need to be proficient enough to be able to look at large volumes of data that the company is producing … and be able to manipulate that data and come up with useful information – it all comes down to really understanding the business before you can understand data' (EM). 'Finding the data is a mission in itself and it's critical to understand how data comes together, how it's stored, how it's accessed and how it's archived, because that's where all the issues start to play out and the risks crop up' (AP). 'Auditors require more [of] an understanding of the data than real programming' (AP). 'It's the unstructured stuff so … [it is] investing in the math [behind] technology that gives you significant, 100% coverage on a wide scale of clients' (AP).
Data analytics	'I can see it's happening in our business … the tools that we are developing to take data, to analyse it and to audit it, is far advanced, [but] not [yet] where we want to be. So your auditor sampling will get less and less and more using data analytics' (AP). 'No, it's definitely a big thing … I'm getting a lot of pressure from my partners saying "oh the big four, they've got data analytics, the leading edge and we [small firms] are falling behind", and I talked to the big four and they are also struggling with it. Everyone is still struggling with it' (AP). 'The auditor today that we release into the market has to do analytics. That's the only way that you can do substantive tests these days' (AP). 'If you look at a lot of analytics, it's identifying patterns and correlations in data and why they produce these particular patterns; so to me it's getting beneath the numbers. We have an analytic [capability] and it's based on Benford's law' (AP).'Let's take journals: you can … go into the detail behind the journals, so you can pull up various statistics like (interference) on a Saturday. It can be done in two seconds, you know, which journals were signed off by a particular person on a Saturday or journals with a value of one cent or one Rand … and if one pops up you can interrogate it further' (AP).
Cloud	'We used to have IFRS books with the standards and our guidance and our interpretations, but there is no book anymore. The information is in the cloud now' (AP). 'Nowadays technology or an aspect of it is outsourced and some customer management is outsourced or insourced. So the data is no longer on client premises, certainly not all of it' (AP). 'Cloud computing will increase and demands additional knowledge. It presents its own challenges, for example how data will be maintained, how regulations of different jurisdictions will be followed and how infringements will be prevented and detected' (TE).
Artificial intelligence (AI)	'So AI is, I think, the first bit we are going to see. And that is where things that are run off specific rules, the specific structures, where actually you don't want people to really use their imaginations and creativity' (F) 'Regression analysis is actually a lot of AI … some basic AI is actually just the clustering of data' (TE). 'How do you get the best auditor in the world on IFRS 9, IFRS 15, whatever? What are the decision points? … What decisions would that partner have made to have got to this particular conclusion? So

	now he starts to build AI … I learned this last week: there are 1200 decision points the average auditor or partner [must] make'(AP). '[When AI is outsourced] do the auditors understand what has just happened, or are they happy with what they got back from the [AI] service centre? … We start to get into difficult discussions around judgment' (AP).
Robotics and robotic process automation (RPA)	'We've got robots reading the standards for us; we've also got robots that can tell us where to look for issues. So the robots are providing us with answers' (AP). 'We hired a bunch of long haired, earringed entrepreneurs and we said we want you to disrupt our business … So the principle what we are trying to do there as well is to disrupt the small market. RPA is available to practitioners in the cloud, so the client can then say "my financial statements [have been] audited"' (AP). 'Just simple things like bank confirmation letters, where a client with 30 bank accounts used to take two, three days to get all the bank confirmations prepared and sent. Now a robot is doing that in a few seconds. … Our client who had about a hundred bank accounts … it would take somebody 4 to 5 man days to do the [confirmation] processes … We designed a RPA that does it in 37 seconds' (AP).
Continuous auditing	'Auditing in particular is going to have to move a lot faster … the next step for the audit profession must be real-time auditing' (F). 'There will be far [fewer] auditors in the future because we'll have audit software developed and verified as good to go which can plug into the corporates' systems and pretty much, you know, do [the continuous audit]' (AP).
Visualisation	'So we are building a model … we are partnering with a data visualisation company. It will create a real time visual hills and valleys … so that the auditor can get a snap shot through data; and this I don't think is that far away. I can see the entire revenue somehow visually' (AP). 'If we have a look at our analytics, one of the things that we've realized is the importance of visualisation and trying to visualise patterns that identifies your exceptions or your issues. … I think, because of the proliferation of data, people can get stuck into the numbers … but you somehow [have] got to present that visually in a way that people understand – so the visualisation is such an important part of analytics' (AP).

The above views confirm that participants were concerned about auditors' skillsets and thus consider that the auditor's 'tool box is not sufficiently stocked … to cater for modern business' (AP). Whilst participants agreed that technical knowledge 'will become automated' (F), most of them believe auditors will still exist in the future. Auditors of the future though, should 'actually be … IT auditors' (TE), spend 'a whole lot of time on analysing data' (AP), and extend 'themselves beyond the financials sphere' (F). They have to shift from 'retrospective' thinking to 'forward thinking' (EM). This requires the ability to 'think about the financial statements (that's history) but anticipate the future and rather build your forecast and help the business to build and execute the strategy that's changing almost [on a] six monthly [basis]' (EM). In this regard, participants emphasised the need for advanced data analytical skills, and personal skills, such as being 'a bit more open minded, more agile' (AP) and flexible.

Ways of working: Participants explained how digital transformation is influencing the ways of working: 'IT is the tail that wags the dog' (EM). Connectivity today makes it

possible to 'Zoom® somebody in, and have them consider security' (TE). It then 'flows into the flexibility of the work place … I don't have to have you in my office all day every day' (F). This is challenging the traditional way that auditors have worked: 'The traditional model is being very often at your client's office, … or in the office based in the city or country where you're based. … You are [now] not necessarily … [required] to sit at your client 24/7' (AP). If a client gives the auditor full access to business systems and the environment, auditors can work remotely and 'what we are seeing [take] place globally is a move to lower cost centres to perform quite a bit of this work, so the [proliferation of] offshoring' (AP). While digital transformation enables remote working, auditors also need to display other (generic) skills: 'self-management, self-motivation, time management; you know, it is not as easy as people think, to work from home' (F).

In addition, participants highlighted other generic skills (e.g. communication, adaptability, and relationship building skills) and commented on their interconnectedness with digital transformation and ways of working. On adaptability, the comment was made 'because everything is changing… you [the auditor] need to keep on changing' (AP), while the interconnectedness between digital transformation and communication was explained as follows: 'IT is obviously embedded now in [ways of working]… you still work with people so you still have to communicate. The following view captures this sentiment with reference to relationship building skills:

> In the next ten years… the work will be much more focused on IT, really understanding it… and then relationships [come to the fore] because eventually that's what it's all about… how do you interact with people, how do you verbalise things properly, how do you articulate, how do you bring across your point - all of those things; and I've had that view for a million years – that is really lacking [in the skillset of auditors] because that's what we do, we talk to people all day because you have to be able to get the information out of them as an auditor (TE).

Participants complained about the disconnect between the digital transformation 'from the clients' side' that increasingly clashes with their firms' methodologies, which are 'guided by the standards which are still very traditional, not considering how the world has moved' (AP). They blamed the standards (the regulator) for audit practices' lag: 'the only reason why we have not been disrupted [fully embraced digital transformation] is because we have a regulator' (AP). Innovation is 'very relevant in the business world that we operate in, but in the compliance world you are going to battle to capture that' (AP). Knowing that when they are involved in litigation, 'the only

thing that we have is our standards; as long as we have complied with our standards, then we know we are safe' (AP). Numerous participants expressed concern that it takes such 'a long time for the standards to catch up' (AP).

Audit practice implications stemming from COVID-19 (dataset 2)

The three prominent themes emerging from dataset 1 (as described above) guided the analysis of dataset 2 and these findings are accordingly presented. The section also presents findings related to two key themes (a care orientation and lessons learnt) that emerged from dataset 2 interviews.

Complexity of the audit environment: COVID-19 and its implications add complexity to the audit environment ('I think definitely the environment has got a bit more complex with COVID' (P1). COVID-19 is 'a different level of complexity' (MS), due to 'the degree of uncertainty' (MC) 'about what is going to happen' (MR) and 'many rules and regulations that need to be put into place to make sure that everybody is safe' (MC). Through a process of 'continuous learning and developing and trying to navigate this complex environment' (MR), and addressing 'growing pains' (MS), Alpha has adapted to 'what's happening outside and dealing with it internally' (MR). The interconnectedness between Alpha and its clients is a big influence. Some clients were better prepared ('The big clients coped well because … they were better prepared … and they have bigger IT infrastructures and they have bigger resources … the small clients struggled a bit' (MH)) for virtual auditing and this influenced Alpha's ways of working ('I think a big thing for us as auditors was to adapt to how our clients operate … [we are] reliant on how the client does business … we had clients who were not prepared to go remotely. They did not have the technology … [and] still had reporting evidence on site which then caused other issues and delays' (MS); 'I actually spoke to a CFO of one my clients and he was saying … remote working doesn't work for them' (MH); 'we are very dependent on our clients. So it also depends on what our clients will be doing [that] will determine what we do but I don't think we will get to a point where we just say now we all work from home' (MD)). The interconnectedness is reciprocal because Alpha also influenced clients' ways of working: '[Alpha and its

clients] have to work together … we need to also make sure that our clients are also moving forward' (MD)).

Digital transformation and skills: Assenting views by participants confirmed Alpha's digital transformation investments enabled work during the COVID-19 pandemic: Alpha's practices have become even more digitalised because 'COVID-19 kind of forced our hand to implement these tools much quicker' (MS):

> 'I think pre-pandemic times we were quite aligned to the fact that business needed to change to remain relevant to the industry that we work in, but the uptake on those digital solutions were perhaps slower than we would have anticipated. The pandemic just fast tracked the implementation of a lot of those solutions. So, looking at data analytics tools, [these] have become part of our day to day business … our data collaboration tools with clients, have become the way that we work now. So, from a firm perspective we have been able to fast track some of our digitisation exercises and programmes (P4);
>
> 'I wouldn't say the impact of the COVID-19 pandemic is the reason why we are [digitally] driven. We have always had the technology … I think it's become a bit more prominent now' (MR);
>
> 'We were put into that situation where we had to use it [digital skills/tools] and I guess it's like being thrown into the deep end, you have to swim and I think that was probably the best way for any auditing firm or any auditor to move forward' (MC);

With regard to the use of digital tools, participants explained the value of a client-specific information sharing portal. It is used to share requests 'upfront about what we want and what information we require' (MR), collect information ('like data collection tool … making sure and keeping track [of deliverables]' (MC)) and resolve problems by avoiding 'miscommunication over emails and virtual calls' (MR).

Participants' views substantiated the need for other skills in a digitally transformed environment influenced by the COVID-19 pandemic. They emphasized specific generic skills that are needed to work remotely and perform virtual audits: (1) adaptability skills ('we had to adapt because our world became too digitally advanced in such a short space of time' (MC), 'we had to really be more agile and we had to really adapt quickly to the change' (ML)); (2) organizational skills ('you have to make sure that you are on top of … what have you received, what is outstanding, following up on your deliverables. So definitely organisational skills is something that is key' (ML), 'I think if you weren't organised during this period, things would have crashed and burned very quickly' (MC)); (3) self-management skills ('I think the whole concept of self-discipline and self-management because it is very easy now to disappear if you

want to disappear. So managing yourself, managing your time' (P2)); (4) time management skills ('It was a very difficult [situation] … you still had to sign financial statements at an agreed date. So time management was one of the big factors and challenges' (MH)); (5) project management skills ('project management - to be able to co-ordinate things, get things where it is a problem, having been able to resolve that, manage diaries and much more' (P1)); and (6) communication skills ('[It] became very, very important because you had to keep on communicating … you had to rely on someone describing exactly where they are with the [audit] process and rely on that communication … taking the message back to the client especially when there were critical matters or findings' (MH), 'The way we communicate now with each other and the client, it has changed significantly. You cannot engage someone or understand something if they haven't received the message that you wanted them to get' (MS)).

Ways of working: 'The pandemic has caused the complexity of being able to work on an online platform consistently, being able to share information in a secure environment' (P4). Participants unanimously agreed that, due to its emphasis on digital transformation, Alpha is well-positioned for these new ways of working:

> 'Being a tech [digitally] driven firm … we were kind of set in our ways to go remotely and able to do an audit remotely' (MS);'I think clients were actually very surprised that we could conduct an entire audit remotely … we were really in a good position to do audits remotely, make use of the technologies and … [even] advancing technologies … in our day-to-day jobs' (MR);
>
> 'We spent a lot of time understanding how important digital skills are and … it changed the whole way of auditing … I mean, I completed some of my audits where I did not see the client once throughout the entire audit and the reality is we did it quite effectively' (MC).
>
> 'While we have been doing [online sharing of information] in pre-pandemic times, just finding better, smarter, simpler, more efficient ways of doing it without compromising any of the information that we may have been sharing' (P4).

Participants' positive views about virtual audits ('we can deliver audits virtually and we've done that successfully' (ML)) was ascribed to Alpha's support ('[Alpha] provided every aspect of or form of help that we could possibly have needed and they did it quite effectively and efficiently and in such a short time and I think that's quite impressive' (MC)) and its focus on audit quality ('we've had to be more aware of the fact that quality cannot fall through the cracks because we are now working remotely'

(ML); ‘our leadership took firm measures in getting everything in place and we could definitely reap the rewards of that ensuring that our quality remains [paramount] as well as ensuring that we adhere to the ISAs‘ (MS)). While Alpha provided additional guidance on certain standards (‘looking at Covid-19 as a subsequent event and then going concern impact thereof’ (MC)), the relevance of some standards was questioned:

> ‘You’ll know that our current standards were never written in a full digital era. So, understanding what electronic documents are, how we rely on those types of documents became an area of focus and then working with the Regulators … to make sure that what we are doing was in line with what they are expecting and satisfied from a compliance perspective. So that’s the complexity I’ve been seeing in dealing with the pandemic and particularly remote working (P4).

An interesting observation is participant P4’s opinion that regulators engaged ‘exceptionally well during the pandemic with the profession’. The IRBA formed a working group comprising of various regulators and Big 4 firms to prepare guidance documents:

> ‘So that as a profession we were going out to market with a consistent approach, a consistent understanding which also helped to alleviate a lot of stress and are we going to be the only firm who is doing it this way.’ (P4)

According to P3, conducting virtual audits added ‘some complexity in terms of skills that people have … the ability to work effectively in a virtual environment, virtual coaching skills and just some of the softer skills around how do you deal with the emotional toll that it takes [to be working from home].’ While client information was readily accessible, client interactions were not straightforward and even caused audit delays:

> ‘Historically, audit has been a face-to-face kind of business, where you engage with the different stakeholders and meeting [them] face-to-face where you are able to read them, understand the tone of their voice if you wanted to ask more probing questions … so from that perspective it made audit slightly challenging. … Collaboration did happen remotely, but it is obviously not as efficient remotely. It meant significant delays from both sides, the client’s side as from our side as well’ (MH);
>
> ‘We do lose that face-to-face interaction with clients, which you know is a huge factor. Yes, we can get source documents and yes, we can trace things but that interaction, that understanding, that discussion of what’s happened behind the transaction and even assessing a client’s body language and how they are feeling during an audit process, I think a lot of that we are losing. That adds to the complexity as to how the audit is flowing’ (P1).

In addition, participants shared examples of how they had adapted audit procedures. A walk-through procedure to document client processes changed from 'sit[ting] with the client' to 'share[ing] a screen' with your client (MD). Participants used 'video conferences for asset verifications because we couldn't go to the client. It obviously had to be real-time and they [clients] had to show us the barcodes of the assets and we had to inspect those' (MH). Fair value assessments, subsequent events and going concern considerations have always required special attention, but participants believed these now require the highest level of professional skepticism ('I think ... it put professional scepticism on steroids' (P2); 'the fair value of investment property … how do you determine it if everyone is in lockdown?' (MH)). In these situations, as in many others. participants extensively called on Alpha's technical and specialist divisions ('our help desk queries have grown substantially in the last year … we are [also] dealing with things that would typically have been dealt with at client sites, on the job, amongst the team' (P4)).

Training facilitated new ways of working. While Alpha had previously 'embarked across our firm on a digital upskilling project' (P3), training became continuous, more extensive and focused ('ongoing … much more training and more to the point training' (MS)), 'on different levels for different things [topics]' (MH)), with some training (e.g. digital skills) becoming 'mandatory where in the past it wasn't necessarily mandatory for everybody' (MS). Alpha successfully converted existing training 'into e-learnings and digitals'(P1) so that 'we didn't even feel that gap' (MC)). Such training was supplemented by e-learning modules and videos for upskilling on Alpha's business school website and 'videos from leadership' on remote working (MD).

Viewing an audit as 'a very collaborative effort … based on working together, sharing information and collaborating', participants described teamwork during a virtual audit. Even though the use of virtual meeting tools was an established practice of Alpha, teamwork during a virtual audit had added complexities:

> '[An audit], it's definitely a team-driven job … the more of those people you put in one room, the better your result is and if you take that away, it does become very difficult' (MR);

> ‘In a remote working environment, it is quite easy for some individuals to work… [on different days at] different times than the rest of the audit team and that has its own issues, but again it is the way how you manage it’ (MS);
>
> ‘In a pre-COVID scenario we would all be sitting in a room … you would have your first year, and your second year and your third year [trainees] right next to you. So the first year can very easily just ask the third year something. But now it’s become a process … I need to check their diaries do they have space in their diaries, I need to book a meeting’ (MC);
>
> ‘We had to get used to managing diaries … as the months progressed, I think it became much easier to communicate in a virtual environment and getting back to that sharing and collaborating’ (MR).

Participants described three ways in which they overcame virtual teamwork challenges, namely communication, engagement, and coaching. First, as audit team members ‘were not sitting together’ (ML), communication was key. Communication had to be clearer so that the correct inferences could be made (‘how do you interpret someone [was] not ... able to understand something or … what you want from them?’ (MS)) and more efficient (‘we learned … not to over communicate … that people didn’t get confused between the messages’ (P2); you need to be pro-active, when you are struggling with someone, don’t sit on it for you know how many hours, reach out to your fellow colleagues, reach out to your managers’ (MD)). Second, Alpha formalized engagements between all audit team members by creating spaces and opportunities. Participants explained virtual audit spaces as follows:

> ‘[we] simulate our audit [by] setting up two-hour virtual audit rooms … everyone is on the call and if you do have a question … someone is there and you can discuss it [just] as if you were in a normal sort of audit environment’ (MD);
>
> ‘So, what we’ve done is we’ve set up a lot of virtual rooms so, yes we are all in our homes, but we are all on our cameras at the same [time], as an audit team, so a lot of that sharing and discussion and learning that we would have had in a normal audit room [still happens]’ (P1).

Engagement opportunities were more formalized (‘we’ve also been formalising even more … the various team members have one-on-ones on a daily basis and catch-ups’ (P1); ‘daily catch up calls’ (ML); ‘regular meetings … see what my calendar looks like’ (MR)). Third, coaching practices were adopted ‘trying to keep those coaching mechanisms going’ (P1). All participants agreed that first year trainees were severely impacted by COVID-19 and struggled to adapt to the audit environment and to build relationships:

> ‘Our first years who joined the firm [at the beginning of 2020] … they literally maybe had two weeks of being out in the field and then COVID hit and we were all sent home … [and] they were essentially really, really struggling … Because you don’t have your manager sitting there giving you guidance … first years were significantly impacted’ (MC);
>
> ‘It’s [COVID-19] impacted on them quite a bit because now not only are they dependant on other people but they are now not even in an environment where they can observe what is happening’ (MD);
>
> ‘I actually felt bad for the first years. It is difficult to develop relationships when you are working virtually’ (ML).

First year trainees required additional coaching support (‘We kind of focused … to support these first years in finding their feet by helping them more with the softer skills around the audit’ (MS); ‘The second years have a formal meeting with the first years every morning, every afternoon to assess how work is going, what is the progress and what are they struggling with’ (P1)).

A care orientation: 2020 was a difficult year (‘all around a very shitty year … it was very tough’ (MD)) and ‘well-being type of initiatives became quite important. Helping people how to deal with stress in this particular environment’ (P3). Some staff had ‘real issues, family members getting sick … being in quarantine’ (MH). Participants perceived Alpha to have adopted a care orientation, a ‘common understanding that we have, personal challenges and we were all trying to navigate things’ (P3). This has been ‘incredibly supportive … [by] placing emphasis on us being human’ (MD), thus ‘the value of care is really showing’ (MR). Participants shared three examples of Alpha’s care orientation relating to communication, flexible staff and support practices:

> ‘The first thing was very active communication from day one and that has continued up until this morning’ (MR);
>
> ‘They definitely increased the communication … ensuring that we are all emotionally supported ‘(ML);
>
> ‘There was one channel that filtered through and whether it is to partners, whether it’s to managers, whether it’s to staff, everybody gets exactly the same message and in a very articulate way that you know exactly what is expected’ (P4);
>
> ‘One of our team members he stays in a township where electricity goes all the time. So I guess at some point he just then came to us as managers and said you know what it is really not working for me to work from home because I have so many distractions and electricity is not in constant supply so then we had to arrange for him to be able to go into the office during I think it was around level four or five when you were not really allowed to be at the office’ (ML);

> ‘There were specific people … [with] preference to be back but because they were battling more from a technology point of view or from a home environment point of view that we encouraged to come back. So, we supported staff that really had issues at home to bring them back and I think that’s still the case’ (P2);
>
> ‘We have a hot line you can call where they put you in touch with psychologists or the appropriate people that you need and that’s totally anonymous and confidential and that message was driven really hard’ (MS).
>
> ‘So a lot of those softer sort of interventions were necessary and we would typically partner with external organisations … to help us connect with some of these topics and they would come in and deliver some of the content to our teams and some of it was internally developed content where we would look at the basics of dealing with the pandemic and we would have sort of informal groups where we would bring people together to allow time to unpack some of the issues that they are facing (P3).

Lessons learnt: Participants all agreed that lessons learnt from Alpha’s COVID-19 practices will influence the way forward. They foresaw: (1) using even more technology to improve efficiencies; (2) more flexible work conditions, combining working from home and being at the office/client to improve work life balance: (3) adopting a care orientation that responds to others’ needs; and (4) applying novel global approaches, for example virtual secondments or quality reviews (which can leverage equal opportunities regardless of one’s personal circumstances):

> ‘I guess you know we have shown ourselves that we can do things differently. Yes we got forced into it but we can do things differently and I do believe that there is going to be a lot more elements of flexibility … I think it’s going to be a new norm that’s going to be a lot more digitally focused and I do believe it’s going to be a new norm where we are going to have a lot more focus on work life balance’ (MC);
>
> ‘Remote working will become something that is much bigger. We expect to work remotely much more than in the past. So using our technology is a big focus for us. I think that will become even more of a bigger focus and using data tools and analytics tools and extracting tools on clients’ sites, will become something much bigger. I think clients will work much more remotely in future’ (MS);
>
> ‘I think we will probably get to a more blended approach so you will probably get to a point where you will be working from the client maybe three times a week’ (MD);
>
> ‘It also showed us how to do things more efficient and be mindful of people’s time and really how to show a lot more care than maybe we did before’ (MR);
>
> ‘I think Covid-19 was obviously bad from a health perspective but I think it did wake us up a bit and I think it’s challenging the way we are doing things. I am seeing a lot of secondments, virtual secondments where people are doing work in France whilst sitting in South Africa’ (MH).

Differences in findings emerging from Dataset 1 and Dataset 2

Dataset 1 participants ascribed complexity in the audit environment to the interconnectedness of related parties (society, audit firms, their consulting divisions, service centres, the professional body and regulator). Dataset 2 participants viewed the COVID-19 pandemic as an added complexity (the uncertainty, related rules and regulations and difficulties to adapt) and they singled out clients as an interconnected related party. With regard to digital transformation, Dataset 1 participants viewed audit firm developments (e.g. data analytics, cloud, AI, RPA, continuous audit, visualisation) as an attempt to mirror business practices but that the firms failed to reach the same heights. Dataset 2 participants believed that the audit firm's digital transformation (e.g. online platforms, data analytics, cloud) enabled remote working and virtual audits. While Dataset 1 participants predicted remote working and virtual audits, they anticipated the use of certain generic skills and advocated more flexible working conditions. For Dataset 2 participants these have become a reality. Even though the professional standards for auditors did not stay up to date with digital transformation and its impact on ways of working, Dataset 2 participants ascribed their seamless transition to remote working and virtual audits to the firm's leadership support, coaching practices and training endeavours. Remote working challenged teamwork skills but it was overcome by good communication, continuous engagement and coaching. The lessons learnt by Dataset 2 participants from their COVID-19 pandemic experience was the need for an even greater use of technology, resulting in more flexible work conditions, the firm displaying a care orientation during the difficult time and the introduction of novel global online practices (participating in secondments or quality review panels).

Discussion of the findings

This study reveals complexity in audit practice, a phenomenon which can be explained when an audit firm is framed as a CAS. This section is therefore presented in accordance with the six key concepts inherent in a CAS (refer to Table 1).

Multiple interacting component parts or agents

Participants perceived audit firms as multi-dimensional organisations (Mitleton-Kelly, 2006) in which their multiple parts or agents interact (Mitleton-Kelly, 2003; Stacey,

1996). Audit firms interact and are influenced by exogenous conditions; these include societal expectations, regulators, professional bodies and client organisations, as well as global and local business environments. Audit firms' set of endogenous dimensions include its business culture's standards/quality orientation, its audit, consulting and support divisions (including service centres) (Downey, 2018; Hux, 2017), and its engagement teams and other groupings, all of which influence each other and are also influenced by exogenous conditions.

Multiple interactions and degrees of interconnectedness

Participants recognised audit practice's connectedness, how it interacts with and is influenced by exogenous conditions. While participants perceived audit practice to be driven by regulators' standards, this study, by focusing on skillsets and ways of working, especially shows the interconnectedness between audit firms and their clients. Dataset 1 participants revealed that as their clients invest in technologies, tools and new thinking, so audit firms are compelled to follow suit (Appelbaum et al., 2018; Earley, 2015): despite this, though, audit firms' advances were seen to be lagging behind those of their clients (Gepp et al., 2018). Dataset 2 participants confirmed that audit firms' virtual audit capabilities were connected with their clients' preparedness and willingness to participate (for example bigger clients had the technology to share digital platforms via the cloud) (Drew, 2020; Lavina, 2020). The interconnectedness is reciprocal because Alpha also influenced its client's progress to adapt to the changing environment.

Adaptation, co-evolution and emerging behaviours

The findings revealed that audit firms are learning systems (Stacey, 1996) that are responding actively to events (Klijn & Snellen, 2009) and learning new behaviours (Mitleton-Kelly, 2003). Participants' perceptions and experiences of ways in which digital transformation is increasingly embedded in audit practices (Huerta & Jensen, 2017; Richins et al., 2017), and how skillsets (e.g. application of data analytics (Earley, 2015; Vasarhelyi et al., 2015)) are changing demonstrate audit firms are adapting and evolving. New patterns of thought are created: dataset 1 participants expected auditors with proficient digital skills (data analytics, RPA, AI and visualisation) to be creating conditions for continuous auditing (AICPA, 2015) and adopting a more

proactive/predictive approach (Kuenkaikaew, 2013) to assist clients in executing strategy over much shorter periods. Using such digital transformation dataset 1 participants predicted remote working and virtual audits and highlighted the need for specific generic skills. By advancing some of the digital skills explained by dataset 1 participants, dataset 2 participants described Alpha's virtual audits. As anticipated by dataset 1 participants, remote working has become a norm in Alpha and it needs to be augmented by generic skills (organisational, time-, project- and self-management skills). As reported in professional literature (IAASB, 2020; ICAEW, 2020a, 2020b; ICAS, 2020; PCAOB, 2020), dataset 2 participants shared examples how Alpha adopted/adapted audit procedures for virtual audits. The findings show how Alpha's team work practices evolved to adapt to virtual audits: communication became clearer and more efficient; engagement opportunities became more formalised and coaching practices became daily one-to-one interactions. Such new behaviours stemmed from patterns of thought (Mitleton-Kelly, 2003) from all staff who had an opportunity to influence practice ('we have also created platforms to allow for the sharing of the content that has been created. So, the idea is once you have seen what other teams are able to do, you should be able to leverage that knowledge on the engagements as well'). In addition, Alpha's training interventions became virtual, more focused and more extensive.

Self-organisation

The findings show the prevalence of self-organizational behaviour in audit firms (Mitleton-Kelly, 2003). These entail spontaneous processes that are not directed by regulators (or outside parties) and are driving the increasingly apparent emergent outcomes (Stacey, 1996). Based on client demands, audit firms are experimenting and exploring with emerging technologies. Dataset 1 participants revealed that most Big 4 firms have their own technology expert groups (experimenting for example with advanced analytics, robotics (Cohen & Rozario, 2019), and computer vision (Rose et al., 2017) or they have established networks with niche specialists (e.g. AI service centres or data visualisation companies). Dataset 2 participants shared Alpha's self-organisation behaviour to show its care orientation. It deals with communication, flexible staff and support practices.

Embrace paradoxes

Participants in both datasets raised the fact that professional standards have not kept up with digital transformation, a matter also highlighted in the literature (Appelbaum et al., 2018; Gepp et al., 2018). From a CAS perspective it can be seen as a paradox, or possibly countervailing pattern, which should not be considered a problem, but rather a tension-creating condition from which a new creative solution can emerge (Grobman, 2005; Stacey, 1996). The latter is evident from the establishment of a representative working group to issue guidance to auditors.

Being at the edge of chaos

The COVID-19 pandemic is a macro-level disruptive event (Vaitilingam, 2020), and its associated impact on “life as we once knew it”, has positioning audit firms at the edge of chaos (Kauffman, 1995). Participants explained how Alpha’s traditional audit practice (initial pattern) has transformed into virtual audits and remote working (new patterns) (Eppel & Rhodes, 2018). Alpha was poised on the boundary between of order and chaos (Kauffman, 1995), a quasi-equilibrium state (Grobman, 2005) which can be seen as the best point for creativity and innovation to prosper during times of uncertainty and rapid change (Brown & Eisenhardt, 1997). The findings revealed the key lessons learned by Alpha during the COVID-19 pandemic which assisted to perform virtual audits (perceived by dataset 2 participants as being done effectively whilst maintaining quality) with sufficient staff support. The four identified lessons open up opportunities for innovations in audit practice: first, even more technology can be used to improve efficiencies; second, introducing more flexible work conditions can improve staff members' work life balance; third, by nurturing a more overt care orientation Alpha can be more responsive to the needs of others; and fourth, by introducing novel global approaches (such as virtual secondments and quality reviews) all staff, irrespective of their personal circumstances, have equal opportunities for participation.

Conclusion

This paper draws on complexity theory to investigate changes in audit practice, particularly those related to auditors’ skillsets and ways of working. Audit firms were framed as CAS, thereby recognising the applicability of six key concepts of CAS: (1)

multiple interacting component parts or agents, (2) multiple interactions and degrees of interconnectedness, (3) adaptation, co-evolution and emerging behaviours, (4) self-organization, (5) the embrace of paradoxes, and (6) being at the edge of chaos. Two distinct datasets were used. Participants from dataset 1 (participating in a research project aimed to revise the SAICA and the IRBA competency frameworks) explained digital skillsets and ways of working needed from auditors to remain fit for the landscape. Participants from dataset 2 worked at a specific Big 4 firm and suggested implications for audit practice stemming from the COVID-19 pandemic by sharing experiences of virtual audits and remote working.

Much more research is needed to gain clarity on the impact of the COVID-19 pandemic on the audit profession and audit practice. This paper can only be regarded as a first step towards establishing a platform for such research. Future research could investigate the impact of COVID-19 on audit quality, audit fees, change of auditors (as part of the bigger debate on audit rotation), the use of data analytics and emerging technologies, and audit firm cultures.

Another interesting aspect will be how small audit firms, an often neglected segment in auditing research (Carter et al., 2015), are being influenced by the impact of COVID-19 and associated mitigation efforts on their clients. They might be vulnerable because small business, a large portion of their client base (Coetzee, Barac, & Seligmann, 2019), have become financially fragile and many may be temporarily or permanently closed because of COVID-19 (Bartik et al., 2020). Based on data obtained before the outbreak of COVID-19, we found small firms were already lagging behind Big 4 firms with respect to their data analytic capabilities and developments in emerging technologies. As our fieldwork during the COVID-19 pandemic was limited to a particular case, a Big 4 firm, we cannot comment on small firms as CAS or related COVID-19 implications. It will be interesting to discover how small audit firms operate as CAS and strategize and embrace technology to achieve sustainability under the ‘new normal’.

In his seminal work, *The System of Professions,* (Abbott, 1988) applied a version of systems theory to professions. A complexity perspective builds on or enriches systems theory (Mitleton-Kelly, 2003). Using such a perspective, (Smith, 2005, p. 25) asserts

that ‘successful change means making organisations less stable’. According to Richardson (2008, p. 13) more explicit view, complexity theory provides insights ‘as to why to some degree we are helpless, and that “shit happens!” … and that we can never have complete control over the future evolution of our organizations’. As one of the first papers to position audit firms within this realm, future research could expand on complexity thinking in auditing research.

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