ABSTRACT: A pandemic is an exceptional context involving radical disruptions for organizations and society. Ethical considerations evolve among individuals and organizations, and the way technology is used is an important factor in this evolution. We explore how key actors in the accounting space—namely, the Big 4 firms, the professional accounting associations, and the audit regulators—responded to the conjunction of the pandemic, ethics, and technology. We contextualize our documentation analysis referring to the ETHOs framework, which integrates ethics and technology. Findings suggest that ethics and technology are significant for the professional accounting associations and the audit regulators during the pandemic. In contrast, the Big 4 appear to overlook this importance, focusing instead on gains to be obtained from technology, applying a commercial logic above a professional logic. Our study underscores the importance of considering ethics in the future design and utilization of technology to maintain trust in the accounting profession.

Data Availability: Data are available from the public sources cited in the text.

Keywords: pandemic; technology; ethics; professional accounting associations; audit regulators; Big 4 firms; skepticism; information systems.

I. INTRODUCTION

Relaxing ethical requirements in a crisis could have unintended harmful consequences that last well beyond the life of the pandemic. (Leslie et al. 2021, 1)
This paper examines the consideration of ethics with respect to the use and development of technology during the pandemic by key accounting actors, namely, the Big 4 accounting firms, the professional accounting associations, and the audit regulators. More specifically, we aim to document how the Big 4, perceived as major influencers of the accounting profession (Daoust 2020; Malsch and Gendron 2011), dealt with ethics and technology during the pandemic.

A pandemic is an exceptional event that causes radical disruptions for individuals, organizations, and society. When COVID-19 struck, organizations had to rapidly reconstruct their business models and processes, which in turn significantly affected individuals, impacting their way of working, communicating, and behaving. This unexpected and dramatic context radically affected how individuals interact with others, forcing them to work remotely using technology. As the impact of the pandemic continues to unfold, we still see new business models and relationships forming and the use of technology to support these new models between individuals and organizations. A recent survey by Ernst & Young (EY) indicates that, due to remote working, disruption to traditional working patterns is the top COVID-19 risk to ethical conduct (Ernst & Young (EY) 2021).

Ethics is at the heart of professional accounting, which has protecting public interests as its core mission. However, the pandemic has created myriad opportunities for unethical behaviors (International Ethics Standards Board for Accountants (IESBA) 2021), putting ethics to the test (Thomson 2021). For instance, auditors have been obliged to perform audits from a distance by using new, and potentially insufficiently mastered, techniques and technologies. They were—and still are—pressured to provide audits without the usual full list of procedures and with inadequate documentation (Association of Chartered Certified Accountants (ACCA) 2020b), while having the duty to maintain ethical professional responsibility and professional skepticism. The quality of audits may suffer from the lack of resources, such as in-person interactions of juniors with more senior colleagues. Additionally, professional accountants must be aware of challenges their colleagues may be facing—yet not speaking about—that may affect judgments and ethical decision-making. In sum, the pandemic has put pressure on time-constrained decision-making, remote work has contributed to compromising data security, and a lack of professional skepticism and examination by more senior members of the audit team has been witnessed (Association of Chartered Certified Accountants (ACCA) 2020a).

The pandemic also forced a speedy adoption of technology, raising concerns about how accountants and organizations deal with threats associated with the proper use of various technologies, such as data security, as firms “might have skipped steps or cut corners on cyber security and related measures to keep doing business in the remote environment” (IESBA 2021, 5). During the pandemic, the use of technologies, such as artificial intelligence (AI) and data analytics, has been accelerated. With more employees working remotely, firms are using cloud services for software, hardware, and data sharing, which is riskier than having a single site connected to a single server, leading to major confidentiality and cybersecurity issues (Taylor 2021). Indeed, the Wall Street Journal reported that “the business and economic turmoil brought on by the COVID-19 pandemic has favored conditions associated with the fraud triangle namely pressure, opportunity, rationalization” (Wall Street Journal (WSJ) 2020, 1), increasing the risk of fraud in organizations.

This paper examines the consideration of ethics by key accounting actors when referring to technology during the pandemic. This examination is done through a content analysis of the Big 4 firms’ annual reviews, the professional accounting associations’ publications, and the audit regulators’ reports. Collectively, these three players represent key actors within the accounting profession. More specifically, we aim to document how the Big 4, which are considered major influencers of the accounting profession, dealt with ethics and technology during the pandemic. We contextualize our documentation analysis referring to the ETHOs framework, which integrates ethics and technology through the Environmental, Technological, Human, and Organizational dimensions.
Although professional accounting associations promote the added value of using technology to perform work, the ethical use of technology might not follow. During the pandemic, how have the key actors of the accounting profession covered the importance of professional ethics when using technology? Have we observed more, or less, attention to ethics? For instance, have we observed a shift, where tasks using technology—in a remote context fueled by a global pandemic—distance professional accountants sufficiently to reduce their level of professional ethics? As explained by Dillard (2003), when one focuses on assigned tasks and using techniques and technologies to meet objectives most effectively, an individual may be blind enough to separate ethics from rational purpose. Using such logic, the rationality of modernity may exclude sound ethical consideration for business decisions. Key actors of the accounting profession have been called on to play an important role in consistently providing guidance and encouraging professional ethics when their members use technology. Accordingly, our core research question is as follows: During the pandemic, how have key actors of the accounting profession considered ethics when referring to technology?

Our findings reveal that the Big 4 firms report on the benefits of using technology and its added value to both the firms and their clients, with few mentions of ethics. In contrast, professional accounting associations communicate a more balanced approach, highlighting the opportunities technology brings to organizations and accountants, but also raising the topic of ethics when using technology. The Big 4 focus predominantly on the gains to be obtained through successful application of advanced technologies, as revealed by prior research on how these firms make choices between adopting a commercial versus a professional logic (Carter and Spence 2014). The results throw into question the role of the Big 4 as major influencers of the accounting profession on ethics due to the way they covered the ethical usage of technology during the pandemic.

This research provides the following contributions. First, we contrast the various viewpoints between three key actors of the accounting domain—the Big 4 firms, the professional accounting associations, and the audit regulators—regarding ethics and technology during the pandemic. We are not aware of any other research currently investigating the intersection of these concepts. Second, we shed light on the dual and almost conflicting roles of professional accounting associations as both educator/thought leader and regulator in charge of protecting the public interest. Our findings show how they communicated and guided their members. Third, our analysis gives voice to the audit regulators, an overlooked actor with lower exposure, with the latter raising major concerns with the way the Big 4 firms managed employees, talent, and resources during the pandemic. Finally, we extend Boulianne, Fortin, and Lecompte (2023) in considering the unique context of the pandemic, adding the audit regulators’ viewpoint, as well as expanding the ETHOS framework.

The paper is organized as follows: Section II presents the relevant literature, whereas Section III describes our method. In Section IV, we present our findings, followed by a discussion of the findings in Section V. In the last section, we conclude the paper.

II. RELEVANT LITERATURE

Technology and Ethics

Information systems capture, record, store, and process data to produce information for decision-makers and include people, procedures, and software (Romney and Steinbart 2018). The “people” here refers to “humans,” a key element for our investigation due to the accountant’s role in designing, operating, and maintaining information systems, as well as being extensive users of such systems. As such, decisions made about information technology (IT) design, and the information generated, have ethical impacts on professional accountants and organizations.
Guragai, Hunt, Neri, and Taylor (2017) proposed the ETHOs framework for studying the relationship between IT and ethics, which they identified upon conducting a literature review of the two fields. The authors argue that the growth of IT provides a unique context for humans (more specifically, accountants) interacting with technology to act unethically. Their logic is that, as users of technology distance themselves from their actions through technology, they tend to both obscure ethical elements and rationalize unethical behaviors.

Furthermore, as technology advances, the human actor (user) becomes more and more removed from their actions, lessening personal accountability (Dillard 2003). The result is the potential for unconsciously legitimizing wrongdoings by focusing on tasks accomplished using technology, while being deprived of an awareness of the ethical impact of their actions (Adams and Balfour 1998). In short, for Guragai et al. (2017), advances in technology tend to facilitate unethical behavior, which is an important concern for professional accountants holding key roles within and beyond organizations, including protecting the public interest. “Accounting is a moral discipline” according to Guragai et al. (2017, 77) where professional accountants are ultimately accountable both for IT design and as providers of information. We thus should consider not only an information system’s financial element—which is used for the purpose of assessing if and how organizations achieve better performance—but also its ethical element, that is, how the usage of IT may cause harm. In other words, both the financial and the ethical dimensions of IT should be considered.

More recently, Shoemaker, Curtis, Fayard, and Kelly (2020) studied employee ethical perceptions and behaviors in the presence of formal norms (namely, formal policies, such as codes of ethics) and informal norms (namely, personal perceptions of appropriate behavior) when using technology for personal tasks while at work. They refer to Ogburn’s (1966) cultural lag theory, where a culture’s material traits (such as technology) progress more rapidly than the culture itself can adapt, leading to a gap between technology use and ethical behavior. Shoemaker et al. (2020) assert that modern workers, who are using technology constantly, cross the line between work and personal life, making it difficult to determine “what is right,” thereby generating ethical issues. For instance, a firm’s code of ethics may forbid the use of a firm’s computers for personal tasks during working hours (e.g., replying to personal text messages/emails or performing banking transactions). However, informal norms may consider such personal tasks during work hours to be “acceptable,” as work tasks may be frequently performed on an individual’s personal time. In other words, both formal and informal norms influence behavior and ethical reasoning. Shoemaker et al. (2020, 252) report that, as advances in IT “are not likely to slow down soon” in term of sophistication and use, and to meet the preferences of the changing workforce, organizations must consider the notable influence of informal norms on employee behavior. For instance, it is suggested that codes of ethics be rewritten to adapt to the current business context, weighing both formal and informal norms.

Boulianne et al. (2023) also explored the intersection of ethics and IT and found that Big Data analytics and AI are the two technologies raising significant ethical concerns, with data access and storage most frequently identified as having a major impact. They question the ability of the accounting profession to properly deal with emerging and disruptive technologies due to the lack of training in technology and ethics. They also suggest that human and machine would better benefit organizations by working together instead of competing.

Academic research on ethics and IT is limited, and, when we include the pandemic context, the literature investigating ethics, technology, and the pandemic is rather sparse. For instance, Rinaldi, Cho, Lodhia, Michelon, and Tilt (2020, 181) launched a call for papers highlighting the need to focus on “how…technologies are used to describe…the dynamics of the pandemic.”

In short, attention is drawn to the ethical challenges that technology generates over its benefits. During the pandemic, individuals and organizations had opportunities to implement technologies to
collect, analyze, and utilize data impacting behavior, where the consideration of ethics in such data collection and use beg further investigation.

**Theoretical Underpinning**

A variety of known frameworks could be considered for studying ethics and technology—for instance, Control Objectives for Information and Related Technology (COBIT), Information Systems Audit and Control Association (ISACA), and Committee of Sponsoring Organizations of the Treadway Commission-Enterprise Risk Management (COSO-ERM), to name a few. However, one framework, ETHOs, stood out, as it specifically examines the relationship between ethics and IT. This framework is relevant for our research as it is both explicit and broad in scope, permitting us to contextualize our investigation. Figure 1 presents the ETHOs framework, where the Environmental, Technological, Human, and Organizational dimensions interact, which then impacts ethical judgments, ethical decisions, and actions.

ETHOs consists of four dimensions, as follows: (1) Environmental, which comprises norms, expectations, rules, and standards that are enacted by external constituents, i.e., organizations, such as professional bodies, regulators, states, stakeholders, and society; (2) Technological, which refers to software, hardware, and communication devices in relation to IT (i.e., inputs, storage, processing, and outputs/reports); (3) Human, which refers to internal constituents, i.e. individuals and/or professional groups, and their ethical attitudes when making decisions and taking actions while interfacing and dealing with IT; and (4) Organizational, which includes contextual factors, such as organizational structure, business strategy, environmental uncertainty, and ethical culture (see Figure 1).

The four dimensions of ETHOs shape and drive the ethical judgments, ethical decisions, and actions of individuals and/or groups that arise while using technology. These judgments, decisions, and actions result in ethical outcomes. These outcomes in turn become subjective assessments that may be considered for some, depending on context, as either ethical or unethical, e.g., “right” or “wrong.”

We now turn to the method section.

---

*FIGURE 1*

**ETHOs: Framework to Study the Ethics-Technology Relationship**

Adapted from Guragai et al. (2017).
III. METHOD

We performed a content analysis of published reports. Documentation was examined to make inferences of changes (Krippendorff 2013), in our case for the period before and during the pandemic. This approach is akin to exegesis, which is a method of interpreting texts to arrive at an understanding of its meaning and to identify specific characteristics of messages. Content analysis involves using word frequencies, occupied space, and presentation format to infer importance or consideration of specific words/themes. For instance, words most often emphasized and mentioned carry greater importance, aiming to convey a core message.

We sought to identify patterns and trends in reports before and during the pandemic. We analyzed documentation, such as annual reviews from the Big 4 accounting firms, professional accounting associations’ publications, and audit regulators’ reports. Audit regulators provided an independent evaluation of the quality of work performed by the Big 4, including ethical issues they faced, bringing a different perspective and helping to corroborate—or not—information conveyed by the Big 4.

We examined the coverage of ethics and technology before and during the pandemic. More specifically, we aimed to document how the Big 4 firms, seen as major influencers of the accounting profession (see Daoust 2020; Malsch and Gendron 2011), dealt with ethics and technology during the pandemic. This content analysis approach has been used in prior accounting research (see Beck, Campbell, and Shrives 2010), including to assess the level of commitment to ethics (Verschoor 1998), ethical climate (Amernic and Craig 2013), and voluntary ethics disclosure (Othman, Ishak, Arif, and Aris 2014). Previous research indicates that comment letters and reports are representative of an accounting actor’s viewpoint (Baudot, Demek, and Huang 2018).

Data Collection

We collected Big 4 firms’ annual reviews for the periods prepandemic and during the pandemic to examine their coverage of ethics and technology. We also collected inspection reports from the Canadian Public Accountability Board (CPAB), the audit regulator in Canada, as well as inspection reports from two Canadian professional accounting associations, namely Chartered Professional Accountants (CPA) Ontario and CPA Quebec.

CPA Ontario and CPA Quebec play the dual roles of being professional accounting associations providing pathways to the profession as educators and thought leaders, as well as being regulators charged with protecting the public interest by inspecting CPAs engaged in public practice (around 20 percent of their members). These inspections may lead to fines, suspensions, revocations, and practice restrictions. CPA Ontario and CPA Quebec collectively represent two-thirds of Canadian CPAs.

Next, we collected publications from key accounting associations to assemble a comprehensive set of reports for analysis and discussion, following the approach taken by Pimentel and Boulianne (2020). We examined publications from CPA Canada, the Association of Chartered Certified Accountants (ACCA), the International Federation of Accountants (IFAC), the Australian Accounting Standards Board (AASB), the Auditing and Assurance Standards Board (AUASB), and the International Ethics Standards Board for Accountants (IESBA). These organizations shape and influence the accounting profession. For our analysis, reports examined ought to combine the terms “ethics,” “pandemic,” “COVID-19,” “technology,” and related terms. In total, we collected eight annual reviews from the Big 4 firms (379 pages), 14 documents from professional accounting associations (281 pages), and six documents from audit regulators (177 pages).
Data Analysis

Using NVivo software, the data were coded into different themes, including according to the four dimensions of the ETHOs Framework (Environmental, Technological, Human, and Organizational) to identify how the Big 4 firms, the professional accounting associations, and the audit regulators covered ethics and technology before and during the pandemic. Using NVivo permitted us to organize a data analysis that was iterative, allowing the main themes to emerge. We sought to determine how key actors of the accounting profession wondered about ethics and technology during the pre- and intrapandemic period.

We now turn to the findings.

IV. FINDINGS

The intensive use of technology has an impact on both ethics and, more broadly, the future of accounting professionals (Guragai et al. 2017). Our interest is to examine how ethics has been considered when using technology during the pandemic through the lens of key actors of the accounting profession. As a reminder, professional ethics is at the heart of the accounting profession. As well, we may see where the views of these key actors align or differ. The following tables illustrate the coverage of ethics and technology during the pandemic for the Big 4 firms, the professional accounting associations, and the audit regulators, organized across the four ETHOs dimensions. We then discuss the nuances between the three actors for each dimension.

The Environmental Dimension

A dominant theme found with the Environmental dimension is the changes in the accounting and auditing standards and in their regulations. As a reminder, actors of the accounting profession are highly regulated. Audit regulators and professional accounting associations have the mission to protect the public interest and, as part of that mission, systematically conduct inspections of CPAs’ work. The pandemic has forced the Big 4 firms to adjust their implementation of the rules to comply with regulations. For instance, the Big 4 have responded to the demands of regulators where technological issues related to security have been considered:

We have also engaged with regulators to facilitate transparency and alignment about any methodological or other changes deemed necessary in the COVID-19 context. (PricewaterhouseCoopers (PwC) 2020, 21)

Deloitte is committed to protecting confidential and personal information…to continually monitor regulatory and legal requirements to support compliance. (Deloitte 2019, 2020, 29)

With the use of technology and digital solutions, EY…provides a new level of trust that…helps organizations meet regulatory responsibilities. (Ernst & Young (EY) 2019, 2020, 12)

We protect information assets, personal data and client information, through their creation, transmission and storage, in accordance with the requirement of applicable laws, regulations and professional standards. (EY 2020, 30)

For accounting associations, their response was to the adaptation of the professional code of ethics. The IESBA launched an initiative on technologies and stated its intention to identify potential ethical implications of technological developments. They examined the robustness and relevance of the fundamental principles and independent standards included in the International Code of Ethics for Professional Accountants, which contained the International Independence
Standards. During the pandemic context, the ACCA issued a reminder of the importance of the code of ethics, since “being a qualified professional accountant… it is vital to follow the code of ethics” (Stephen Heathcote in ACCA 2020a, 9).

The above quotes provide responses by the Big 4 on technology, ethics, and the pandemic that give the impression that they reacted properly to the challenging COVID-19 context. But audit regulators provide a different perspective. They raised concerns about noncompliance with standards (Canadian Public Accountability Board (CPAB) 2020), as well as poor implementation of new standards during the pandemic (CPA Quebec 2020, 2021). Inspections reports reveal that the number of such incidents have increased, leading audit regulators to stress the importance of ethics surrounding the use of technology and to adapt to standards accordingly.

For instance, CPA Ontario’s inspections report revealed that from 2019 to 2020, significant reportable deficiencies increased from 37 percent to 41 percent, whereas referrals to the Professional Conduct Committee after initial inspection increased from one to eight. As mentioned in their 2021 report, “the number of referrals after an initial inspection was historically high in 2020” (CPA Ontario 2021, 9). CPA Quebec also reported a decline in the overall quality of dossiers inspected; a total 201,939 percent of dossiers met their requirements, whereas only 34 percent did in 2020 (CPA Quebec 2021). Canadian Public Accountability Board (CPAB) (2021, 13) also reported an “increase in cases” leading to a “significant concern” as an audit regulator. Table 1 summarizes the coverage of ethics and technology during the pandemic by key accounting actors for the Environmental dimension.

We now turn to the ETHOs Technological dimension.

TABLE 1
ETHOs Environmental Dimension: Coverage of Ethics and Technology during the Pandemic for the Big 4 Firms, the Professional Accounting Associations, and the Audit Regulators

<table>
<thead>
<tr>
<th>Big 4 Firms</th>
<th>Professional Accounting Associations</th>
<th>Audit Regulators</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Committing to protect confidential and personal data in compliance with regulatory and legal requirements (Deloitte 2019; EY 2019; KPMG 2019).</td>
<td>● Perform the appropriate audit procedures (Australian Accounting Standards Board (AASB) and Auditing and Assurance Standards Board (AUASB) 2020)</td>
<td>● Necessity to adapt to new standards (CPA Quebec 2020)</td>
</tr>
<tr>
<td>● Committing to protect confidential and personal data in compliance with regulatory and legal requirements and professional standards (Deloitte 2020; EY 2020; KPMG 2020; PwC 2020)</td>
<td>● International Code of Ethics for Professional Accountants is adapted to pandemic (Arnold 2021)</td>
<td>● Concerns about noncompliance with standards (CPAB 2020)</td>
</tr>
<tr>
<td>● Facilitating transparency and alignment regarding any changes needed from regulators in the context of COVID-19 (PwC 2020)</td>
<td></td>
<td>● Identification of a downward trend indicating that some practicing offices are still struggling to meet professional standards (CPA Ontario 2020)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● A decline in assurance quality (CPA Ontario 2020)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Necessity to adapt to new standards (CPA Quebec 2021)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● A decline in assurance quality (CPA Ontario 2021)</td>
</tr>
</tbody>
</table>
The Technological Dimension

During the pandemic context, advanced technologies, such as data analytics, blockchain, AI, and Internet of Things (IoT), provided the potential to help detect outbreaks. However, the pandemic accelerated the adoption and implementation of these technologies in a sudden and unexpected way, which raised concerns about ethics. AI and blockchain are the most cited technologies by Big 4 firms as opportunities to improve audit quality and fraud detection:

We are increasing investments in advanced technologies and methods that can help drive audit quality improvements and better detect fraudulent behavior. This includes greater use of artificial intelligence, data-based risk-sensing tools and predictive analysis. (Deloitte 2019, 6)

Technology has been promoted by Big 4 firms as being an effective tool to help organizations with their decision-making and risk management. The following quotes are taken from their publications:

We’ve developed a new approach to managing risk…(to) elevate risk management from a responsive function to a proactive tool for strategic decision-making. (EY 2019, 13)

Our work around blockchain supports authenticity and accountability, and…trust in the products and services that people are buying. (EY 2019, 10)

In the wake of the pandemic, Deloitte helped many clients quickly virtualize their operations and develop crisis response plans. (Deloitte 2020, 7)

(We are) helping clients use emerging technologies such as artificial intelligence successfully and responsibly so they benefit both business and society. (PricewaterhouseCoopers (PwC) 2019, 26)

When AI is part of an organization’s business model, professional accountants have an ethical obligation to be concerned about associated issues, such as the dehumanization of business processes, tasks performed, data privacy, data security, and any negative consequences impacting humans. Ethical obligations are even more critical when AI is deployed to perform data analytics with the aim of generating systematic and actionable decisions. Risk also comes into play, as AI systems may store a large volume of sensitive data used for key decisions, including health care, financial credits, and employment information. Systems designers not paying enough attention to the encryption of sensitive data are thus a major organizational threat.

Ideally, systems users must be able to look “under the hood” of the models they use, explore the data employed, and be able to “expose the reasoning behind each decision, and provide coherent explanations to all stakeholders in a timely manner” (PwC 2019, 11). Wynants et al. (2020) examined the prediction models used by AI systems and found that, due to the pressure of rushed delivery, prediction systems used during the pandemic had a high risk of statistical bias. Chandra, Gupta, and Agarwal (2020) reported that some AI systems ultimately aim to replace humans with technology (where some already do so for some tasks), a phenomenon that has accelerated with the pandemic. The resulting tension between workers (even those occupying higher-level positions with expertise, such as CPAs) and advanced technology calls for management to make difficult business and ethical choices.

Although audit regulators agree that technology may help professional accountants to accomplish their tasks, providing benefits to individuals and organizations, technology also raises significant threats. Table 2 summarizes the coverage of ethics and technology during the pandemic by key accounting actors for the Technological dimension.

We now turn to the ETHOs Human dimension.
For the Human dimension, the wording revolves around the loss of ethical behavior or awareness, as the pandemic-related pressure to react quickly “created myriad opportunities for unethical behavior” (International Federation of Accountants (IFAC) 2021, 7). The pandemic context “not only [intensified] ethical dilemmas already familiar to professional accountants, but also [brought] forward new issues that required them to exercise their professional expertise and ethical judgement” (ACCA 2020a, 3). This refers to the potential negative impact of the pandemic on accountants’ ethical judgments.

Professional accountants and auditors should always apply professional skepticism, evaluating data with curiosity and vigilance while keeping in mind potential ethical issues. This skepticism not only is at the heart of the accounting profession but is also included in accounting and audit standards. The pandemic created a context where skepticism by accountants has been confronted. ACCA reports that this pressure can manifest through inadequate documentation, as highlighted by CPA Ontario in its 2021 Inspection report, and a lack of professional skepticism:

The direct financial impacts are likely to involve accounting estimates prepared by management. Significant assumptions including projected cash flows, used in these accounting estimates may be affected by the COVID-19 event. If your audit client has significant amounts of direct financial impacts that contain estimation uncertainty, the risk assessment and audit evidence supporting these accounting estimates and related disclosures may be affected by the COVID-19 event. (AASB and AUASB 2020)

In such contexts, the advocacy threat may generate biased information (ACCA 2020a). In their annual inspection reports, the audit regulators state that more skepticism is needed from auditors (CPAB 2021; CPA Ontario 2021), particularly in the context of a pandemic where the risk of financial irregularities may significantly increase. Auditors lacking professional skepticism represent a
key issue in performing audit mandates. As stated above, skepticism is paramount to the ethics of professional accountants. More specifically, the AASB-AUASB reports that “auditors should be alert and exercise professional skepticism…to not give rise to financial reporting misstatements” (AASB and AUASB 2020, 3). IFAC (2021, 16) refers to an ongoing concern about “mental wellness and the state of mind required to think critically.” During the pandemic, accounting professionals were under great pressure and experienced tremendous stress, such that some may have suffered mentally, affecting their behavior and judgment (ACCA 2020b).

According to EY (2020, 12), one of the pandemic’s consequences on professional accountants has been the impact on their level of commitment toward “independence, integrity, objectivity and professional skepticism.” This observation is corroborated by the 2021 CPA Ontario Inspection report, which states that “[o]ne of the most common causes identified is a lack of professional skepticism” (CPA Ontario 2021, 18). This lack of professional skepticism, coupled with the lack of supervision raised by audit regulators, indicates that the use of new technologies, which were adopted in a rapid way, might raise ethical concerns in terms of adequate utilization. A lack of proper supervision of the audit work may be reflected during the implementation and utilization of related technologies. Table 3 summarizes the coverage of ethics and technology during the pandemic by key accounting actors for the Human dimension.

We now turn to the ETHOs Organizational dimension.

**The Organizational Dimension**

For the Organizational dimension, the Big 4 firms promoted adaptability during the pandemic, in which technology plays a key role, as well as fostering ethical behaviors:

During the pandemic to...help clients emerge from it even more resilient...where organizations are adaptable and prepared for the next crisis; one where people and technology bring out the best in each other. (Deloitte 2020, 9)

Table 3 summarizes the coverage of ethics and technology during the pandemic by key accounting actors for the Human dimension.

<table>
<thead>
<tr>
<th>Big 4 Firms</th>
<th>Professional Accounting Associations</th>
<th>Audit Regulators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teams committed to independence, integrity, objectivity, and professional skepticism (EY 2020)</td>
<td>Maintaining independence (ACCA 2020a; IFAC 2021)</td>
<td>More skepticism needed from auditors (CPAB 2020)</td>
</tr>
<tr>
<td></td>
<td>Issues with adequate documentation, bias, and lack of professional skepticism (ACCA 2020a; CPA Canada 2021b; IFAC 2021)</td>
<td>Lack of professional skepticism from practitioners (CPA Ontario 2021)</td>
</tr>
<tr>
<td></td>
<td>Objectivity can be affected (ACCA 2020a; IFAC 2021)</td>
<td>Lack of questioning in a period where the going concern assumption is critical (CPA Ontario 2021)</td>
</tr>
<tr>
<td></td>
<td>Skills needed to work remotely (ACCA 2020a; CPA Canada 2021a, 2021b)</td>
<td></td>
</tr>
</tbody>
</table>
We strive…[to act] as role models and promoting ethical behavior. (KPMG 2019, 8)

During the pandemic, professional accounting associations focused on educating their members on the impact of working remotely and the importance of professional skepticism and respecting data privacy:

The employer must consider what is an appropriate level of staff tracking, balancing controls with privacy. With software tools, organizations can track how much time an employee is online, whether they are typing or idle, their location or even obtaining visual confirmation for certain roles, using the employee’s webcam. (Picard 2020, 5)

Remote working increases the challenge of applying professional skepticism effectively by limiting the skills used to evaluate representations made by management. (CPA Ontario 2021, 20)

Professional accounting associations are promoters of technology to be used by their members, while taking into consideration the difficult business and ethical choices (e.g., workers versus technology) when implementing such technology:

Downsizing the organisation needs to apply an ethical approach when determining which employees are to be made redundant, put on furlough or given other options. (Picard 2020, 6)

Audit regulators have expressed significant concerns about audit teams’ lack of expertise and use of specialized external resources (CPAB 2021)—specifically when advanced technologies create new audit risks factors—which in turn impact audit quality (CPA Ontario 2021). Audit regulators also report on the lack of supervision and review of audit work by more experienced auditors. CPAB (2021) requires significant improvement from the Big 4 in the areas of talent and resource management and work oversight. CPA Ontario (2021, 9) reports that “national firms are at the forefront of engagement quality, and we expect them to set an example for other firms in Ontario by reducing their significant reportable deficiencies to a more acceptable level.” Table 4 summarizes the coverage of ethics and technology during the pandemic by key accounting actors for the Organizational dimension.

In short, using the ETHOs framework, our analysis of the Big 4 firms during the pandemic indicates an emphasis on using technology responsibly, where key reminders on proper ethical behavior seem to have been understated. This finding is at odds with what professional accounting associations have conveyed with frequent reminders to their members on the importance of ethics when using technology. As well, as indicated by the audit regulators, the Big 4, being seen as major influencers of the accounting profession, should have led by example on ethics during the pandemic. We now turn to the discussion of the findings.

V. DISCUSSION

In the previous section, we used a framework, including four components, to organize our findings on ethics and technology during the pandemic. We now provide a discussion of our findings.

The Environmental dimension shows that the Big 4 use technology to help them comply with accounting and auditing standards, whereas the audit regulators report a downward trend in audit firms’ compliance with the standards, impacting audit quality, which challenges Big 4’s statements. For the Technological dimension, Big 4 firms report on the benefits of using new technologies, emphasizing their added value to both clients and the firms, with rather rare mentions of ethics. In contrast, professional accounting associations convey more balanced and nuanced information,
highlighting the opportunities technology brings to organizations and accountants but also raising ethical concerns about the risks associated with the use of these technologies.

Our findings illustrate how the Big 4 place their focus on the gains to be obtained through a successful implementation of technologies. This observation refers to prior research on the Big 4 into how they make choices between applying a commercial logic versus a professional logic in their decision-making (Carter and Spence 2014). Our results suggest that during the pandemic, regarding technology, Big 4 firms may have placed a greater emphasis on performance than on ethics. However, these concepts—performance versus ethics—are not incompatible, as shown in the professional accounting associations’ reports. We observed that the \emph{Human} dimension is covered differently by the Big 4 when compared with the professional accounting associations, with the latter emphasizing the importance of integrity, objectivity, and professional skepticism, whereas audit regulators raise concerns with the lack of expertise and professional skepticism in audits performed by large audit firms.

Within the \emph{Organizational} dimension, our results indicate that audit regulators raised major concerns with the way the Big 4 managed employees, talent, and resources during the pandemic. Although these firms have consistently experienced high staff turnover for years (Daoust 2020), the shortage of employees, amplified by the pandemic, created an important expertise gap from which it will take time to recover. Yet, during the pandemic, the Big 4’s annual reviews focused on

---

**TABLE 4**

\emph{ETHOs Organizational} Dimension: Coverage of Ethics and Technology during the Pandemic for the Big 4 Firms, the Professional Accounting Associations, and the Audit Regulators

<table>
<thead>
<tr>
<th>Big 4 Firms</th>
<th>Professional Accounting Associations</th>
<th>Audit Regulators</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ethical climate sets by a code of ethics (EY 2019; KPMG 2019)</td>
<td>• Have appropriate level of staff tracking (ACCA 2020a)</td>
<td>• Lack of expertise, consultation, and resources (CPA Quebec 2020)</td>
</tr>
<tr>
<td>• Importance of protecting confidential information embedded in the organizational culture (Deloitte 2019)</td>
<td>• Fair treatment of staff on remote work (ACCA 2020a)</td>
<td>• Poor auditor knowledge of specialized sectors (CPA Quebec 2020)</td>
</tr>
<tr>
<td>• Strategy implemented to ensure security, vigilance, and resilience to protect confidential information (Deloitte 2019)</td>
<td>• Issues when reducing staff size (ACCA 2020a)</td>
<td>• Concerns about supervision and review by senior auditors (CPAB 2020; CPA Quebec 2021)</td>
</tr>
<tr>
<td>• Culture enabling remote working (Deloitte 2020)</td>
<td>• Presentation of biased financial information (ACCA 2020a; IFAC 2021)</td>
<td>• Lack of resources and specialized skills (CPAB 2020)</td>
</tr>
<tr>
<td>• Culture to protect confidentiality (Deloitte 2020)</td>
<td>• Cybersecurity and fraud issues (ACCA 2020a; IFAC 2021)</td>
<td>• Need to commit sufficient resources (CPAB 2020)</td>
</tr>
<tr>
<td>• Ethical climate set by a code of ethics (KPMG 2020)</td>
<td></td>
<td>• Audit teams lacking technical knowledge (CPA Ontario 2020)</td>
</tr>
<tr>
<td>• Improve controls to ensure confidentiality and privacy (Deloitte 2020)</td>
<td></td>
<td>• Absence of effective monitoring (CPA Ontario 2020)</td>
</tr>
</tbody>
</table>
the needs of their clients and how they could help clients to survive and adapt, which is reflective of the predominance of commercial logic.

The interaction of the ETHOs’ four components (see Figure 1) would lead to ethical judgments, decisions, and/or actions. As an example, we find that the lack of ethical consideration stems from a lack of adequate supervision and review by the audit teams (Organizational), as well as a lack of professional skepticism (Human). This would have an impact on the quality of the audit (Environmental) when technology is not utilized correctly and responsibly (Technological). Audit quality being at the heart of the auditors’ work, the rapid adoption of technology under pressure, and the poor supervision of technology usage, which were all amplified by the pandemic, have had impacts on the ethical judgments, decisions, and actions.

The pandemic is a unique context that affects the ethical decision-making of accounting professionals and challenges the organizational ethical culture. CPAs have to consider at minimum two viewpoints when it comes time to make decisions and take action. First, being a member of a professional accounting association, they have to comply with their association’s code of ethics and act with professionalism. As a reminder, such associations also play the role of regulator of the profession. Second, CPAs work in various organizations, including accounting firms, where they also have to comply with their organization’s rules, code of ethics, and policies, as well as with organization culture. Loyalty toward their organization is a requirement. Accordingly, professional accountants are asked to ponder both the commercial logic and the professional logic when making decisions.

Our results indicate that the Big 4 firms favor organizational performance in helping clients and promoting technology. Professional accounting associations also support the use of technology but raise awareness among their members, through several relevant publications, of the importance of ethics. One possible explanation for this difference is professional accounting associations’ dual roles of being both professional associations providing pathways to the profession as educators and thought leaders and regulators of their members, in charge of protecting the public interest.

Should we be concerned that, among the three key accounting actors, the ethical implications of technology during the pandemic were less emphasized by the Big 4? One may refer to the recent PricewaterhouseCoopers (PwC) scandal on internal training exam cheating (for which they were fined $750,000 and censured by the Public Company Accounting Oversight Board [PCAOB] in the United States and fined $200,000 and censured by the CPAB). Nicolas Marcoux, chief executive of PwC Canada, said, “We have since undertaken several remediation steps including retraining, additional ethics training, financial penalties, written warnings, and terminations where warranted.” Other CPA firms have also been fined for widespread cheating on internal personnel training tests.

Will these Big 4, in their next annual reviews, mention these issues and promote a culture of professional ethics, with the intention of sending a strong signal that this issue is very important to them and will never again be tolerated? Or will they hope that the internal training exam cheating story will be forgotten by the public and ignore this ethical issue in their annual reviews? We do not have the answer to this question (yet). However, what we do know is that the audit regulators will not forget such a story in their reports. In the end, we believe that adding the viewpoints of the audit regulators and the professional accounting associations creates a better overall picture of the Big 4 firms’ level of ethics during the pandemic.

**What Does the Pandemic Change?**

Organizations are constantly trying to streamline business processes to achieve cost savings, and advanced technologies help to reach such objectives. Organizations can increasingly
automate tasks performed by low-level employees and, as technology evolves, potentially even tasks currently performed by mid- to high-level employees holding specific expertise. In such a context, professional accounting associations raise the ethical issues associated with replacing humans with machines, stressing the impact of computer-based knowledge systems on professionals’ knowledge and expertise (Sutton, Arnold, and Holt 2018).

Professional accountants are asked to practice the right level of skepticism, and the pandemic context has tested professional skepticism. With isolation and remote working, audit regulators raised concerns about the quality of audits when skepticism is relaxed, which may potentially lead to more material misstatements and even fraud. Audit firms have been asked to be more vigilant and to remind their teams to be more skeptical. The CPAB (2020) report mentions that professional skepticism is even more important in times of crisis, such as a pandemic, which is a context that increases risks related to financial irregularities.

Technology has a significant impact on professional accountants, and its use has accelerated during the pandemic. Our results indicate that the Big 4 firms promote and implement technologies to serve their clients, with limited mention of ethics when compared to other actors. One may see this as a flag from major influencers of the accounting profession. Professional accounting associations have a different approach in frequently reminding their members through their publications of the prime importance of ethical behavior.

Numerous organizational changes made during the pandemic will remain in place postpandemic. For instance, people have become accustomed to working remotely using technology, often experiencing a better work-life balance. Accordingly, challenges related to ethics and technology will remain in the accounting domain postpandemic.

VI. CONCLUSION

Even though technology is reported to improve organizations’ business processes and performance, there are cases when the use of technology brings ethical concerns, as cautioned by the professional accounting associations and the audit regulators. Technology today is challenging the competence and even the relevance of professional accountants, having an impact on their skepticism, ethical judgments, ethical decisions, and actions. The pandemic context has turned the world upside down, leading to new business models and new ways to run organizations using technology, including the mandatory implementation of remote working. These forced and sudden changes have led to changes in individuals’ behaviors. Professional accountants’ ethics have been challenged and accounting associations have responded accordingly, recalling that “being ethical (means) demonstrating professional competency…exercising due care…and acting to uphold the public interest” (ACCA 2020b, 3).

This paper examined the consideration of ethics, when referring to technology during the pandemic, by key accounting actors through a content analysis of Big 4 firms’ annual reviews, professional accounting associations’ publications, and audit regulators’ reports. More specifically, we aimed to document how the Big 4 dealt with ethics and technology during the pandemic. We contextualized our documentation analysis using the ETHOs framework, which integrates ethics and technology. Our findings suggest that the Big 4, compared with other actors, reported primarily on the benefits of technology use and its added value to both clients and the firm, with less emphasis on ethics. In contrast, professional accounting associations offer a more balanced view, highlighting the opportunities technology brings to organizations and accountants while also raising ethical concerns surrounding the use of these technologies.
This research has limitations. Given the sensitive topic we studied, namely, professional ethics, the data collection was challenging. Using reports from three key actors in the area (Big 4, professional accounting associations, and audit regulators), we aimed to provide a partial picture of a complex construct. Controversial topics, such as ethics, fraud, privacy, and budgetary slack, to name a few, are very important to investigate but difficult to research. That said, we concur that, when feasible, case studies and interviews should be conducted to know more about the ethical usage of technology by accountants during the pandemic, as a diversity of methods may only help to better capture the phenomena under study.

For future research, it would be interesting to see if the Big 4 annual reviews are so different from the annual reports of other large firms. The pandemic context forces the Big 4 to first find ways to save businesses by serving clients in distress and thus prioritizing effective operations using technology for profits, which is a commercial logic. Such a unique context may have placed professional ethics as a second prerogative. It may all depend on how, in the end, we perceive the Big 4—as profit-oriented firms, as professional accountants serving the public interest, or as something in between. The pandemic offers a unique context to challenge professional ethics in the accounting domain.

REFERENCES


