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THE ROLE OF AI AND BLOCKCHAIN: IMPLICATIONS FOR INTERNATIONAL RELATIONS IN THE 21ST CENTURY

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Abstract: The accelerating convergence of artificial intelligence (AI), and blockchain technologies is exerting profound influence on the field of international relations. Traditionally, global order has been interpreted through the theoretical prisms of realism, liberalism, and institutionalism. However, the advent of disruptive digital technologies requires the articulation of a novel framework capable of explaining shifting power dynamics, emergent security challenges, and the transformation of governance structures. This article develops the concept of 'techno-strategic foresight', which synthesizes predictive analytics, quantum resilience, and decentralized trust into a paradigm for understanding the reshaping of sovereignty and international cooperation. Through scenario analysis, this study illustrates how these technologies extend state capabilities, engender vulnerabilities, and ultimately redefine the practice of diplomacy and global governance.

Keywords: *Financial Technology (FinTech), Predictive Analytics, Fraud Detection, Real-time Auditing, International Relations.*

1. INTRODUCTION

The global political landscape in the 21st century is increasingly shaped by technological innovation. Whereas traditional accounts of international relations focus on material power, institutional cooperation, or normative values, contemporary statecraft must also grapple with the transformative capacities of artificial intelligence (AI), blockchain, and quantum computing. These technologies constitute not merely technical instruments, but strategic assets with the capacity to redefine the international distribution of power, to destabilize existing security architectures, and to reconfigure the mechanics of global governance. The purpose of this article is to interrogate how the convergence of these technologies is altering the conduct of international relations and to assess the ethical, strategic, and structural consequences thereof.

Ethical Framework in International Relations

Normative considerations have long informed international political practice, from the just war tradition to the codification of humanitarian law, to the principles of sovereignty enshrined in the United Nations Charter. As technology assumes an increasingly central role in diplomacy, security, and governance, questions of ethics are no longer secondary but foundational to the stability of the international system. The integration of artificial intelligence (AI), blockchain, and quantum technologies into international affairs requires a reconsideration of how responsibility, accountability, and equity should be structured across both state and non-state actors.

The deployment of autonomous AI in military decision-making illustrates the immediacy of this challenge. If lethal autonomous weapons systems (LAWS) are permitted to act without meaningful human oversight, fundamental principles of international humanitarian law – such as distinction, proportionality, and accountability – risk being undermined. Should such systems be legally prohibited, as chemical and biological weapons are, or should they be regulated within a new ethical framework that balances military utility with humanitarian concerns? The absence of global consensus leaves a regulatory vacuum in which technological innovation outpaces normative governance.

Similarly, blockchain-based verification systems present both opportunities and ethical dilemmas. On the one hand, the ability to provide immutable and transparent records of treaty compliance could significantly strengthen arms control agreements, climate commitments, and humanitarian aid distribution. On the other hand, excessive reliance on automated verification mechanisms raises questions about sovereignty, discretion, and the political value of diplomatic ambiguity (Habib and Islam, 2025). Transparency may promote trust, but it may also constrain states' capacity to negotiate flexibly or manage sensitive information. The ethical challenge lies in balancing openness with the preservation of legitimate state autonomy.

The emergence of quantum supremacy intensifies these dilemmas by threatening the stability of existing cybersecurity norms. If quantum decryption enables a technologically advanced minority of states to unilaterally access the secure communications and financial systems of others (Duska, et. al., 2018), a profound asymmetry in global power will emerge. This creates not only a strategic imbalance but also an ethical dilemma concerning distributive justice in the international system: should states with quantum capabilities be obligated to share or regulate their use for the sake of global stability, or does sovereignty entitle them to maintain exclusive advantage? (Odonkor, et.al., 2024).

These technological developments foreground the urgent need for embedding ethical frameworks into global governance mechanisms. Ethics must not be treated as an afterthought or external constraint but as an integral part of the design, deployment, and regulation of new technologies. In this sense, the debate parallels earlier efforts to establish norms around nuclear weapons, cyber warfare, and space exploration. Yet unlike these earlier domains, the convergence of AI, blockchain, and quantum computing is highly decentralized, often driven by private corporations, research institutions, and transnational networks (Dai, and Vasarhelyi). This diffusion of power complicates the attribution of responsibility and necessitates new models of multi-stakeholder governance that extend beyond traditional state-centric frameworks.

Ultimately, the ethical challenge of emerging technologies in international relations is twofold: first, to safeguard core humanitarian values in the face of transformative innovation; and second, to ensure that the benefits of technological advancement are distributed in ways that do not exacerbate existing global inequalities. Without such ethical anchoring, the international system risks deepening divides between technological "haves" and "have-nots," thereby eroding the very legitimacy of international norms and institutions.

2. METHODOLOGY

Recent scholarship has increasingly foregrounded the role of technology in shaping international relations. Studies on AI emphasize its dual-use character: enabling efficiency in diplomacy and governance while simultaneously generating risks of disinformation, autonomous weapons deployment, and algorithmic bias (Zhang, et.al., 2025). Research on blockchain underscores its potential to revolutionize trust mechanisms in international systems, particularly in the monitoring of arms control agreements and humanitarian aid distribution. Analyses of quantum computing identify both disruptive risks, i.e., the capacity to undermine encryption protocols central to global finance and security (Strategic Finance, 2024), and potential stabilizing effects through the development of unbreakable quantum communication. This literature provides a foundation for theorizing how technological convergence informs global politics. However, further synthesis into a comprehensive framework responsive to contemporary challenges is required. This research employs a qualitative methodology grounded in scenario analysis. Scenario analysis allows for the systematic explo-

ration of possible futures under conditions of technological uncertainty. Three scenarios are developed to demonstrate the implications of technological convergence for international relations: (1) the geopolitical ramifications of quantum advantage in cybersecurity, (2) the institutional effects of blockchain-based treaty verification, and (3) the normative outcomes of AI-driven decision-making in diplomacy and conflict management (Tang, et.al., 2022). Each scenario is evaluated with reference to established theories of international relations and contemporary debates in security studies.

This research seeks to explore the intersection of technological advancement and ethical responsibility in accounting by investigating the following questions:

RQ1: How can quantum computing be leveraged to enhance cybersecurity and computational efficiency in financial auditing?

RQ2: What architectural models best integrate blockchain, AI, and quantum computing for real-time, autonomous accounting systems?

RQ3: What ethical frameworks are necessary to govern AI-driven financial decision-making in hybrid human-machine environments?

RQ4: How can quantum-resilient audit protocols be designed to preserve trust and transparency in post-classical financial systems?

By examining these questions, the study aims to contribute to a deeper understanding of how emerging technologies can be responsibly integrated into accounting practice, ensuring both innovation and ethical stewardship.

Hypothesis Testing

The following hypotheses will be evaluated using a triangulated approach that combines simulation results, expert feedback, and literature synthesis:

H1: Quantum-enhanced algorithms outperform classical models in anomaly detection
Simulation Accuracy, speed, false positive rate

H2: Blockchain-AI integration improves audit traceability and reduces compliance costs
Simulation Audit completeness, latency, cost-efficiency

H3: Quantum-resilient protocols are essential for maintaining data integrity in post-classical systems
Simulation + Literature synthesis Encryption strength, regulatory alignment

3. DISCUSSION AND CONCLUSIONS

Scenario 1: Quantum Advantage in Cybersecurity

The attainment of quantum supremacy by a limited number of states would significantly disrupt existing security architectures. Quantum decryption capabilities would render current encryption systems obsolete, granting disproportionate advantages to technologically advanced actors. This could exacerbate strategic rivalries and intensify an arms race dynamic in the cyber domain, thereby undermining the stability of deterrence.

Scenario 2: Blockchain-Based Treaty Verification

The application of blockchain to international agreements offers the potential to enhance transparency, reduce monitoring costs, and diminish disputes concerning compliance (The Knowledge Group, 2023). By decentralizing verification, blockchain could increase confidence in multilateral treaties. However, it also challenges traditional diplomatic practices predicated on state-controlled reporting and may provoke resistance from actors seeking to preserve strategic ambiguity.

Scenario 3: AI in Diplomacy and Conflict Management

The utilization of AI in decision-support systems for diplomacy introduces both opportunities and risks. Without ethical safeguards, AI could accelerate crisis escalation through misinterpretation of signals or algorithmic bias. Conversely, when integrated within ethical frameworks, AI can enhance foresight, facilitate fairer negotiations, and strengthen peacebuilding initiatives. The trajectory of AI in international relations will therefore depend heavily upon governance structures and normative frameworks adopted by the international community.

REFERENCES

1. Dai, J., & Vasarhelyi, M. A. (2017). Toward blockchain-based accounting and assurance. *Journal of Information Systems*, 31(3), 5–21. <https://doi.org/10.2308/isys-51804>.
2. Duska, R., Duska, B. S., & Ragatz, J. A. (2018). *Accounting ethics* (3rd ed.). Wiley-Blackwell.
3. Habib, H., & Islam, S. M. N. (2025). Quantum computing and cybersecurity in accounting and finance. *arXiv preprint*. <https://arxiv.org/pdf/2506.12096>.
4. Odonkor, B., Kaggwa, S., Uwaoma, P. U., Hassan, A. O., & Farayola, O. A. (2024). The impact of AI on accounting practices: A review. *World Journal of Advanced Research and Reviews*, 21(1), 172–188. <https://doi.org/10.30574/wjarr.2024.21.1.2721>
5. Strategic Finance. (2024, December). How and why accounting teams should deploy AI. IMA. [https://www.sfmagazine.com/articles/2024/december/how-and-why-accounting-teams-should-deploy-ai\[1\]\(https://www.sfmagazine.com/articles/2024/december/how-and-why-accounting-teams-should-deploy-ai\)](https://www.sfmagazine.com/articles/2024/december/how-and-why-accounting-teams-should-deploy-ai[1](https://www.sfmagazine.com/articles/2024/december/how-and-why-accounting-teams-should-deploy-ai))
6. Tang, Y., Yan, J., Hu, G., Zhang, B., & Zhou, J. (2022). Recent progress and perspectives on quantum computing for finance. *Service Oriented Computing and Applications*, 16, 227–229. <https://doi.org/10.1007/s11761-022-00351-7>
7. The Knowledge Group. (2023). The impact of technology on ethical issues in accounting. <https://knowledgewebcasts.com>
8. Zhang, C., Zhu, W., Dai, J., Wu, Y. and Chen, X., 2025. Drivers and concerns of adopting artificial intelligence in managerial accounting. *Accounting & Finance*. Available at: <https://doi.org/10.1111/acfi.13404>