HEC Montréal
École affiliée à l'Université de Montréal

Three essays on the impacts of cryptocurrencies, ICOs and other emerging technologies: Implication for the accounting profession

par

Annie Lecompte

Thèse présentée en vue de l'obtention du grade de Ph. D. en administration
(Spécialisation Sciences comptables)

Avril 2023

© Annie Lecompte, 2023

HEC Montréal
École affiliée à l'Université de Montréal

Cette thèse intitulée :

Three essays on the impacts of cryptocurrencies, ICOs and other emerging technologies: Implication for the accounting profession

Présentée par :

Annie Lecompte

a été évaluée par un jury composé des personnes suivantes :

Simon Dermarkar
HEC Montréal
Président-rapporteur

Claude Francoeur
HEC Montréal
Directeur de recherche

Emilio Boulianne
Concordia University
Membre du jury

Sylvie Berthelot
Université de Sherbrooke
Examinatrice externe

Caroline Lambert
HEC Montréal
Représentante du directeur de HEC Montréal

Résumé

Les technologies émergentes, telles que la cryptomonnaie ou le Big Data, ne cessent d'évoluer et d'attirer des utilisateurs. Ces technologies sont porteuses de solutions et d'avancées qui bénéficient à un grand nombre, mais elles sont également entachées de manquements éthiques de diverses natures. Dans cette thèse doctorale, divisée en trois essais, j'ai étudié l'information qui entoure ces technologies émergentes pour souligner la façon dont les utilisateurs en font usage pour se protéger des risques qui en découlent, et mieux comprendre la place de l'éthique en lien avec leur utilisation.

Le premier essai concerne la place de l'éthique chez les auditeurs dans un contexte de pandémie mondiale qui a précipité l'adoption de nouvelles technologies dans leur travail. S'appuyant sur des rapports annuels émanant des grands cabinets comptables canadiens, de même que sur des rapports des associations comptables professionnelles et des rapports d'inspection des principaux organismes de surveillance des auditeurs canadiens, l'essai met en lumière la considération de l'éthique dans l'utilisation des nouvelles technologies par les auditeurs de grands cabinets avant et pendant la pandémie de Covid-19. Prenant appui sur le cadre théorique ETHO, l'essai démontre qu'un fossé existe entre la faible importance de l'éthique dans le discours des grands cabinets d'audit et le ton plutôt alarmant emprunté par les associations professionnelles comptables ayant soulevé de nombreuses problématiques potentielles en la matière. L'analyse des rapports d'inspection des principaux organismes canadiens de surveillance de la profession comptable permet de confirmer cet écart, et d'ainsi informer sur cet enjeu majeur qui doit être pris en compte par la profession comptable.

Le deuxième essai vise à informer les investisseurs dans les premières émissions de cryptoactifs (PEC) des indicateurs de fraude à prendre en compte avant de se lancer dans un tel type d'investissement. La croissance vertigineuse dans l'offre de PEC, couplée à un manque important de réglementation encadrant le secteur, met l'investisseur à risque de pertes importantes. J'ai donc cherché à comprendre quels sont les indicateurs de fraude à considérer dans le cas d'un PEC, et à déterminer dans quelle mesure ces indicateurs de fraude diffèrent de ceux qui découlent de la finance traditionnelle. La mise en lumière de nouveaux indicateurs de fraude permet ainsi aux investisseurs, mais également aux

régulateurs financiers et aux enquêteurs en matière de fraude, d'être mieux informés face à ce milieu financier hautement risqué.

Le troisième essai cherche à comprendre pourquoi des investisseurs avisés, qui connaissent très bien le milieu des cryptoactifs de par leurs activités professionnelles ou personnelles, désirent investir dans des PEC, et par quel processus ils passent pour prendre la décision ultime d'investir ou non dans un projet. S'appuyant sur la théorie des perspectives, l'essai démontre que ces investisseurs sont en fait des parieurs qui prennent un risque calculé. De plus, le cadre théorique de *l'Art de la guerre*, l'œuvre de Sun Tzu, permet d'expliquer le comportement de l'investisseur avisé qui cherche à investir dans un projet de PEC, démontrant les quatre étapes par lesquels passent à la fois un général d'armée et un investisseur avisé pour se protéger d'ennemis embusqués cherchant à leur dérober leurs économies.

Mots-clés : Technologies émergentes, Information, Fraude, Réglementation, Éthique, Auditeurs

Méthodes de recherche : Entrevue en profondeur, Analyse de contenu

Abstract

Emerging technologies, such as cryptocurrencies or Big Data, are constantly evolving and attracting new users. They offer solutions and advances that benefit many, but are also fraught with ethical failings of various kinds. In this doctoral dissertation, divided into three essays, I study the information surrounding these emerging technologies to highlight how users protect themselves from the risks involved and how ethical the process is.

The first essay addresses the place of ethics among auditors in the context of a global pandemic that has precipitated the adoption of new technologies at work. Drawing on annual reports from large Canadian accounting firms, as well as reports from professional accounting associations and inspection reports from major Canadian auditor oversight bodies, the essay highlights the consideration of ethics in the use of new technologies, such as Big Data and artificial intelligence, by large firm auditors before and during the COVID-19 pandemic. Drawing on the ETHOS framework, the essay reveals a gap between the low importance of ethics in the discourse of large audit firms and the rather alarming tone taken by professional accounting associations that have raised numerous potential ethical issues. The analysis of the inspection reports of the main Canadian oversight bodies of the accounting profession confirms this discrepancy and thus informs on this major issue that must considered by the accounting profession.

The second essay aims to inform investors in initial coin offerings (ICOs) of fraud indicators to consider before embarking on such an investment. The dizzying growth in the supply of ICOs, coupled with a significant lack of regulation overseeing the sector, puts the investor at risk of great losses. The essay therefore seeks to understand what fraud indicators should be considered in the case of an ICO and to determine to what extent these fraud indicators differ from those derived from traditional finance. By understanding highlighting new fraud indicators, not only investors but also financial regulators and fraud investigators can be better informed about this high-risk financial environment.

The third essay seeks to understand why savvy investors, who are very familiar with the cryptoasset environment from their professional or personal activities, consider investing

in ICOs and what process they go through to make the ultimate decision to invest or not. Drawing on prospect theory, the essay demonstrates that these investors are essentially gamblers who are taking calculated risks. In addition, the theoretical framework of Sun Tzu's *Art of War* is used to explain the behavior of the smart investor seeking to invest in an ICO project, demonstrating the four steps that, as an army general going to war, savvy investors would undertake to protect themselves from ambush predators seeking to rob them of their savings.

Keywords : Emerging technologies, Information, Fraud, Regulation, Ethics, Auditors
Research methods : In-depth interviews, content analysis

Contribution of Authors

Chapter 1 :
Emilio Boulianne and Mélissa Fortin participated in manuscript writing.

Table of contents

List of tables

List of figures

List of acronyms

AASB	Auditing and Assurance Standards Board
ACCA	Association of Chartered Certified Accountants
AI	Artificial Intelligence
AUASB	Australian Auditing and the Assurance Standards Board
COBIT	Control Objectives for Information and Related Technologies
CPA	Chartered Professional Accountants
CPAB	Canadian Public Accountability Board
CSA	Canadian Securities Administrators
DeFi	Decentralized Finance
ICO	Initial Coin Offering
IESBA	International Ethics Standards Board for Accountants
IFAC	International Federation of Accountants
IPO	Initial Public Offering
ISACA	Information Systems Audit and Control Association
IT	Information Technology
PCAOB	Public Company Accounting Oversight Board
SEC	Stock and Exchange Commission

Remerciements

Le doctorat est plus qu'une aventure individuelle. Je n'aurais pu me rendre jusqu'au bout de cette quête sans le support de plusieurs personnes.

Je tiens tout d'abord à remercier vivement mon directeur, Claude Francoeur, pour son soutien inestimable tout au long de mon parcours. Je le remercie pour la confiance et l'appui accordés dans mon exploration d'un champ de recherche qui me passionne.

Je remercie également tous les membres de mon comité et de mon jury, pour les suggestions éclairantes et leur support. Un merci tout spécial à Pr. Boulianne, sans qui je n'aurais pas eu l'opportunité de connaître un domaine de recherche qui m'était jusqu'alors inconnu, et pour lequel j'éprouve toujours un enthousiasme sans borne à explorer.

Un doctorat ne s'accomplit pas seul, et c'est pourquoi je tiens à souligner tout le support moral et l'encouragement que m'ont procuré mes proches. Merci à toi, Marouan, de m'avoir accompagnée dans ce changement de carrière. Merci aussi à vous, Malik, Sofia et Norah, mes chers enfants qui sont la lumière de ma vie. J'espère que cette expérience saura vous inspirer à votre tour à poursuivre vos rêves. Et merci à toi, papa, qui a écouté patiemment mes frustrations, mes joies et mes emballements.

Finalement, un merci tout spécial à mes amies et collègues, Mélissa et Anne Marie, qui sont passées avant moi par ce périple, et qui ont écouté et calmé autant mes déceptions que mes frustrations, et qui m'ont prodigué maints conseils. Merci d'avoir été des alliées! Et un merci à mes amies de longue date, Stéphanie, Charlène et Julie, dont l'appui moral fut indéfectible. Merci mes amies!

Introduction

Emerging technologies undoubtedly have the wind in their sails. Initial coin offerings (ICOs), for instance, are more popular than ever, with total investments of nearly $27 billion in 2021 (Karpenko et al., 2021). Technologies such as artificial intelligence (AI) and Big Data are just as popular, particularly in the financial audit sector, with Big 4 firms implementing numerous applications derived from them (Kokina and Davenport, 2017). These new technologies are obviously of great benefit to the entities and individuals who use them, particularly in the case of ICOs, because they facilitate access to faster and cheaper financing for startup companies (Joo et al., 2019). They are also very useful because they allow for the optimization of work, including that of auditors (Kokina and Davenport, 2017), as well as time savings and faster data analysis (Munoko et al., 2020).

However, there is a darker side to these new technologies, which implies deviant behaviors. There is a high rate of scams in the field of ICOs; researchers estimate that the prevalent fraud rate in ICOs is between 10% and 26% (Tiwari et al., 2020; Hornuf et al., 2022). Ethical issues are also raised when auditors use AI, especially in the case of a failure audit, since auditing standards stipulate that the auditor is responsible for the audit, including the tools used. Can auditors, using AI in the framework of an audit, be held liable in the case of audit failure caused by this technology, where it is implied that they have to push their understanding of the tool to its technical aspects? In response to this, Munoko et al. (2020) has called the need for the ethical governance of AI within audit firms.

In this three-essay doctoral thesis, I study the nature of the information needed to signal potential risk of fraud in ICOs and for investors' decision making in the high-risk context of ICOs. In addition, I examine the discourses of stakeholders in financial auditing— namely, the Big 4 firms, professional accounting associations, and audit regulators— to assess the importance (or not) of ethics in the adoption, implementation, and use of emerging technologies in the work of auditors.

The first essay investigates the consideration of ethics in auditing in a pandemic context. The COVID-19 pandemic forced the implementation of remote work and the rapid and

unprepared adoption of technology in auditors' work. The essay explores how the key players in the Canadian accounting profession—namely, the Big 4 firms, professional accounting associations, and audit regulators—responded to the conjunction of the pandemic, ethics, and technology. The analysis of documentation from these key players, using the ETHOs framework, highlights the gap between the Big 4 firms, on the one hand, and professional accounting associations and audit regulators, on the other, when it comes to technology during the pandemic. While the latter are highly aware of the ethical risks associated with the use of technology, Big 4 firms seem to have overlook these, focusing instead on the gains to be obtained from technologies. The findings call into question the role of major influencers of the accounting profession (Malsch and Gendron, 2011; Daoust, 2020); Big 4 firms seem to often adopt a commercial logic rather than a professional one.

The second essay aims to identify fraud risk indicators that affect ICOs, and to establish the extent to which these indicators differ from those in traditional finance. Interviews with stakeholders navigating the world of ICOs have allowed me to highlight new indicators of fraud, previously unknown in traditional finance. This is even more important, since there is very little, if any, regulation around ICOs, which shifts the burden of protection onto the shoulders of investors. Knowledge of the new fraud indicators specific to ICOs allows investors to better protect themselves and avoid investing in potentially fraudulent ICO projects. Moreover, this information is key for financial regulators, who will not only be able to better inform the public about fraud indicators to consider before investing in ICOs, but also guide them in the preparation of regulations governing the sector.

The third essay focuses on savvy investors who are interested in ICOs. These investors, well aware of the risks to which they are exposed because of their professional or personal activities in the world of ICOs, are nevertheless looking to invest in them. I therefore explore, through interviews, their decision making process before investing. Based on prospect theory, I find that these investors know the risks they are facing, but decide to invest anyway. Unlike naive gamblers, their knowledge of the field makes them savvy, taking calculated risks. Moreover, the decision making process in which they engage in before investing is comparable to the process of preparation for war illustrated in Sun Tzu's work *The Art of War* and can be broken down into four stages. The ICO environment is

particularly hostile to investors, being plagued with fraud, because it lacks proper regulation. Regulation in this area proves to be highly difficult, because there are no clear and commonly approved terminology and definitions in the sector (Lai and Whitlow, 2020) and the level of regulation varies greatly from country to country (Collomb et al., 2019). Until there is more uniform regulation that will adequately protect investors, when they are aware of the risks, they have no choice but to engage in a validation process before investing.

References

Collomb, A., De Filippi, P., & Klara, S. O. K. (2019). Blockchain technology and financial regulation: a risk-based approach to the regulation of ICOs. *European Journal of Risk Regulation*, *10*(2), 263-314.

Daoust, L. (2020). Playing the Big Four recruitment game: The tension between illusion and reflexivity. *Critical Perspectives on Accounting*, *66*, 1–24.

Hornuf, L., Kück, T., & Schwienbacher, A. (2022). Initial coin offerings, information disclosure, and fraud. *Small Business Economics*, *58*(4), 1741-1759.

Joo, M. H., Nishikawa, Y., & Dandapani, K. (2019). ICOs, the next generation of IPOs. *Managerial Finance, 46*(6), 761-783.

Karpenko, O. A., Blokhina, T. K., & Chebukhanova, L. V. (2021). The initial coin offering (ICO) process: Regulation and risks. *Journal of Risk and Financial Management*, *14*(12), 599-605.

Kokina, J., & Davenport, T. H. (2017). The emergence of artificial intelligence: How automation is changing auditing. *Journal of emerging technologies in accounting*, *14*(1), 115-122.

Lai, J., & Whitlow, L. (2020). The spaghetti effect of ICO regulations: An introduction to the developing regulatory frameworks of initial coin offerings around the world. Retrieved from https://legaltechcenter.net/files/sites/159/2020/09/The-Spaghetti-Effect-of-ICO-Regulations.pdf

Malsch, B., and Y. Gendron (2011). Reining in auditors: On the dynamics of power surrounding an innovation in the regulatory space. *Accounting, Organizations and Society* 36 (7), 456–76.

Munoko, I., Brown-Liburd, H. L., & Vasarhelyi, M. (2020). The ethical implications of using artificial intelligence in auditing. *Journal of Business Ethics*, *167*(2), 209-234.

Tiwari, M., Gepp, A., & Kumar, K. (2020). The future of raising finance-a new opportunity to commit fraud: a review of initial coin offering (ICOs) scams. *Crime, Law and Social Change*, *73*(4), 417-441.

Chapter 1 Technology, Ethics and the Pandemic: Responses from Key Accounting Actors

Abstract

A pandemic is an exceptional situation involving radical disruptions for individuals, organizations, and society as a whole. Ethical considerations evolve for both individuals and organizations and how technology is used is an important factor in this evolution. This essay explores how key actors in the accounting field–more specifically the Big 4 firms, professional accounting associations and audit regulators–responded to the conjunction of the pandemic, ethics and technology. We contextualize our documentation analysis using the ETHOs Framework, which integrates ethics and technology. Our findings suggest that ethics and technology have been significant issues for the professional accounting associations and audit regulators during the pandemic. In contrast, the Big 4 firms appear to have overlooked their importance, focusing instead on the gains' technology can provide, thus applying a commercial rather than a professional logic. The Big 4's approach to ethics and technology during the pandemic calls into question their role as major influencers of ethics of the accounting profession. It could even be suggested that an implicit (or perhaps explicit) agreement has been reached through which the Big 4 has delegated professional ethics to the professional accounting associations and audit regulators. This essay underscores the importance of taking ethics into consideration in the future design and use of technology in order to maintain trust in the accounting profession.

1.1 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, p.1)

This essay examines the consideration of ethics in the use and development of technology during the pandemic by the following key accounting actors: the Big 4 accounting firms, professional accounting associations and audit regulators. More specifically, it aims to document how the Big 4, perceived as major influencers of the accounting profession

(Malsch and Gendron, 2011; Daoust, 2020), have dealt with ethics and technology during the pandemic.

A pandemic is an exceptional event that causes radical disruptions for individuals, organizations and society as a whole. 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 use technology to work remotely. As the impact of the pandemic continues to unfold, we still see new business models and relationships forming that use technology to support these new models between individuals and organizations. A recent survey by Ernst and Young (EY) indicates that, because of remote working, disruption to traditional working patterns is the top COVID-19 risk to ethical conduct (EY, 2021a).

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 (IESBA, 2021), putting ethics to the test (Thomson, 2021). For instance, auditors have been forced to perform audits from a distance using new and potentially insufficiently mastered techniques and technologies. They have been–and still are–pressured to provide audits without the usual full list of procedures and adequate documentation (ACCA, 2020b), while at the same time respecting their duty to maintain ethical professional responsibility and professional skepticism. Furthermore, the quality of audits may suffer from the lack of resources, such as in-person interactions of juniors with more senior colleagues. Professional accountants must also be aware of challenges their colleagues may be facing, yet not articulating, that may affect judgments and ethical decision making. In short, the pandemic has put pressure on time-constrained decision making; remote work has contributed to the compromising of data security; and a lack of professional skepticism and examination by more senior members of audit teams has been noted (ACCA, 2020a).

The pandemic has also forced the speedy adoption of technology, raising concerns about how accountants and organizations deal with threats, such as those to data security, associated with the improper use of various technologies since firms “might have skipped

steps or cut corners on cyber security and related measures to keep doing business in the remote environment" (IESBA, 2021 p.5). The use of technologies like artificial intelligence (AI) and data analytics has accelerated during the pandemic. 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, and has in turn led to major confidentiality and cybersecurity issues (Taylor, 2021). *The Wall Street Journa*l 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" (WSJ, 2020, p.1), thus increasing the risk of fraud in organizations.

This essay examines how key accounting actors have addressed the issue of ethics in reference to technology during the pandemic through a content analysis of the Big 4 firms' annual reports, professional accounting association publications, and audit regulators' reports. Together, these three players represent key actors in the accounting profession. More specifically, the study aims to document how the Big 4, considered a major influencer 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 environmental, technological, human and organizational dimensions.

Although professional accounting associations promote the added value of using technology to perform work, its ethical use might not necessarily follow. How have the key actors in the accounting profession addressed the importance of professional ethics in using technology during the pandemic? Have we observed more or less attention to ethics? For instance, have we seen a shift in which tasks using technology in a remote context, fueled by a global pandemic, sufficiently distance professional accountants to reduce their level of professional ethics? As Dillard (2003) explains, when individuals use techniques and technologies to meet the objectives of assigned tasks most effectively, they may be blind enough to separate ethics from rational purpose. In such a logic, the rationality of modernity may exclude sound ethical considerations for business decisions. Key actors in 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 : During the pandemic, how have key actors in the accounting profession taken ethics into consideration when using of technology?

Our findings show that Big 4 firms report on the benefits of using technology and its added value to both themselves and their clients, with few mentions of ethics. In contrast, professional accounting associations report a more balanced approach, not only highlighting the opportunities technology brings to organizations and accountants, but also raising ethical considerations about its use. The Big 4 focus primarily on the gains to be obtained through the successful application of advanced technologies, as indicated by prior research on how these firms choose between adopting a commercial or a professional logic (Carter and Spence, 2014). These results challenge the role of the Big 4 firms as major influencers of ethics of the accounting profession because of how they have addressed the ethical use of technology during the pandemic. This essay concludes that there appears to be an implicit (or perhaps explicit) deal through which the Big 4 have delegated professional ethics to the professional accounting associations and audit regulators.

This research provides the following contributions. First, it contrasts the various viewpoints of the three above-mentioned key actors in the accounting field on ethics and technology during the pandemic. We are not aware of any other research currently investigating the intersection of these concepts. Second, the study sheds light on the dual, and almost conflicting, roles of the professional accounting associations as educators and thought leaders, as well as regulators responsible for protecting the public interest. Our findings show how they have communicated and guided their members. Third, our analysis gives voice to audit regulators, disregarded actors with lower exposure, raising major concerns about how the Big 4 firms have managed employees, talent and resources during the pandemic. Finally, we extend Boulianne, Fortin, and Lecompte (2023) in consideration of the unique context of the pandemic, adding audit regulators' point of view, as well as expanding the ETHOs Framework.

The essay is organized as follows: we present the relevant literature and describe our method. We then outline our findings, followed by a discussion of these findings. The last section concludes our essay.

1.2 Relevant literature

1.2.1 Technology and Ethics

Information systems, which capture, record, store and process data to produce information for decision makers, include people, procedures and software (Romney and Steinbart, 2018). In this context, "people" refers to "humans," a key element in our investigation given 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 design and the information generated have ethical impacts on professional accountants and organizations.

Guragai et al. (2017) proposed the ETHOs Framework for studying the relationship between information technology and ethics, which they identified when conducting a literature review of the two fields. They argue that the growth of information technology provides a unique context for humans (more specifically, accountants) interacting with technology to act unethically. Their reasoning 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, human actors (users) become increasingly removed from their actions, lessening personal accountability (Dillard, 2003). The result is the potential they have to unconsciously legitimize wrongdoings by focusing on tasks accomplished using technology, while being deprived of 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, creating a major concern for professional accountants playing key roles within and outside of organizations, which include protecting the public interest. According to Guragai et al. (2017), "accounting is a moral discipline" (p. 77) where professional accountants are ultimately accountable both for designing information technology (IT) and for providing information. We should thus consider not only an information system's financial component, which is tied to how organizations

achieve better performance, but also its ethical component, that is, how the use of IT may cause harm. In other words, both the financial and the ethical dimensions of IT should be taken into account.

More recently, Shoemaker et al. (2020) studied employees' ethical perceptions and behaviors in the presence of formal norms (formal policies like codes of ethics) and informal norms (personal perceptions of appropriate behavior) when using technology for personal tasks at work. They refer to Ogburn's (1966) cultural lag theory, according to which a culture's material traits (such as technology) progress more rapidly than the culture can adapt, creating a gap between technology use and ethical behavior. Shoemaker et al. (2020) assert that modern workers using technology constantly cross the line between work and personal life, making it difficult to determine "what is right" and thereby generating ethical issues. For instance, a firm's code of ethics may prohibit the use of its computers for personal tasks during working hours (e.g., replying to personal text messages/emails or performing banking transactions). However, informal norms may consider performing such personal tasks during work hours to be "acceptable," since work tasks may frequently be carried out on an individual's personal time. In other words, both formal and informal norms influence behavior and ethical reasoning. Shoemaker et al. (2020) report that since advances in information technology "are not likely to slow down soon" (p. 252) in terms 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 has been suggested that codes of ethics and conducts be rewritten to adapt to the current business context, weighting both formal and informal norms.

Boulianne et al. (2023), who also explored the intersection of ethics and information technology, found that Big Data analytics and AI are the two technologies that raise 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 because of a lack of training in technology and ethics. They also suggest that humans and machines would better benefit organizations by working together rather than competing.

Academic research on ethics and information technology is limited. The literature investigating ethics, technology and the pandemic has proven to be rather sparse. For instance, Rinaldi et al. (2020) launched a call for papers highlighting the need to focus on "how…technologies are used to describe…the dynamics of the pandemic" (p.181).

In short, attention has been drawn to the ethical challenges that technology generates rather than its benefits. During the pandemic, individuals and organizations have had opportunities to implement technologies to collect, analyze and utilize data impacting behavior; the consideration of ethics in such data collection and use calls for further investigations.

1.2.2 Theoretical framework

A variety of frameworks are available to study ethics and technology, including COBIT (Control Objectives for Information and Related Technology), ISACA (Information Systems Audit and Control Association), and COSO-ERM. However, one framework stands out since it specifically examines the relationship between ethics and information technology–ETHOs. This framework is relevant for our research as it is both explicit and broad in scope, enabling us to contextualize our investigation in a comprehensive way. Figure 1.1 presents the ETHOs Framework where the environmental, technological, human, and organizational dimensions interact, thereby impacting ethical judgments and decisions, as well as actions.

---------- Insert Figure 1.1 about here ----------

ETHOs consists of the following four dimensions: 1) environmental, which comprises norms, expectations, rules, and standards that are enacted by organizations such as professional bodies, regulators, states, stakeholders, and society; 2) technological, which refers to IT software, hardware and communication devices (i.e., inputs, storage, processing, outputs/reports); 3) human, which refers to individuals and/or professional groups and their ethical attitudes when making decisions and taking action when interfacing and dealing with IT; and 4) organizational, which includes contextual factors

like organizational structure, business strategy, environmental uncertainty, and ethical culture.

The four dimensions of ETHOs shape and drive the ethical judgments, decisions and actions of individuals and/or groups that arise and occur in using technology. These judgments, decisions and actions result in ethical outcomes, which in turn become subjective assessments that may, depending on the context, be considered by some as either ethical or unethical; in other words, as "right" or "wrong".

1.3 Method

We performed 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, a method of interpreting a text to reach an understanding of its meaning and 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 for the pre-pandemic (before 2019) and pandemic (2020) periods, and to assess whether they survived once the key actors had time to adjust to the impacts of the pandemic (2021). The documents analyzed consisted of annual reports from Big 4 accounting firms, professional accounting association publications, and audit regulators' reports. Audit regulators provided an independent evaluation of the core message and the quality of work performed by the Big 4, including the ethical issues they faced, bringing a different perspective and helping to corroborate (or not) information they conveyed.

We also examined the coverage of ethics and technology before and during the pandemic. More specifically, the study aimed to document how the Big 4 firms, seen as major influencers of the accounting profession (see Malsch and Gendron, 2011; Daoust, 2020), dealt with ethics and technology during the pandemic. This content analysis approach has been used in prior accounting research (see Beck et al., 2010) to assess the level of

commitment to ethics (Verschoor, 1998), the ethical climate (Amernic and Craig, 2013), and voluntary ethics disclosures (Othman et al., 2014). Previous research indicates that comment letters and reports are representative of an accounting actor's viewpoint (Baudot et al. 2017).

1.3.1 Data collection

We collected the annual reports of Big 4 firms for pre-pandemic (before 2019) and pandemic (2020) periods to examine how they addressed ethics and technology. We also collected inspection reports from the Canadian Public Accountability Board (CPAB), Canada's audit regulator, as well as inspection reports from two Canadian professional accounting associations, CPA Ontario and CPA Quebec.

CPA Ontario and CPA Quebec play the dual roles of professional accounting associations, by providing pathways to the profession as educators and, as regulators charged to protect the public interest, by inspecting chartered professional accountants (CPAs) engaged in public practice (around 20% of their members). These inspections may lead to fines, suspensions, revocations and practice restrictions. Together, CPA Ontario and CPA Quebec represent two-thirds of Canadian CPAs.

We subsequently collected professional accounting association publications to assemble a comprehensive set of reports for analysis and discussion, following the approach used by Pimentel and Boulianne (2020). We examined publications from key accounting associations–CPA Canada, ACCA, IFAC, AASB, AUASB, and IESBA[1]. Although the AASB, AUASB and IESBA are standards setters, we included them in the professional accounting associations. For our analysis, the reports examined had to include the terms ethics, pandemic, COVID-19, technology, and related terms. In total, we collected eight annual reports from Big 4 firms (379 pages), fourteen documents from professional accounting associations (281 pages), and six documents from audit regulators (177 pages).

[1] Acronym definitions: Chartered Professional Accountants of Canada (CPA Canada), Association of Chartered Certified Accountants (ACCA), International Federation of Accountants (IFAC), Auditing and Assurance Standards Board (AASB), Australian Auditing and the Assurance Standards Board (AUASB), and International Ethics Standards Board for Accountants (IESBA).

Finally, we performed an additional analysis using the 2021 annual reports of Big 4 firms, the 2021 inspection reports from CPAB, CPA Quebec and CPA Ontario, and 2021 documentation from key accounting associations. Using the ETHOS Framework, this further analysis was performed to assess whether the pre- and intra-pandemic (i.e., 2019 and 2020) results were still valid in 2021 or if changes had occurred.

1.3.2 Data Analysis

Using NVivo software, the data was coded into different themes according to the four dimensions of the ETHOs Framework (environmental, technological, human and organizational) to identify how the Big 4 firms, professional accounting associations and audit regulators addressed ethics and technology before and during the pandemic. Using the ETHOs Framework enabled us to organize a data analysis that was iterative, allowing the main themes to emerge. We aimed to identify the dimensions of the ETHOs Framework to discover how ethics and technology have been addressed both before and during the pandemic. In other words, we sought to determine how key actors in the accounting profession took ethics and technology into consideration during the pre- and intra-pandemic period.

1.4 Findings

The intensive use of technology has an impact on both ethics and, more broadly, the future of accounting professionals (Guragai et al., 2017). Through the lens of key actors of the accounting profession, this study examines how ethics has been considered in using technologies during the pandemic. It is important to remember that professional ethics is at the heart of the accounting profession. This study also provides a view of how these key actors are aligned and how they differ. The following Tables illustrate how the Big 4 firms, professional accounting associations and audit regulators have addressed the issues of ethics and technology during the pandemic across the four ETHOs dimensions. We then discuss the differences between the responses of the three actors for each ETHOs dimension.

1.4.1 The environmental dimension

The changes in accounting and auditing standards and in their regulation constitute a dominant theme within the environmental dimension. It should be remembered that actors in 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, to systematically conduct inspections of CPAs' work. The pandemic has forced the Big 4 firms to adjust how they implement the rules to comply with regulations. For instance, they have responded to the regulators' demands respecting technological issues and security:

> We have also engaged with regulators to facilitate transparency and alignment about any methodological or other changes deemed necessary in the COVID-19 context (PwC, 2020, p.21).
>
> Deloitte is committed to protecting confidential and personal information…to continually monitor regulatory and legal requirements to support compliance (Deloitte, 2019; Deloitte, 2020, p. 29).
>
> With the use of technology and digital solutions, EY…provides a new level of trust that…helps organizations meet regulatory responsibilities (EY, 2019; EY, 2020, p.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, p. 30).

The response of the professional accounting associations was to adapt the professional code of ethics. The IESBA launched an initiative on technologies and stated its intention to identify the potential ethical implications of technology developments. It 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. In the context of the pandemic, the ACCA issued a reminder of the importance of the code of ethics, since as "a qualified professional accountant…it is vital to follow the code of ethics" (Stephen Heathcote in ACCA, 2020a, p.9).

The above quotes provide Big 4 responses to technology, ethics and the pandemic in general that give the impression that they reacted appropriately to the challenges of the COVID-19 context. Providing a different perspective, audit regulators raised concerns about non-compliance with standards (CPAB, 2020) and the poor implementation of new standards during the pandemic (CPA Quebec, 2020; 2021). Inspection reports show that the number of such incidents has increased, prompting audit regulators to stress the importance of ethics surrounding the use of technologies and of adapting to standards accordingly.

For instance, CPA Ontario's inspections report revealed that significant reportable deficiencies increased from 37% to 41% from 2019 to 2020, while referrals to the Professional Conduct Committee after initial inspection rose from one to eight. As mentioned in its 2021 report, "the number of referrals after an initial inspection was historically high in 2020" (CPA Ontario p. 9). CPA Quebec also reported a decline in the overall quality of dossiers inspected; in 2019, 39% met its requirements, whereas only 34% did so in 2020 (CPA Quebec, 2021). CPAB also reported an *"*increase in cases*"* leading to "significant concern*"* as an audit regulator (2021, p.13).

---------- Insert Table 1.1 about here ----------

1.4.2 The technological dimension

During the pandemic, advanced technologies like data analytics, blockchain, artificial intelligence (AI), and the Internet of Things (IoT) provided the potential to help detect outbreaks. AI and blockchain are the technologies the Big 4 firms most mentioned 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, p.6)

The Big 4 firms have promoted technology as providing effective tools to help organizations with their decision making and risk management. The following quotes are taken from their annual reports:

> 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, p. 13)
>
> our work around blockchain supports authenticity and accountability, and…trust in the products and services that people are buying (EY, 2019, p. 10)
>
> in the wake of the pandemic, Deloitte helped many clients quickly virtualize their operations and develop crisis response plans (Deloitte, 2020, p. 7)
>
> helping clients use emerging technologies such as artificial intelligence successfully and responsibly so they benefit both business and society (PwC, 2019, p.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 people. 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, including health care, financial credit and employment information that is used for key decisions. Systems designers' not paying enough attention to the encryption of sensitive data thus represents 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, p. 11). In examining the prediction models used by AI systems, Wynants et al. (2020) found that prediction systems used during the pandemic had a high risk of statistical bias due to the pressure of rushed delivery. Chandra et al. (2020) reported that some AI systems ultimately aim to replace humans with technology (some already do so for certain tasks), a trend that

has accelerated with the pandemic. The resulting tension between workers (even those occupying higher-level positions demanding expertise, such as CPAs) and advanced technology requires management to make difficult business and ethical choices.

While audit regulators agree that technology can help professional accountants accomplish their tasks, they also raise the significant threats that we covered in the ETHOs environmental dimension.

---------- Insert Table 1.2 about here ----------

1.4.3 The human dimension

The human dimension is associated with the loss of ethical behavior or awareness as the pandemic pressure to react quickly "created myriad opportunities for unethical behavior" (IFAC, 2021a, p.7). The pandemic "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, p.3). This refers to the potentially negative impact of the pandemic on accountants' ethical judgement.

Professional accountants and auditors should always apply professional skepticism, evaluating data with curiosity and vigilance, while keeping in mind potential ethical issues. This skepticism is not only at the heart of the accounting profession, but it is also included in accounting and audit standards. The pandemic created a context that brought this skepticism into focus. The ACCA reports that this pressure can be reflected in inadequate documentation, as highlighted by CPA Ontario in its 2021 Inspection report, and a lack of professional skepticism (2020):

> 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−AUASB, 2020).

In such contexts, the advocacy threat may generate biased information (ACCA, 2020a). In their annual inspection reports, the audit regulators indicate that auditors should exercise more skepticism (CPAB, 2020; CPA Ontario, 2021). In fact, the lack of professional skepticism by auditors is a key issue in the performance of audit mandates. As stated above, skepticism is paramount to the ethics of professional accountants. More specifically, the AASB−AUASB (2020) reports that "auditors should be alert and exercise professional skepticism…to (not) give rise to financial reporting misstatements" (p. 3). IFAC (2021a), referring to ongoing concern about "mental wellness and the state of mind required to think critically" (p. 16). During the pandemic, accounting professionals have been under great pressure and experienced tremendous stress, so much so that some may have suffered mentally, which has affected their behavior (ACCA, 2020).

According to EY (2020), one of the consequences of the pandemic for professional accountants has been the effect on their level of commitment toward "independence, integrity, objectivity and professional skepticism" (p. 12). This observation is corroborated by the 2021 CPA Ontario Inspection report, which states that "(one) of the most common root causes identified is a lack of professional skepticism" (p. 18).

---------- Insert Table 1.3 about here ----------

1.4.4 The organizational dimension

In terms of the organizational dimension, the Big 4 firms have promoted adaptability during the pandemic, with technology and ethical behaviour playing key roles:

> 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, p.9)
>
> We strive…acting as role models and promoting ethical behavior (KPMG, 2019, p.8)

In contrast, the professional accounting associations have focused on educating their members about 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 (ACCA, 2020c, p.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, p. 20).

Professional accounting associations are promoters of technology to be used by their members, while taking into consideration difficult business and ethical choices (e.g. workers vs. technology) when implementing this 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 (ACCA, 2020c, p. 6).
>
> Audit regulators have expressed significant concerns about audit teams' lack of expertise and use of specialized external resources (CPAB, 2020) –specifically when advanced technologies create new audit risks factors– which in turn impacts audit quality (CPA Ontario 2021). They also report on the lack of supervision and review of audit work by more experienced auditors. CPAB (2020) demands significant improvement from the Big 4 in the areas of Talent & Resource Management and Oversight. According to CPA Ontario (2021), "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" (p. 9).

In short, through the ETHOs Framework, our analysis of the Big 4 firms' actions during the pandemic indicates an emphasis on using technology responsibly, while specific reminders on proper ethical behavior have been understated. This approach is at odds with what professional accounting associations have conveyed with their frequent reminders on the importance of ethics. As the audit regulators indicated, because of their size and omnipresence, the Big 4 should have led by example since they are seen as a major influencer of the accounting profession.

---------- Insert Table 1.4 about here ----------

1.4.5 Additional analysis

Additional analysis was performed to determine whether any differences were noted between the pre- and intra-pandemic periods (i.e., 2019 and 2020 respectively). As 2021 marked the second year of the pandemic since the initial shock in 2020, the stakeholders under scrutiny in this essay have had time to respond and adapt. We therefore sought to assess whether changes had occurred in 2021 according to the four dimensions of the ETHOs Framework, that is, environmental, technological, human, and organizational.

1.4.5.1 The environmental dimension

In our initial analysis of the pre- and intra-pandemic period (i.e. 2019 and 2020), we noted that Big 4 firms were well aware of the significant changes brought to standards, both accounting and auditing, and that they were willing to comply with any rules regarding confidentiality. They were clear about their desire to engage with regulators to ensure proper compliance with the changing regulatory landscape that was deemed necessary because of COVID-19. Yet audit regulators revealed that their inspections showed an increase in non-compliance with standards or poor implementation of new standards. Professional accounting associations however pointed to the need to adapt the professional code of ethics

The analysis of all the stakeholders' documentation from 2021 showed that the Big 4 firms are still committed to protecting confidential and personal data (Deloitte, 2021, KPMG, 2021; PwC, 2021), without further reference to the rapid development and adoption of technologies. This is surprising, especially since, as a professional accounting association, the IESBA has affirmed the importance of seeking to enhance "the Code's robustness and expand its relevance in an environment being reshaped by rapid technological advancements." (IESBA, 2022, p.1). Moreover, audit regulators maintained the same discourse as in 2019 and 2020, lamenting a lack of knowledge on the part of auditors (CPA Ontario, 2022) that has led to a marked decline in the inspection success rate (CPA Quebec, 2022). However, according to statistics provided by CPA Ontario (2022), approximately 26% of the files inspected in the Big 4 had significant deferrable deficiencies, which constitutes an improvement over 2020 (28%). This led them to conclude that "Over the last two inspection cycles we observed a continual decline in assurance quality. This trend appears to be reversing." (CPA Ontario, 2022, p.7).

From an environmental perspective, we thus noted a certain improvement in compliance with the standards during 2021, compared to 2019 and 2020.

1.4.5.2 The technological dimension

Our analysis of the 2021 documentation showed that Big 4 firms seem to have adapted to the COVID-19 pandemic by indicating that they offer guidance and tools to their staff (Deloitte, 2021; KPMG, 2021). Deloitte (2021) points out that it "responded swiftly to the challenges presented by COVID-19, arming its professionals with the guidance and tools necessary to perform high-quality audit and assurance services in a virtual environment" (p.18). However, professional accounting associations have expressed great concern about the increase of AI integration in the accounting profession, highlighting the need for CPAs to maintain control over data access and quality (CPA Canada, 2022b). They are also concerned about the rise of mis- and disinformation, partly triggered by the increasingly rapid adoption of new technologies. These associations have repeatedly emphasized the key role that CPAs must play in combating mis- and disinformation as information and data stewards (CPA Canada 2022a). According to CPA Canada (2022d): "Continuous

technological developments are creating risks and opportunities for the audit profession" (p.1).

This negative tone was also noted in the discourse of the audit regulators, who have reported audits carried out without the use of adequate tools and templates, appropriate understanding of their use (CPA Ontario, 2022) or taking into account the risk linked to the automation bias when using automated tools (CPAB, 2022). CPA Quebec (2022) also pointed out a glaring lack of understanding and documentation of IT-related risks. This is especially concerning because the Big 4 now appear to be committed to developing and adopting new high-tech tools, yet audit regulators tell us that they are not using or understanding them properly.

We thus conclude that the gap between the will and progress of the Big 4 firms in terms of development and adoption of new technologies and the fears and findings of professional accounting associations and audit regulators is not only still present, but also continues to grow.

1.4.5.3 The human dimension

Our analysis of the pre- and intra-pandemic period demonstrates that while Big 4 firms were inclined to embrace ethical behavior, professional accounting associations were more concerned about the very rapid and important rise of remote work. They have indeed underlined the perverse effects of this measure, particularly as concerns data privacy and the difficulty of maintaining an adequate level of professional skepticism. Audit regulators have issued findings that are in line with the concerns of the professional accounting associations, indicating that one result of the inspections is the inadequate supervision and review of junior members of audit teams by more senior members.

Our analysis of the 2021 literature highlighted the fact that Big 4 firms are more than ever aware of the importance of demonstrating values of integrity, respect, teamwork and inclusiveness (EY, 2021b), while simultaneously recognizing the difficulty of adapting to remote work, maintaining professionalism and meeting family imperatives, which are particularly acute in times of pandemic (Deloitte, 2021). Despite this profession of faith on

the part of the Big 4 firms, audit regulators have pointed to a flagrant lack of professional skepticism in their inspections (CPA Ontario, 2022). However, professional accounting associations were more concerned about the rise of misinformation, emphasizing the CPA's important role as a guardian of the truth and the public interest (CPA Canada, 2022a). According to CPA Canada (2022c): "CPAs have to make sure they're proponents of reliable and trustworthy information" (p.7).

We note that despite the awareness on the part of the Big 4 firms of the difficulty of reconciling remote work, professionalism and family concerns, newly raised in 2021, their confidence in the ability of their employees to do so has not materialized, as evidenced by the results of inspections conducted by audit regulators.

1.4.5.4 The organizational dimension

Our analysis of the organizational dimension for the pre- and intra-pandemic periods shows that while Big 4 firms emphasized the importance of the responsible use of technology, they lacked reminders about proper ethical behaviors. This was however pointed out as being of prime importance by professional accounting associations, as they highlighted the need for frequent reminders in this respect. Audit regulators also added their point of view, stating that, as major influencers of the accounting profession, the Big 4 firms must serve as models for the profession in this domain.

Our analysis of the 2021 documentation leads us to conclude that despite the emphasis the Big 4 firms place on the importance of remote work and the presence and development of an organizational culture conducive to it (Deloitte, 2021; KPMG, 2021), the inspection reports still show a weakness in audit quality (CPA Quebec, 2022). The COVID-19 pandemic, labor shortages and remote work have impacted audit quality because of a lack of adequate supervision and revision. Similarly, CPAB (2022) mentions that: "During our 2021 regulatory assessment we observed some improvements in file inspection results and the systems of quality management at some audit firms. However, the quality of audit files continues to be inconsistent, and in some cases significant improvement is required." (p.10).

We thus conclude that the organizational dimension also reveals a significant gap between what is conveyed by the Big 4 firms and what is demonstrated in the inspection reports of regulatory audits.

---------- Insert Table 1.5 about here ----------

1.5 Discussion

In the previous section, we applied the ETHOs Framework to theorize our data analysis and findings on ethics and technology before and during the pandemic. A discussion of our findings is presented below.

An examination of the environmental dimension shows that the Big 4 use technology to help them comply with accounting and auditing standards, while audit regulators report a downward trend in audit firms' compliance with standards that impacts audit quality, posing somewhat of a challenge to Big 4 statements. In respect of the technological dimension, Big 4 firms report on the benefits of using new technologies, emphasizing their added value to both clients and themselves and rarely mentioning 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 the successful implementation of technologies. This observation refers us to prior research on the Big 4 firms and how they make choices between applying a commercial logic and a professional logic in their decision making (Carter and Spence, 2014). Our results suggest that during the pandemic the Big 4 firms may have placed greater emphasis on performance than on ethics as related to technology. However, these concepts, performance and ethics, are not incompatible, as the professional accounting associations' reports show. We observed that the Big 4 firms address the human dimension differently than the professional accounting associations, the latter emphasizing the importance of integrity, objectivity and

professional skepticism, while audit regulators raise concerns about the lack of expertise and professional skepticism in audits performed by large audit firms.

Within the organizational dimension, our results indicate that audit regulators raised major concerns about how the Big 4 firms have managed employees, talent and resources during the pandemic. While these firms have consistently experienced high staff turnover for years, the shortage of employees, amplified by the pandemic, created a significant gap in expertise that will take time to remedy. Yet Big 4 annual reports focused on the needs of their clients and how they could help them to survive and adapt during the pandemic, which reflects the predominance of a commercial logic.

Finally, our additional analysis of the 2021 documentation (Big 4 firms' annual reports, publications from professional accounting associations, and inspection reports from audit regulators) of the key actors shows that while few changes occurred, most of the findings from the pre- and intra-pandemic periods are still valid[2]. In 2021, the Big 4 firms improved their compliance with standards compared to previous years (environmental dimension). However, the gap between the Big 4 and the professional accounting associations and audit regulators remains, and in some cases widens, when comparing the 2021 publications with those of 2019 and 2020. The Big 4 firms remain enthusiastic about the development and implementation of new technologies (technological dimension) and the ability of their employees to combine remote work, professionalism and family concerns (human dimension), while satisfying the need for integrity and ethical behavior (organizational dimension), a stance that runs counter to the fears expressed by the professional accounting associations and the negative results of inspections by the audit regulators.

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 least two perspectives when it comes to making decisions and taking action. First, as members of a professional accounting association, they have to comply with their association's code of ethics and act with professionalism. It should be remembered that

[2] As part of this essay, additional analyses were performed to assess whether the 2019 and 2020 results remained valid in 2021. We recognize that 2021 is still in the intra-pandemic era, yet the time elapsed since the onset of the pandemic could have prompted changes.

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, policies, and organizational culture. Loyalty to their organization is also expected. Accordingly, these accountants are asked to reflect on both commercial and professional logics in making their decisions.

Our results indicate that the Big 4 firms favor organizational performance in helping clients and promoting technology, with very little emphasis on ethics. While professional accounting associations also support the use of technology, they have raised their members' awareness of the importance of ethics through several relevant publications. One possible explanation for this difference is their dual role as professional associations providing pathways to the profession as educators and thought leaders and as regulators in charge of protecting the public interest.

Our results may call into question the role of the Big 4 as major influencers of the accounting profession given how they have addressed the ethical use of technology during the pandemic. Or perhaps there is an implicit (or explicit) agreement between the Big 4 and professional accounting associations through which the Big 4 has delegated the promotion of professional ethics to professional associations.

Should we be concerned that the ethical implications of using technology was not significant for the Big 4 firms? We should not forget that the recent PwC scandal about cheating on the internal training exam led to a fine of $750,000 and censure by the Public Company Accounting Oversight Board (PCAOB) in the United States, as well as a fine of $200,000 and censure by the Canadian Public Accountability Board (CPAB). According to the chief executive of PwC, Nicolas Marcoux: "We have since undertaken several remediation steps including retraining, additional ethics training, financial penalties, written warnings, and terminations where warranted." KPMG has also recently been fined for widespread cheating on internal personnel training tests.

Will Big 4 firms mention these issues and promote a culture of professional ethics in their next annual reports, with the intention of sending a strong signal that this issue is very important to them? Or will they hope that the public will forget the cheating scandals and

effectively ignore this ethical issue in their annual reports? Although we do not yet have the answer to this question, what we do know is that the audit regulators will not forget these incidents in their reports. In the end, we believe that adding the viewpoint of the audit regulators provides a better overall picture of the Big 4 firm's level of ethics.

1.5.1 What has the pandemic changed?

Organizations are constantly trying to streamline business processes to achieve cost savings; advanced technologies help them attain these 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 with the necessary expertise may be automated. 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 et al., 2018).

Professional accountants are asked to exercise the appropriate level of skepticism. The pandemic has tested this skepticism. With the advent of isolation and remote work, audit regulators have 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.

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 attention to the ethics of these technologies. The professional accounting associations have taken a different approach, frequently reminding their members of the prime importance of ethical behaviour in their publications. The Big 4 have primarily focused on data security and regulations compliance, overlooking the ethics-technology relationship, which may be seen as a flag from a major influencer of the accounting profession.

Numerous organizational changes made during the pandemic will remain in place post-pandemic. For instance, people have become accustomed to using technology to work

remotely, often experiencing a better work-life balance. Accordingly, ethical and technological challenges will remain.

1.6 Conclusion

Even though technology is reported to improve organizations' business processes and performance, there are cases when its use raises ethical concerns, as cautioned by the professional accounting associations and audit regulators. Technology today is challenging the competence and even the relevance of professional accountants, impacting their skepticism, ethical judgments, ethical decisions and actions. The pandemic has turned the world upside down, leading to new business models and new ways to run businesses, including the mandatory implementation of remote work using technology. These forced and sudden changes have led to changes in individual 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, p. 3).

This essay examines how key accounting actors have considered ethics in relation to technology during the pandemic through a content analysis of Big 4 firms' annual reports, professional accounting association publications and audit regulators' reports. More specifically, we aimed to document how the Big 4 have 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 primarily report on the benefits of using technology, its added value to both clients and firms, with little mention of ethics. In contrast, professional accounting associations offer more balanced reports, highlighting the opportunities technology brings to organizations and accountants, while also raising ethical concerns about the use of these technologies.

This research has some limitations. Given the sensitive issue of professional ethics, the data collection was challenging. Using reports from the three key actors in the field, we aimed to provide a partial picture of a complex construct. Controversial topics like ethics, fraud, privacy and budgetary slack are important to investigate but difficult to research.

That said, we concur that, when feasible, case studies and interviews should be conducted to find out more about the ethical use of technology by accountants during the pandemic, as a diversity of methods can only help to more effectively capture the issues under study.

For future research, it would be interesting to see whether the annual reports of the Big 4 firms are so different from those of other large firms that the pandemic has forced to first find a way to survive and serve clients in distress, thus prioritizing effective operations using technology for profits, a commercial logic, and placing ethics and professionalism as a secondary prerogative. It may all depend on how we perceive the Big 4 in the end: profit-oriented firms or groups of professional accountants serving the public interest? Based on our findings we may, at least in terms of ethics, question the label of "major influencer of the accounting profession" accorded to the Big 4 firms.

References

Adams, G. B., and D. L. Balfour. (1998). An historical analysis of a destructive organizational culture: The Von Braun team, the Marshall Space Flight Center and the space shuttle Challenger disaster. *Administrative Theory & Praxis, 20*(3), 300–314.

Amernic, J., and R. Craig. (2013). Leadership discourse, culture, and corporate ethics: CEO-speak at news corporation. *Journal of Business Ethics*, *118*(2), 379–394.

Association of Chartered Certified Accountants (ACCA). (2020a). *Ethics in a COVID-19 World.* Retrieved from https://www.accaglobal.com/gb/en/technical-activities/technical-resources-search/2020/october/ethics-covid19-world.html#:~:text=This%20white%20paper%20%E2%80%93%20developed%20as,challenges%20that%20organisations%20are%20experiencing.

Association of Chartered Certified Accountants (ACCA). (2020b). *Ethics and trust in the digital age. (Report)*. Retrieved from https://www.accaglobal.com/gb/en/technical-activities/technical-resources-search/2017/august/ethics-and-trust-in-a-digital-age.html

Association of Chartered Certified Accountants (ACCA). (2020c). *ACCA: Covid-19 poses new ethical challenges for accountants.* Retrieved from https://www.theaccountant-online.com/news/newsacca-covid-19-poses-new-ethical-challenges-for-accountants-8200018/

Australian Accounting Standards Board (AASB) and Auditing and Assurance Standards Board (AUASB). (2020). *The Impact of Coronavirus on Financial Reporting and the Auditor's Considerations.* Retrieved from https://www.aasb.gov.au/admin/file/content102/c3/AASB19009_COVID19_FA.pdf

Baudot, L., Demek, K. and Z. Huang. (2018). The accounting profession's engagement with accounting standards: Conceptualizing accounting complexity through Big 4 comment letters. *Auditing: A Journal of Practice and Theory*, *37*(2), 175–196.

Beck, A. C., D. Campbell, and P. J. Shrives. (2010). Content analysis in environmental reporting research: Enrichment and rehearsal of the method in a British-German context. *The British Accounting Review*, *42*(3), 207–222.

Boulianne, E., Fortin, M., and A. Lecompte. (2023). "Artificial Intelligence and Data Analytics: Ethical Implications for Accountants," in M. Brivot and C.H. Cho (dir.), *Research Handbook on Accounting and Ethics*, Edward Elgar Publishing Ltd.

Canadian Public Accountability Board (CPAB). (2019). *2019 Annual Report: Reinforcing public confidence in Canada's capital markets.* Retrieved from https://www.cpab-ccrc.ca/docs/default-source/annual-reports/2019-annual-report-en.pdf?sfvrsn=dc4b1e23_13

Canadian Public Accountability Board (CPAB). (2021). *2020 Annual Report: Regulatory oversight in a global pandemic.* Retrieved from https://www.cpab-ccrc.ca/docs/default-source/annual-reports/2020-annual-report-en.pdf?sfvrsn=416a2a95_14

Canadian Public Accountability Board (CPAB). 2022. *2021 Annual Inspections Results.* Retrieved from https://cpab-ccrc.ca/docs/default-source/inspections-reports/2021-annual-inspections-results-en.pdf?sfvrsn=55b1df58_13

Carter, C. and C. Spence. (2014). Being a successful professional: An exploration of who makes partner in the Big 4. *Contemporary Accounting Research*, *31*(4), 949–981.

Chandra, G., Gupta, R., and N. Agarwal. (2020). Role of artificial intelligence in transforming the justice delivery system in COVID 19 pandemic. *Artificial Intelligence*, *2*(5).

CPA Australia. (2019, April 6). *Auditors turn to new tech amid COVID-19 crisis*. Retrieved from https://intheblack.cpaaustralia.com.au/technology/auditors-turn-to-new-tech-amid-covid-19-crisis

CPA Canada. (2021a). *Technology is a double-edged sword with both opportunities and challenges for the accountancy profession.* Retrieved from https://www.cpacanada.ca/en/foresight-initiative/trust-and-ethics/technology-double-edged-sword

CPA Canada. (2021b). *Ethical Leadership in an Era of Complexity and Digital Change*. Retrieved from https://www.cpacanada.ca/en/foresight-initiative/trust-and-ethics/ethical-leadership-during-complexity-digital-change

CPA Canada. (2022a). *CPAs as data stewards in an era of fake news*. Retrieved from https://www.cpacanada.ca/en/news/accounting/the-profession/2022-03-31-misinformation

CPA Canada. (2022b). *Episode 5: How can CPAs protect public interest in the AI era?* Retrieved from https://www.cpacanada.ca/en/foresight-initiative/podcast/season-1/protecting-public-interest-ai-era

CPA Canada. (2022c). *Navigating fact from fiction in an info-heavy world*. Retrieved from https://www.cpacanada.ca/en/news/pivot-magazine/misinformation-digital-age

CPA Canada. (2022d). *Technology's impact on the audit*. Retrieved from https://www.cpacanada.ca/en/business-and-accounting-resources/audit-and-assurance/blog/2022/april/technologys-impact-on-audit

CPA Ontario. (2020). *Focus on practice inspection 2019*. Retrieved from https://dokumen.tips/documents/focus-on-practice-inspection-cpa-ontario-action-plan-a-specified-course-of-action.html

CPA Ontario. (2021). *Focus on practice inspection 2020*. Retrieved from https://assets.cpaontario.ca/members/regulations-guidance/pdfs/focus-on-practice-inspection-2020.pdf

CPA Ontario. (2022). *Focus on practice inspection 2021*. Retrieved from https://assets.cpaontario.ca/members/regulations-guidance/pdfs/focus-on-practice-inspection-2021.pdf

CPA Quebec. (2020). *2019–2020 Retour sur l'inspection professionnelle—Faits saillants et analyse.* Retrieved from https://cpaquebec.ca/-/media/docs/membres-cpa/obligations-cpa/inspection-professionnelle/bilan-annuel-2019-2020_fr.pdf

CPA Quebec. (2021). *2020–2021 Retour sur l'inspection professionnelle—Faits saillants et analyse.* Retrieved from https://cpaquebec.ca/-/media/docs/membres-cpa/obligations-cpa/inspection-professionnelle/bilan-annuel-2020-2021_fr.pdf

CPA Quebec. (2022). *2021–2022 Retour sur l'inspection professionnelle—Faits saillants et analyse.* Retrieved from https://cpaquebec.ca/-/media/docs/membres-cpa/obligations-cpa/inspection-professionnelle/bilan-annuel-2021-2022.pdf

Daoust, L. (2020). Playing the Big Four recruitment game: The tension between illusion and reflexivity. *Critical Perspectives on Accounting*, *66*, 1–24.

Deloitte. (2019). *Connect for impact. 2019 Global impact report.* Retrieved from https://www2.deloitte.com/za/en/pages/about-deloitte/articles/2019-global-impact-report.html

Deloitte. (2020). *Repair and reshape—Creating a better normal. 2020 Global impact report.* Retrieved from https://www2.deloitte.com/content/dam/Deloitte/global/Documents/About-Deloitte/about-deloitte-global-report-full-version-2020.pdf

Deloitte. (2021). *A year of connection, action and impact. 2021 Global impact report.* Retrieved from https://www2.deloitte.com/content/dam/Deloitte/global/Documents/About-Deloitte/about-deloitte-global-report-full-version-2021.pdf

Dillard, J. F. (2003). Professional services, IBM, and the Holocaust. *Journal of Information Systems, 17*(2), 1–16.

Ernst and Young (EY). (2019). *How can we create long-term value for a better working world? EY Global review 2019*. Retrieved from https://www.ey.com/en_ee/global-review/2019

Ernst and Young (EY). (2020). *EY Global Review 2020—How will we reframe our future?* Retrieved from https://www.ey.com/en_ca/global-review/2020

Ernst and Young (EY). (2021a). *Why COVID-19 made fraud and compliance a bigger issue.* Retrieved from https://www.ey.com/en_us/assurance/why-covid-19-made-fraud-and-compliance-a-bigger-issue

Ernst and Young (EY). (2021b). *How do you move long-term value creation from ambition to action? EY Value Realized: Reporting progress on global impact 2021*. Retrieved from https://www.ey.com/en_hu/global-review/value-realized-2021

Guragai, B., Hunt, N. C., Neri, M. P., and E. Z. Taylor. (2017). Accounting information systems and ethics research: Review, synthesis, and the future. *Journal of Information Systems*, *31*(2), 65–81.

International Ethics Standards Board for Accountants (IESBA). (2021). *Ethical challenges that will intensify as the pandemic wanes.* Retrieved from https://www.ethicsboard.org/news-events/2021-05/new-article-iesba-covid-19-working-group-5-ethical-challenges-will-intensify-pandemic-wanes

International Ethics Standards Board for Accountants (IESBA). (2022). Proposed technology-related revisions to the code. Retrieved from https://www.ethicsboard.org/publications/proposed-technology-related-revisions-code

International Federation of Accountants (IFAC). (2021a). *5 Ethics Challenges that Will Intensify as the Pandemic Wanes.* Retrieved from https://www.ifac.org/knowledge-gateway/building-trust-ethics/discussion/5-ethics-challenges-will-intensify-pandemic-wanes

International Federation of Accountants (IFAC). (2021b). *Ethics, Technology, and the Professional Accountant in the Digital Age.* Retrieved from https://www.ifac.org/knowledge-gateway/supporting-international-standards/discussion/ethics-technology-and-professional-accountant-digital-age

Kim, I. and J. Kuljis. (2010). Applying content analysis to web-based content. *Journal of Computing and Information Technology*, *18*(4), 369–375.

KPMG. (2019). *2019 Transparency report.* Retrieved from https://home.kpmg/xx/en/home/campaigns/2019/12/kpmg-international-transparency-report.html

KPMG. (2020). *2020 Transparency report.* Retrieved from https://home.kpmg/xx/en/home/insights/2020/12/kpmg-international-transparency-report-2020.html

KPMG. (2021). *2021 Transparency report.* Retrieved from https://home.kpmg/ca/en/home/services/audit/transparency-report.html

Krippendorff, K., (2013). *Content Analysis: An Introduction to Its Methodology*, 3rd ed., Beverly Hills, CA: Sage Publications.

Leslie, D., Mazumder, A., Peppin, A. Wolters, M. K., Hagerty, A., and S. Cave. (2021). University of Cambridge, *Use of AI to fight COVID-19 risks harming 'disadvantaged groups', experts warn.* Retrieved from https://www.cser.ac.uk/news/use-ai-fight-covid-19-risks-harming-disadvantaged-/

Malsch, B., and Y. Gendron (2011). Reining in auditors: On the dynamics of power surrounding an innovation in the regulatory space. *Accounting, Organizations and Society, 36*(7), 456–76.

Ogburn, W. F. (1966). *Social change with regard to cultural and original nature.* New York, NY: Smith Peter. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwju4dOs2Iz5AhViM1kFHYcrCnUQFnoECAcQAQ&url=https%3A%2F%2Fwww.tandfonline.com%2Ftoc%2Fracc20%2Fcurrent&usg=AOvVaw2kbGMzPURvUs_Rpm8gwpu6

Othman, R., Ishak, I. F., Arif, S. M. M., and N. A. Aris. (2014). Influence of audit committee characteristics on voluntary ethics disclosure. *Procedia-Social and Behavioral Sciences*, *145*, 330–342.

Pimentel, E., and E. Boulianne. (2020). Blockchain in accounting research and practice: Current trends and future opportunities. *Accounting Perspectives, 19*(4), 325–361.

PwC. (2019). *New world. Transforming talent and trust. PwC's Global Annual Review 2019.* Retrieved from https://www.pwc.com/gx/en/about-pwc/global-annual-review-2019/downloads/organisation.pdf

PwC. (2020). *Working together to build a better tomorrow. Global Annual Review 2020.* Retrieved from https://www.pwc.com/gx/en/about-pwc/global-annual-review-2020/downloads/pwc-global-annual-review-2020-v2.pdf

PwC. (2021). *The New Equation - Building trust - delivering sustained outcomes. Global Annual Review 2021.* Retrieved from https://www.pwc.com/hu/hu/kiadvanyok/assets/pdf/pwc-global-annual-review-2021.pdf

Rinaldi, L., Cho, C. H., Lodhia, S. K., Michelon, G., and C. A. Tilt. (2020). Accounting in times of the COVID-19 pandemic: S forum for academic research, *Accounting Forum, 44*(3), 180–183.

Romney, M. B., and P. J. Steinbart. (2018). *Accounting Information Systems.* 14th Ed. Pearson.

Shoemaker, N., Curtis, M. B., Fayard, L. D., and M. T. Kelly. (2020). What happens when formal and informal norms conflict for IT usage? *Journal of Information Systems, 34*(2), 235–256.

Sutton, S. G., Arnold, V., and M. Holt. (2018). How much automation is too much? Keeping the human relevant in knowledge work. *Journal of emerging technologies in accounting*, *15*(2), 15–25.

Taylor, S. (2021). With Big Data comes big responsibility. *Pivot, CPA Magazine*, Nov/Dec, 40–44.

Thomson, J. (2021). *Technology and COVID-19: The perfect storm for ethics violations*, *Forbes*. Retrieved from https://www.forbes.com/sites/jeffthomson/2021/10/20/technology-and-covid-19-the-perfect-storm-for-ethics-violations/?sh=4fbcb78328a5

Verschoor, C. C. (1998). A study of the link between a corporation's financial performance and its commitment to ethics. *Journal of Business ethics*, *17*(13), 1509–1516.

Wall Street Journal (WSJ). (2020, May 8). *Financial statement fraud risk escalates in pandemic.* Retrieved from https://deloitte.wsj.com/articles/financial-statement-fraud-risk-escalates-in-pandemic-01588964527

Wynants, L., Van Calster, B., Collins, G. S., Riley, R. D., Heinze, G., Schuit, E., and M. van Smeden. (2020). Prediction models for diagnosis and prognosis of Covid-19: Systematic review and critical appraisal. *British Medical Journal*, *369*.

Figure 1.1 ETHOs: Framework to study the relationship between ethics and technology

(adapted from Guragai et al., 2017)

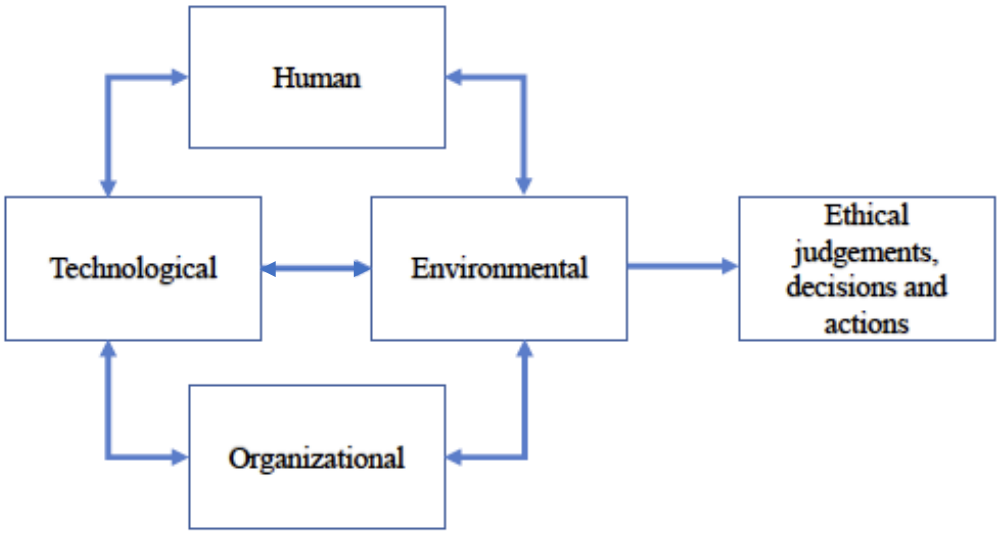


Table 1.1 ETHOs environmental dimension

	Big 4 firms	Professional accounting associations	Audit regulators
2019	• Commitment to protect confidential and personal data in compliance with regulatory and legal requirements (Deloitte, 2019; EY, 2019; KPMG, 2019).	• International Code of Ethics for Professional Accountants is adapted to pandemic (IFAC, 2021b) • Perform the appropriate audit procedures (AASB and AUASB, 2020)	• Necessity to adapt to new standards (CPA Quebec, 2020) • Concerns with standards non-compliance (CPAB, 2020) • Identification of a downward trend indicating that some practicing offices are still struggling to meet professional standards (CPA Ontario, 2020) • A decline in assurance quality overs the last few years (CPA Ontario, 2020)
2020	• Commitment to protect confidential and personal data in compliance with regulatory and legal requirements and professional standards (Deloitte, 2020; EY, 2020; KPMG, 2020; PwC, 2020) • Facilitation of transparency and alignment respecting any changes needed from regulators in the context of COVID-19 (PwC, 2020)		• Necessity to adapt to new standards (CPA Quebec, 2021) • A decline in assurance quality over the last few years (CPA Ontario, 2021)

Table 1.2 ETHOs technological dimension

	Big 4 firms	Professional accounting associations	Audit regulators
2019	• Work in blockchain to support authenticity accountability and greater trust (EY, 2019) • Restriction of access to data in their audit tool (KMPG, 2019)	• AI system raised broad and profound concerns (IFAC, 2021b; CPA Australia, 2020; CPA Canada, 2021b) • Paperless and cloud applications (CPA Canada, 2021a; CPA Australia, 2019)	• Use of tools in a cursory and non-tailored way (CPA Ontario, 2020)
2020	• Restriction of access to data in their audit tool (KMPG, 2020) • Allowing the use of emerging technologies successfully and responsibly (KPMG, 2020) • Acquiring and storing data in a secure and safe way (KPMG 2020).		

Table 1.3 ETHOs human dimension

	Big 4 firms	Professional accounting associations	Audit regulators
2019		• Maintaining independence (ACCA, 2020a; IFAC, 2021a) • Issues with adequate documentation, bias and lack of professional skepticism (ACCA, 2020a; IFAC, 2021a; CPA Canada, 2021b) • Objectivity can be affected (ACCA, 2020a; IFAC, 2021a) • Skills to work remotely (CPA Canada, 2021a; CPA Canada, 2021b; ACCA, 2020a)	• More skepticism needed from auditors (CPAB, 2020)
2020	• Teams committed to independence, integrity, objectivity and professional skepticism (EY, 2020)		• Lack of professional skepticism noted on the part of practitioners (CPA Ontario, 2021) • Lack of questioning in a period where the going concern assumption is critical (CPA Ontario, 2021)

Table 1.4 ETHOs organizational dimension

	Big 4 firms	Professional accounting associations	Audit regulators
2019	• Ethical climate set by a code of conduct/ethic (EY, 2019; KPMG, 2019) • Importance of protecting confidential and personal information embedded in the organizational culture (Deloitte, 2019) • Strategy implemented to ensure security, vigilance and resilience to protect confidential information (Deloitte, 2019)	• Appropriate level of staff tracking (ACCA, 2020a) • Fair treatment of staff on remote work (ACCA, 2020a) • Reducing staff size (ACCA, 2020a) • Presentation of biased financial information (ACCA, 2020a, IFAC, 2021a) • Cybersecurity and fraud (ACCA, 2020a, IFAC, 2021a)	• Lack of expertise, consultation, resources (CPA Quebec, 2020) • Poor auditor knowledge of specialized sectors (CPA Quebec, 2020) • Concerns about supervision and review by seniors (CPAB, 2020) • Lack of resources; specialized skills (CPAB, 2020) • Leadership needs to commit sufficient resources (CPAB, 2020) • Engagement without team's having robust technical knowledge (CPA Ontario, 2020) • Absence of effective monitoring (CPA Ontario, 2020)
2020	• Culture enabling remote working (Deloitte, 2020) • Culture to protect confidentiality (Deloitte, 2020) • Ethical climate set by a code of conduct/ethics (KPMG, 2020) • Improve controls to ensure confidentiality and privacy (Deloitte, 2020)		

Table 1.5 ETHOs four dimensions addressed in 2021

2021	Big 4 firms	Professional accounting associations	Audit regulators
Environmental	• Commitment to protect confidential and personal data in compliance with regulatory and legal requirements (Deloitte, 2021; KPMG, 2021; PwC, 2021).	• Proposal to enhance the robustness of the International Code of Ethics and expand its relevance in an environment facing rapid technological advancements (IESBA, 2022)	• Lack of technical knowledge of the standards (CPA Ontario, 2022) • A significant decrease in inspection success rate (CPA Quebec, 2022) • New industry sectors make for new risks for auditors, thus emphasizing the importance of gaining a better understanding of these industries and the technologies they use (CPAB, 2022) • Trend in assurance quality decline appears to be reversing (CPA Ontario, 2022)
Technological	• Guidance and tools provided to staff to perform services amidst COVID-19 challenges (Deloitte, 2021) • Resources, guidance, platforms and tools made available virtually to staff to enable	• Concerns about mis- and disinformation that need to be addressed by CPAs as stewards of information and data (CPA Canada, 2022a) • Role to be played by CPAs in establishing new controls and	• Audits performed while lacking appropriate tools and templates and without appropriate understanding of their use (CPA Ontario, 2022) • Lack of in-depth documentation on information systems and how entities respond to IT-

	the conversion to remote-work environment (Deloitte, 2021; KPMG, 2021) • Continual evolution and development of technology solutions, such as cloud-based solutions, machine learning and cognitive technologies, and AI-powered tools, to keep pace with businesses' demands (Deloitte, 2021; KPMG, 2021; PwC, 2021)	systems to assess data value (CPA Canada, 2022a) • Concerns about the increase of AI integration in the accounting profession and the need for CPAs to maintain control over data access and quality (CPA Canada, 2022b) • Acceleration of the pace of digital transformations that force CPAs to rethink related issues (CPA Canada, 2022b) • CPAs will have to engage in thought processes about the best way to use information from Big Data in an appropriate and safe way (CPA Canada, 2022c) • Continuous technological developments create risks and opportunities for the audit profession (CPA Canada, 2022d)	related risks (CPA Quebec, 2022) • Increased use of automated tools and techniques in audits without considering automation bias (CPAB, 2022) • Concerns identified in inspections relating to several assertions not tested when automated tools and techniques are used (CPAB, 2022)

Human	• Need to reinforce commitment to ethics, integrity and professional skepticism (Deloitte, 2021) • Team members demonstrate integrity, respect, teaming and inclusiveness (EY, 2021b) • Team members had to adapt quickly to working remotely, while maintaining professionalism, even though family responsibilities were increased (Deloitte, 2021)	• CPAs are responsible for discerning the truth and acting in the public interest in this time of uncertainty (CPA Canada, 2022a) • CPAs are key actors for small businesses that represent around 95% of businesses in Canada, most of which are without a Chief Data Officer (CPA Canada, 2022b) • CPAs must ensure that they are proponents of reliable and trustworthy information (CPA Canada, 2022c)	• Lack of skepticism identified (CPA Ontario, 2022)

Organizational	• Ethical climate set by a code of conduct/ethics (EY, 2021b; KPMG, 2021; PwC, 2021) • Importance of protecting confidential and personal information embedded in the organizational culture (Deloitte, 2021) • Culture enabling remote work (Deloitte, 2021 KPMG, 2021) • Looking to strengthen the culture of integrity across the organization (Deloitte, 2021) • Looking to build a stronger culture of consistency and accountability (KPMG, 2021) • Fostering an environment of objectivity, independence, ethics and integrity (KPMG 2021)		• Inadequate attendance in professional development courses highlighted (CPA Ontario, 2022) • Socioeconomic context (i.e., COVID-19 pandemic, labor shortage and remote work) has impacted audit quality because of a lack of adequate supervision and review (CPA Quebec, 2022) • Improvements noted regarding file inspection reports and systems of quality management, but not in the quality of audits (CPAB, 2022) • Evidences of altered or backdated working papers noted this year (CPA Ontario, 2022)

Chapter 2 The Devil Is in the Details: A Taxonomy of Red Flags of Fraudulent Initial Coin Offering Projects

Abstract

The popularity of initial coin offerings (ICOs) is undeniable. Introduced in 2013 with the first ICO ever offered, this financial vehicle, which sometimes generates returns on investments beyond expectations, had raised a total of nearly $27 billion by January 2021. However, this popularity comes at a cost. ICOs scams capture media attention almost daily. Even though close to a three quarter of ICO projects do not present with a fraudulent idea, up to 26% of all of these types of vehicles launched are scams (Hornuf et al., 2022). This is significant considering that reports on fraud state that 5% of revenues in general are targeted by fraud (ACFE, 2022). Unfortunately, this trend has definitely increased over the passing years, regulation of ICOs to protect investors is still lacking. Through interviews with key players in this environment, including financial regulators, investigators, investors, investees, and advisers, this essay proposes a taxonomy that highlights the red flags of fraudulent ICOs. This study contributes to the literature by providing guidance to investors on the red flags to watch for in order to avoid investing in fraudulent ICO projects. It will also inform and help financial regulators develop relevant ICO regulations in response to distinctive ICO red flags.

2.1 Introduction

Despite the alarming tone adopted by some observers who, as early as 2018, claimed a "massive slowdown" in public investment in ICOs (Farmbrough, 2018), the popularity of initial coin offerings is undeniable. Starting in 2013 with the first ICO ever offered, this financial vehicle raised a total of $7.5 billion in 2017 (Coindesk, s.d.). Some researchers have reported overall investments approaching $15 billion in 2019 (de Best, 2021) and nearly $27 billion as of January 2021 (Karpenko et al., 2021). In addition, Coinbase, a regulated exchange that offers cryptoasset trading, has had $223 billion in active assets on its platform, including digital currencies and utility tokens, since 2021 (Coinbase, s.d.). ICOs are also popular because they allow, in some cases, to reach funding goals quickly: the former CEO of Mozilla, who was able to raise $35M in 30 seconds for his start-up

Brave (Russell, 2017), as well as the case of EOS, a cryptocurrency token issued through an ICO, was able to raise $185M in 5 days (Iyer, 2018), are striking examples. However, this popularity comes at a cost: ICOs scams capture media attention almost daily. Famous cases include OneCoin, where the project's initiator, the so-called "cryptoqueen," vanished with what is now estimated to be $4 billion invested by various parties in her ICO (Bartlett, 2019). Some scholars estimate the rate of fraudulent ICOs at between 10% (Tiwari et al., 2020) and 26%[3] (Hornuf et al., 2022), while one article reports that only 10 fraudulent ICOs were responsible for nearly $690 million in losses around the same time (Finance Monthly, 2018). Fraud in ICOs occurs at a much faster rate in the case of IPOs, about 8 times more often[4]. The passing years have not diminished this trend, quite the contrary. Some research points to an increase in fraudulent ICOs (DeMatteo, 2021), in part due to the increasing ease of launching this type of vehicle, which one researcher compared to sending an email (Momtaz, 2020b). However, this easiness is an advantage for startups seeking financing. Moreover, ICOs are still attracting many investors, as evidenced by the figures on cumulative investment in this financial product, which continue to climb year after year (Fisch, 2019; Momtaz, 2020a; Momtaz, 2020b). This increase is due not only to positive publicity, especially through whitepapers (Zhang et al., 2022), but also to the vehicle's unparalleled success in terms of performance (Fisch and Momtaz, 2020; Aslan et al., 2021; Lyandres et al., 2022).

According to Adhami et al. (2018), an ICO is "an open call, through the Internet, for the provision of cryptocurrencies in exchange for tokens generated through smart contracts and relying on the blockchain technology, allowing the pledger to enjoy an exclusive right or reward or financial claim" (p.527). These tokens can be categorized in different ways according to the rights[5] they provide, which range from financial rights (voting rights, property rights) to consumptive rights (access to a service or product) and even currency, making it difficult for financial regulators to introduce and enforce legislation (Ofir and

[3] We have added the number of suspected cases (188) to the number of confirmed cases (175) to obtain the fraud case rate identified by Hornuf et al. (2022)

[4] Wang et al. (2010), studying fraudulent IPOs, reported finding 110 cases of fraudulent IPOs between 1995 and 2005 out of a total of 3,297 ICOs completed, which represents an occurrence of 3.33%.

5 In order to be consistent with the literature, we use the term "rights". However, in the case of unregulated ICOs, there can be no question of rights.

Sadeh, 2020). Unfortunately, the difficulty to regulate this ecosystem contribute to the proliferation of fraudulent ICOs.

ICOs are often compared to IPOs because they have similar characteristics. In fact, they share common goals such as raising public funds from investors and allowing the token or coin (in the case of an ICO), or the security (in the case of an IPO), to be traded on the secondary market (Ofir and Sadeh, 2020). However, they also have significant differences because the nature of ICOs is decentralized and largely unregulated, as opposed to IPOs that navigate in a highly regulated environment. The decentralized and unregulated nature of ICOs translates into a faster and cheaper way to raise capital (Joo et al., 2019). With IPOs, investors obtain ownership rights, which is not necessarily the case with ICOs, depending on the type of tokens issued (utility, no ownership rights; or security, financial rights that can be equated to ownership rights; or currency) (Ofir and Sadeh, 2020). ICO issuers are allowed to raise capital without diluting ownership, which is a major criticism of IPOs (Pritchard, 2012; Karnes et al., 2017; Ofir and Sadeh, 2020). In addition, ICOs have a much shorter duration than IPOs with regards to setup mechanisms (Felix and von Eije, 2019; Joo et al., 2019). While it takes an average of six to nine months for a well-organized company to complete an IPO (PitchBookBlog, 2021), some ICOs have successfully raised millions of dollars in just a few seconds. Mozilla's former CEO, who raised $35M in 30 seconds with his ICO (Russell, 2017), is just one example. Moreover, the mode of communication between investors and companies (direct or indirect) is very different, allowing investors to establish a relationship of trust with the project, ICOs favoring direct communication with investors via different communication channels such as Discord or Telegram, while IPOs favor indirect communication via vehicles such as prospectuses and press releases. This means that compared to investors in IPOs, investors in ICOs have new tools to build their trust in the projects. Moreover, ICOs face far less disclosure and registration requirements and sometimes even none at all in some contexts and countries (Joo et al., 2019). They can also be launched at a lower level of maturity than IPOs (Ofir and Sadeh, 2020), which may however be detrimental for investors facing losses after the failure of an ICO they invested in, and leaving them unprotected by financial regulators.

Because of the above facts, the lack of regulation of the ICO environment,[6] and the absence of disclosure standards and requirements, investors have to rely on themselves to make informed ICO investment decisions. This essay thus seeks to answer the following research questions: *What red flags do stakeholders regularly encounter when navigating the world of ICOs? Do these red flags differ from those encountered in traditional investments?* The undeniable popularity of ICOs, together with the current lack of regulation in this domain and the high rate of ICO fraud, motivates this study.

This article contributes to the accounting literature in several ways. The study is one of the first to address the potential red flags of fraudulent ICOs. As such, the proposed taxonomy provides investors with guidance on the red flags to look for in ICO projects in order to inform investors, which is especially necessary given the lack of regulation in this domain. In addition, it informs investigators of the red flags to watch for in their investigations, which have so far been ignored in the literature. Finally, the taxonomy will allow financial regulators to develop ICO regulations that take into account fraud red flags that may differ from those in traditional investment fraud models.

This article proceeds as follows. It first presents background information on ICOs and related concepts, such as blockchains and cryptoassets, before reviewing the literature on fraud red flags and ICOs to inform readers about the current content of the relevant literature. It then describes the methodology and presents the study findings in the form of a taxnomy of red flags signaling potentially fraudulent ICO projects derived from interviews with a number of stakeholders, including financial regulators, investigators, investors, investees, and advisers.

[6] While some countries like China, Bangladesh and Bolivia have banned ICOs from their territories, others are considered "ICO friendly" (e.g., Switzerland and Singapore), Canada being situated between these two opposites. Nonetheless, scholars agree that the ICO ecosystem is plagued with a lack of regulation that fuels fraudulent behaviors (Tiwari et al., 2020).

2.2 Background information

This section examines the concept of ICOs and provides explanations of underlying concepts such as blockchains and cryptoassets.

2.2.1 Blockchains

A blockchain is "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way" (Iansiti and Lakhani, 2017, p.4). Contrary to banks, blockchains provide a distributed public ledger to secure transactions initiated between parties that are unknown to each other, without using a central authority (Dai and Vasarhelyi, 2017). This technology was first put in place to trade Bitcoins (Nakamoto, 2008). The idea of reducing costs and eliminating the need for a third party as intermediary appealed to many. Today this technology is used for a wide range of transactions, including private blockchains and permissioned ledgers; for a variety of business tasks, such as supply chains (O'Leary, 2017); and in banking, insurance and intellectual property (Dai and Vasarhelyi, 2017). The architecture of the blockchain ensures the integrity and irreversibility of published transactions, making it difficult to tamper with (Dai and Vasarhelyi, 2017). As blockchains evolved over time, and thus expanded from digital currency trading to a broader set of products, smart contracts have been included in their ranks. They make it possible to "autonomously verify, enforce, and execute the terms in contracts" (Day and Vasarhelyi, 2017, p.7), rendering the repudiation or modification of a transaction or trade nearly impossible. Interestingly, the first proposal of smart contracts took place years before Nakamoto's (2008) publication of the Bitcoin whitepaper. In fact, as early as 1997, Nick Szabo proposed the concept of smart contracts, which consist in contractual agreements embedded in software codes and executed in a fully automated manner (Ofir and Sadeh, 2020).

2.2.2 Cryptoassets

While there are different kinds of blockchain transactions, the blockchain was first created to trade Bitcoins (Nakamoto, 2008), a cryptoasset that remains the most commonly traded

asset of this kind (CoinMarketCap, s.d.). Cryptoassets, which are "an extremely long code made up of a combination of digital signatures" (Geiregat, 2018, p.1145), are used on a blockchain to generate secure, anonymous and immutable transactions. There are several categories of this asset class, which allows "for advancing financial exchange, storage of value, venture capital, and contracting" (Smith, 2019, p.156), including smart contracts, coins and tokens (Huang et al., 2022).

Although coins and tokens are not the same, coins being associated with forms of payment and tokens with the ability to provide access to a product or service, scholars use these terms interchangeably when discussing ICOs. The very nature of an ICO is to offer a token in exchange for money, which can be broken down into four types: i) cryptocurrency, ii) utility, iii) security, and iv) hybrid tokens. The first category (cryptocurrency) involves trading a digital currency and, by extension, a payment method (i.e., a coin). The second (utility) is used in a transaction to obtain a product or service (i.e., a token), while the third (security) is used to hold a participation in a venture (i.e., similar to equity) and be granted financial rights. The fourth category (hybrid tokens) involves tokens that can borrow from more than one category, for example both a utility and a security token (Boulianne and Fortin, 2020), thus granting rights to both a product (or service) and ownership, a utility or a security token, including payment-token features (Dobrauz-Saldapenna and Klebeck, 2019). Hybrid tokens can sometimes be difficult to categorize as it is not always easy to determine the exact category to which the token belongs. In fact, categorizing a token depends on how it derives value and how it functions economically (Cong and Xiao, 2021). This very categorization determines the jurisdiction under which the entity behind the project falls. For example, security tokens are currently governed by rules that apply worldwide, whereas few, if any, rules apply to utility tokens. However, since most tokens do not seem to provide ownership rights, according to Momtaz (2019b), they are not categorized as security tokens. A security token is defined as such when it meets the Howey Test's four criteria, which were developed in 1946 following a case in the US Supreme Court and are identified as follows: i) investment of money; ii) expectation of profits, iii) common investment with other investors, and iv) profits coming from the efforts and promotion from a third party to investors. According to this court, an investment that meets all the criteria of the Howey Test is a contract investment (i.e., a security). The Court

defines an investment contract as a security, "whether the scheme involves an investment of money in a common enterprise with profits to come solely from the efforts of others." (Gritz, 2018, p.197). In reality, very few ICO projects meet these criteria because "many ICO projects design their tokens to fail the Howey Test in order to avoid stricter regulation" (Momtaz, 2019b, p.8). The case of Kik Interactive, a messaging app development firm based in Ontario, Canada, demonstrates very well the extent of ambiguity that remains in ICOs and the types of tokens sold. Indeed, Kik Interactive was sued by the SEC for the launch of an unregulated ICO, thus violating securities laws, the SEC accusing them to have try to sell a security token. However, the company refuted this, stating that it had instead launched an ICO selling utility tokens (Boulianne and Fortin, 2020).

2.2.3 The foundation of ICOs

Although coins have different uses and outcomes, they can all be bought through initial coin offerings (ICOs), which are a "form of fundraising for blockchain-based start-ups in which digital coins […] are issued to investors in exchange for funds to help finance business" (Gan et al., 2021, p.914). The offering typically begins with the publication of a whitepaper, a sort of voluntary prospectus that describes the project and its main features and provides some information about the coin sale, such as the sale period and the sale cap (if any). It also often includes an overview of the team behind the project. However, the form and content of the whitepapers are not standardized (Joo et al., 2019) and because ICOs are not regulated[7]; there are no requirements as to the type and format of the information to be disclosed.[8]

Many consider ICOs to be attractive not only because they facilitate disintermediation– thus lowering the costs by removing intermediaries from the equation (Momtaz, 2019b),

[7] Even though there are a few cases of regulated ICOs (Boulianne and Fortin, 2020), the vast majority are unregulated (Bourveau et al., 2021), hence the generalization used here that all ICOs are unregulated.

[8] To understand the difference between a prospectus (whose content is regulated and standardized) and a white paper (whose content is not regulated or standardized), see the prospectus of 5D Acquisition Corp. for the launch of an IPO: https://www.sedar.com/GetFile.do?lang=EN&docClass=9&issuerNo=00055428&issuerType=03&projectNo=03411592&docId=5296182 and the whitepaper of Well for the launch of an ICO: https://joinwell.io/files/whitepaper.pdf

but also because of the lack of regulation or compliance requirements (Amsden and Schweizer, 2018; Boulianne and Fortin, 2020). However, the Stock and Exchange Commission (SEC) (Chiu and Greene, 2019) and the Canadian Securities Administrators (CSA) are making efforts to regulate ICOs. Both institutions proposed a new regulatory framework adapted to the reality of ICO issuers, allowing certain exemptions to current securities regulations. This consists in a regulatory sandbox aim to support Fintech entities in their growth and innovation, while ensuring that they respect a certain regulatory framework. Regulatory sandboxes allow FinTech startups and other financial innovators to experiment in a controlled environment under a regulator's supervision. Each case is studied separately so that the sandbox is specifically adapted to its reality. According to Ahern (2021), a regulatory sandbox "responds to the need for regulators to gain firsthand understanding of new technological developments rather than risking an inept approach to regulating emerging technologies when business models and risks are not yet fully bedded down and understood." (p.395). The United Kingdom introduced the very first regulatory sandbox in 2015. The idea behind this innovation was to guide and supervise while lowering administrative barriers and associated costs. To prevent putting investors at risk, the financial regulator provides guidance and supervision (Thomas, 2018). Starting in 2018, the SEC allowed an exemption from the Securities Act of 1933 in certain fairly limited cases of ICOs, similar to the sandboxes introduced in Switzerland, Gibraltar and Singapore. One of these exemptions is covered by "Rule 504 under Reg D which allows a company to offer and sell virtual tokens through an ICO to an unlimited number of investors, when the offering is limited to a maximum of 5 million of dollars during any 12-month period." (SGR, s.d., p.3). The CSA also introduced a regulatory sandbox in 2017, which "allows firms to register and/or obtain exemptive relief from securities law requirements, under a faster and more flexible process than through a standard application" (CSA, 2020, p.5), on a case-by-case basis. For the CSA, exemptions can take the form of a prospectus, registration or marketplace requirements' exemption that are otherwise enshrined in the regulations (CSA, 2017). This mechanism means that the entities issuing ICO projects are not subject to the full regulation required from other financial products. Fairly supple, the process behind regulatory sandboxes allows for opportunity-based regulations (Ahern, 2019), supporting rather than hindering innovation. However,

regulatory sandboxes for Fintechs are not mandatory, except in the case of ICOs where the token offered has the characteristics of a security. However, as Momtaz (2019b) indicated, very few ICOs offer security tokens, making it possible for the vast majority of ICOs only to participate in regulatory sandboxes voluntarily. Nonetheless, Boulianne and Fortin (2020) have pointed out that this process is costly and time consuming, which explains why some firms decide to launch ICOs without taking the regulatory path.

The fact remains that this lack of regulation has a direct impact on investors since they are left with very little information to make an informed decision. The lack of comparability between different whitepapers, to mention just one effect of the lack of regulation and standards, can lead less sophisticated investors to make decisions that could be detrimental to them since ICOs are known to attract both institutional and retail investors (Amsden and Schweizer, 2018). Hornuf et al. (2022) pointed out that information is now disclosed using a template, making it more difficult than ever to detect fraud. Some researchers argue in favor of the implementation of soft law, such as policy statements, pending regulation ("hard law") (Dostov et al., 2019). However, until there is unanimity about the implementation of soft law, or even the adoption of regulations and disclosure standards, investors will be left to their own devices to make informed decisions about investing in ICOs.

In short, ICOs are projects on a blockchain that aim to seek investment, but differ from IPOs in that they offer tokens rather than shares in exchange for funds from investors. These tokens can be broken down into four types: cryptocurrency, security tokens, utility tokens, and hybrid tokens. Cryptocurrency is the most well-known by the general public because of Bitcoin. ICOs also differ from IPOs in that they are very poorly regulated, if at all. Table 2.1 demonsgtrates the main similarities and differences between ICOs and IPOs. As a result, the information released by the teams in charge of these ICOs does not meet any disclosure standards, thus limiting potential investors' access to quality information.

----------Insert Table 2.1 about here----------

2.3 Literature review

This section presents a review of the literature on ICOs and the red flags that indicate possible fraud, with a view to examining the field of knowledge on the subject to date.

2.3.1 ICOs

Prior literature on ICOs has mainly focused on its outcomes. More specifically, scholars have sought to understand what signals a form of success. They found that a successful ICO project is one that has reached its pre-determined funding target (Amsden and Schweizer, 2018; Giudici and Adhami, 2019; Dean et al., 2020; Roosenboom et al., 2020; Aslan et al., 2021; Bourveau et al., 2021; Samieifar and Baur, 2021; Lyandres et al., 2022). Attaining the target has been measured in different ways, ranging from reaching a predetermined softcap[9] (Fenu et al., 2018) to reaching a hardcap[10] (Guidici and Adhami, 2019; Lyandres et al., 2019; Belitski and Boreiko, 2021), or even both (Amsden and Schweizer, 2018; Roosenboom et al., 2020; Ahmad et al., 2021).

While ICO success determinants have been studied from a variety of perspectives, Kher et al.'s (2021) review of the literature points to most studies being focused on the informational environment and the quality of disclosure in relation to ICO success. For example, after examining information disclosure, some researchers concluded that the success rate is higher when more information is disclosed to investors (Roosenboom et al., 2020), whitepapers are longer (Samieifar and Baur, 2021), and some internal governance mechanisms are revealed (Bourveau et al., 2021). Others who have studied ICO characteristics, such as holding a presale (Adhami et al., 2018; Roosenboom et al., 2020) and using social media (Howell et al., 2020), found that they were linked to ICO success. However, an ICO that is successful (in terms of fund raising) may ultimately prove to be fraudulent–one does not exclude the other. Accordingly, the success of an ICO is no guarantee that it is fraud free.

[9] Softcap is the minimum fundraising target sought in an ICO project.
[10] Hardcap is the maximum number of tokens that can be sold in an ICO project.

Some scholars recognize the importance of governance mechanisms in signaling ICO success. One example is that connected CEOs (Amsden and Schweizer, 2018) who demonstrate greater loyalty (Momtaz 2019a; Montaz, 2020a) are related to ICO success. Research has also shown that certain governance mechanisms such as the size of the project team (Amsden and Schweizer, 2018; Giudici and Adhami, 2019; Roosenboom et al., 2020), the managerial and entrepreneurial experience of founding members (Giudici and Adhami, 2019), the participation of women in the project team (Guzmán et al., 2021), and the disclosure of founders' educational background, professional experience and social networks (An et al., 2019) all have a positive and significant impact on ICO success.

In addition to governance mechanisms, researchers have looked at other determinants of ICO success. Studies show that the use of the Ethereum platform is negatively tied to day one return, the level of which is correlated with success, the higher the better (Burns and Moro, 2018). Ayarci and Birkan (2020) also demonstrated that investors favor certain sources of information, such as whitepapers and social media, over others before deciding to invest in an ICO project. Nevertheless, Gächter and Gächter (2021) have shown that success is often closely linked to lucky timing.

The literature focuses on the success factors of ICOs in terms of success for issuers rather than investors (i.e., reaching a capitalization threshold for the investees rather than a performance threshold for the investors). Very few, if any, articles have looked at ICO fraud indicators. Some scholars have pointed out that software code disclosure, seen as a sign of trustworthiness and transparency (Amsden and Schweizer, 2018; Howell et al., 2020), is actually detrimental to ICO projects, increasing the likelihood of victimization by fraudsters via phishing[11] by 7% (Hornuf et al., 2022). Furthermore, a study by Hornuf et al. (2020) examining factors that predict fraud in ICOs found that it is extremely difficult to predict fraud at the time of issuance from the information disclosed in the whitepaper. The same holds true for IPOs, although the underlying reason differs. Unlike for ICOs, the

[11] Phishing can be defined as a "(…) a trapped legitimate user who gives away its personal details over the duplicate web site." (Sahu and Dubey, 2014, p.42). In ICOs, a phishing attack occurs when a person (or group of people) external to the project copies the code in order to launch their own ICO, generally serving to perform an exit scam, i.e., suddenly closing the ICO and absconding with the funds invested by the cheated investors.

content of the documentation related to issuing IPOs (i.e., prospectus) is highly regulated, prompting entities to often use templates to prepare it. This leaves little room for predicting potentially fraudulent IPOs as the documentation is very similar. It also explains why scholars tend to focus on financial statements to study IPO fraud detection (Beasley, 1996; Carcello and Nagy, 2004a; Carcello and Nagy, 2004b; Goel and Gangolly, 2010).

The ICO environment is characterized by information asymmetry, caused in part by a lack of regulation on disclosures. ICO analysts and experts producing ICO ratings can help combat this asymmetry by using their knowledge to rate ICOs and inform investors (Florysiak and Schandlbauer, 2022). ICO ratings derive from one of two sources: an algorithm or a crypto-expert. ICO rating platforms like ICOBench generate ratings using algorithms employing certain criteria to rate ICOs (Liu et al., 2021). Although these criteria are not disclosed publicly, they "focus on the product, the vision, and the team of the ICO startup." (Liu et al., 2021, p.8). However, crypto-experts "voluntarily contribute their ratings of the overall prospects of ICOs to rating platforms." (Bourveau et al., 2021, p. 132). Because these sources of information have attracted the attention of investors, who "heavily rely on the expert ratings signal" (Florysiak and Schandlbauer, 2022, p.3), researchers have studied ICO analysts and ICO ratings to determine whether the information they provide can signal the potential success of an ICO project. According to some scholars, although this source of information can be useful, care should be taken not to blindly rely on rating sites. Boreiko and Vidusso (2019) pointed out that "ratings data seem and appear to vary considerably across different rating websites and appear to be of mediocre quality." (p.67), encouraging investors to use this information with caution. This caution is all the more necessary as one of the issues with ratings is that they can be modified by experts ex post (Momtaz, 2020b). Another study on the subject concluded that these rating sites use easy-to-extract and uninformative information, such as the size of the project team and the length of the whitepaper (Florysiak and Schandlbauer, 2022). Many agree that ICO analysts seem to use an overly optimistic tone in their analyses, which skew valuations (Liu et al., 2021). This of course has the effect of encouraging fundraising for ICO projects (Aslan et al., 2021; Barth et al., 2021; Liu et al., 2021; Lee et al., 2022), but does not necessarily make them profitable for investors or even successful in the end (Barth et al., 2021; Liu et al., 2021). Moreover, expert ratings are sometimes counterproductive

for investors as they reduce the effectiveness of whitepaper information delivery. Florysiak and Schandlbauer (2022) concluded that investors rely on expert ratings rather than on information in whitepapers, even though whitepapers can be very informative: "high-quality ICO issuers signal their quality by providing more informative whitepaper content, i.e., excess or new textual information not contained in recent and peer white papers." (p.1). Whitepapers are thus still useful because they are the source of the ratings. ICO ratings have a positive side as a high rating increases the chances of an ICO project being listed on an exchange platform, thus augmenting the chances of success in terms of reaching the capitalization threshold (i.e., achieving a funding objective) (Feng et al., 2019; Aslan et al., 2021; Lee et al., 2022). Some researchers see ICO analysts as being "incentivized by the platform to issue informative ratings." (Lee et al., 2022, p.1), because it allows them to build up a track record of their ability to identify successful ICOs to earn or increase their reputation (Bourveau et al., 2021). The literature on ICO analysts and ICO ratings suggests that investors still need other ways to identify potentially fraudulent ICOs, even though these analysts and ratings are considered informative (Florysiak and Schandlbauer, 2022).

2.3.2 Fraud red flags in IPOs and traditional finance

As investment vehicles in the realm of traditional finance, IPOs have been thoroughly studied from the perspective of fraud. Whether in the form of fraud red flags or fraud detection indicators, the literature on IPOs, unlike that on ICOs, is quite extensive.

A study on U.S.-listed Chinese companies demonstrated that several firms' characteristics, such as poor corporate governance and the use of small and obscure audit firms, are somehow linked to potential fraud and the misrepresentation of financial information (Lim et al., 2012). Fraud red flags in traditional finance often consist in the application of fraud models and the calculation of ratios (Loughran and McDonald, 2011; Grove and Clouse, 2014; Grove and Clouse, 2017).

Fraud red flags are also frequently studied from the perspective of financial statement fraud. A study by Brazel et al. (2015) revealed several red flags relating to this type of

fraud that were raised by experienced non-professional investors. They expressed concerns about certain indicators that they believed to be prominent in cases found to be fraudulent, including facing SEC investigations and pending litigations, as well as violating debt covenants. In an article in the *CPA Journal*, Benson (2009) highlights several red flags to look for to avoid investing in a Ponzi investment scheme like that headed by the now infamous Bernard L. Madoff. Among those red flags, the author underlines the "promise of guaranteed above-market returns (…)" (p.21), a "fuzzy investment strategy" (p.21) where the investee cannot clearly explain where the investors' money is going and an unlicensed investee. Kieffer and Mottola (2017) also mention a too-good-to-be-true level of returns in their work on understanding and combatting investment fraud, in which they thoroughly explain these influence tactics they call "phantom riches." They also point out another common tactic, which is to raise the specter of scarcity to encourage victims to invest rapidly and without further questioning. In addition, they mention the reciprocity tactic, a process by which the investee, having granted a small favor, such as a free dinner, expects the target to invest in its project in return. A paper on the identification of Ponzi schemes (Drew and Drew, 2010) reported a number of red flags raised by the SEC in the Madoff case. For example, it showed that there was a "culture of exclusivity surrounding entry into Madoff-related funds", as well as a "unique remuneration arrangements of the feeder funds" and a "lack of base-plus-performance (operation) fees" (p.54). Another scholar investigating the Madoff case mentioned that the investors' inability to withdraw their money from Madoff funds was the last straw that made it possible to uncover the Ponzi scheme (Quisenberry, 2017).

Other investment fraud red flags that have been raised include negative media coverage, apparently unsustainable investment, inconsistent investment performance with regard to the actual market (Sinclair and McPherson, 2011), and the absence of a third-party custodian or an independent administrator (Evola and O'Grady, 2009). Table 2.2 presents a summary list of fraud red flags arising from traditional finance.

----------Insert Table 2.2 about here----------

However, it should be pointed out that no one has identified the red flags investors should pay attention to in order to avoid potentially fraudulent ICO investments. In fact, red flags are mainly discussed in terms of potentially unsuccessful (Kaal and Dell'Erba, 2017) rather than fraudulent ICOs. Given that a significant number of ICOs launched are later found to be fraudulent (Hornuf et al., 2022), the need to identify these red flags is urgent. The goal is to better inform investors, the public, investigators and financial regulators. Furthermore, stakeholders must be able to identify the ICO signs that differ from those pertaining to traditional finance.

2.4 Method

To answer the research questions, stakeholders including investors, consultants, investigators and experts interacting with cryptoassets were interviewed. A qualitative approach was considered the most suitable as the research questions aimed to better understand the reality of facing fraudulent ICOs. According to King (2004), various perspectives are of great importance in exploratory research and the interviews were conducted with this in mind.

Table 2.3 presents the demographic characteristics of the interviewees, who belong to different categories of stakeholders navigating the ICO ecosystem and represent key players. The interviewees were selected through purposive and snowball sampling techniques, which is common in explanatory research design (Sandhu, 2016). A total of 42 semi-structured interviews with 53 participants (Table 2.3), using an interview guide (Table 2.4) with open-ended questions to help conduct the interviews, were held between September 2020 and December 2021. The interviews ranged in length from 25 to 109 minutes, with an average length of 52 minutes. These interviews were part of a larger project on ICOs and cryptoassets focusing on the red flags of potentially fraudulent ICOs, the lack of regulations and disclosure standards applicable to ICOs, and risk management in this environment. All interviews, except two during which notes were taken, were recorded and then transcribed by research assistants to increase the reliability of the data collected. The interviewees, a third of which were women, came mainly from Canada, with

one person from the Cayman Islands and four from the USA. They hold various positions, whether as auditor or consultants, or as employees of a financial regulator.

----------Insert Table 2.3 about here----------

The interviews were first coded by the author and two research assistants using structural coding (Saldaña, 2016), where sentences or paragraph of the interviews "were coded inductively to gather topics lists or indexes of major categories or themes" (Saldaña, 2016, p.98). This method is particularly suited to allow for the examination of commonalities. As a result, a list of first order themes emerged, which was compared by the three coders. When agreement was reached on the list of first order themes, it was then refined to second order coding, using pattern coding as a second cycle coding method (Saldaña, 2016). This method aggregates the first order themes "into a smaller number of categories, themes or concepts (…) pull(ing) together a lot of material from first cycle coding into more meaningful and parsimonious units of analysis" (Saldaña, 2016, p.236). Finally, the themes were aggregated to third order themes to obtain an overview of the red flags raised.

2.5 Findings

The purpose of this essay is to explore the red flags encountered in fraudulent ICO projects. Because there is almost a total lack of regulation for ICOs (Amsden and Schweizer, 2018; Boulianne and Fortin, 2020), investors need to take steps to protect themselves from fraudulent ones, especially since a quarter[12] of ICOs launched are estimated to be fraudulent (Hornuf et al., 2022). We therefore investigate the red flags of fraudulent ICOs through in-depth interviews with stakeholders who use, invest in, investigate, or advise on ICOs and cryptoassets to explore the red flags they have encountered and to propose a taxonomy of fraud red flags investors and financial regulators should watch for. Interviewees shared their experiences with cryptoassets and ICOs and confided a number of experiences that can be divided into three main categories: red flags from the

[12] We have added the number of suspected cases (188) to the number of confirmed cases (175) to obtain the fraud case rate identified by Hornuf et al. (2022)

investments, red flags from different sources of information, and red flags from project teams (Figure 2.1).

----------Insert Figure 2.1 about here----------

2.5.1 Red flags from investments

2.5.1.1 Similar across all types of investment

Analysis of the interviews points to many red flags inherent in ICOs, some of which are similar to those that can be found in regulated investments. Since an investment in an ICO remains an investment, although at a higher level, it is natural to find risk indicators in ICO projects that are similar to those in traditional finance. Thus, the sense of urgency to comply or to invest raised by some interviewees was summarized by one as follows:

> In terms of scams, it's the classic things: if there's urgency (…). (Interviewee 13)

Another common red flag associated with questionable investments is the high or guaranteed returns that investees often promise potential investors to convince them to invest in their project. Several interviewees raised this point:

> (…) where there is a high return, there is automatically a significant high risk (…) (Interviewee 3)

> (…) if a loved one asks you to invest and promises you big returns quickly, be alert and do your checks. (Interviewee 35)

> If people talk like that, if they are–like, if they say: I'm sure or (…) It is guaranteed, then you already know that is a red flag, because in crypto especially, like obviously, free money doesn't exist anywhere in the world but in crypto especially, there is no one that is just going to be like: Ah, invest in this, you're going to be a millionaire. Why does he tell you to invest in it? What is his benefit behind it; right? Like, why does he want you to put money in this system? (Interviewee 39)

In addition, some investors may experience significant delays in payouts or withdrawals, which are often a feature of fraud schemes, as one interviewee mentioned:

> Number one flag of insolvency in any financial operation is delays in payouts. (Interviewee 7)

While some reasonable payout delays can be encountered on blockchains, and thus in using some platforms (Eckey et al., 2020), several interviewees see excessive delays as a signal that something is wrong:

> (…) a lot of these red flags are with withdrawals, when people start withdrawing cash or crypto and there are delays. (Interviewee 5)

> But I have to wait 90 days or 120 days to take out the initial investment, so they're stringing these people along. (Interviewee 8)

As one of the interviewees reported, the delays experienced in payouts or payments sometimes turn into the outright impossibility to withdraw the money invested, which has also been highlighted in Boulianne and Fortin (2020):

> I found the one that I found, pretty much since last summer, I've been doing steady percentages and I've cashed out. That's another thing. When they tell you that you can't cash out money or something, that's a red flag. (Interviewee 29)

2.5.1.2 New red flags relating to ICOs

Fraudulent ICO projects also have their share of red flags that are not seen in traditional investments. The decentralized and largely unregulated nature of this investment vehicle means that several indicators of fraud risk will diverge from those found in traditional finance. One interviewee pointed out that some investors play on the supposed difficulty of understanding and navigating the cryptoasset space to convince potential investors to let them control their own money:

> That's very much what we're seeing in the crypto fraud world is people that are creating these smoke and mirrors; "This is complicated. Just give us your money. We will do these investments for you. We will invest into the right cryptos, and we will get you the returns that you're seeing are available." They're really playing into the hype. (Interviewee 14)

However, what differentiates ICOs from traditional investments is the fact that the investment itself can be used in different ways that are usually mentioned in the whitepapers. In this respect, one interviewee identified one red flag as not being able to use the coin as the whitepaper states:

> I found the one that I found, pretty much since last summer, I've been doing steady percentages and I've cashed out. That's another thing. When they tell you that you can't cash out money or something, that's a red flag. (Interviewee 29)

The red flags arising from the investment itself are somewhat similar to those noted in traditional investments, where high or guaranteed returns, long lead times or the inability to cash out the investment, together with the pressure investors feel to invest quickly, are shared by both types of investments. However, as a new type of unregulated investment using new technologies, ICOs have their own red flags that have not been previously encountered in traditional investments: attempts to take control of one's investments for one's own benefit and not being able to use the token as intended in the agreement (i.e., the whitepaper).

2.5.2 Red flags from sources of information

2.5.2.1 Red flags from internal sources of information

The interviewees raised other red flags from a variety of sources. In terms of internal sources of information, the whitepaper is generally the main source for ICOs, disclosing a great deal of information about the project and the ICO team. This source, which can be very revealing, sometimes arouses suspicion. For example, some participants mentioned that they believed sloppy information, such as the fact that the name of the entity varies from one page to another, to be an important signal of a potentially fraudulent ICO.

> I guess the red flags for me were changing the name, not being on any of the corporate documentation. (Interviewee 7)

> But I started noticing that this looked like there was something strange here (…) (Interviewee 8)

Others believe the quality of the language used to be another red flag indicating a shady ICO project.

> And the spelling, the quality of the site, we put it in. If it's full of spelling mistakes, well we find it less believable then people should pay attention to it. (Interviewee 33)

> This is something that we have noticed in recent years, because there are certain fraudulent pitches in which the communication–especially in English–was bad. (Interviewee 45)

Whitepapers also constitute a wealth of information that could indicate a fraudulent ICO because of the way the information they contain is expressed. For example, participants pointed out that the unjustified use of very complex language is indicative of an obfuscation scheme where the investor seeks to disguise the true nature of the project, which very often is not real.

> If it's a person who manages a fund, for example, we will expect there to be a certain simplicity. If it gets complex, maybe it's a little more curious. (Interviewee 23)

> Whitepapers are written–it's so complex you don't even understand, in fact. ... You don't even really understand what investing is, but all you understand in the whitepaper is that it's a good investment but you can't understand the whole logistics of what they are proposing because they are going in directions to lose investors. (Interviewee 36)

> So these (whitepapers)–that too are–you know, this kind of disparity and then the complexity, the terminology that sometimes instead of simplifying things for people–because we are talking to a public, normally the message should be–make it digestible for those who read it, but it is the opposite. In fact, we make it more complex; we use terms that are not quite understandable to everybody. So that is also one of the indicators. (Interviewee 38)

This red flag is often equated with high information density, where the company seeks to drown the project information in a sea of information that will confuse the whitepaper's readers.

> It is the promise of a gigantic global vision with a glaring lack of detail (Interviewee 40)

Some interviewees also noted a wide disparity in the technical level of the whitepapers; some papers gave little detail and, unexpectedly, others were highly complex. Other interviewees pointed out that the whitepapers of shady ICO projects did not provide any technical data, while other papers plagiarized academic discourse to lend gravitas to their approach. This is not the case in prospectus, because the required disclosure is standardized.

> But there is a disparity. It's that those terms, the theoretical part, it is–well, there is a file that I have in my hands right now, it's a whitepaper. There are passages, in fact, that would take four doctorates to dissect. Then when they give examples, they are examples for (the average person). It's that simple. (Interviewee 38)

> (…) look at the site, look at the whitepaper. Is there any technical information available on the site? (…) There is no technical information that is available. (Interviewee 40)

> Lots of plagiarism too. There are–often they'll take, to write the whitepaper–for example, they're going to take studies from emeritus professors or they're going to paste and copy and paste. (Interviewee 38)

Another common red flag for many interviewees is a lack of information about project team members in the whitepaper. In their view, the anonymity of the parties transacting on the various platforms means that readers do not know who they are dealing with. The whitepapers sometimes remain silent on this as well, which should raise doubts in the mind of potential investors.

> But to give you a general overview of "red flags" equals lack of transparency. If a project is run by an anonymous team or a group of avatars, this is usually not a good sign. (Interviewee 53)

Participants reported finding significant anomalies on the websites of ICO projects that turned out to be fraudulent. Errors or duplicate web links were found, which, according to one interviewee, should raise a potential investor's suspicions:

> I start clicking all these links and I go down and down and I find this strange link here. (Interviewee 8)

Another participant also mentioned that some people behind fraudulent ICO projects do not hesitate to copy logos of well-known and respected institutions to gain legitimacy among potential investors. This interviewee also pointed out that a website allowing investment in an ICO project that is offered in several dozen languages should also be of concern to potential investors since this is a red flag signaling that the person or team behind the project is looking to raise as much money as possible in numerous countries.

> We currently also have people who copy the image of companies (…). (Interviewee 36)

> (…) when the website can be translated into 30 languages, that, I find that it can still be an important red flag because you see that there, they are really trying to reach the widest possible audience. (Interviewee 36)

2.5.2.2 Red flags from external sources of information

While whitepapers are the primary internal source of information for potential investors, when looking for red flags signaling potentially fraudulent ICO scheme, investors should also keep in mind that there are other sources that can provide relevant information.

For example, traditional and non-traditional news media (e.g., social media) provide a wealth of information that investors can consult. The fact that this information comes from sources outside the team behind the ICO project often makes it more reliable than the whitepaper alone. One participant rightly reminded us of the importance of staying informed at all times when investing in a project, which includes questioning its authenticity:

> Obviously, checking the news (Interviewee 39)

> I use websites like Token Sniffer, which kind of checks if this project has been cloned before. So, you often see people just grab most of this open-source code, clone it, call it something else, and then run away with the money. (Interviewee 39)

Social networks are an important source of information as users of different platforms and investors in many ICO projects are inclined to read and post information on these platforms.

> (…) in Discord then Telegram, where can you speak directly to the developers. Then it's small communities. Then it's the first time we've seen this, but if–it's a bit like the beginning of–the Internet, where can you talk to the founders of the next big companies, well, those who went there. (…) I'm the last guy to talk to you about social media. I am happy to never go on social networks. But, ironically, Twitter is an incredible source of information with good, very filtered following from the right people. (Interviewee 40)

2.5.3 Red flags from project teams

2.5.3.1 Project team expertise

Several interviewees saw team members' lack of expertise in important areas as one of the biggest red flags. In particular, a lack of expertise in blockchains, cryptoassets, or more broadly in the financial field as a whole when it comes to an ICO project is a red flag indicating little chance of success, if not outright fraud.

Thus, interviewees identified this lack of expertise as a major red flag signaling a questionable ICO project:

> (…) the first thing I'm going to look at is the team. Who are the team members? What is the background of each member? So, is there a background in cryptos? Is this the first time this person has ventured into the crypto world? What is his credibility? (Interviewee 40)

> I think that the scams were really just people coming up with what I would think a novel idea, not really having the expertise, the know-how, and maybe the maturity of the platform of Ethereum to build those tools. (Interviewee 15)

> Development capacity is super important. Good developers in the business are being ripped off right now. This is…everyone needs to be a developer. There's not enough. (Interviewee 40)

Comments about an ICO project that ultimately failed:

> On the other hand, the first thing I noticed in one of the videos (…) where the two founders (…) talk about precisely their background. (One) has a background in marketing and (the other one) is–just that he has no background in the banking world, then laughing he mentions: yes, we want to start a bank. So, right off the bat, two people who don't have a background in the financial world, at the background level, right away, that raises questions for me. (Interviewee 40)

> To put it in context; a Stablecoin is probably the most complicated thing to develop, and then it's extremely, extremely, extremely difficult. (…) The team that it takes to develop that is incredible. It's really, really, really extremely difficult. Then there is no one who will make you believe that these two guys are capable of developing (it). (Interviewee 40)

2.5.3.2 Other characteristics of project team

Other characteristics of project teams may raise questions from potential investors. Above and beyond the lack of expertise, there are other elements that should raise investors' eyebrows when they encounter these situations. Many interviewees mentioned the difficulty of reaching team members as one of the red flags of a fraudulent ICO project. According to the interviewees, the people behind the project should be and usually are easy to reach. The ease of access to these teams is a new development in ICOs compared to traditional investments. Problems establishing communication can mean a potential problem with the project, or even fraud.

> And what I can only recommend to everyone; all of these cryptos, they have Discords. All of them have Telegrams. Go on them. Send your questions in. They are–if they don't answer you don't invest in them. If they don't have the time to give you feedback as one of their early investors in this project, don't give them any of your money, like why would you? (Interviewee 39)

The difficulty of accessing communications and getting answers to questions is even more questionable when it comes to an ICO project.

In addition, the fact that most, if not all, of the ICO project team lives in a country other than the investor's country or the country where the investment is being sought should raise doubts in the minds of potential investors[13]. A project team that is based abroad makes it more difficult to verify its members' identity and thus to know if they actually exist.

> There is also the team, for example; often, on the website or in the whitepaper, they will basically present the team behind this investment. These are all people who are predominantly based abroad or who don't seem to exist. (Interviewee 36)

> There is also the structure of the whitepaper, then–the promoters are located where? If they are located abroad" (Interviewee 36)

> My due diligence process is kind of–it is not totally simplistic but is somewhat simplistic. I start looking at projects. I started reading about them. I go on their website. I check their team. I check if their team is actually made up of legitimate people–because you often see, they just take pictures of people from Instagram that look very pretty but that is not actually them. (Interviewee 39)

All these red flags encountered by people with a variety of profiles, be they investors, investigators or even advisors, thus provide a useful taxonomy for informing potential investors and even financial regulators about potentially fraudulent ICO projects.

2.6 Discussion and conclusion

The objective of this study is twofold: to identify the red flags of potentially fraudulent ICO projects regularly encountered by stakeholders navigating the world of ICOs, and to determine whether they significantly differ from those already identified in traditional finance. The research focuses on the red flags that should be considered when deciding to invest in or investigate a particular ICO project, or even when seeking to regulate ICO

[13] According to interviewees, shady ICO projects seem to be launched from outside Canada

projects in general. The results have important implications. They suggest that there are red flags that different stakeholders navigating the environment of ICOs regularly encounter and that these flags can serve as a means of information for investors and a taxonomy for conducting an investigation. Owing to the highly unregulated nature of ICO projects and the high level of non-compliance where regulation is in place, such a taxonomy might be relevant to investors and investigators to help them make decisions.

This study finds that red flags can be classified into the following three categories: red flags related to the investments, red flags gleaned from various sources of internal or external information, and red flags tied to the ICO project team. This classification enables various stakeholders to more effectively target the elements to be taken into account, depending on the nature of the information they have obtained. It also demonstrates that although the regulations are not at the same level as those currently applicable to traditional investments, there are ways for investors to be more informed.

Investment fraud red flags, especially those that are specific to ICOs, are an important part of efficient capital markets. While the literature on fraud indicators is relatively abundant, it has focused exclusively on those indicators related to investments in traditional finance. It is true that ICOs share some indicators with traditional financial investments, but new ones are emerging. The high degree of technology involved in this new form of finance explains why these indicators are surfacing with the advent of ICOs on the financial landscape.

Issues with the technology itself provides indicators of fraud (i.e., issues with the exchange platform, or with the website). The fact that a token cannot be used as the original intent usually specified in the whitepaper reflects a technological facet of the fraud. In addition, the impossibility of cashing out the money invested in ICOs by selling the purchased tokens also derives from the underlying technology.

While cutting off access to an investment is unknown in the traditional financial system, cutting off access to a token wallet regularly makes headlines, and was reported by several interviewees. This leaves investors unable to withdraw the money they have invested and

without recourse for compensation from a third-party insurer as is possible in the traditional financial system.

Investors should keep in mind that the lack of regulation puts the burden of protection on their shoulders. Financial regulators are currently struggling to meet their responsibilities to protect the public, not only because of the scarcity of regulation in this area, but also because of the difficulty in enforcing existing regulations. Investors can take steps to inform themselves. They can learn about the fraud indicators detailed in the taxonomy presented in this essay. They can also make sure that the information they gather about the project is trustworthy. Since the disclosure of ICO information remains unregulated, many investors turn to rating sites to learn about the quality of the project that interests them. However, it is important to be careful as researchers have concluded that rating sites can barely reduce information asymmetry. Caution must be exercised in respect of the ratings that are provided as most of these sites generate low-quality data (Boreiko and Vidusso, 2019). According to Ofir and Sadeh (2020), "it is not uncommon for fraudulent ICOs to be involved in such websites, due to their business model." (p.587). Generally, these websites make the ICO issuer pay to receive the rating. ICO analysts are therefore not independent and tend to provide poor quality information. Researchers have concluded that a number of ICO projects have not been successful, despite high ratings, calling into question the over-optimism of analysts (Barth et al., 2021). This phenomenon has also been found in other context, such as in sustainability reporting (Cho et al., 2018).

It is thus important to develop and implement a regulatory framework for ICO projects. The highly technological content of this relatively new financial product, as well as its decentralization and the lack of geographical boundaries, calls for the adoption of new regulations. Slow progress in this respect can be explained by the very fast pace of innovation in the ICO ecosystem (Corbet et al., 2019), which makes it necessary to constantly adjust the regulations governing this system. The lack of consensus on the terminology and the definitions to be used (Collomb et al., 2019; Dobrauz-Saldapenna and Klebeck, 2019) has also constrained regulatory development. There needs to be a discussion among the world's various regulatory players, including the SEC and the CSA, for common definitions to be adopted. In addition, coordination of regulatory efforts must

be initiated to avoid regulatory arbitrage. An uneven level of regulation between different countries could encourage some ICO project teams to take advantage of more favorable laws in one jurisdiction to circumvent less favorable ones in another. The same phenomenon has been observed in the area of taxation, where some firms move their revenues to countries offering more favorable tax conditions or weaker enforcement of tax law (Elemes et al., 2021). It is also important to regulate ICO information disclosure, including the content and format of whitepapers. ICO disclosure provides key information for potential ICO investors; many researchers have shown that the lack of a disclosure framework opens the door to fraud and scams (Dean et al., 2020; Samieifar and Bauer, 2021). Researchers recommending the implementation of mandatory disclosure in the context of ICOs have identified the basic information that the issuers of these projects should disclose, that is, the issuer should identify and provide details of the laws and regulations applicable to the project (Zetzsche et al., 2019). According to these authors, this minimum level of information could nevertheless enable investors to access key information on ICO projects. They suggest that in the absence of regulation this could be achieved through an international cooperative effort or a soft law such as a set of policy statements. Another way to enable more sustained and reliable information is through sandboxes (Boulianne and Fortin, 2020). Such initiatives would inform investors of the legal framework applicable to the project. It would also, to some extent, force compliance with these regulations as they are recognized by the issuer, thus achieving the delicate balance between protecting investors and fostering innovation.

The findings of this study also show the extent to which fraud red flags in ICO projects differ from those in traditional finance investment tools like IPOs. Figure 2.2 presents the fraud indicators shared by both ICOs and more traditional investments, as well as fraud red flags that are unique to ICOs and to traditional investments. Those unique to ICOs are mainly related to the technological content of this financial product.

----------Insert Figure 2.2 about here----------

Among the first to highlight the red flags of potentially fraudulent ICO projects, this study fills an important gap in the literature in terms of investor information. The results highlight how important it is for potential investors in ICO projects to be informed so that they can better inform themselves. This is especially true in a highly dynamic and technological environment, where financial regulators cannot be as effective as they are in more traditional investments, particularly due to the lack of regulation or the difficulty in enforcing regulation when it exists. Moreover, there must be a rapid improvement of the regulatory framework for ICOs to shift the burden of protection that currently rests entirely on the shoulders of investors. In particular, regulators should aim to provide investors in ICOs with protection that is similar to that available to investors in traditional financial products. Future research should seek to better understand how investors in ICO projects make their investment decisions, as compared to investors in traditional investments, and how the red flags listed are addressed. In addition, special attention should be paid to the different types of investors in ICO projects to determine whether their differences impact their decision making.

Despite its contributions, the article has some limitations. The results could be influenced by the North American context and the regulations in the countries of the respondents (Canada, United States and Cayman Islands (for one interviewee). Further research should investigate the impact of country on the perception of red flags in fraudulent ICO projects.

References

Adhami, S., Giudici, G., & Martinazzi, S. (2018). Why do businesses go crypto? An empirical analysis of initial coin offerings. *Journal of Economics and Business*, *100*, 64-75.

Ahern, D. M. (2019). Regulators nurturing fintech innovation: global evolution of the regulatory sandbox as opportunity-based regulation. *Indian Journal of Law and Technology, 15*(2), 345-378.

Ahern, D. (2021). Regulatory Lag, Regulatory Friction and Regulatory Transition as FinTech Disenablers: Calibrating an EU Response to the Regulatory Sandbox Phenomenon. *European Business Organization Law Review*, *22*(3), 395-432.

Ahmad, M. F., Kowalewski, O., & Pisany, P. (2021). What determines Initial Coin Offering success: A cross-country study. *Economics of Innovation and New Technology*, 1-24.

Amsden, R., & Schweizer, D. (2018). *Are Blockchain Crowdsales the New'Gold Rush'? Success Determinants of Initial Coin Offerings.*

An, J., Duan, T., Hou, W., & Xu, X. (2019). Initial coin offerings and entrepreneurial finance: the role of founders' characteristics. *The Journal of Alternative Investments*, *21*(4), 26-40.

Aslan, A., Sensoy, A., & Akdeniz, L. (2021). *Determinants of ICO Success and Post-ICO Performance*. Retrieved from https://reader.elsevier.com/reader/sd/pii/S2214845022000898?token=ED742233DFF54A2ADA8BFDB95525B883203945E5610E8DDE48BF833159D5AD721967E1F212CD0B7DC33D182CCE94E8C7&originRegion=us-east-1&originCreation=20221121190754

Association of Certified Fraud Examiners (ACFE). (2020). *Occupational fraud 2022 : A report to the nation.* Retrieved from https://acfepublic.s3.us-west-2.amazonaws.com/2022+Report+to+the+Nations.pdf

Ayarci, N., & Birkan, A. O. (2020). Determinants of ICO investment decision: an exploratory factor analysis. *International Journal of Financial Research*, *11*(5), 69-78.

Barth, A., Laturnus, V., Mansouri, S., & Wagner, A. F. (2021). ICO analysts. Retrieved from https://www.econstor.eu/bitstream/10419/242429/1/vfs-2021-pid-50327.pdf

Bartlett, J. (2019, December 15). The £4bn OneCoin scam: how crypto-queen Dr Ruja Ignatova duped ordinary people out of billions — then went missing, *The Times*. Retrieved from https://www.thetimes.co.uk/article/the-4bn-onecoin-scam-how-crypto-queen-dr-ruja-ignatova-duped-ordinary-people-out-of-billions-then-went-missing-trqpr52pq

Beasley, M. S. (1996). An empirical analysis of the relation between the board of director composition and financial statement fraud. *Accounting review 71*(4), 443-465.

Belitski, M., & Boreiko, D. (2021). Success factors of initial coin offerings. *The Journal of Technology Transfer*, 1-17.

Benson, S. S. (2009). Recognizing the red flags of a Ponzi scheme. *The CPA Journal*, *79*(6), 18-25.

Boreiko, D., & Vidusso, G. (2019). New blockchain intermediaries: do ICO rating websites do their job well?. *The Journal of Alternative Investments*, *21*(4), 67-79.

Boulianne, E., & Fortin, M. (2020). Risks and Benefits of Initial Coin Offerings: Evidence from impak Finance, a Regulated ICO. *Accounting Perspectives*, *19*(4), 413-437.

Bourveau, T., De George, E. T., Ellahie, A., & Macciocchi, D. (2021). The Role of Disclosure and Information Intermediaries in An Unregulated Capital Market: Evidence from Initial Coin Offerings. *Journal of Accounting Research*.

Brazel, J. F., Jones, K. L., Thayer, J., & Warne, R. C. (2015). Understanding investor perceptions of financial statement fraud and their use of red flags: Evidence from the field. *Review of Accounting Studies*, *20*(4), 1373-1406.

Burns, L., & Moro, A. (2018). What makes an ICO successful? An investigation of the role of ICO characteristics, team quality and market sentiment. *An Investigation of the Role of ICO Characteristics, Team Quality and Market Sentiment (September 27, 2018)*.

Canadian Securities Administrators (CSA). (2017, August 24. *CSA Staff Notice 46-307 Cryptocurrency offerings.* Retrieved from https://www.osc.ca/fr/droit-valeurs-mobilieres/normes-regles-politiques/4/46-307/csa-staff-notice-46-307-cryptocurrency-offerings

Canadian Securities Administrators (CSA). (2020, January 16). *CSA Staff Notice 21-327 - Guidance on the Application of Securities Legislation to Entities Facilitating the Trading of Crypto Assets*. Retrieved from https://www.securities-administrators.ca/uploadedFiles/Industry_Resources/CSAStaffNotice21-327_trading-crypto-assets.pdf

Carcello, J. V., & Nagy, A. L. (2004a). Audit firm tenure and fraudulent financial reporting. *Auditing: a journal of practice & theory*, *23*(2), 55-69.

Carcello, J. V., & Nagy, A. L. (2004b). Client size, auditor specialization and fraudulent financial reporting. *Managerial Auditing Journal, 19*(5), 651-668.

Chiu, I. H., & Greene, E. F. (2019). The marriage of technology, markets and sustainable (and) social finance: insights from ICO markets for a new regulatory framework. *European Business Organization Law Review*, *20*(1), 139-169.

Coinbase. (s.d.). *About*. Retrieved on August 3, 2021 from https://www.coinbase.com/fr/about

Coindesk. (s.d.). *$6.3 Billion: 2018 ICO Funding Has Passed 2017's Total.* Retrieved on August 3, 2021 from https://www.coindesk.com/6-3-billion-2018-ico-funding-already-outpaced-2017

CoinMarketCap. (s.d.). All cryptocurrencies. Retrieved from https://coinmarketcap.com/all/views/all/

Collomb, A., De Filippi, P., & Klara, S. O. K. (2019). Blockchain technology and financial regulation: a risk-based approach to the regulation of ICOs. *European Journal of Risk Regulation*, *10*(2), 263-314.

Cong, L. W., & Xiao, Y. (2021). Categories and functions of crypto-tokens. In *The Palgrave Handbook of FinTech and Blockchain* (pp. 267-284). Palgrave Macmillan, Cham.

Corbet, S., Lucey, B., Urquhart, A., & Yarovaya, L. (2019). Cryptocurrencies as a financial asset: A systematic analysis. *International Review of Financial Analysis*, *62*, 182-199.

Dai, J., & Vasarhelyi, M. A. (2017). Toward blockchain-based accounting and assurance. *Journal of Information Systems*, *31*(3), 5-21.

Dean, T., Daluwathumullagamage, D. J., & Marsden, A. (2020). Predictability of ICO success and returns. *Journal of Applied Business and Economics*, *22*(13), 20-36.

de Best, R. (2021, February 11). Cryptocurrency projects: funds raised worldwide by industry 2019. *Statista. Retrieved from https://www.statista.com/statistics/802925/worldwide-amount-crytocurrency-ico-projects-by-industry*

DeMatteo, M. (2021, November 21). Crypto Scams Are on the Rise — Here's How Investors Can Protect Their Coins. *Time*. Retrieved from https://time.com/nextadvisor/investing/cryptocurrency/common-crypto-scams/

Dobrauz-Saldapenna, G., & Klebeck, U. (2019). Initial Coin Offering—Legal and Regulatory Challenges of Crossing the Borders. *The Journal of Alternative Investments*, *21*(4), 81-94.

Dostov, V., Shust, P., Leonova, A., & Krivoruchko, S. (2019). “Soft law” and innovations: empirical analysis of ICO-related statements. *Digital Policy, Regulation and Governance, 21*(5), 476-493.

Drew, J. M., & Drew, M. E. (2010). The identification of Ponzi schemes: can a picture tell a thousand frauds?. *Griffith Law Review*, *19*(1), 51-70.

Eckey, L., Faust, S., & Schlosser, B. (2020, October). Optiswap: Fast optimistic fair exchange. In *Proceedings of the 15th ACM Asia Conference on Computer and Communications Security*(pp. 543-557).

Evola, K., & O'Grady, N. (2009). As fraud schemes proliferate–are you the next investor to crash and burn?. *Journal of Investment Compliance, 10*(2), 14-17.

Farmbrough, H. (2018, July 20). Investors Shying Away From ICOs In Positive Shakeout. *Forbes*. Retrieved form https://www.forbes.com/sites/heatherfarmbrough/2018/07/20/public-investors-shying-away-from-icos-weekly-figures-suggest/?sh=414d2c362fc3

Felix, T. H., & von Eije, H. (2019). Underpricing in the cryptocurrency world: evidence from initial coin offerings. *Managerial Finance, 45*(4), 563-578.

Feng, C., Li, N., Wong, M. H., & Zhang, M. (2019). Initial coin offerings, blockchain technology, and white paper disclosures. *Mingyue, Initial Coin Offerings, Blockchain Technology, and White Paper Disclosures (March 25, 2019)*.

Fenu, G., Marchesi, L., Marchesi, M., & Tonelli, R. (2018, March). The ICO phenomenon and its relationships with ethereum smart contract environment. In *2018 International Workshop on Blockchain Oriented Software Engineering (IWBOSE)* (pp. 26-32). IEEE.

Finance Monthly. (2018, October 3). The 10 Biggest ICO Scams Swindled $687.4 Million. *Finance Monthly*. Retrieved from https://www.finance-monthly.com/2018/10/the-10-biggest-ico-scams-swindled-687-4-million/

Fisch, C. (2019). Initial coin offerings (ICOs) to finance new ventures. *Journal of Business Venturing*, *34*(1), 1-22.

Fisch, C., & Momtaz, P. P. (2020). Institutional investors and post-ICO performance: an empirical analysis of investor returns in initial coin offerings (ICOs). *Journal of Corporate Finance*, *64*, 1-24.

Florysiak, D., & Schandlbauer, A. (2022). Experts or charlatans? ICO analysts and white paper informativeness. *Journal of Banking & Finance*, *139*, 1-25.

Gächter, I., & Gächter, M. (2021). Success factors in ICOs: Individual firm characteristics or lucky timing?. *Finance Research Letters*, *40*, 101715.

Gan, J., Tsoukalas, G., & Netessine, S. (2021). Initial coin offerings, speculation, and asset tokenization. *Management Science*, *67*(2), 914-931.

Geiregat, S. (2018). Cryptocurrencies are (smart) contracts. *Computer law & security review*, *34*(5), 1144-1149.

Giudici, G., & Adhami, S. (2019). The impact of governance signals on ICO fundraising success. *Journal of Industrial and Business Economics*, *46*(2), 283-312.

Goel, S., Gangolly, J., Faerman, S. R., & Uzuner, O. (2010). Can linguistic predictors detect fraudulent financial filings?. *Journal of Emerging Technologies in Accounting*, *7*(1), 25-46.

Gritz, L. (2018). Teaching a New Dog Old Tricks: Why the Howey Test is Still the SEC's Best Friend When Examining Initial Coin Offerings. *North Carolina Journal of Law & Technology*, *19*(4), 193-220.

Grove, H., & Clouse, M. (2014). Using fraud models and ratios to improve cross-border forensic analysis: Examples with Chinese IPO and RTO companies. *Journal of Forensic & Investigative Accounting*, *6*(3), 189-235.

Grove, H., & Clouse, M. (2017). Forensic Accounting Procedures Applied to Valeant: Where Were the Gatekeepers. *Journal of Forensic and Investigative Accounting*, *9*(2), 836-848.

Guzmán, A., Pinto-Gutiérrez, C., & Trujillo, M. A. (2021). Signaling Value through Gender Diversity: Evidence from Initial Coin Offerings. *Sustainability*, *13*(2), 700.

Hornuf, L., Kück, T., & Schwienbacher, A. (2022). Initial coin offerings, information disclosure, and fraud. *Small Business Economics*, *58*(4), 1741-1759.

Howell, S. T., Niessner, M., & Yermack, D. (2020). Initial coin offerings: Financing growth with cryptocurrency token sales. *The Review of Financial Studies*, *33*(9), 3925-3974.

Huang, X., Han, W., Newton, D., Platanakis, E., Stafylas, D., & Sutcliffe, C. (2022). The diversification benefits of cryptocurrency asset categories and estimation risk: pre and post Covid-19. *The European Journal of Finance*, 1-26.

Iansiti, M., & Lakhani, K. R. (2017). The Truth About Blockchain: It will take years to transform business, but the journey begins now. *The Harvard Business Review, Jan-Feb 2017*, 1-11.

Joo, M. H., Nishikawa, Y., & Dandapani, K. (2019). ICOs, the next generation of IPOs. *Managerial Finance, 46*(6), 761-783.

Kaal, W. A., & Dell'Erba, M. (2017). Initial coin offerings: emerging practices, risk factors, and red flags. *Verlag CH Beck (2018), U of St. Thomas (Minnesota) Legal Studies Research Paper*, (17-18).

Karnes, Y., Makhija, M., & Peng, M.W. (2017). Home Country, Industry, and Ownership Dilution: Signaling During International IPOS. In *Intelligence, Sustainability, and Strategic Issues in Management*, Routledge: New York, 234p.

Karpenko, O. A., Blokhina, T. K., & Chebukhanova, L. V. (2021). The Initial Coin Offering (ICO) Process: Regulation and Risks. *Journal of Risk and Financial Management*, *14*(12), 599-605.

Kher, R., Terjesen, S., & Liu, C. (2021). Blockchain, Bitcoin, and ICOs: a review and research agenda. *Small Business Economics*, *56*(4), 1699-1720.

Kieffer, C., & Mottola, G. (2017). Understanding and combating investment fraud. In *Financial decision making and retirement security in an aging world*. UK: Oxford University Press, 185-212.

King, N. (2004). Using interviews in qualitative research. In *Essential guide to qualitative methods in organizational research* (pp. 11-22). Sage.

Lee, J., Li, T., & Shin, D. (2022). The wisdom of crowds in fintech: Evidence from initial coin offerings. *The Review of Corporate Finance Studies*, *11*(1), 1-46.

Lim, T., Lim Xiu Yun, J., Liu, Y., & Jiang, H. (2012). Red Flag–Characteristics of Fraudulent US-listed Chinese Companies. *International Journal of Management Sciences and Business Research*, *1*(10), 1-11.

Liu, B., McConnell, J. J., & Wang, J. (2021). The ICO Rating Game: Biased Ratings of Crypto Experts in Initial Coin Offerings. *Available at SSRN 3776935*.

Loughran, T., & McDonald, B. (2011). Barron's red flags: do they actually work?. *Journal of Behavioral Finance*, *12*(2), 90-97.

Lyandres, E., Palazzo, B., & Rabetti, D. (2019). Do tokens behave like securities? an anatomy of initial coin offerings. *SSRN Electronic Journal*.

Lyandres, E., Palazzo, B., & Rabetti, D. (2022). Initial coin offering (ICO) success and post-ICO performance. *Management Science*, 1-22.

Momtaz, P. P. (2019a). CEO emotions and underpricing in initial coin offerings. *Available at SSRN 3580719*.

Momtaz, P. P. (2019b). Token sales and initial coin offerings: introduction. *The Journal of Alternative Investments*, *21*(4), 7-12.

Momtaz, P. P. (2020a). Initial coin offerings, asymmetric information, and loyal CEOs. *Small Business Economics, 57*, 975-997.

Momtaz, P. P. (2020b). Initial coin offerings. *Plos one*, *15*(5). Retrieved from https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0233018

Nakamoto, S. 2008. Bitcoin: A Peer-To-Peer Electronic Cash System. Retrieved from https://bitcoin.org/bitcoin.pdf

Ofir, M., & Sadeh, I. (2020). ICO vs. IPO: Empirical Findings, Information Asymmetry, and the Appropriate Regulatory Framework. *Vanderbilt Journal of Transnational Law*, *53*, 525.

O'Leary, D. E. (2017). Configuring blockchain architectures for transaction information in blockchain consortiums: The case of accounting and supply chain systems. *Intelligent Systems in Accounting, Finance and Management*, *24*(4), 138-147.

PitchBook Blog. (2021, July 12). *A guide to every step in the IPO process*. Retrieved from https://pitchbook.com/blog/ipo-process-explained

Pritchard, A. C. (2012). Revisiting Truth in Securities Revisited: Abolishing IPOs and Harnessing Private Markets in the Public Good. *Seattle University Law Rev.*, *36*(2), 999-1026.

Quisenberry, W. L. (2017). Ponzi of all Ponzis: critical analysis of the Bernie Madoff scheme. *International Journal of Econometrics and Financial Management*, *5*(1), 1-6.

Roosenboom, P., van der Kolk, T., & de Jong, A. (2020). What determines success in initial coin offerings?. *Venture Capital*, *22*(2), 161-183.

Russell, J. (2017, June 1). *Former Mozilla CEO raises $35M in under 30 seconds for his browser startup Brave.* Retrieved from https://techcrunch.com/2017/06/01/brave-ico-35-million-30-seconds-brendan-eich/

Sahu, K. R., & Dubey, J. (2014). A survey on phishing attacks. *International Journal of Computer Applications*, *88*(10), 42-45.

Saldaña, J. (2016). *The coding manual for qualitative researchers*. Sage.

Samieifar, S., & Baur, D. G. (2021). Read me if you can! An analysis of ICO white papers. *Finance Research Letters*, *38*, 101427.

Sandhu, N. (2016). Behavioural red flags of fraud—A qualitative assessment. *Journal of Human Values*, *22*(3), 221-237.

Sinclair, P., & McPherson, B. (2011). Red flags of fraud part ii: A due-diligence checklist. *American Bankruptcy Institute Journal*, *30*(5), 72-73.

Smith, B. (2019). The life-cycle and character of crypto-assets: A framework for regulation and investor protection. *Journal of Accounting and Finance*, *19*(1), 156-168.

Smith Gambrell Russell (SGR). (s.d.). *Initial Coin Offerings (ICOs): SEC Regulation and Available Exemptions From Registration* [blog post], Corporate Law: Initial Coin Offerings (ICOs). Retrieved from https://www.sgrlaw.com/initial-coin-offerings-icos-sec-regulation-and-available-exemptions-from-registration/

Tiwari, M., Gepp, A., & Kumar, K. (2020). The future of raising finance-a new opportunity to commit fraud: a review of initial coin offering (ICOs) scams. *Crime, Law and Social Change*, *73*(4), 417-441.

Thomas, L. G. (2018). The case for a federal regulatory sandbox for Fintech companies. *North Carolina Banking Institute*, *22*(1), 257-281.

Wang, T. Y., Winton, A., & Yu, X. (2010). Corporate fraud and business conditions: Evidence from IPOs. *The Journal of Finance*, *65*(6), 2255-2292.

Zhang, S., Aerts, W., Zhang, D., & Chen, Z. (2022). Positive tone and initial coin offering. *Accounting & Finance*, *62*(2), 2237-2266.

Zetzsche, D. A., Buckley, R. P., Arner, D. W., & Fohr, L. (2019). The ICO gold rush: It's a scam, it's a bubble, it's a super challenge for regulators. *Harvard. International Law Journal*, *60*, 267-315.

Figure 2.1 Data analysis structure

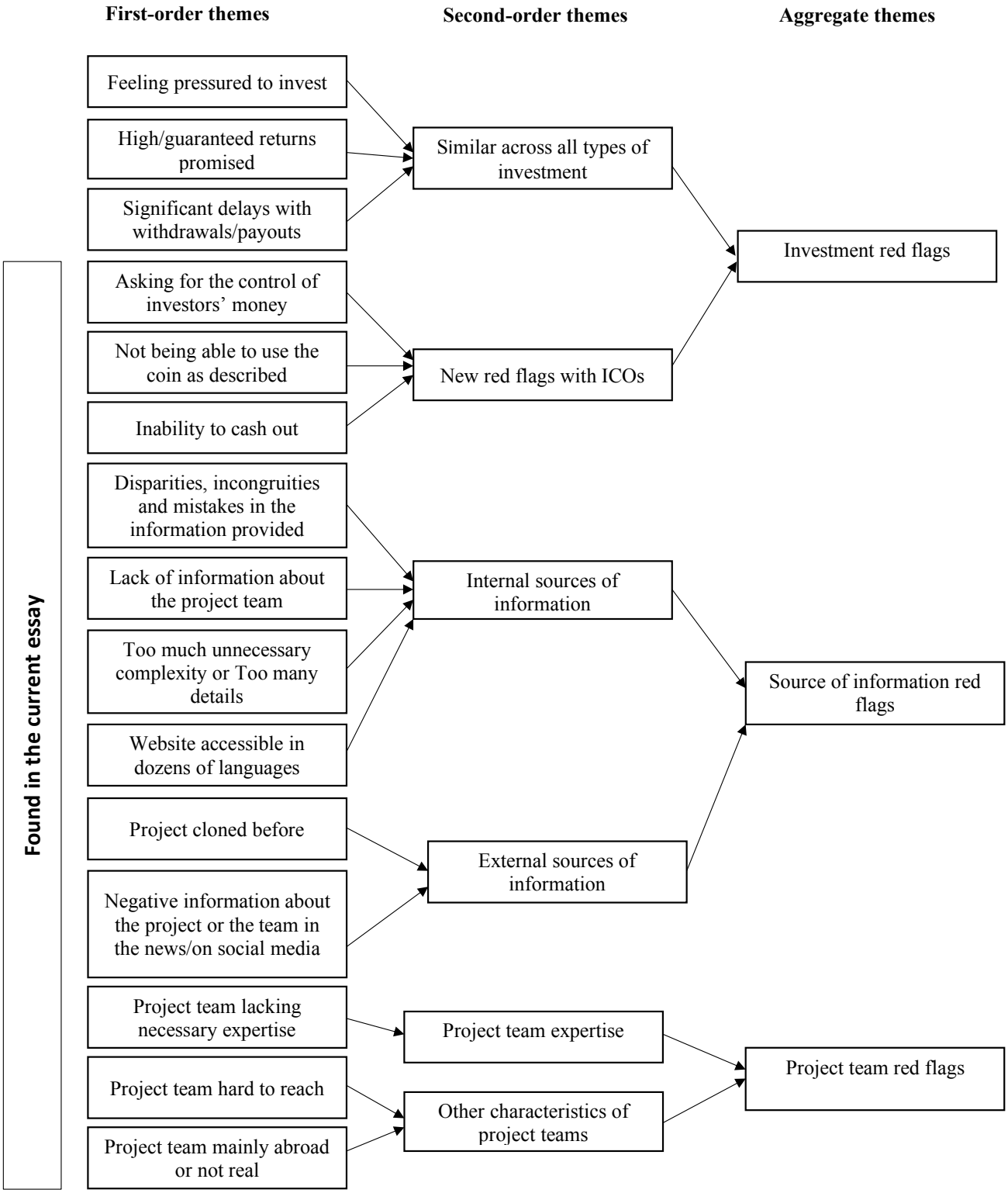


Figure 2.2 Fraud red flags in ICOs vs traditional investments

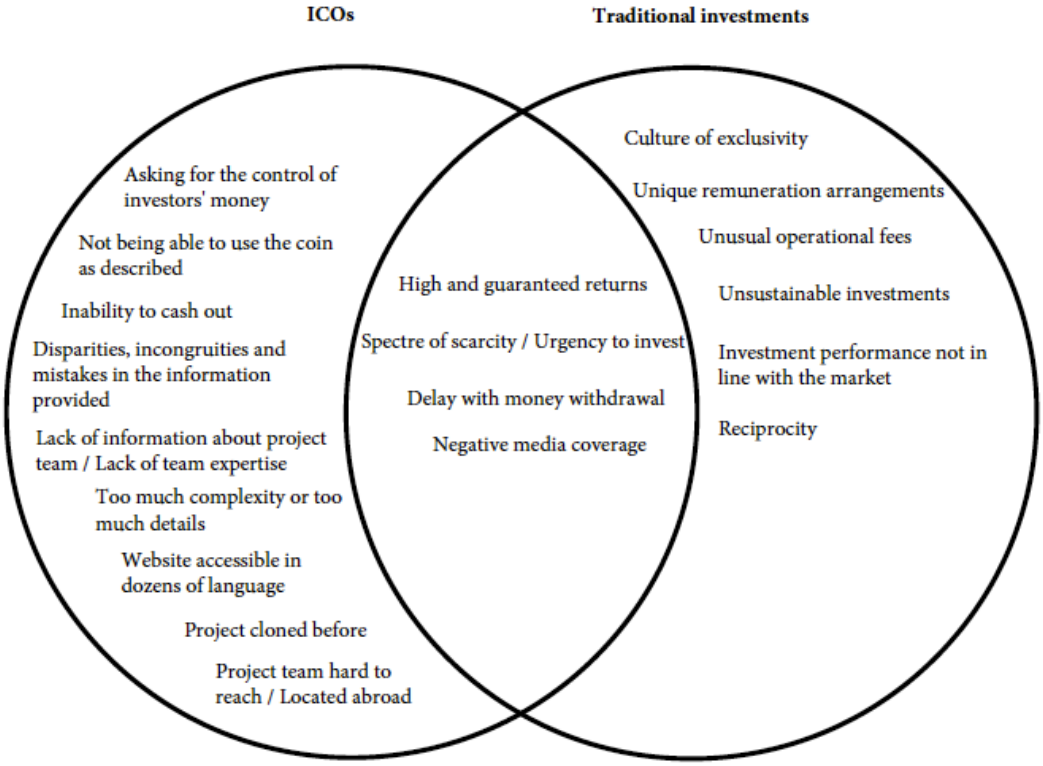


Table 2.1 Main similarities and differences between ICOs and IPOs

Goal of raising money from investors (Ofir and Sadeh, 2020)	
Can be traded on secondary market (Ofir and Sadeh, 2020)	
Do not automatically grant ownership rights (Ofir and Sadeh, 2020)	Grant ownership rights (Ofir and Sadeh, 2020)
Shorter duration (Felix and von Eije, 2019; Joo et al., 2019)	Longer duration (Felix and von Eije, 2019; Joo et al., 2019)
Direct communication (e.g., Discord, Telegram)	Indirect communication (e.g., prospectus)
Less disclosure requirements, if any (Joo et al., 2019)	Disclosure requirements (Joo et al., 2019)

Table 2.2 Fraud red flags in traditional finance

Fraud red flags
Promise of guaranteed above-market returns (Benson, 2009)
Spectre of scarcity (Kieffer and Mottola, 2017)
Culture of exclusivity to enter the investment (Drew and Drew, 2010)
Remuneration arrangements that differ from the norm (Drew and Drew, 2010)
Operational fees that differ from the norm (Drew and Drew, 2010)
Delay with money withdrawal (Quisenberry, 2017)
Negative media coverage (Sinclair and McPherson, 2011)
Unsustainable investment (Sinclair and McPherson, 2011)
Investment performance not in line with the market (Sinclair and McPherson, 2011)
Reciprocity (Kieffer and Mottola, 2017)

Table 2.3 List of interviewees

Participant	Gender	Position	Organization type	Country
1	M	Compliance expert	Consulting firm	Canada
2	M	Compliance expert	Consulting firm	USA
3	M	Investigator	Consulting firm	Canada
4	M	Investigator	Consulting firm	Canada
5	M	Computer science expert	University	Canada
6	F	Compliance expert	Consulting firm	Canada
7	M	Compliance expert	Consulting firm	Canada
8	M	Consultant	Consulting firm	Canada
9	F	Consultant	Consulting firm	Canada
10	M	Consultant	Consulting firm	Canada
11	M	Expert in Financial Crime	Financial institution	Canada
12	M	Computer science expert	University	Canada
13	M	Consultant	Consulting firm	Cayman Islands
14	F	Forensic accountant	Consulting firm	USA
15	M	Consultant	Consulting firm	USA
16	M	Blockchain expert	Consulting firm	Canada
17	M	Blockchain auditor	Consulting firm	Canada
18	M	Controller	Exchange	Canada
19	M	Blockchain auditor	Consulting firm	Canada
20	M	Security consultant	Consulting firm	Canada
21	F	Consultant	Consulting firm	Canada
22	M	Accountant	Accounting firm	Canada
23	M	Blockchain expert	Consulting firm	Canada
24	F	Crypto specialist	DeFi	Canada
25	M	Auditor	Accounting firm	Canada
26	M	Insolvency expert	Accounting firm	Canada
27	M	VP finance	Blockchain consulting firm	Canada
28	M	Tax consultant	Accounting firm	Canada
29	F	Crypto investor	Investment	Canada
30	M	Tax consultant	Accounting firm	Canada
31	M	Manager	Exchange	Canada
32	M	Manager	Exchange	Canada
33	F	Investigator	Regulator	Canada
34	F	Investigator	Regulator	Canada
35	F	Investigator	Regulator	Canada
36	F	Investigator	Regulator	Canada
37	M	Investigator	Regulator	Canada
38	M	Investigator	Regulator	Canada
39	M	Manager	Exchange	Canada

Table 2.3 List of interviewees (continued)

Participant	Gender	Position	Organization type	Country
40	M	Crypto investor	Investment	Canada
41	F	Consultant	Payment solution	USA
42	M	Blockchain expert	Accounting firm	Canada
43	M	Blockchain expert	Accounting firm	Canada
44	M	Forensic accountant	Accounting firm	Canada
45	M	Investigator	Police service	Canada
46	F	Analyst	Police service	Canada
47	F	Analyst	Police service	Canada
48	F	Analyst	Police service	Canada
49	F	Analyst	Police service	Canada
50	F	Analyst	Police service	Canada
51	F	Analyst	Police service	Canada
52	M	Consultant	Consulting firm	Canada
53	M	Crypto investor	Investment	Canada

Table 2.4 Interview guide

1) What was your first encounter with blockchain/cryptoassets/ICOs?

2) Did you invest or are you currently investing in cryptoassets or ICOs? If so, what led you to it?

3) From your perspective, how do you evaluate red flags about cryptoasset platforms or trading?

4) Is the speed of the implementation of new technologies causing issues? If so, what types of issues?

5) Have you heard of fraud in relation with cryptoassets/blockchain/platforms? Could you tell us more about how you heard about it and what were the main reasons it occurred?

6) Is there anything we didn't talk today that is important to know about cryptoassets or platforms you want to share with us?

Chapter 3
Gamblers Going to War: Preventing Investment in Fraudulent Initial Coin Offerings

Abstract

Initial coin offering (ICO) investment vehicles have been gaining popularity since their introduction, in 2013, with a market capitalization now reaching $250 billion worldwide. However, not a week goes by without hearing about new ICO fraud in the news. This type of investment is very risky and leads potentially savvy investors to use strategies to protect themselves. This study, using prospect theory and Sun Tzu's seminal work *The Art of War*, investigates how risk aware ICO investors are in their investment decision making to protect themselves, considering that 26% of ICO projects are fraudulent (Hornuf et al., 2022)[14]. Because they know they can lose a great deal, as in gambling, their knowledge of the ICO ecosystem makes them quick to protect themselves from these risks. They take calculated risks, but make serious preparations before investing. The findings indeed demonstrate that the decision making process of risk-aware ICO investors follows a pattern similar to that of Sun Tzu's description of planning for war. The process can also be interpreted through the lens of prospect theory. However, unlike pure gamblers, these savvy investors seek investment rather than speculation. This study contributes to the emergent literature on ICOs by highlighting the behavior of informed investors engaging in highly risky investment ventures. It also illustrates the downsides for investors of the lack of regulation. In conclusion, as for soldiers preparing to face the enemy, information gathering plays a key role in the decision making process of ICO investors.

3.1 Introduction

Initial coin offerings (ICOs) undoubtedly have the wind in their sails: since the first ICO was launched in 2013, the number of ICOs has continued to rise. It went from a mere $100 million invested in 2016 (Bitni, n.d.) to $65 billion in 2021, reaching a market

[14] We have added the number of suspected cases (188) to the number of confirmed cases (175) to obtain the fraud case rate identified by Hornuf et al. (2022)

capitalization of $250 billion worldwide (Karpenko et al., 2021). ICOs have thus strongly contributed to making 2021 a record year for cryptocurrency (The Block Research, 2022). The short period needed to obtain the necessary capital for a project coupled with very limited regulation, for the moment, has led several entities, particularly startups and small companies with limited means, to resort to this type of financing instead of traditional methods, particularly initial public offerings (IPOs). ICOs offer quick access to capital, at lower cost, allowing new technology startups to grow faster than they would in a more traditional financial environment. However, the increasing popularity of ICOs comes with a high risk. In addition to that, news, blogs, and social media are filled with stories describing new fraud schemes involving ICOs. Researchers of the issue have estimated that the rate of fraudulent ICOs ranges from 10% (Tiwari et al., 2020) to 26%[15] (Hornuf et al., 2022). Although some instances of fraud strike the imagination more than others, as in the case of OneCoin, where nearly $4 billion in investment disappeared (Bartlett, 2019), the fact remains that, for every fraudulent ICO launched, investors are losing money.

An ICO is "an open call, through the Internet, for the provision of cryptocurrencies in exchange for tokens generated through smart contracts and relying on the blockchain technology, allowing the pledger to enjoy an exclusive right or reward or financial claim" (Adhami et al., 2018, p. 527). The fact that these tokens—or coins—can achieve different outcomes, from financial rights[16], such as voting or property rights, to consumptive rights, such as access to a product of service, makes laws to protect investors, among others, all the more difficult to adopt and enforce (Ofir and Sadeh, 2020). This complexity in adequately regulating the field means that the proliferation of ICOs has not been curbed—quite the contrary (Zetzsche et al., 2019).

While ICOs are oftentimes compared to IPOs, because of their similar goals (i.e., raising funds from investors; see Ofir and Sadeh, 2020), they are nevertheless intrinsically different. ICOs do not necessarily grant ownership to the investor who put money into the project, and they are mostly unregulated, unlike IPOs (Ofir and Sadeh, 2020). ICOs are

[15] The number of suspected cases (188) was added to the number of confirmed cases (175) to obtain the fraud case rate identified by Hornuf et al. (2022).

[16] In order to be consistent with the literature, we use the term "rights". However, in the case of unregulated ICOs, there can be no question of rights.

both a faster and cheaper way to raise capital (Joo et al., 2019), with millions of dollars having been raised in mere seconds in some cases. Moreover, ICOs offer a way to raise money without diluting ownership, one of the major criticisms of IPOs (Pritchard, 2012; Karnes et al., 2017; Ofir and Sadeh, 2020). One of the main differences between ICOs and IPOs is the direct communication that is possible in ICOs between potential investors and project teams. This allows investors to gather information from project teams directly to then make an informed investment decision. This aspect is particularly important, given the unregulated nature of ICOs, which has left investors with little or no recourse if a problem arises.

The unregulated nature of ICOs and its reporting imply that investors must rely on very little information to both make informed investment decisions about ICOs and try to avoid fraudulent ones. Not all ICO investors are aware of the risks involved in investing in such highly risky products. However, there are investors who are informed about the risks, mostly due to their professional activities, and who understand the high level of fraud risk of ICOs but decide to invest in them anyway. Given their knowledge of the risk to which they are exposed, it is interesting to investigate how they manage it. We therefore seek to answer the following research question: How do risk-aware investors construct their approach to investing in ICOs to make money and protect themselves from potential fraud?

Building on prospect theory and on Sun Tzu' seminal work The Art of War, we analyze the processes ICO investors go through to make their decision to invest in such a risky product and to try to protect themselves from these risks. Moreover, we try to understand why, despite their knowledge of the ICO environment, these investors are interested in this type of risky investment, which is similar to gambling to some extent, and how they engage in the decision making and protection process to ultimately take the risk, however calculated, to invest in it.

This essay contributes to the emerging literature on ICOs. While most papers on ICOs study the characteristics of ICOs related to their success, very few look at their impact on investors. Moreover, most of the data from previous literature was gathered from secondary sources. In this study, we directly interviewed informed ICOs investors, to gather a unique

set of data offering a prime point of view on the topic. We argue that this information allows for a better understanding of why these investors are interested in ICOs. In addition, we identify the process by which key actors with a high level of knowledge of the ICO environment and the related risks are able to protect themselves from potentially fraudulent ICOs by using the information at hand. The findings are of primary importance for financial regulators, who must develop and implement regulations aimed at protecting investors, among others. Therefore, it should also help them better adapt the regulations by taking into account not only the investors and their motivations for investing in this type of product, but also the types and sources of information consulted by investors in ICOs. This is particularly important given the discourse of the majority of the people we met, who are open to possible regulation of the sector.

3.2 Background information

3.2.1 Blockchains

Blockchains can be public or private. A public blockchain is "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way" (Iansiti and Lakhani, 2017, p. 4). It provides a distributed public ledger that is secure and makes apparent transactions initiated between parties unknown to each other, without the necessity of a middle man or central authority, as in the case of banks (Dai and Vasarhelyi, 2017). This technology was first initiated for trading Bitcoin, with the publication of Nakamoto's whitepaper in 2008. At the heart of the concept were the ideas of eliminating the need for a third party in transactions, and increasing transaction settlement speed, among other things. On the other hand, private blockchains—or permissioned ledgers—although used to sustain some cryptocurrencies (i.e., Monero), have mostly been deployed for a variety of other uses. For example, they were especially designed for supply chains (O'Leary, 2017), but are also used in the banking, insurance, and intellectual property domains (Dai and Vasarhelyi, 2017) to provide secure and immediate information between parties with authorized access to the blockchain in question. The architecture of blockchains, both public and private, ensures the integrity and irreversibility of published transactions, making it difficult or even impossible to tamper

with (Dai and Vasarhelyi, 2017). Every time a transaction is made, it is recorded on the blockchain. To make these transactions irreversible, a certain amount of them are accumulated that are then certified by a network of computers through a consensus protocol. When the network, upon the resolution of various mathematical equations, confirms the validity of the transactions, they are clustered into a block. Such blocks are then chained together to ensure their permanence and immutability. Figure 3.1 gives an overview of a transaction process on a public blockchain.

----------Insert Figure 3.1 about here----------

Blockchains have evolved over time to include smart contracts to "autonomously verify, enforce, and execute the terms in contracts" (Day and Vasarhelyi, 2017, p. 7). These smart contracts make it almost impossible to repudiate or change a transaction, or trade. Smart contracts are not a new innovation, as they were presented as a concept back in 1994, nearly 15 years before the publication of Nakamoto's (2008) Bitcoin whitepaper. Nakamoto is a computer scientist who proposed the concept of smart contracts under the form of contractual agreements embedded in software codes and executed in a fully automated manner (Ofir and Sadeh, 2020). Ethereum, the second largest cryptocurrency in term of market capitalization after Bitcoin, had its blockchain created specifically for the purpose of creating and incorporating smart contracts (Hertig, 2021).

Blockchain offers certain advantages, as well as downsides. While blockchain is recognized as being resistant to faults, attacks, and collusion because of its distributed nature, it is also highly criticized, because its very nature induces slowness, redundancy, and limited scalability (Adhami et al., 2018).

3.2.2 Coins and cryptocurrencies

A coin is "an extremely long code made up of a combination of digital signatures" (Geiregat, 2018, p. 1145) and is used on a blockchain to induce secure, anonymous, and

immutable transactions. There are four categories of coins, or tokens: i) cryptocurrency, ii) utility tokens, iii) security tokens, and iv) hybrid tokens. A cryptocurrency is a digital or virtual currency secured by cryptography. Following the success of Bitcoin, other cryptocurrencies have been launched, either clones or forks of Bitcoin (i.e., "altcoins"), or new currencies have been built on different blockchains (i.e., Ethereum). Unlike fiat currencies (e.g., the US dollar), cryptocurrencies are not backed by any public or private entities. They exist outside the existing financial structure established throughout the world, which partly explains why they are subject to strong volatility. Moreover, cryptocurrencies are little or not regulated, which make it difficult for investors to invest. On the other hand, they present the advantage of eliminating one of the main causes of the 2008 financial market collapse, namely, the possibility that a single point of failure could cause the collapse of an entire system. In addition, they make it easier to transfer money from one part of the world to another, especially in emerging economies, where the banking system might not be as secure or easily accessible.

Utility tokens are used in transactions to obtain a product or a service, similar to crowdfunding. They are usually pre-mined, meaning that they are all created at once and distributed by the project team following a plan, typically in exchange of fiat currency. What differentiates utility tokens from crowdfunding is the digital nature of the product or service. Utility tokens oftentimes grant rights to access blockchain-based platforms (Ackermann et al., 2020). On the other hand, security tokens are used to participate in a venture (as "equity") and to be granted financial rights. The latter is what differentiates utility tokens from security tokens, along with the fact that security tokens fall under the definition of securities regulated in several countries, including Canada and the United States. Hybrid tokens have this particularity that they involve the features of several types of tokens. For example, a hybrid token can confer rights to both property and a product (i.e., can be both a security and a utility token; see Boulianne and Fortin, 2020) or can be a token (security or utility) that integrates payment token features (Dobrauz-Saldapenna and Klebeck, 2019).

3.2.3 ICOs

Coins or tokens can be bought through ICOs, as a "form of fundraising for blockchain-based start-ups in which digital coins … are issued to investors in exchange for funds to help finance business" (Gan et al., 2021, p. 914). Unlike crowdfunding, which "facilitates solicitation of investments or donations by providing a platform to … connect fundraisers to a vast number of potential supporters" (Tiwari et al., 2020, p. 417), ICOs are not limited to any country or region, being advertised everywhere and in various languages. This makes ICOs an attractive funding tool. They are very easy to launch, and some even claim that they are as easy to launch as sending an email (Momtaz, 2020a). ICOs' unquestionable popularity and frequent success stories demonstrate their usefulness—and even requirement—for companies, especially startups; these companies can "avoid rigid and long money raising protocols imposed by classical channels like banks or venture capitalists … by selling tokens" (Cerchiello and Toma, 2019, p. 13).

An ICO offering usually begins with the publication of a whitepaper, a sort of voluntary prospectus, that describes the project and its main features and offers information about the coin sale (i.e., sale period, sale cap, etc.). However, ICOs are generally not regulated, nor are whitepapers, whose form and content obviously do not follow any standards (Joo et al., 2019). This allows for the team behind the project to write whatever they want and to omit any information they choose not to share. Indeed, scholars have concluded that a great deal of information disclosure is now achieved by using templates (Hornuf et al., 2022) and adjusted to fit the market environment and conditions (Florysiak and Schandlbauer, 2019), making fraud detection more difficult than ever.

The lack of regulation or compliance requirements surrounding ICOs makes them attractive to some (Amsden and Schweizer, 2018; Boulianne and Fortin, 2020), a situation that has a direct impact on investors. Investors are left with very little reliable information to assess whether an ICO is a sound investment they should get into, and at risk for potential fraud, considering that ICO whitepapers have been proven to be a crucial piece of information (Zhang et al., 2019). In addition, ICO issuers make these whitepapers, whose form and content are currently unregulated, available to investors only on a voluntary basis. Researchers thus conclude that, while information disclosure is key to the success of an

ICO (Bourveau et al., 2022), this nonstandardized information is not effective in predicting fraud in an ICO at the time of its issuance (Hornuf et al., 2022). Despite the efforts of regulatory bodies, the fact remains that ICO investors are not being offered the same level of protection as in traditional finance (Fahlenbrach and Frattaroli, 2021).

3.3 Theoretical approach and Literature review

3.3.1 Theoretical approach

This section presents prospect theory, which supports the idea that informed investors' decision to invest in ICOs does not follow rational thinking, thus explaining why they consider investing in ICOs despite their high risk.

Before focusing on the prospect theory, several other theories were analyzed to see if they could be used effectively to explain the choice to invest in high risk investments by informed investors. We first considered the planned behavior theory, which states that individuals act rationally according to their attitudes, subjective norms, and perceived behavior control (Ajzen, 1985). However, this theoretical framework does not allow us to study and explain the seemingly irrational behavior of investors who wish to invest in a highly risky environment. Next, we analyzed the Risk and Return Theory (Fiegenbaum, 1990), which relates perceived risks to expected returns. Although this is indeed the case with the people interviewed, who are indeed seeking profitability while trying to avoid being trapped in a fraud, this theoretical framework does not explain the prima facie non-rational behavior of these investors who are well informed about the risks. Now, Fiegenbaum (1990) makes an interesting parallel between risk-return and prospect theory, which led us to consider the prospect theory as the adequate theoretical framework for this essay.

However, while prospect theory informs us on why sophisticated investors are still interested in the high-risk ICO market, it says nothing about how they protect themselves. This is where Sun Tzu's *The Art of War* comes into play, as a theoretical lens through which to better understand the decision making and protection process these investors adopt. Concepts of *The Art of War* are thus put forward to demonstrate the path taken by

ICO investors to invest in risky projects, and to protect themselves from investing in fraudulent ones.

3.3.1.1 Prospect theory

Prospect theory, proposed in 1979 by Kahneman and Tversky, states that investors are quicker to minimize outcomes that are merely probable than those that can be obtained with certainty. This effect, called the certainty effect, "contributes to risk aversion in choices involving sure gains and to risk seeking in choices involving sure losses" (Wen, 2010, p. 117). Prospect theory is the result of a critique of utility theory, which Kahneman and Tversky (1979) have demonstrated to not be applicable under certain circumstances because the "preferences [observed] systematically violate the axioms (i.e., completeness, transitivity, independence and continuity) of expected utility theory" (p. 263). This behavioral model predicts how investors make their investment decisions when confronted with alternatives that involve risk and uncertainty. In this context, investment decisions might be carried out based on an unconsciously biased (i.e., non-rational) judgment. The theory has been described as the most promising of all non-expected utility theories. It has the power to explain a many great unexpected or irrational investment behaviors (Barberis and Thaler, 2003) and is still, to this day, "the best available description of how people evaluate risk in experimental settings" (Barberis, 2013, p. 173) and is increasingly applied outside of the laboratory nowadays (Barberis, 2013).

Prospect theory has been used by scholars in finance for decades to help explain various phenomena, such as the risk–return relation. Using the theoretical lens of prospect theory, scholars have concluded that, while firms experiencing returns above their target are risk averse, those with returns below their target are, instead, risk seeking (Fingenbaum and Thomas, 1988; Fingenbaum, 1990; Jegers, 1991). Similar results are found when analyzing investors' behaviors (Olsen, 1997). Prospect theory also helps scholars describe behaviors under strong financial incentives, such as high monetary incentives in comparison to the cost of living (Kachelmeier and Shehata, 1992) and high payoffs in game shows (Post et al., 2008).

Pope and Schweitzer (2011) demonstrate, relying on prospect theory, how this theoretical underpinning plays a role in explaining the behavior of highly experienced professionals, golf players in their case. The authors describe professional golf playing as "a market with high stakes and experienced agents" (Pope and Schweitzer, 2011, p. 130). They empirically demonstrate that, when players are under par (with fewer strokes than par, a winning position), they perform worse than when they are in a par position (with a number of strokes equal to par), where loss aversion is less acute (Pope and Schweitzer, 2011). This conclusion is in line with prospect theory, where loss aversion is lower in a riskier position.

Barberis (2012) also rely on prospect theory to explain why gamblers in a casino continue to do so for longer than they initially intended, particularly when they are losing. The author builds on prospect theory to explain casino gambling behaviors, where some people continue to bet money when they have already lost a great deal. Berberis explains this as follows: by leaving the game when in a losing position, the player is aware of the loss, since it is established (i.e., the money is already lost). However, if the player continues to bet, there is still the possibility of "making up for it," that is, winning again and erasing the loss, which is still in the theoretical stage. This behavior is consistent with the premise of prospect theory, where a person in a loss position will be less risk averse than a person in a gain position, and a parallel can be made with ICO investments. This investment tool, known not only for its sometimes significant value gains but especially for its high high rate of failure and fraud, is comparable to a game of chance, especially compared to IPOs, where fraud is 8 times lower than in ICOs[17]. It is very difficult to predict a successful ICO investment, just as it is very difficult, if not impossible, to predict a win at the casino. However, in both cases and even when aware of the high risk of gaining or losing significant amounts of money, some people risk it anyway.

[17] Wang et al. (2010), studying fraudulent IPOs, reported finding 110 cases of fraudulent IPOs between 1995 and 2005 out of a total of 3,297 ICOs completed, which represents an occurrence of 3.33%. This is 8 times lower than the fraud rate in ICOs reported by Hornuf et al. (2022), which is around 26%.

3.3.1.2 The Art of War

The Art of War is an ancient Chinese military treatise written by Sun Tzu, a military strategist, dating to around the fifth century BC. The book is composed of 13 chapters that address various subjects related to warfare. Of these 13 chapters, the first 11 are devoted to the pre-war period, and the last two to the war itself. Sun Tzu's analysis of the pre-war period encompasses the decisions that must be made before going to war, that is, i) deciding to engage in this way after weighing all the options (i.e., Chapter I, "Laying Plans"; Chapter II, "Waging War"), ii) thinking about strategies (i.e., Chapter III, "Attack by Stratagem"; Chapter IV, "Tactical Disposition"), iii) how to enact the strategies (i.e., Chapter V, "Energy"; Chapter VI, "Weak Points and Strong"; Chapter VII, "Maneuvering"; Chapter VIII, "Variation in Tactics"), and iv) making sure the army has everything needed for every situation to ensure victory (i.e., Chapter IX, "The Army on the March"; Chapter X, "Terrain"; Chapter XI, "The Nine Situations"). The analysis of the war period addresses the methods of attacking the enemy (i.e., Chapter XII, "Attack by Fire") and the use of other sources of information to better position the army and fight successfully (i.e., Chapter XIII, "The Use of Spies").

In his work, Sun Tzu (n.d., p. 3) recalls that "All warfare is based on deception." The same can be said about fraud and, in particular, fraudulent ICOs, which Dürr et al. (2020) associate with deception. In line with this war metaphor, in looking to prevent investment in fraudulent ICOs, the empirical data point toward the fact that the process that investors use to navigate in the ICO world can be associated with the preparation for going to war, that is, the pre-war period. Scholars have compared the business marketplace to a battlefield (Tung, 1994; Lo et al., 1998; Lee et Ko, 2000; Wu et al., 2004), stating that the terminology used in the business world is very similar to that of the military world (Lo et al., 1998). Thus, it is possible to draw very interesting parallels between the military strategy thought out by Sun Tzu and the investment strategy implemented by certain investors, particularly in risky contexts such as ICOs. Indeed, ICOs are linked to high rates of fraud, with Hornuf et al. (2022) estimating that nearly 26% of ICO projects launched are fraudulent.

The four stages of the pre-war period can therefore be translated, in investment terminology, as i) making the decision to invest, ii) thinking about strategies, iii) ways to enact the strategies, and iv) ensuring that the information needed for successful investment has been gathered. The first stage, in the work of Sun Tzu, comprises two chapters that encompass a planification process that includes making the decision to effectively go to war or not. In terms of investments, this can be related to making the decision to invest and is especially relevant to investment in a hostile environment. Sun Tzu (n.d., p. 1) mentions, "It is a matter of life and death, a road either to safety or to ruin. Hence it is a subject of inquiry which can on no account be neglected." This statement reinforces the idea that planning before investing in an ICO is important, because an investor can win or lose a great deal, if not everything, because of the rampant fraud in the industry.

The second stage refers to the strategies developed to battle against the enemy, which can be translated, in investment, to weighing different investment strategies while minimizing the investment risk, and in the case of ICOs, the risk of fraud. Moreover, defining strategies of investment involves identifying which information is needed to make what is hopefully a successful investment, and this information is sometimes provided only by the project team. On this matter, Sun Tzu (n.d., p. 12) indicates that "to secure ourselves against defeat lies in our own hands, but the opportunity of defeating the enemy is provided by the enemy himself." Sun Tzu also implies that success can be controlled by what he calls the leader, who can be related to the investor in the case of an ICO: "The consummate leader cultivates the moral law, and strictly adheres to method and discipline; thus it is in his power to control success." (n.d., p. 14), meaning that investors have the possibility to protect themselves.

The third stage covers chapters aimed at helping to find better ways to enact the planned strategies, such as determining the tools and resources at hand and how to handle them to achieve success. This area transposes to investments as the way of putting into action the strategies thought out beforehand, with the aim of avoiding investing in projects that will later be not profitable or be fraudulent. Among those strategies are the gathering of adequate information to make an informed investment decision. Sun Tzu indicates that there are two ways to engage in an attack: "In battle, there are not more than two methods

of attack—the direct and the indirect; yet these two in combination give rise to an endless series of maneuvers" (n.d., p. 16). These means can be related to the source of information when it comes to an ICO project. There are several ways to obtain information about an ICO project, one being direct information from the project team (i.e., from the project whitepaper or website) and another being indirect information, such as news, but more often social media. Sun Tzu (n.d., p. 19) recalls the importance of being adequately prepared before engaging in a war when he states, "Whoever is first in the field and awaits the coming of the enemy, will be fresh for the fight; whoever is second in the field and has to hasten to battle will arrive exhausted." This statement implies that, in any case, when faced with a hostile environment, preparation and laying strategies ahead of time are key to success. Sun Tzu insists on the importance of not putting on blinders when analyzing a situation and to not assume that a winning strategy will always turn out the same under similar but different situations: "Do not repeat the tactics which have gained you one victory, but let your methods be regulated by the infinite variety of circumstances" (n.d., p. 23). This approach thus emphasizes the importance for investors to adapt their strategies to each ICO.

Finally, the fourth stage aims to ensure as well as possible that the army has everything in hand and has planned everything to obtain the desired result. This stage can be related to ensuring that the investor has done everything possible to avoid investing in a non-profitable investment or a fraudulent ICO project. As indicated by Sun Tzu (n.d., p. 45), "If you know the enemy and know yourself, your victory will not stand in doubt," which emphasizes the necessity of being as prepared as possible before investing in an ICO, or in any other investments.

Although *The Art of War* was first written as a war treatise, scholars from different domains have adopted its approach as a theoretical framework to explain or theorize on various behaviors and outcomes, including successful management (Michaelson and Michaelson, 2010), successful small business ventures (Sheetz-Runkle, 2014), and successful executives (Krause, 2005). The first inference from the strategy of The Art of War to the finance area was made by Charles Davenant, a mercantilist thinker. Back in 1695, Davenant argued that the "whole art of war" was reduced to money, meaning that wars

were very costly and that even the greatest war strategy could not succeed without sufficient funding. Closer to present day, McCaffrey (2014), a researcher specializing in economics, studied The Art of War under the light of political economy. The author not only concludes that the treatise "deals with the economic aspects of military operations as well as some more general economic principles," but also uncovers "how the text treats ideal military strategy as a matter of opportunity discovery (McCaffrey, 2014, p. 354). Others have studied The Art of War from a leadership perspective, arguing that success in war, as in business, is the result of leadership (Dimovski et al., 2012). Moreover, McLachlan (2009) has attempted to apply the principles set out in Sun Tzu's treatise to successful investing. It is clear that the financial and economic literature that has focused on Sun Tzu's work has done so from an outcome perspective, achieving success, thus emphasizing the war period itself.

Scholars have relied on *The Art of War* to study business strategies. In a paper on corporate business strategic planning, Lee and Ko (2000) develop a methodology for implementing business management strategies based on Sun Tzu's work, using each of the 13 steps to define the implementation of such a strategy. Other scholars have delved into Sun Tzu's *Art of War* to make a comparison with strategic quality management in an Asian context, showing the approach's high degree of relevance (Lo et al., 1998). Others have demonstrated that a strategy's success rate is proportional to the degree of alignment of the analysis of the situation and the development of a strategy with the principles underlying the work of Sun Tzu (Wu et al., 2004). Hence, most of the literature linking business and *The Art of War* has aimed at the development and implementation of business strategies to achieve success. The Art of War's strategy development is, however, very similar to the process employed by sophisticated investors when investing in ICOs, but few studies have addressed *The Art of War* from the perspective of the decision making process, that is, the pre-war period.

Sun Tzu's work thus emphasizes a process of warfare, and the analysis of the data collected for this study demonstrates that ICO investors also engage in a similar dynamic when deciding to invest or not. In accordance with previous literature, this process is at the junction of business and military strategies. Moreover, prospect theory helps explain why

sophisticated investors, with their extensive knowledge of ICOs and their underlying risks, engage anyway in these potentially highly rewarding but risky investment ventures.

3.3.2 Literature review

The literature on ICOs is only emerging, because this investment vehicle is fairly new, with the first ICO, MasterCoin, having been launched in 2013 (Shin, 2017). Most papers have focused on the characteristics that makes ICOs successful (Adhami et al., 2018; Howell et al., 2020; Roosenboom et al., 2020; Guzmán et al., 2021; Lyandres et al., 2022), with other studies looking at post-ICO performance (Fisch and Momtaz, 2020; Lyandres et al., 2022) and the governance mechanisms that fueled such success (Amsden and Schweizer, 2018; An et al., 2019; Giudici and Adhami, 2019; Momtaz, 2019, 2020b). The success of ICOs has also been studied from the perspective of the voluntary disclosure of information. Researchers have demonstrated that such provision of information benefits ICO projects by facilitating their operation and funding (Bourveau et al., 2022), but it also has the negative consequence of allowing for greater fraud (Hornuf et al., 2022).

The literature on traditional investment oftentimes alludes to gambling and speculation. Gambling and speculation and the problems they can cause are related to investment decisions to some extent. According to Arthur et al. (2016), speculation is midway between gambling and investing, with gamblers, speculators, and investors sharing similar cognitive, motivational, and personality attributes. The authors also conclude that speculation is highly linked to gambling behaviors. Additionally, gambling underperformance—as in gambling losses—has been associated with low-income investors in a study on socioeconomic factors explaining which socioeconomic factors are determinants of such losses (Kumar, 2009). Gambling behaviors have also been linked with low levels of finance literacy and overconfidence (Mosenhauer et al., 2021).

Given the highly speculative nature of some cryptocurrencies, it is not surprising that researchers have also looked at behaviors related to gambling and/or speculation. Delfabbro et al. (2021) scrutinize the behaviors of investors, stating that highly volatile investments coupled with limited information is oftentimes related to gambling. The

authors also investigate gambling problems among cryptocurrency investors and find that they tend to show greater gambling behaviors and have more gambling problems.

From a financial point of view, investment, as opposed to speculation and gambling, is more likely to be associated with long-term savings (Dorn et al., 2015). This finding is in line with that of Auer and Tercero-Lucas (2022, p. 1), who conclude that "owners of crypto increasingly tend to hold their investment for longer periods." It is also emphasized by Bonaparte (2022, p. 2), who concludes that "households with a longer self-reported time horizon for savings and investment exhibit an increased propensity to hold cryptocurrency." Despite being highly volatile and risky, ICOs, including cryptocurrency projects, are able to provide acceptable and sometimes high returns on investment (Korpinen, 2018). These attractive returns for investors have prompted the financial market to develop new products in the form of crypto funds. According to Momtaz (2022), these crypto funds, which "intermediate Decentralized Finance (DeFi) markets by pooling contributions from crowd-investors and investing in tokenized startups, combining sophisticated venture- and hedge-style investment strategies" (p. 1), demonstrate persistent outperformance. Momtaz concludes that this exceptional performance is due more to skill than to luck.

This literature allows us to demonstrate that ICOs can be serious investment projects that nevertheless require future investors to commit to their own protection, given the prevalence of fraud in the field. The field's lack of regulation, particularly related to the information disclosed to investors through whitepapers, and the lack of recourse for investors in the event of fraud have required investors to conduct their own due diligence to protect their investment.

On the investors' side, studies have looked at the characteristics of issuers (Howell et al., 2020) and investors engaged in successful ICOs (Fahlenbrach and Frattaroli, 2021), while others have investigated investors' behaviors in the form of their investment patterns and role in successful ICOs (Boreiko and Risteski, 2021). A recent study by Fisch et al. (2021) on investment motives and investor profiles demonstrates that "investors are driven by ideological, technological, and financial motives." (p. 564). Auer and Tercero-Lucas

(2022) demonstrate that, contrary to general belief, distrust in fiat currency is not a motivation for most investors investing in cryptocurrencies. According to the authors, crypto investors—and, by extension, fintech investors—are educated, young, and mostly digital natives, in other words, mainly sophisticated, well-informed investors. This finding is in line with the study of De Bondt (2005), who indicates that self-confidence and sophistication are key determinants to the perceived attractiveness of new investment strategies and new asset classes, such as ICOs.

The rather scarce ICO literature on risk management focuses exclusively on ICOs as an investment vehicle. For example, scholars look at risk management in the initial choice to opt for an ICO, instead of using it as another financing vehicle (Miglo, 2020), and during the ICO financing phase (Doszhan et al., 2020). However, the literature is silent on ICO investors' risk management.

On the other hand, the literature on traditional finance investors' is abundant, with scholars investigating how investors assess investment risk (Lipe, 1998; Koonce et al., 2005; Bracking, 2012) and tackle it (Lipe, 1998; Angerer, 2004; Coleman, 2015; Ullah et al., 2019). However, due to the major differences that exist between investing in ICOs and in traditional finance, such as IPOs, the way investors assess and manage their risks could be significantly distinct. Ofir and Sadeh (2020, p. 590) conclude that ICO investors "cannot fully rely on the competitive forces of an economy," thus calling for regulators to engage in the field to reduce information asymmetry. In the meantime, ICO investors must rely solely on their knowledge and competencies to assess the risks of investing in ICO projects and their quality.

3.3 Methods

3.3.1 Data collection

In this study, informed investors in ICO projects have been interviewed to understand the process they use to decide to invest or not. Those interviewed had extensive knowledge in the field of ICOs, because they were pursuing a career in that field, whether as a blockchain expert/specialist, crypto investor, or crypto consultant, for example, and they worked as

either a blockchain consultant, compliance expert, or professional investor, to name only a few categories. Being experts in fields related to ICOs, they were informed not only of the opportunities that these financial products represent, but also of the risks involved in investing in them, especially due to the high prevalence of fraud.

A qualitative approach was chosen for the study, because the research question seeks to understand the process of risk-aware investors wishing to invest in an ICO project. As a reminder, the research question is: How do risk-aware investors construct their approach to investing in ICOs to make money and protect themselves from potential fraud? The perspective of the interviewees is key to understanding this process, and the qualitative approach is therefore perfectly suited to this type of study, which is intended to be exploratory.

Table 3.1 presents the demographic characteristics of those interviewed for the global research project and indicates which persons are also ICO investors. Among the 53 interviewees, 25 were also investors in ICO projects; these 25 investors constitute our sample. Their selection was carried out through purposive and snowball sampling techniques commonly used in explanatory research design (Sandhu, 2016). The interviews were conducted using an interview guide with open-ended questions to help conduct the interviews. They took place between September 2020 and December 2021 and ranged in length from 25 to 109 minutes, with an average length of 52 minutes. The interview guide (see Table 3.2) was prepared prior to the interviews. All the interviews, except for two, during which notes were taken, were recorded and then transcribed by research assistants to increase the reliability of the collected data. . The interviewees, about one-third of whom were women, were primarily from Canada, with four from the United States. They work in a variety of roles, from consulting firms to exchange platforms to professional investors.

----------Insert Table 3.1 about here----------

----------Insert Table 3.2 about here----------

3.3.2 Data analysis

The data analysis was iterative, to allow the main themes to emerge. The data were coded with NVivo into different themes focusing on the investment process and decisions. After several rounds of coding the interviews, it became clear that a metaphor for war was reflected by the interviewees in the way they described their decision process before investing in ICOs and that the work of Sun Tzu could thus serve as a fruitful theoretical framework to interpret the data, with prospect theory explaining the interviewees' interest in these highly risky investments.

3.4 Analysis

We investigate the decision making investment process undertaken during the analysis of an ICO project through in-depth interviews with informed ICO investors, to explore how they analyzed ICO projects before deciding to invest—or not—considering the lack of regulation surrounding ICOs and the high risk of this kind of investment and of fraud in this area.

3.4.1 Pre-investment period

The data analysis shows that informed investors who decide to engage in ICO projects do so following an approach that meets the logic of both prospect theory and the war strategies described by Sun Tzu's work. In other words, their choice to enter the high-risk ICO environment is a decision that can be seen through the lens of prospect theory; even though they are aware of the risks and potential negative outcomes, ICO investors still decide to invest. We argue that ICO investors consider investing in ICOs as if they were preparing to go to war: weighing the pros and cons, thinking about strategies and putting them into action, and making sure they obtain all the useful information possible before investing. It is therefore relevant to use two theoretical approaches to explain ICO investors' behavior: those of prospect theory and *The Art of War*.

3.4.1.1 Consideration of investing in an ICO

Consideration of investing in an ICO is quite different from the consideration of other investment vehicles. ICOs, being little or not regulated, put investors in a position where they must actively seek protection for themselves. Moreover, informed investors in ICOs know that these projects are at high risk of gain or loss, which makes them all the more cautious.

In the interviews, some investors shared that their interest in ICOs was initially purely for entertainment but they became caught up with the topic and decided to invest more time into learning more about the projects (Interviewees 2, 15, 16, 17, 20, and 22). As expressed by one of the interviewees,

> So, I felt myself constantly questioning more and more and falling deeper into the rabbit hole. And I started attending conferences, just watching a lot more videos. And I started looking for more of these answers as I started falling into the technology. (Interviewee 17)

The meetings, which were organized by a rather underground community of enthusiasts of cryptocurrencies and ICOs, also sparked a flame in some of the interviewees. Some reported that going to these meetings and interacting with people already engaged in that sphere contributed to their knowledge and to their interest in ICOs in terms of investment (Interviewees 2, 3, 13, and 14). This community, which was built after the publication of Nakamoto's whitepaper, is recognized for its detachment from the banking system and its search for decentralized solutions that avoid the scrutiny of regulatory authorities. This way of thinking is shared by one of the interviewees, who stated,

> During that same time period … it was 2009, 2010, I started losing trust in the financial system a little bit, in how they handled the government bailouts, the bank bailouts, and how the U.S. government took control of Freddie and Fannie, the big banks. I really questioned at that point how much of a real market, a true market did we have at this point. So, again, I started developing questions. Really, how I transitioned to Bitcoin was, it's kind of interesting. (Interviewee 24)

Because of the decentralized and mostly unregulated nature of ICOs, many interviewees admitted that to consider investing in ICOs, even when taking precautions and obtaining information from credible sources, is somewhat of a leap of faith. One investor referred to it as having a "strong belief system" (Interviewee 23), with another one adding that "at any point you really are at the mercy of your intuition" (Interviewee 24). This led some of the interviewees to assert themselves as believers, with one interviewee noting that he "trust[s] the cryptography in cryptocurrency" (Interviewee 24), and another one indicating that "truthfully, I mean, I'm a big believer in Bitcoin specifically, and blockchains more broadly" (Interviewee 6).

Many interviewees mentioned that the consideration to invest in ICOs is not an easy one. However, the interest in this investment vehicle and thrill that goes along with it are sometimes stronger than everything else. Although knowing full well that they could spend a lot of time reading and studying the subject, these investors decided to engage with ICO anyway, as this interviewee explained:

> And then by the time Monday rolls around, I sort of emerged and X called me and he said, "Are you ready?" And I said, "No, definitely not ready. But I'm absolutely willing to try it and I have set up a wallet and I'll send you the public key and I feel like I could be reading for three more months and not be ready." (Interviewee 3)

Overall, the investors described various reasons for investing, from purely pleasure investments to serious investments, but they all agreed on the great interest they have in ICOs. Following the first step of the *Art of War, and according to the prospect theory*, these investors consider investing in ICOs despite the risk at play.

3.4.1.2 Thinking about strategies

Once investors seriously considered investing in ICOs, aware of the high prevalence of fraudulent ICOs and the associated risk of losing everything, they engaged in a process of strategy building.

Some of the interviewees introduced the notion of risk when thinking about ways to invest in ICOs. Indeed, risk rating was an important step for many of them, to decide if a specific investment was within their risk tolerance or outside of it (interviewees 3, 7, and 18). One of them recalled that risk is associated with opportunity and acknowledged that ICO projects are riskier than other investment vehicles, but he nevertheless considered it within his own risk tolerance scope (Interviewee 18). Along this line of thought, an investor shared the following on how he sees investment in ICOs:

> The mentality you have to have—it's a bit like when you go to the casino one evening and then say to yourself, "Look, my budget is X tonight, if I lose it doesn't matter," to understand that, from the outset, most of the time you will lose money that you will put into this." (Interviewee 22).

Many of the interviewees incorporated investments in ICOs within their investment portfolio, keeping in mind that this was part of their investment strategy (Interviewees 8, 18, and 21). One interviewee indicated that "the general investment strategy is you try and diversify your investments" (Interviewee 8), with another mentioning his investment in what he sees as safe cryptocurrencies: "Part of my portfolio is very safe cryptos, which is what I call them, even though safe and crypto are kind of an oxymoron in that sense" (Interviewee 21). Another added that, when investing in ICOs and, more specifically, in cryptocurrencies, it is all the more important to keep abreast of what is happening in these areas: "You've got to constantly be up to date with where the market is going" (Interviewee 21).

A common strategy shared by the interviewees was to ask themselves how a fraudster would act and react, to recognize the red flags of potentially fraudulent ICOs. As one interviewee mentioned, "What I like to do … is really put myself in the shoes of the fraudster, and say, 'Okay, if I was the one trying to steal from this company, where can I do it? Where's the room here?'" (Interviewee 19. Another interviewee explained that his way of developing strategies to avoid investing in fraudulent ICOs was a mental framework with several criteria that almost never failed (Interviewee 22). However, this interviewee, along with others, recognized that failures are part of the adventure and an important step in the learning process when investing in ICOs and that more rigorous research and

selection of ICO projects help in being more successful with this kind of investment (Interviewees 16 and 22).

In short, investors described several strategies, recognizing that the size of their investment depended partly on their risk tolerance and risk appetite, and that they considered the importance of diversifying their investments accordingly. They shared their thoughts on strategies, as in the second step of the Art of War.

3.4.4.3 Ways to enact strategies

The strategies thought out by the investors interviewed were enacted in different ways. Some interviewees mentioned performing data analytics to gather insightful information before investing (Interviewees 8 and 9). As one interviewee reported, "You slice and dice the data in different ways and you run analytics on them" (Interviewee 9). Information could also be gathered from different sources, such as whitepapers or social media. One investor mentioned, "I do a lot of research. I am very active on Twitter. I try to integrate myself into the community" (Interviewee 16), all to obtain useful information before investing. By actively engaging in information gathering, rather than passively (i.e., reading whitepapers and surfing the Web to look for videos and information on ICO projects), some interviewees reported that they felt they were gaining more confidence in the projects they chose to invest in the end. Thus, an investor mentioned that one should not hesitate to ask "questions about how do we make sure that these funds are safeguarded and not stolen" (Interviewee 1). Others did not hesitate to invest small amounts to obtain a feel for the projects (Interviewees 20 and 21). As reported by one of them,

> My due diligence process is kind of—it is not simplistic, but it is somewhat simplistic. I try to use the cryptocurrency I want to buy. I buy a tiny bit of it, I sign up. I use their platform. I use it. I send it to a friend. I see if it works. If all of that works and I actually get what they claim on their website, and nothing less, then I'm somewhat comfortable with it. (Interviewee 21).

Many investors mentioned using a due diligence process before investing in ICO projects (Interviewees 4, 5, 21, 24, and 25), with one investor stating that her way of feeling secure was, rather, to invest in ICO projects already tested by acquaintances (Interviewee 18).

In sum, the investors demonstrated numerous ways of enacting their risk management strategies, as in the third step of the *Art of War*, from data analytics to engaging with the community, showing that, in all cases, the collection of information and its analysis were key in their risk management process.

3.4.1.4 Ensuring the information required for successful investment was gathered

The highly decentralized and largely unregulated nature of ICO projects means that sophisticated investors will seek to ensure that they have gathered enough information before investing in such a project. They do so to feel comfortable moving forward while avoiding investing in a project that will ultimately not be profitable or worst, prove to be fraudulent.

One investor reported the fact that blockchains—on which ICO projects are based—being, for the most part, public means that an investor with the required knowledge can read the contract underlying the ICO (Interviewee 22). Moreover, it was clear for this interviewee that this transparency was not only at the level of the blockchain, but in the entire ecosystem of ICOs, through the facilitation of access to the creators of ICO projects and the entire community around these projects. He emphasized his point by stating, "It's interesting how easy it is when you're motivated to find the right information and then meet the right people, how accessible people are" (Interviewee 22).

For an interviewee, a successful investor must have gathered all the information needed to make an informed decision and must have conducted careful due diligence beforehand (Interviewee 6).

It is important to note that the amount of information available today about new ICO projects is far greater than what was previously available, making it easier to gather useful and reliable information these days. As this interviewee reported,

> Back then, even though it's only been four or five years, there were much fewer resources available and far fewer people talking about it. So, it really was a self-study thing, and it's, like, if you don't really dive in deep, now there's a lot of ways that you can find concise information; back then, there wasn't, so you were really digging into forums and posts and Discord chats and all of these places where you really had to dig to find information. (Interviewee 17).

However, interviewees made it clear that oftentimes reliable and useful information just cannot be gathered, no matter the amount of time and perseverance dedicated to it. One interviewee mentioned, "Lack of information is always an issue. Sometimes, you can do whatever due diligence you can, but there's just not enough information out there" (Interviewee 10). This matter was emphasized by another interviewee, who indicated that

> Oftentimes, there's not even the information available for the investors to come to a good decision, even if they wanted to or knew how to. That's one half of it. The other half of it is ... this is where I think it's particularly dangerous. (Interviewee 9).

This means that informed investors, while implementing various strategies to protect themselves from investing in potentially fraudulent projects, are still aware of the risks associated with this type of investment. As mentioned by one investor,

> You have to understand that, when you make your decision with all the information you have … you make a good decision. And if you lose, it's okay, because you made the right decision with the information you had. (Interviewee 22).

This aspect was emphasized by the same investor when he indicated that "a blockchain, no matter how many audits, you can't trust it.… the only test is the test of time" (Interviewee 22). This means that, no matter the time and effort put into researching an ICO project, at the end of the day, a decision to invest or not must be made and only time will tell if it was the right decision.

In summary, the investors expressed that information is of primary importance in their risk management process and that it is important to validate this information through different sources. This approach not only validates the information obtained, but also allows one to obtain as much information as possible on the projects in which one is interested, as in the fourth step of the *Art of War*. However, most were aware that not all information about a project could be obtained and that, at the end of the risk management process and when it comes time to inject money into a project, there will still be unknowns.

3.5 Discussion and conclusion

This study investigates the decision making process of the ICO investors interviewed, considering the high level of risk involved. The results show that these investors, well aware of the risks involved, are not interested in ICOs for speculation purposes, but, rather, to make a sound investment. Moreover, the findings show that the mechanism behind their decisions mirrors that of soldiers preparing for war and that information about ICO projects is key for their decision making process, especially in the highly unregulated and hostile environment of ICOs, for which the majority of interviewees are open to regulation. Our essay also highlights the harmful consequences this lack of regulation imposes on investors. We call on regulators to be aware of the severe information asymmetry facing ICO investors and to develop the necessary regulations.

We investigate savvy ICO investors' behavior using prospect theory. These investors still decide to invest in ICOs, even though they possess advanced knowledge of the high risk involved, and potential of fraud. Consistent with prospect theory, savvy ICO investors do not value gains and losses the same way, giving more weight to estimated gains than to estimated losses. Similar to gamblers, they know that they can lose a great deal, but the chances of becoming rich, even if small, incite them to invest anyway. Savvy ICO investors do take a risk when they invest in an ICO, but it is a calculated risk. While there is an element of gambling in their decision to invest, they are nonetheless seriously preparing for these risks. However, while this theory informs us on what drives savvy investors to

take an interest in ICOs, it does not allow us to understand what process they go through to protect themselves from the risks they know they are facing.

This study demonstrates that the decision making process of risk-aware investors in ICOs is very similar to the process of preparing for war as described by Sun Tzu (see Figure 3.2). The process, which every informed investor we interviewed engaged in, consists in four steps. These four steps follow the pre-war period strategy described in Sun Tzu's Art of War.

The first step is to consider investing in an ICO project. Just like army generals who prepare for war without knowing the tactics of the opposing army, ICO investors must navigate in an ICO environment plagued with fraud and surrounded by invisible enemies. Thus, the consideration to invest in an ICO by an informed and risk-aware investor is similar to the decision to go to war after weighing all the other options. In both cases, the investor and the army general are aware of the risks and of the fact that the enemy could be hiding in places that are the least suspected.

Second, investors engage in a process of reflecting about the strategies to be put in place to obtain all the information necessary to make an informed investment decisions, and to understand how fraud could occur. Similar to the second step from The Art of War's pre-war period, investors engage in the development of investment strategies while minimizing their risk. Hence, ICO investors and Sun Tzu are aligned on the importance of thinking about strategies to minimize risks and how to implement them.

Third, investors prepare the implementation of their strategies. They perform data analysis to gather information relevant to their decision making and protection process. While the investors in this study explained how they gathered information, Sun Tzu outlines the importance of thinking about war tactics and their variations, to prepare for any eventuality once in the field. This demonstrates the importance of adequate preparation before embarking (or not) on the adventure, that is, investing (or not) in ICOs or going (or not) to war.

Fourth and last, before making their decision, investors make sure they have collected sufficient quality information about the ICO they are considering buying, to convince themselves of the plausibility, seriousness, and profitability of the project. This behavior follows Sun Tzu's teaching on the importance of ensuring that everything necessary, in in terms of both information and resources, has been obtained to achieve victory. Thus, both approaches emphasize the importance of gathering all the information necessary before making a decision.

----------Insert Figure 3.2 about here----------

The investors we interviewed followed a rigorous process before investing in ICOs. These savvy investors in the fintech environment adopted risk management behaviors in line with previous literature on the subject. Contrary to what the literature on gambling and speculation concludes (Kumar, 2009; Mosenhauer et al., 2021), given their high level of finance literacy and despite the high level of risk, some educated investors invest in ICOs with a long-term investment horizon rather than with a purely speculative short-term goal (Auer and Tercero-Lucas, 2022; Bonaparte, 2022).

The lack of regulation regarding ICO projects makes it possible for anyone to become an investee and launch an ICO, which has certain similarities with a war. In the case of wars, the armies are governed by the laws of war "and tactics used by militaries during times of war." (Posner, 2003, p. 297). However, as other international laws, they are not enforced by a central authority, and it has been demonstrated that states frequently violate such laws (Posner, 2003). A parallel can be drawn between war and ICOs at the level of laws, because, although there are currently attempts at regulating them in some countries, there is no uniformity in the various countries allowing ICOs, let alone common and broad enforcement. Moreover, Dinniss (2012, p. 1) has established a link between cyberspace and the laws of war by demonstrating "the power and possibility of computer network attacks if utilized in an armed conflict (but) also … the vulnerability of the states," with

Goldsmith (2013) stating that cyberspace is witnessing crimes that could be registered as war crimes, partly because of the lawfulness of cyber warfare (Gervais, 2012).

The Art of War does not apply to traditional finance, because this segment of the finance industry operates in an environment where the disclosure of information is highly regulated. Traditional finance operates on the basis of the efficient market hypothesis, which states that

> In the limit a market is efficient if all the players acting within it have the same information [where] no player would be able to gain advantage from the information obtained, or to predict future developments of prices of an asset from the information available. (Hu and Zheng, 2016, p. 6)

Hence, traditional finance regulates information disclosure, among other aspects. Originating in financial scandals, the enactment of the Sarbanes–Oxley Act of 2002 seeks "to protect investors by improving the accuracy and reliability of corporate disclosures" (US House of Representatives, 2002, p. 1). This regulation has proven to be effective in terms of the quality of information disclosed and governance, promoting a certain effectiveness of these information and investor protection mechanisms (Cohen et al., 2013).

3.5.1 Harmful consequences of the lack of regulation for investors

Uncovering the investment decision making process of ICO investors highlights the strategies they need to undertake to protect themselves from potentially bad investments. Scholars have brought to light the impact of the lack of regulation on ICOs. Although there are positive outcomes, such as more flexibility and lower transaction costs (Dostov et al., 2019), Dean et al. (2020) and Samieifar and Baur (2021) have demonstrated that these gaps in ICO regulation allow for serious deficiencies, which in turn open the door to scams and fraud. Lack of regulation is also linked to "high volatility, superficial due diligence, minimal government control and lack of protection for investors" (Ivashchenko et al., 2018, p. 70). The very absence of investor protection is the primary risk that ICO investors aim to reduce through the investment decision making process illustrated in this essay, and this

process is made necessary by this very lack of regulation. Karpenko et al. (2021) have indicated that regulation, particularly in terms of the content of whitepapers and the procedures required in connection with Know Your Customer (KYC) standards, is necessary to reduce the risks affecting potential investors. Some scholars are strong advocates of any regulation that would lower information asymmetry (Zetzsche et al., 2018), because, in an unregulated environment, ICOs can lead to significant agency costs (Gan et al., 2021). In their study of the very first regulated ICO launched in Canada, Boulianne and Fortin (2020) proposed a framework (Figure 3.3) demonstrating the risks and benefits of both regulated and unregulated ICOs, highlighting the fact that financial regulators must offer protection to investors because of the risks they face.

----------Insert Figure 3.3 about here----------

Collomb et al. (2019) have studied the issue of regulation and shown that there is currently a great deal of heterogeneity in the regulation of various countries in relation to ICOs, notably because, while some countries accept and attempt to legislate ICOs (i.e., Canada and the United States), others have banned them outright (i.e., China and South Korea). This lack of regulation is due to the fact that it is particularly difficult to develop regulations when there are no clear or commonly approved terminology and definitions in this sector (Lai and Whitlow, 2020). Nevertheless, suggestions for future regulations have already been put forward, including the requirement to use cloud access broker security—able to track down and flag any irregularities on an exchange platform (El-Essawi and Ratti, n.d.)—and the regulation of miners, all with the aim of balancing innovation and accountability (Chohan, 2019) with both supportive and restrictive legislation (Bellavitis et al., 2021).

First, regulators must seek international harmonization of the regulation of ICOs, since ICOs know no physical borders. Second, regulators must coordinate their practices to avoid

regulatory arbitrage. Third, it is important to improve the method of classifying ICOs into different categories—utility tokens, security tokens, and so forth—because better identification facilitates the development, application, and enforcement of regulations. Finally, the promotion of sandboxing, a process to reduce the burden on fintech by allowing certain exemptions to existing regulations, should be emphasized.

As long as regulations to protect ICO investors are not adopted and implemented worldwide, investors will need to elaborate strategies to protect themselves from potentially harmful consequences such as losing their investment to bad or fraudulent ICO projects. Using an analogy between the enactment of the Sarbanes–Oxley Act in 2002 and the recent financial crisis of 2008, Hart (2009, p. 444) states, "The extent of the crisis was so great that nonintervention simply was not an option." We hope the authorities will not wait for that to happen before developing and enforcing sufficient and necessary regulation for adequate ICO investor protection.

We acknowledge this study has limitations. First, almost all the investors we interviewed had great knowledge of the ICO field, since they also worked in it. The data are therefore not generalizable to all investors. Investors who are familiar with the field but not working closely in it could behave differently when investing in ICOs. Moreover, the investors we met were mainly based in Canada, which could influence the way they manage their risk, since the culture and access to information are different in other parts of the world. Despite its limitations, this study allows for a better understanding of the way well-informed investors manage their risk in a highly volatile and risky environment. It maps the types and sources of information and the steps taken by educated investors in their quest for information before investing. Moreover, this essay seeks to inform financial regulators and enabling them to tailor future regulations to investors' needs.

This essay also advances knowledge, since it goes beyond the motives (Fisch et al., 2021) and investment patterns (Boreiko and Risteski, 2021) of investors by looking at their risk management process. It highlights current issues on ICO regulation and investor protection. It also demonstrates that voluntary disclosures from ICO projects, mostly in the form of whitepapers, are not sufficiently reliable or comprehensive for investors' sole reliance.

Although scholars cast doubt on the seriousness of investors who put money into ICOs (Zetzsche et al., 2019), this study shows that some informed investors opt for this kind of investment after a thoughtful process. Consequently, it would be useful to learn more about the type of information that potential ICO investors are interested in, to better understand what quality information constitutes for them. Moreover, data could be collected, mostly through interviews, to capture how ICO investors sort and select the information deemed relevant to their decision making.

In addition, ICO issuers have been shown to be more than ever aware of the regulatory issues that affect ICOs (Fahlenbrach and Frattaroli, 2021), but the fact remains that the prevalence of fraudulent ICOs and lack of regulation surrounding ICOs make them particularly risky for the potential investor. Future research should inquire about the views of ICO investors regarding the impact of the lack of regulation on their decision to invest in ICOs.

References

Ackermann, E., Bock, C., & Bürger, R. (2020). Democratising entrepreneurial finance: the impact of crowdfunding and initial coin offerings (ICOs). In *Contemporary developments in entrepreneurial finance* (pp. 277-308). Germany: Springer.

Adhami, S., Giudici, G., & Martinazzi, S. (2018). Why do businesses go crypto? An empirical analysis of initial coin offerings. *Journal of Economics and Business*, *100*, 64-75.

Ajzen, I. (1985). *From intentions to actions: A theory of planned behavior*. Springer Berlin Heidelberg, 11-39.

Amsden, R., & Schweizer, D. (2018). Are blockchain crowdsales the new 'gold rush'? Success determinants of initial coin offerings. *Success determinants of initial coin offerings (April 16, 2018)*.

An, J., Duan, T., Hou, W., & Xu, X. (2019). Initial coin offerings and entrepreneurial finance: the role of founders' characteristics. *The Journal of Alternative Investments*, *21*(4), 26-40.

Angerer, X. W. (2004). *Empirical studies on risk management of investors and banks*. The Ohio State University.

Arthur, J. N., Williams, R. J., & Delfabbro, P. H. (2016). The conceptual and empirical relationship between gambling, investing, and speculation. *Journal of behavioral addictions*, *5*(4), 580-591.

Auer, R., & Tercero-Lucas, D. (2022). Distrust or speculation? The socioeconomic drivers of US cryptocurrency investments. *Journal of Financial Stability*, *62*, 1-23.

Barberis, N., & Thaler, R. (2003). A survey of behavioral finance. *Handbook of the Economics of Finance*, *1*, 1053-1128.

Barberis, N. (2012). A model of casino gambling. *Management Science*, *58*(1), 35-51.

Barberis, N. C. (2013). Thirty years of prospect theory in economics: A review and assessment. *Journal of Economic Perspectives*, *27*(1), 173-196.

Bartlett, J. (2019, December 15). The £4bn OneCoin scam: how crypto-queen Dr Ruja Ignatova duped ordinary people out of billions—then went missing, *The Times*. Retrieved from https://www.thetimes.co.uk/article/the-4bn-onecoin-scam-how-crypto-queen-dr-ruja-ignatova-duped-ordinary-people-out-of-billions-then-went-missing-trqpr52pq

Belinky, M., E. Rennick, and A. Veitch. 2015. The Fintech 2.0 paper: Rebooting financial ser- vices. London: Santander InnoVentures Fund.

Bellavitis, C., Fisch, C., & Wiklund, J. (2021). A comprehensive review of the global development of initial coin offerings (ICOs) and their regulation. *Journal of Business Venturing Insights*, *15*, 1-16.

Bitni.com (n.d.). *Statistics for cryptocurrency, ICO, IEO and STO - Year-by-year*. Retrieved from https://bitni.com/site/coin-schedule/stats.php

Bonaparte, Y. (2022). Time horizon and cryptocurrency ownership: Is crypto not speculative? *Journal of International Financial Markets, Institutions and Money*, *79*, 1-23.

Boreiko, D., & Risteski, D. (2021). Serial and large investors in initial coin offerings. *Small Business Economics*, *57*(2), 1053-1071.

Boulianne, E., & Fortin, M. (2020). Risks and Benefits of Initial Coin Offerings: Evidence from impak Finance, a Regulated ICO. *Accounting Perspectives*, *19*(4), 413-437.

Bourveau, T., De George, E. T., Ellahie, A., & Macciocchi, D. (2022). The role of disclosure and information intermediaries in an unregulated capital market: evidence from initial coin offerings. *Journal of Accounting Research*, *60*(1), 129-167.

Bracking, S. (2012). How do investors value environmental harm/care? Private equity funds, development finance institutions and the partial financialization of nature-based industries. *Development and Change*, *43*(1), 271-293.

Cerchiello, P., Tasca, P., & Toma, A. M. (2019). ICO success drivers: a textual and statistical analysis. *The Journal of Alternative Investments*, *21*(4), 13-25.

Cohen, J. R., Hayes, C., Krishnamoorthy, G., Monroe, G. S., & Wright, A. M. (2013). The effectiveness of SOX regulation: An interview study of corporate directors. *Behavioral Research in Accounting*, *25*(1), 61-87.

Coleman, L. (2015). Facing up to fund managers: An exploratory field study of how institutional investors make decisions. *Qualitative Research in Financial Markets, 7*(2), 111-135.

Collomb, A., De Filippi, P., & Klara, S. O. K. (2019). Blockchain technology and financial regulation: a risk-based approach to the regulation of ICOs. *European Journal of Risk Regulation*, *10*(2), 263-314.

Cho, C. H., Laine, M., Roberts, R. W., & Rodrigue, M. (2018). The frontstage and backstage of corporate sustainability reporting: Evidence from the Arctic National Wildlife Refuge Bill. *Journal of Business Ethics*, *152*, 865-886.

Chohan, U. W. (2019). Initial coin offerings (ICOs): Risks, regulation, and accountability. In *Cryptofinance and mechanisms of exchange*. Switzerland : Springer.

Dai, J., & Vasarhelyi, M. A. (2017). Toward blockchain-based accounting and assurance. *Journal of Information Systems*, *31*(3), 5-21.

Davenant, C. (1695). An Essay upon Ways and Means of Supplying the War.

Dean, T., Daluwathumullagamage, D. J., & Marsden, A. (2020). Predictability of ICO success and returns. *Journal of Applied Business and Economics*, *22*(13), 20-36.

De Bondt, W. (2005). The values and beliefs of European investors. *The sociology of financial markets*, 163-186.

Delfabbro, P., King, D., Williams, J., & Georgiou, N. (2021). Cryptocurrency trading, gambling and problem gambling. *Addictive Behaviors*, *122*, 1-6.

Dimovski, V., Marič, M., Uhan, M., Đurica, N., & Ferjan, M. (2012). Sun Tzu's "*The Art of War*" and Implications for Leadership: Theoretical Discussion. *Organizacija*, *45*(4), 151-158.

Dinniss, H. H. (2012). *Cyber warfare and the laws of war*. New York: Cambridge University Press.

Dobrauz-Saldapenna, G., & Klebeck, U. (2019). Initial Coin Offering—Legal and Regulatory Challenges of Crossing the Borders. *The Journal of Alternative Investments*, *21*(4), 81-94.

Dorn, A. J., Dorn, D., & Sengmueller, P. (2015). Trading as gambling. *Management Science*, *61*(10), 2376-2393.

Dostov, V., Shust, P., Leonova, A., & Krivoruchko, S. (2019). "Soft law" and innovations: empirical analysis of ICO-related statements. *Digital Policy, Regulation and Governance, 21*(5), 476-493.

Doszhan, R., Alimbekova, G., Kalymbekova, Z., & Talasbek, M. (2020). Risk management in the financing of ICO projects: prospects for the use of modern technologies in Kazakhstan. In *E3S Web of Conferences* (Vol. 159, p. 04017). EDP Sciences.

Dürr, A., Griebel, M., Welsch, G., & Thiesse, F. (2020). Predicting Fraudulent initial Coin Offerings using Information Extracted from Whitepapers. In *ECIS*.

Elemes, A., Blaylock, B., & Spence, C. (2021). Tax-motivated profit shifting in big 4 networks: Evidence from Europe. *Accounting, Organizations and Society*, *95*, 1-18.

El-Essawi, H., & Ratti, D. (n.d.). Fake It Till You Break It: How AI Can Impact the ICO Space. Retrieved from https://techundertwenty.com/wp-content/uploads/2019/03/Fake-It-Till-You-Break-It-Final.pdf

Fahlenbrach, R., & Frattaroli, M. (2021). ICO investors. *Financial Markets and Portfolio Management*, *35*(1), 1-59.

Fiegenbaum, A., & Thomas, H. (1988). Attitudes toward risk and the risk–return paradox: prospect theory explanations. *Academy of Management journal*, *31*(1), 85-106.

Fiegenbaum, A. (1990). Prospect theory and the risk-return association: An empirical examination in 85 industries. *Journal of Economic Behavior & Organization*, *14*(2), 187-203.

Fisch, C., & Momtaz, P. P. (2020). Institutional investors and post-ICO performance: an empirical analysis of investor returns in initial coin offerings (ICOs). *Journal of Corporate Finance*, *64*, 101679.

Fisch, C., Masiak, C., Vismara, S., & Block, J. (2021). Motives and profiles of ICO investors. *Journal of Business Research*, *125*, 564-576.

Florysiak, D., & Schandlbauer, A. (2019). The information content of ico white papers. *Available at SSRN 3265007*.

Gan, J., Tsoukalas, G., & Netessine, S. (2021). Initial coin offerings, speculation, and asset tokenization. *Management Science*, *67*(2), 914-931.

Geiregat, S. (2018). Cryptocurrencies are (smart) contracts. *Computer law & security review*, *34*(5), 1144-1149.

Gervais, M. (2012). Cyber attacks and the laws of war. *Journal of Law & Cyber Warfare*, *1*(1), 525-579.

Giudici, G., & Adhami, S. (2019). The impact of governance signals on ICO fundraising success. *Journal of Industrial and Business Economics*, *46*(2), 283-312.

Goldsmith, J. (2013). How cyber changes the laws of war. *European Journal of International Law*, *24*(1), 129-138

Guzmán, A., Pinto-Gutiérrez, C., & Trujillo, M. A. (2021). Signaling Value through Gender Diversity: Evidence from Initial Coin Offerings. *Sustainability*, *13*(2), 700.

Hart, O. (2009). Regulation and Sarbanes–Oxley. *Journal of Accounting Research*, *47*(2), 437-445.

Hayes, A. (2022, Feb 16). Blockchain explained. *Investopedia.* Retrieved from https://www.investopedia.com/terms/b/blockchain.asp

Hertig, A. (2021, Jul 22). How do Ethereum smart contracts work? *CoinDesk*. Retrieved from https://www.coindesk.com/learn/how-do-ethereum-smart-contracts-work/

Hornuf, L., Kück, T., & Schwienbacher, A. (2022). Initial coin offerings, information disclosure, and fraud. *Small Business Economics*, *58*(4), 1741-1759.

Howell, S. T., Niessner, M., & Yermack, D. (2020). Initial coin offerings: Financing growth with cryptocurrency token sales. *The Review of Financial Studies*, *33*(9), 3925-3974.

Hu, B., & Zheng, L. (2016). Digital finance: Definition, models, risk, and regulation. In *Development of China's Financial Supervision and Regulation*. New York: Palgrave Macmillan.

Iansiti, M., & Lakhani, K. R. (2017). The Truth About Blockchain: It will take years to transform business, but the journey begins now. *The Harvard Business Review, Jan-Feb 2017*, 1-11.

Ivashchenko, A., Polishchuk, Y., & Britchenko, I. (2018). Implementation of ICO European best practices by SMEs. *Economic Annals-XXI*, *169*(1-2), 67-71.

Iyer, S. (2018, October 18). *8 Most Successful ICOs Of All Time With The Highest ROI*. Retrieved from https://www.instarem.com/blog/8-most-successful-icos-of-all-time/

Jegers, M. (1991). Prospect theory and the risk-return relation: Some Belgian evidence. *Academy of Management Journal*, *34*(1), 215-225.

Joo, M. H., Nishikawa, Y., & Dandapani, K. (2019). ICOs, the next generation of IPOs. *Managerial Finance, 46*(6), 761-783.

Kachelmeier, S. J., & Shehata, M. (1992). Examining risk preferences under high monetary incentives: Experimental evidence from the People's Republic of China. *The American economic review,* 82(5), 1120-1141.

Kahneman, D., & Tversky, A. (1979). Prospect theory an analysis of decision under risk. *Econometrica, 47*, 26-291.

Karnes, Y., Makhija, M., & Peng, M.W. (2017). Home Country, Industry, and Ownership Dilution: Signaling During International IPOS. In *Intelligence, Sustainability, and Strategic Issues in Management*, Routledge: New York, 234p.

Karpenko, O. A., Blokhina, T. K., & Chebukhanova, L. V. (2021). The Initial Coin Offering (ICO) Process: Regulation and Risks. *Journal of Risk and Financial Management*, *14*(12), 599-605.

Korpinen, M. (2018). An empirical investigation of ICO returns. [Bachelor thesis], Tallinn, Tallinn University of Technology.

Koonce, L., McAnally, M. L., & Mercer, M. (2005). How do investors judge the risk of financial items?. *The Accounting Review*, *80*(1), 221-241.

Krause, D. G. (2005). *The art of war for executives*. New York: Penguin.

Kumar, A. (2009). Who gambles in the stock market? *The Journal of Finance*, *64*(4), 1889-1933.

Lai, J., & Whitlow, L. (2020). The Spaghetti Effect of ICO Regulations: An Introduction to the Developing Regulatory Frameworks of Initial Coin Offerings Around The World. Retrieved from https://legaltechcenter.net/files/sites/159/2020/09/The-Spaghetti-Effect-of-ICO-Regulations.pdf

Lee, S. F., & Ko, A. S. O. (2000). Building balanced scorecard with SWOT analysis, and implementing "Sun Tzu's The Art of Business Management Strategies" on QFD methodology. *Managerial Auditing Journal, 15*(1/2), 68-76.

Lipe, M. G. (1998). Individual investors' risk judgments and investment decisions: The impact of accounting and market data. *Accounting, Organizations and Society*, *23*(7), 625-640.

Lo, V. H. Y., Ho, C. O., & Sculli, D. (1998). The strategic insights of Sun Tzu and quality management. *The TQM Magazine*, *10*(3), 161-168.

Lyandres, E., Palazzo, B., & Rabetti, D. (2022). Initial Coin Offering (ICO) Success and Post-ICO Performance. *Management Science*.

McCaffrey, M. (2014). The political economy of *The Art of War*. *Comparative Strategy*, *33*(4), 354-371.

McLachlan, K. (2009). The Art of Investing: investment insights. *Personal Finance*, *2009*(337).

Michaelson, G. A., & Michaelson, S. W. (2010). *Sun Tzu-The Art of War for Managers: 50 Strategic Rules Updated for Today's Business*. Avon: Simon and Schuster.

Miglo, A. (2020). *Choice Between IEO and ICO: Speed vs. Liquidity vs. Risk*. University Library of Munich, Germany.

Momtaz, P. P. (2019). Ceo emotions and underpricing in initial coin offerings. *Available at SSRN 3580719*.

Momtaz, P. P. (2020a). Initial coin offerings. *Plos one*, *15*(5), 1-30.

Momtaz, P. P. (2020b). Initial coin offerings, asymmetric information, and loyal CEOs. *Small Business Economics, 57*, 975-997.

Momtaz, P. P. (2022). The economics of crypto funds. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3865240

Mosenhauer, M., Newall, P. W., & Walasek, L. (2021). The stock market as a casino: Associations between stock market trading frequency and problem gambling. *Journal of behavioral addictions*, *10*(3), 683-689.

Nakamoto, S. 2008. Bitcoin: A Peer-To-Peer Electronic Cash System. Retrieved from https://bitcoin.org/bitcoin.pdf

Ofir, M., & Sadeh, I. (2020). ICO vs. IPO: Empirical findings, information asymmetry, and the appropriate regulatory framework. *Vanderbilt Journal of Transnational Law*, *53*, 525.

O'Leary, D. E. (2017). Configuring blockchain architectures for transaction information in blockchain consortiums: The case of accounting and supply chain systems. *Intelligent Systems in Accounting, Finance and Management*, *24*(4), 138-147.

Olsen, R. A. (1997). Prospect theory as an explanation of risky choice by professional investors: Some evidence. *Review of Financial Economics*, *6*(2), 225-232.

Pope, D. G., & Schweitzer, M. E. (2011). Is Tiger Woods loss averse? Persistent bias in the face of experience, competition, and high stakes. *American Economic Review*, *101*(1), 129-57.

Posner, E. A. (2003). A theory of the laws of war. *The University of Chicago Law Review*, *70*(1), 297-317.

Post, T., Van den Assem, M. J., Baltussen, G., & Thaler, R. H. (2008). Deal or no deal? decision making under risk in a large-payoff game show. *American Economic Review*, *98*(1), 38-71.

Pritchard, A. C. (2012). Revisiting truth in securities revisited: Abolishing IPOs and harnessing private markets in the public good. *Seattle University Law Rev.*, *36*(2), 999-1026.

Roosenboom, P., van der Kolk, T., & de Jong, A. (2020). What determines success in initial coin offerings?. *Venture Capital*, *22*(2), 161-183.

Samieifar, S., & Baur, D. G. (2021). Read me if you can! An analysis of ICO white papers. *Finance Research Letters*, *38*, 101427.

Sandhu, N. (2016). Behavioural red flags of fraud—A qualitative assessment. *Journal of Human Values*, *22*(3), 221-237.

Sheetz-Runkle, B. (2014). *The Art of War for Small Business: Defeat the Competition and Dominate the Market with the Masterful Strategies of Sun Tzu*. New York: Amacom.

Shin, L. (2017, Sep 21). Here's the man who created ICOs and this is the new token he's backing. *Forbes*. Retrieved from https://www.forbes.com/sites/laurashin/2017/09/21/heres-the-man-who-created-icos-and-this-is-the-new-token-hes-backing/?sh=4aa13f9f1183

Sun Tzu. (n.d.). *The Art of War.* Allandale Online Publishing. Retrieved from https://sites.ualberta.ca/~enoch/Readings/The_Art_Of_War.pdf

The Block Research. (2022). *2022 Digital Asset Outlook.* Retrieved from https://www.tbstat.com/wp/uploads/2021/12/The-Block-Research-2022-Digital-Asset-Outlook.v2.pdf

Tiwari, M., Gepp, A., & Kumar, K. (2020). The future of raising finance-a new opportunity to commit fraud: a review of initial coin offering (ICOs) scams. *Crime, Law and Social Change*, *73*(4), 417-441.

Tung, R. L. (1994). Strategic management thought in East Asia. *Organizational Dynamics*, *22*(4), 55-65.

Ullah, S., Wang, Z., Stokes, P., & Xiao, W. (2019). Risk perceptions and risk management approaches of Chinese overseas investors: An empirical investigation. *Research in International Business and Finance*, *47*, 470-486.

US House of Representatives, Sarbanes–Oxley Act of 2002, H.R. 3763. (2002), 107-204. Retrieved from https://www.govinfo.gov/content/pkg/BILLS-107hr3763enr/pdf/BILLS-107hr3763enr.pdf

Wang, T. Y., Winton, A., & Yu, X. (2010). Corporate fraud and business conditions: Evidence from IPOs. *The Journal of Finance*, *65*(6), 2255-2292.

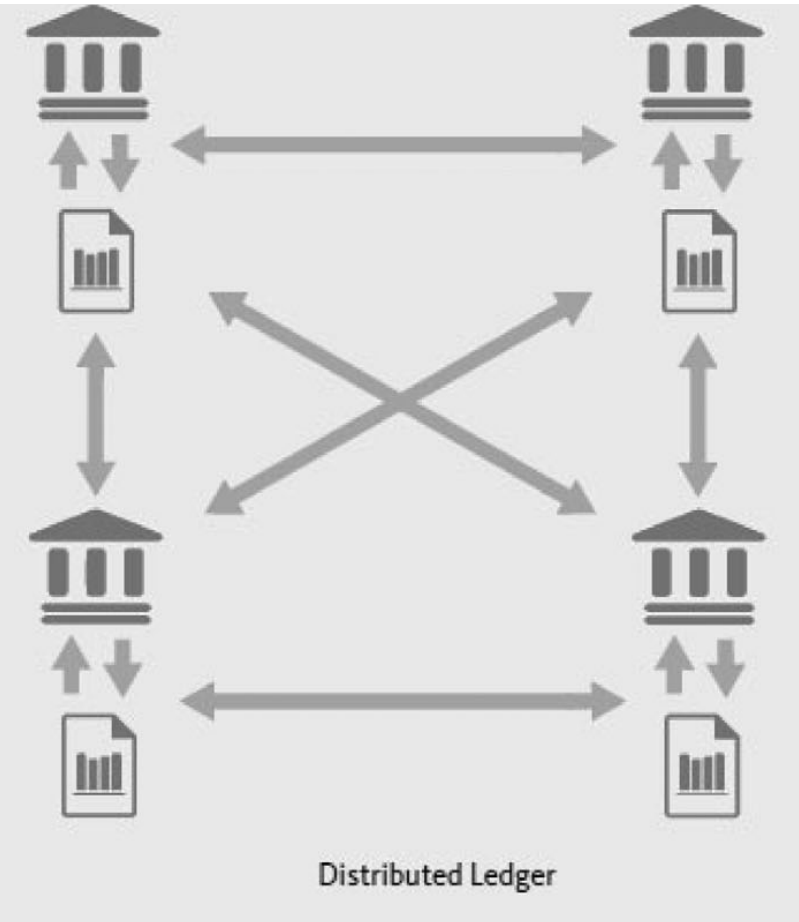
Wen, Y. F. (2010). Capital investment decision, corporate governance, and prospect theory. *Procedia-Social and Behavioral Sciences*, *5*, 116-126.

Wu, W. Y., Chou, C. H., & Wu, Y. J. (2004). A study of strategy implementation as expressed through Sun Tzu's principles of war. *Industrial management & data systems, 104*(5), 396-408.

Zetzsche, D. A., Buckley, R. P., Arner, D. W., & Fohr, L. (2019). The ICO gold rush: It's a scam, it's a bubble, it's a super challenge for regulators. *Harvard. International Law Journal*, *60*, 267-315.

Zhang, S., Aerts, W., Lu, L., & Pan, H. (2019). Readability of token whitepaper and ICO first-day return. *Economics Letters*, *180*, 58-61.

Figure 3.1 Transaction process on a public blockchain



Source: Adapted from Belinky et al. (2015)

Figure 3.2 Comparison between ICO investment decision making processes and preparation to war

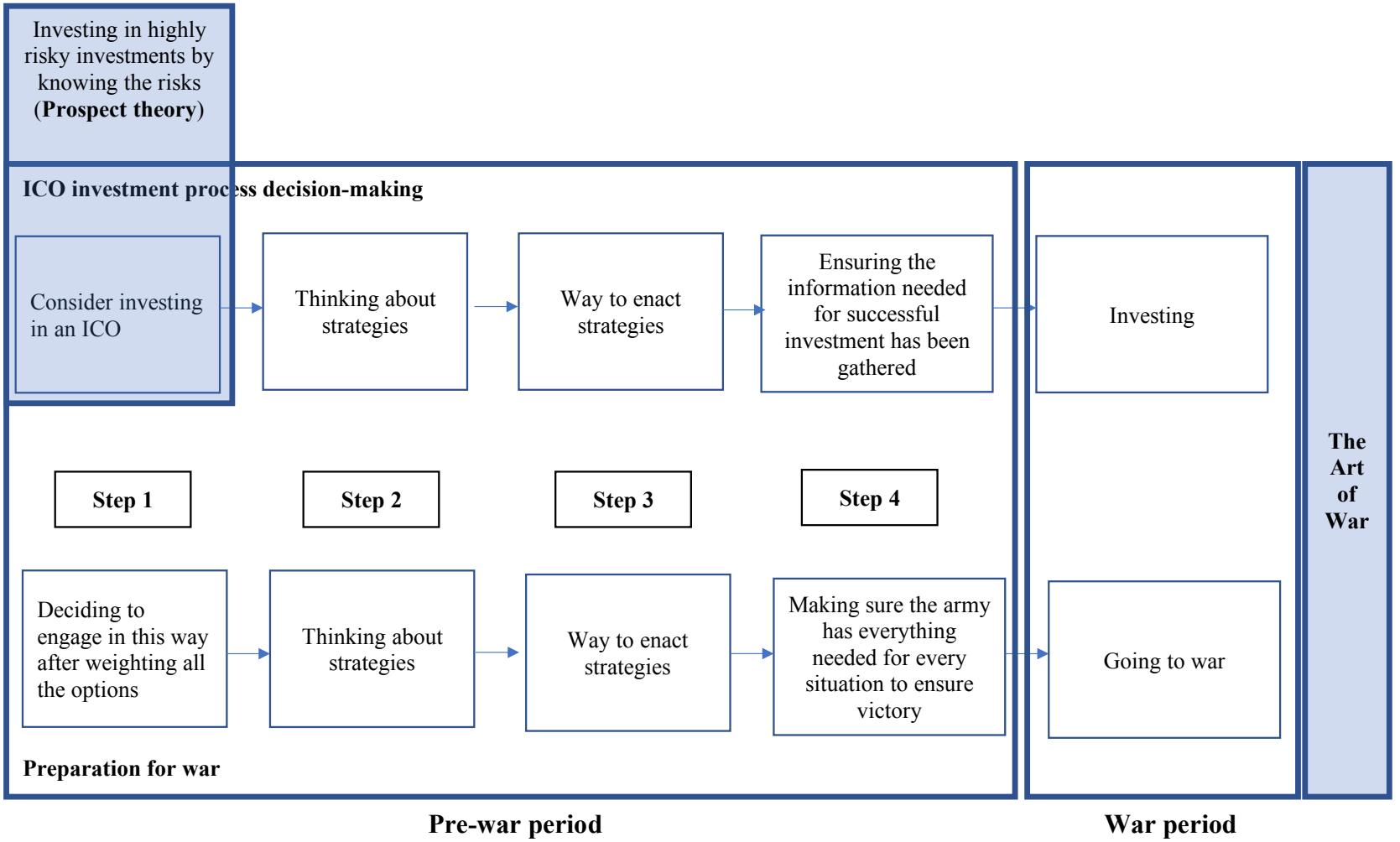
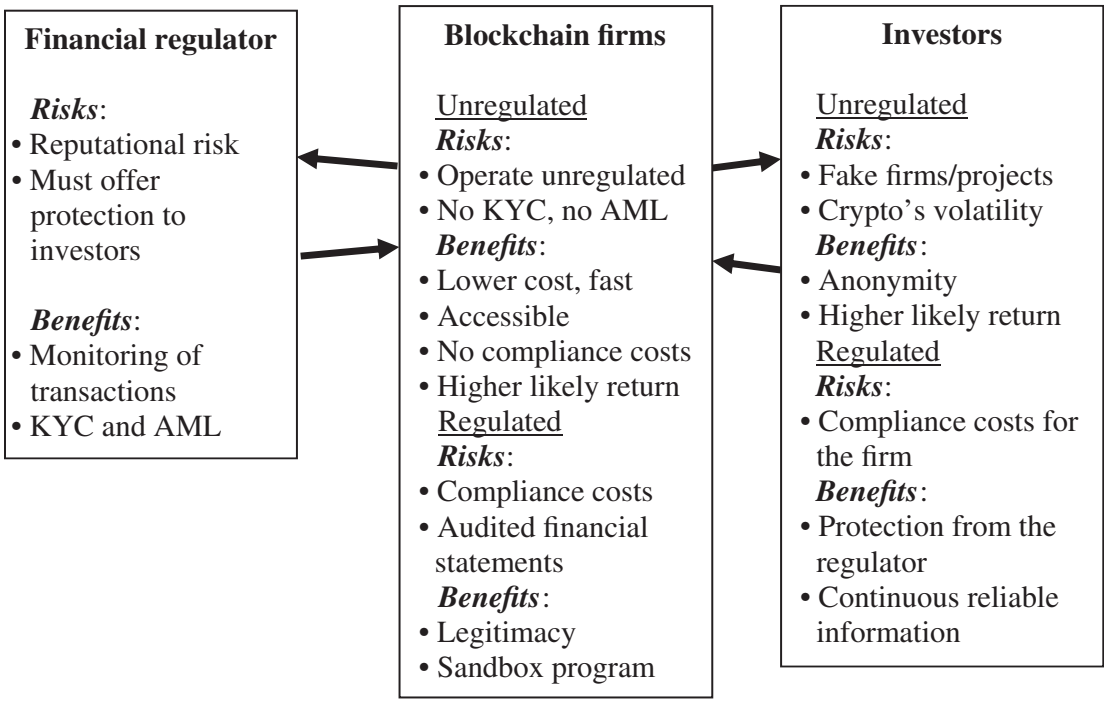


Figure 3.3 Framework of risk and benefits for unregulated and regulated ICOs



Source: Boulianne and Fortin (2020)

Table 3.1 List of interviewees

Participant	Gender	Position	Organization type	Country
1	M	Compliance expert	Consulting firm	Canada
2	M	Compliance expert	Consulting firm	USA
3	F	Compliance expert	Consulting firm	Canada
4	M	Compliance expert	Consulting firm	Canada
5	M	Consultant	Consulting firm	Canada
6	F	Consultant	Consulting firm	Canada
7	M	Consultant	Consulting firm	Canada
8	M	Computer science expert	University	Canada
9	F	Forensic accountant	Consulting firm	USA
10	M	Consultant	Consulting firm	USA
11	M	Blockchain expert	Consulting firm	Canada
12	M	Blockchain auditor	Consulting firm	Canada
13	M	Blockchain auditor	Consulting firm	Canada
14	F	Consultant	Consulting firm	Canada
15	M	Blockchain expert	Consulting firm	Canada
16	F	Crypto specialist	DeFi	Canada
17	M	VP finance	Blockchain consulting firm	Canada
18	F	Crypto investor	Investment	Canada
19	M	Manager	Exchange	Canada
20	M	Manager	Exchange	Canada
21	M	Manager	Exchange	Canada
22	M	Crypto investor	Investment	Canada
23	F	Consultant	Payment solution	USA
24	M	Consultant	Consulting firm	Canada
25	M	Crypto investor	Investment	Canada

Table 3.2 Interview guide

1) What was your first encounter with blockchain/cryptoassets/ICOs?

2) Did you invest or are you currently investing in cryptoassets or ICOs? If so, what led you to it?

3) From your perspective, how do you evaluate red flags about cryptoasset platforms or trading?

4) Is the speed of the implementation of new technologies causing issues? If so, what types of issues?

5) Have you heard of fraud in relation with cryptoassets/blockchain/platforms? Could you tell us more about how you heard about it and what were the main reasons it occurred, in your opinion?

6) Is there anything we didn't talk today that is important to know about cryptoassets or platforms you want to share with us?

Conclusion

The three essays presented in this thesis provide a better understanding of the dark side of new technologies. I have sought to understand what information is useful to investors, financial regulators, and investigators interested in the initial coin offering (ICO) environment, as well as how this information is used as a protection mechanism. In addition, I have studied the consideration of ethics in the adoption, implementation, and use of technologies during the recent pandemic.

The first essay focuses on the place of ethics in the audit sector, in relation to technologies, in the context of the COVID-19 pandemic. Ethical perceptions and behaviors have been studied in the academic literature, whether related to work (Shoemaker et al., 2020) or to emerging technologies (Boulianne et al., 2022). However, the ethical aspects of the use of technologies at work have never been studied, let alone in a pandemic context. It is therefore appropriate to ask how key actors of the Canadian accounting profession—namely the Big 4 firms, professional accounting associations, and audit regulators—have considered ethics with respect to their use of technology during the pandemic, considering that remote work and the adoption of new technologies arose very rapidly and were completely unplanned. The findings reveal that Big 4 firms have reported from the outset on the benefits of using technology in their work, with very little mention of the ethical precautions to be taken. Professional accounting associations and audit regulators have, instead, issued more nuanced publications; they have highlighted the added value and opportunities technology brings to organizations and accountants, while considering the ethical issues related to the use of these technologies. This raises the question of the role of Big 4 firms as major influencers of the accounting profession, because they seem to advocate more of a commercial logic than a truly professional one.

The findings contribute to the accounting literature by contrasting the various viewpoints between three key actors in the accounting domain and by shedding light on the dual and conflicting roles played by professional accounting associations and audit regulators, both

thought leaders and in charge of protecting the public interest. The essay also gives a voice to audit regulators, an overlooked and underexposed actor.

The second essay aims to identify the indicators of fraud present in fraudulent ICO cases. ICOs are a relatively new form of startup financing, which is part of technological finance, or Fintech. Although ICOs share characteristics with initial public offerings (Ofir and Sadeh, 2020), these two forms of financing are so different that I have sought to determine the red flags regularly encountered by stakeholders navigating in the world of ICOs and if these red flags differ from those of traditional investments. The literature on fraud indicators in traditional finance is extensive (Loughran and McDonald, 2011; Lim et al., 2012; Grove and Clouse, 2014; Grove and Clouse, 2017); however, there is none in the case of fraud indicators in ICOs. I find that there are indeed many fraud indicators that can be found in both traditional finance and Fintech. Moreover, there are new fraud red flags within the ICO environment, and it is particularly important to raise public awareness of them, especially because there is a lack of regulation surrounding this ecosystem, placing the burden of protection entirely on the shoulders of investors.

The essay contributes to the literature by proposing a taxonomy of fraud indicators in ICOs, classified in three categories. This taxonomy is intended to be useful not only to inform potential investors, so that they avoid investing in potentially fraudulent ICO projects, but also to inform financial regulators. This taxonomy allows regulators to be better equipped to raise public awareness of these risks and can guide them in the development of regulations in the field.

The third essay aims to better understand why investors who know the risks of investing in ICOs decide to invest in them anyway and how they protect themselves. The literature on ICOs, which is still emerging, has not yet addressed investors' risk management. Many studies relate ICO investment to gambling or speculation, with speculation borrowing from the behavior ofa gambler (Arthur et al., 2016). Relying on prospect theory, I find that savvy investors are indeed gamblers who nevertheless take calculated risks, because, unlike the average gambler, they do not demonstrate a low level of finance literacy or overconfidence

(Mosenhauer et al., 2021) and are looking more toward the long term, as is the case in an investment (Dorn et al., 2015). Moreover, I find that the decision making process they engage in before investing resembles the process of preparing for war described in Sun Tzu's *The Art of War*.

This essay contributes to the literature by focusing on the investor rather than the investment. In addition, it identifies the process by which key actors with a high level of knowledge of the ICO environment and related risks are able to protect themselves from investing in potentially fraudulent ICOs. It also sheds light on why such informed investors decide to invest despite the risks, and on what types and sources of ICO information they consult.

References

Arthur, J. N., Williams, R. J., & Delfabbro, P. H. (2016). The conceptual and empirical relationship between gambling, investing, and speculation. *Journal of behavioral addictions*, *5*(4), 580-591.

Boulianne, E., Fortin, M., and A. Lecompte. (in press). "Artificial intelligence and data analytics: Ethical implications for accountants", in M. Brivot and C.H. Cho (dir.), *Research Handbook on Accounting and Ethics*, Edward Elgar Publishing Ltd.

Dorn, A. J., Dorn, D., & Sengmueller, P. (2015). Trading as gambling. *Management Science*, *61*(10), 2376-2393.

Grove, H., & Clouse, M. (2014). Using fraud models and ratios to improve cross-border forensic analysis: Examples with Chinese IPO and RTO companies. *Journal of Forensic & Investigative Accounting*, *6*(3), 189-235.

Grove, H., & Clouse, M. (2017). Forensic Accounting Procedures Applied to Valeant: Where Were the Gatekeepers. *Journal of Forensic and Investigative Accounting*, *9*(2), 836-848.

Lim, T., Lim Xiu Yun, J., Liu, Y., & Jiang, H. (2012). Red Flag–Characteristics of Fraudulent US-listed Chinese Companies. *International Journal of Management Sciences and Business Research*, *1*(10), 1-11.

Loughran, T., & McDonald, B. (2011). Barron's red flags: do they actually work? *Journal of Behavioral Finance*, *12*(2), 90-97.

Mosenhauer, M., Newall, P. W., & Walasek, L. (2021). The stock market as a casino: Associations between stock market trading frequency and problem gambling. *Journal of behavioral addictions*, *10*(3), 683-689.

Ofir, M., & Sadeh, I. (2020). ICO vs. IPO: Empirical Findings, Information Asymmetry, and the Appropriate Regulatory Framework. *Vanderbilt Journal of Transnational Law*, *53*, 525.

Shoemaker, N., Curtis, M. B., Fayard, L. D., and M. T. Kelly. (2020). What happens when formal and informal norms conflict for IT usage? *Journal of Information Systems, 34*(2), 235–256.