GSC Advanced Research and Reviews
eISSN: 2582-4597 CODEN (USA): GARRC2
Cross Ref DOI: 10.30574/gscarr
Journal homepage: https://gsconlinepress.com/journals/gscarr/

(REVIEW ARTICLE)

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Cybersecurity strategies in fintech: safeguarding financial data and assets

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GSC Advanced Research and Reviews, 2024, 20(01), 050–056

Publication history: Received on 19 May 2024; revised on 29 June 2024; accepted on 02 July 2024

Article DOI: https://doi.org/10.30574/gscarr.2024.20.1.0241

Abstract

The financial technology (fintech) sector has witnessed remarkable expansion in recent years, fundamentally reshaping the landscape of financial services delivery and consumption. This growth is driven by new technologies such as mobile banking, digital wallets, blockchain and artificial intelligence Keenan the risk for fintech has increased. As pioneers in the use of technology to enhance financial transactions, Fintech has become an attractive target for cybercriminals looking to exploit weaknesses in digital infrastructure. The evolving nature and sophistication of cyber threats, including phishing attacks, ransomware, data breaches, and insider threats, pose significant risks to the integrity and security of financial data and assets. This paper aims to provide a comprehensive review of cybersecurity strategies implemented within the fintech industry to safeguard against these threats. It examines the current landscape of cyber risks facing fintech firms, highlighting the multifaceted challenges posed by malicious actors and technological vulnerabilities. Moreover, the paper evaluates the effectiveness of various cybersecurity measures adopted by fintech companies, such as encryption protocols, multi-factor authentication, AI-driven threat detection, and blockchain technology. Furthermore, the review discusses emerging trends and technologies poised to bolster cybersecurity in the fintech sector. These include advancements in quantum-resistant encryption, zero-trust architecture, regulatory compliance frameworks (e.g., GDPR, PCI DSS), and proactive incident response strategies. By exploring these innovative approaches, the paper seeks to illuminate proactive measures that can mitigate cyber risks and enhance resilience in fintech operations.

Keywords: Fintech; Cybersecurity; Encryption; Block chain; Regulatory Compliance

1. Introduction

The fintech industry has rapidly emerged as a transformative force in the realm of financial services, leveraging advanced technologies to redefine how financial transactions are conducted and managed [1]. Online banking systems, mobile payment methods, blockchain technology, robo-advisors, peer-to-peer lending platforms, digital currencies, and other developments are all included in this area. These developments have changed customer expectations and market dynamics in addition to improving the effectiveness and ease of financial services [2] [3].

1.1. Technological Advancements in Fintech

Online Banking and Mobile Payments: Fintech agencies have revolutionized conventional banking by offering online platforms that enable users to perform various banking activities remotely [4] [5] . From bank account balances to

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shifting finances and paying bills, online banking has supplied exceptional convenience to customers internationally. Simultaneously, mobile payment solutions permit customers to conduct transactions using their smartphones, further streamlining financial transactions and lowering dependency on physical banking infrastructure [6].

Blockchain Technology: The introduction of blockchain era, popularized by way of cryptocurrencies like Bitcoin and Ethereum, has delivered decentralized and obvious transactional frameworks [7] [8]. Beyond cryptocurrencies, blockchain's disbursed ledger machine holds immense potential for boosting safety and efficiency in economic transactions, including lowering agreement instances and enhancing traceability in deliver chains.

Robo-Advisors: Robo-advisors make use of algorithms and artificial intelligence to provide automated funding advisory offerings [9] [10] [11]. These platforms offer personalized investment recommendations based on user preferences and risk profiles, often at lower costs compared to traditional financial advisors. Robo-advisors have democratized access to investment advice and portfolio management, appealing to tech-savvy buyers seeking cost-effective and data-driven investment strategies [12].

2. Importance of cybersecurity

The importance of cybersecurity in fintech cannot be overstated, as the world increasingly relies on superior technology to supply financial services efficiently and securely [4]. Fintech companies handle vast amounts of sensitive financial data, including personal information, transaction details, and payment credentials [13] . Protecting this data from cyber threats is not only essential for maintaining consumer trust but also for complying with stringent data protection regulations enforced by authorities such as the General Data Protection Regulation (GDPR) in Europe and the Payment Card Industry Data Security Standard (PCI DSS) globally. The fintech business relies heavily on consumer trust, which is based on the guarantee that their financial data is protected [14]. A fintech company's image can be seriously harmed by a single data breach or cyberattack, which can result in lost business, financial fines, and legal implications. [15] [16]. Strong cybersecurity measures are therefore essential for protecting sensitive financial data and preserving operational integrity.

Fintech businesses need to make investments in thorough cybersecurity frameworks that are adapted to their unique operating requirements and dangers [18]. This entails putting robust encryption mechanisms in place to safeguard data while it's in motion and at rest, making sure that private data is unreadable by unauthorized parties even if it is intercepted. By requiring users to provide various forms of verification, multi-factor authentication solutions offer an extra layer of protection and lower the risk of unwanted access even if login credentials are stolen.[19].

To guarantee that systems and applications are created with security in mind from the beginning, secure software development techniques are also essential [20]. This entails doing frequent vulnerability scans, code reviews, and security assessments to find and fix any possible flaws before bad actors can take advantage of them. Capabilities for proactive threat detection and response are crucial elements of a strong cybersecurity plan in the financial industry. [21]. Monitoring system logs and network traffic in real-time allows for the early identification of suspicious activity or abnormalities that might point to a cyberattack that is now underway. According to Jameaba [22] Fintech organizations may minimize the effect of cyber catastrophes and swiftly resume regular operations with little interruption to clients and partners by implementing swift incident response protocols and disaster recovery plans. As fintech advancements have transformed financial services through increased accessibility, effectiveness, and openness, they have also created new weaknesses and increased the industry's susceptibility to cyberattacks. Thus, in an increasingly digitized and linked financial environment, cybersecurity measures must always evolve to protect financial data, maintain customer confidence, and foster the sustainable expansion of fintech companies [17].Fintech businesses may successfully manage risks, safeguard their assets, and maintain stakeholder confidence and expectations by making cybersecurity a key business strategy.

3. Cybersecurity Challenges in Fintech

Fintech organizations face a significant cybersecurity issue due to the fast digital transformation of the industry and the growing complexity of cyber-attacks. Fintech companies function at the nexus of technology and finance, utilizing cutting-edge technologies like robo-advisors, mobile payments, blockchain, and online banking to improve client satisfaction and operational effectiveness [24] .But these developments also make cyberattacks more likely, which calls for strong defenses to safeguard private financial information and uphold customer confidence. The risk of data breaches is one of the main cybersecurity issues that fintech organizations must deal with [25].Cybercriminals looking to take advantage of weaknesses in their digital infrastructure find these companies to be attractive targets because

they manage enormous volumes of sensitive personal and financial data, including payment information and transaction history. A successful data breach can result in significant financial losses, reputational damage, and regulatory penalties, underscoring the critical need for stringent data protection measures and proactive threat detection strategies [26].

Another widespread concern to fintech security is malware assaults. Advanced malware types could penetrate corporate networks, financial systems, and mobile apps, jeopardizing confidential information and enabling unapproved access [27].This danger has been made worse by the quick spread of mobile banking and payment applications, which makes it necessary to continuously monitor and upgrade to successfully fight growing malware threats. Phishing methods, which utilize social engineering techniques to trick users into disclosing sensitive information, continue to be a serious threat to fintech security [28] [29].Cybercriminals use phony emails, websites, and texts that look and feel like official correspondence from financial institutions. They take advantage of gullibility and confidence to get private information without authorization. Informing staff members and clients about the dangers of phishing threat and implementing robust authentication protocols are essential countermeasures in mitigating this pervasive risk.

Due to its capacity to provide financial services with more agility, cost-effectiveness, and scalability, cloud computing has completely changed the fintech industry [30]. But moving to cloud-based infrastructures comes with its own set of security issues. To protect data processed and stored in the cloud from unwanted access and data breaches, fintech companies must have strong security controls, encryption techniques, and access management rules in accordance with the shared responsibility model of cloud providers. Fintech apps and services are vulnerable to a serious cybersecurity risk from distributed denial of service (DDoS) attacks [31].The goal of these assaults is to flood malicious traffic into servers and networks, disrupting services and perhaps resulting in losses of money. Implementing scalable mitigation mechanisms, traffic monitoring tools, and a strong network architecture are necessary for mitigating DDoS assaults to prevent financial fraud and guarantee continuous service delivery.

Fintech businesses face not just technological weaknesses but also a complicated legal environment that governs cybersecurity, financial transactions, and data protection [32]. Requirements like GDPR, PCI DSS, and industry-specific standards must be followed to preserve operational integrity, defend consumer rights, and stay out of legal hot water [33]. To reduce the legal and financial risks associated with non-compliance, fintech companies should emphasize regulatory compliance, invest in strong governance structures, and perform routine audits

4. Cybersecurity Strategies and Solutions

In the fintech sector, cybersecurity strategies and solutions are essential as businesses battle more complex cyberthreats and work to preserve the security and confidence of their financial services. Because fintech companies manage so much sensitive financial data such as payment details, transaction history, and personal information—they have become easy targets for thieves. [34]. Fintech organizations are using a range of proactive cybersecurity procedures and solutions to successfully reduce these threats.

4.1. Advanced Security Protocols and Technologies

Fintech businesses are investing in modern security technology and processes to strengthen their defenses. Beyond simple password techniques, multi-factor authentication (MFA) is commonly used to tighten access restrictions [35]. Even if login credentials are stolen, MFA lowers the danger of unauthorized access by requiring extra verification factors like biometrics or one-time passwords. In fintech systems, encryption is essential for protecting data integrity and confidentiality both in transit and at rest. Strong encryption techniques lessen the effect of any data breaches by ensuring that private data is unreadable by unauthorized parties [36] [37]. Furthermore, sophisticated firewall systems are used to keep an eye on and manage all incoming and outgoing network traffic. They serve as a vital defense against a range of online dangers, including malware and illegal access attempts.

4.2. Employee Training and Awareness

Recognizing the critical role of human factors in cybersecurity, fintech companies prioritize comprehensive employee training and awareness programs. Staff members receive regular training on cybersecurity best practices, with a focus on the value of storing data securely and identifying possible security risks like phishing attempts. Employee knowledge is continuously evaluated to make sure staff members are knowledgeable about the latest cybersecurity threats and can successfully mitigate them [38] [39]. Fintech companies enable their staff to actively participate in preserving data security and minimizing possible risks by cultivating a culture of security awareness.

4.3. Data Protection Policies and Procedures

Sophisticated data protection rules and processes are essential for protecting private financial data in fintech settings [40]. Proactive identification of suspicious activity or possible security breaches through continuous system monitoring helps firms to swiftly execute actions and eliminate risks. Customer data is collected, stored, and shared under strict data management rules, reducing the possibility of illegal access or data leaks. Fintech organizations demonstrate their commitment to consumer trust by upholding regulatory compliance standards and upholding strict data security safeguards that secure customers' personal and financial information. [41].

4.4. Cloud Security Measures

The growing use of cloud computing by finance for scalability and operational efficiency has made cloud environment security a top priority. Maintaining data integrity and security requires choosing trustworthy and secure cloud service providers [42]. Fintech companies apply strong access controls, encryption techniques, and data segregation tactics inside cloud infrastructures to tailor cloud solutions to meet particular security requirements. Organizations may limit the inherent risks associated with cloud adoption and maintain the robustness of their financial services against possible cyber-attacks by implementing strict cloud security measures.

4.5. API Security

Fintech platform integration and interoperability are made possible in large part by Application Programming Interfaces (APIs) [43]. Protecting sensitive data and ensuring operational continuity require securing APIs against potential vulnerabilities. Fintech businesses utilize techniques like resource limitations and rate restriction to stop API misuse and lessen the impact of Distributed Denial of Service (DDoS) attacks. API security is improved by putting strong authentication procedures and API gateways in place, which guarantee that only authorized parties may safely access and deal with sensitive financial data.

4.6. Regulatory Compliance

Fintech cybersecurity initiatives must adhere to industry norms and regulatory frameworks. Comprehensive security controls and data protection procedures must be implemented to comply with standards like GDPR and PCI DSS. To guarantee continued adherence to regulatory standards, fintech organizations create compliance frameworks that include frequent security audits, risk assessments, and governance structures [44]. Organizations may maintain the faith and confidence of stakeholders, consumers, and regulatory authorities by proactively addressing compliance duties. This also helps to reduce the legal and financial risks associated with non-compliance. A proactive and multi-layered strategy is required to manage the increasing risks presented by cyber-attacks considering the constantly changing financial cybersecurity landscape. Fintech organizations may enhance their security posture by incorporating cutting-edge security solutions, cultivating a security-aware culture, and complying with rigorous regulatory requirements.

5. Future Trends in Fintech Cybersecurity

The future of cybersecurity in the fintech sector is being molded by several revolutionary developments and technology as industry develops. To safeguard the security and integrity of financial transactions and data, as well as to handle the constantly changing environment of cyber threats, these innovations are essential. For financial companies, artificial intelligence (AI) and machine learning (ML) provide a substantial improvement in cybersecurity capabilities [45]. Through the analysis of enormous amounts of data and the identification of patterns suggestive of possible assaults, these technologies enable companies to detect and respond to cyber threats in real time. Overall cybersecurity resilience may be strengthened by using AI-driven algorithms to automate threat intelligence analysis, reduce incident response times, and improve anomaly detection. To proactively limit risk, fintech businesses are increasingly incorporating AI and ML into their security systems.

With its decentralized and unchangeable ledger system, blockchain technology has the potential to revolutionize fintech cybersecurity by improving transaction security and transparency. Blockchain reduces the possibility of data manipulation and illegal alterations by doing away with centralized points of control and maintaining transaction records across a dispersed network of nodes [46]. Blockchain-based fintech applications can save operating costs associated with traditional financial intermediaries, improve transaction security, and expedite regulatory compliance procedures. Blockchain is particularly useful in preventing fraud, maintaining data integrity, and building trust among players in the financial ecosystem because of its inherent transparency and cryptographic security.

In fintech cybersecurity, Zero Trust Architecture (ZTA) is starting to take center stage and challenge established perimeter-based security methods. Since ZTA is based on the idea of "never trust, always verify," all users and devices wanting to access network resources must constantly authenticate and get permission. Strict access restrictions, network environment micro segmentation, and real-time monitoring are used by ZTA to reduce attack surfaces and lessen the effect of possible security breaches [47].By using ZTA frameworks, fintech companies may bolster their defenses against insider risks, stop cyber threats from moving laterally, and shield confidential information from unauthorized access. Advanced biometric authentication technologies are playing an increasingly pivotal role in enhancing user identity verification and combatting identity fraud within fintech applications. Biometric identifiers such as fingerprints, facial recognition, and voice patterns offer unique physiological or behavioral characteristics that are difficult to replicate or spoof. Fintech companies are integrating biometric authentication into their platforms to strengthen security measures beyond traditional password-based methods **Error! Reference source not found.** .By requiring biometric verification for sensitive transactions and account access, fintech firms mitigate the risk of unauthorized account access and fraudulent activities while enhancing user convenience and trust.

6. Conclusion

Fintech cybersecurity that works demands a diversified strategy. Fortifying defenses against cyberattacks requires the implementation of cutting-edge security technologies, such as secure authentication methods, encryption protocols for data protection, and artificial intelligence (AI) and machine learning (ML) for real-time threat detection. These technologies improve resilience against emerging threats that target financial institutions and their clients, in addition to mitigating risks. As fintech continues to reshape the landscape of financial services, the imperative of robust cybersecurity strategies cannot be overstated in safeguarding sensitive financial data and assets. The rapid adoption of digital technologies such as online banking, mobile payments, and blockchain has expanded access and convenience for consumers while simultaneously exposing fintech firms to increasingly sophisticated cyber threats.

Furthermore, it is imperative to cultivate a security-aware culture among stakeholders and workers. All staff members are guaranteed to understand their roles and responsibilities in upholding cybersecurity best practices through regular training programs and awareness campaigns. Fintech organizations may considerably lower the probability of successful cyberattacks and lessen their effects by developing a watchful staff that can identify and react to such threats Cybersecurity procedures must constantly innovate and adapt due to the dynamic nature of cyber threats. Future studies ought to concentrate on investigating cutting-edge technologies that have the potential to improve fintech security even further, such quantum computing and sophisticated biometrics. Furthermore, it is important to comprehend the dynamic regulatory environment, including compliance mandates like GDPR and PCI DSS, to guarantee that cybersecurity tactics conform to legal responsibilities and industry norms. In summary, strong cybersecurity is still essential for preserving operational integrity, fostering consumer trust, and protecting financial transactions as fintech develops and grows. Fintech businesses may successfully traverse the complexity of cybersecurity by adopting cutting-edge technology, encouraging a culture of alertness, and being up to date on legislative developments and potential threats. This will ensure ongoing growth.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] Hermiyetti H. LEVERAGING FINTECH INNOVATIONS TO ENHANCE FINANCIAL MANAGEMENT EFFICIENCY: A COMPREHENSIVE ANALYSIS OF IMPLEMENTATION STRATEGIES AND IMPACT ON ORGANIZATIONAL PERFORMANCE. INTERNATIONAL JOURNAL OF ECONOMIC LITERATURE. 2023 Nov 26;1(3):305-18.

[2] Gomber P, Kauffman RJ, Parker C, Weber BW. On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. Journal of management information systems. 2018 Jan 2;35(1):220-65.

[3] King B. Bank 2.0: How customer behaviour and technology will change the future of financial services. Marshall Cavendish International Asia Pte Ltd; 2010 Jun 5.

[4] Jameaba MS. Digitization revolution, FinTech disruption, and financial stability: Using the case of Indonesian banking ecosystem to highlight wide-ranging digitization opportunities and major challenges. FinTech

Disruption, and financial stability: Using the Case of Indonesian Banking Ecosystem to highlight wide-ranging digitization opportunities and major challenges (July 16 2, 2020). 2020 Jul.

[5] Wewege L, Thomsett MC. The digital banking revolution: how fintech companies are transforming the retail banking industry through disruptive financial innovation. Walter de Gruyter GmbH & Co KG; 2019 Dec 2.

[6] Krishnan S. The power of mobile banking: how to profit from the revolution in retail financial services. John Wiley & Sons; 2014 May 19.

[7] Hashemi Joo M, Nishikawa Y, Dandapani K. Cryptocurrency, a successful application of blockchain technology. Managerial Finance. 2020 Aug 29;46(6):715-33.

[8] Lipovyanov P. Blockchain for Business 2019: A user-friendly introduction to blockchain technology and its business applications. Packt Publishing Ltd; 2019 Jan 29.

[9] Shanmuganathan M. Behavioural finance in an era of artificial intelligence: Longitudinal case study of robo-advisors in investment decisions. Journal of Behavioral and Experimental Finance. 2020 Sep 1; 27:100297.

[10] Bhatia A, Chandani A, Atiq R, Mehta M, Divekar R. Artificial intelligence in financial services: qualitative research to discover robo-advisory services. Qualitative Research in Financial Markets. 2021 Nov 2;13(5):632-54.

[11] Hakala K. Robo-advisors as a form of artificial intelligence in private customers' investment advisory services (bachelor's thesis).

[12] Lu L. Global Fintech Revolution: Practice, Policy, and Regulation. Oxford University Press; 2024 May 28.

[13] Nicoletti B, Nicoletti W, Weis A. Future of FinTech.

[14] Aldboush HH, Ferdous M. Building trust in fintech: an analysis of ethical and privacy considerations in the intersection of big data, AI, and customer trust. International Journal of Financial Studies. 2023 Jul 10;11(3):90.

[15] Ali G, Mijwil MM, Buruga BA, Abotaleb M. A Comprehensive review on cybersecurity issues and their mitigation measures in FinTech.

[16] Ungureanu MA, Filip LM. The rise of FinTech and the need for robust cybersecurity measures. EIRP Proceedings. 2023 Nov 10;18(1):549-59.

[17] Ng AW, Kwok BK. Emergence of Fintech and cybersecurity in a global financial centre: Strategic approach by a regulator. Journal of Financial Regulation and Compliance. 2017 Nov 13;25(4):422-34.

[18] Kaur G, Lashkari ZH, Lashkari AH. Understanding cybersecurity management in FinTech. Springer International Publishing; 2021.

[19] Ometov A, Bezzateev S, Mäkitalo N, Andreev S, Mikkonen T, Koucheryavy Y. Multi-factor authentication: A survey. Cryptography. 2018 Jan 5;2(1):1.

[20] Viega J, McGraw GR. Building secure software: how to avoid security problems the right way. Pearson Education; 2001 Sep 24.

[21] Efijemue O, Obunadike C, Taiwo E, Kizor S, Olisah S, Odooh C, Ejimofor I. Cybersecurity strategies for safeguarding customers data and preventing financial fraud in the United States financial sectors. International Journal of Soft Computing. 2023 Aug;14(3):10-5121.

[22] Jameaba MS. Digitalization, emerging technologies, and financial stability: challenges and opportunities for the Indonesian banking sector and beyond. Emerging Technologies, and Financial Stability: Challenges and Opportunities for the Indonesian Banking Sector and Beyond (April 26, 2024). 2024 Apr 26.

[23] Ng AW, Kwok BK. Emergence of Fintech and cybersecurity in a global financial centre: Strategic approach by a regulator. Journal of Financial Regulation and Compliance. 2017 Nov 13;25(4):422-34.

[24] Khayer A, Alam S. Application of Management Information Systems in the Financial Sector: An Overview of FinTech Innovations. SSRN; 2023.

[25] Najaf K, Mostafiz MI, Najaf R. Fintech firms and banks sustainability: why cybersecurity risk matters? International Journal of Financial Engineering. 2021 Jun 19;8(02):2150019.

[26] Sharma P, Barua S. From data breach to data shield: the crucial role of big data analytics in modern cybersecurity strategies. International Journal of Information and Cybersecurity. 2023 Sep 5;7(9):31-59.

[27] Al-Hawawreh M, Alazab M, Ferrag MA, Hossain MS. Securing the Industrial Internet of Things against ransomware attacks: A comprehensive analysis of the emerging threat landscape and detection mechanisms. Journal of Network and Computer Applications. 2023 Dec 4:103809.

[28] Ali G, Mijwil MM, Buruga BA, Abotaleb M. A Comprehensive review on cybersecurity issues and their mitigation measures in FinTech.

[29] Javaheri D, Fahmideh M, Chizari H, Lalbakhsh P, Hur J. Cybersecurity threats in FinTech: A systematic review. Expert Systems with Applications. 2023 Nov 23:122697.

[30] Amajuoyi CP, Nwobodo LK, Adegbola MD. Transforming business scalability and operational flexibility with advanced cloud computing technologies. Computer Science & IT Research Journal. 2024 Jun 25;5(6):1469-87.

[31] Despotović A, Parmaković A, Miljković M. Cybercrime and cyber security in fintech. InDigital transformation of the financial industry: approaches and applications 2023 Jan 30 (pp. 255-272). Cham: Springer International Publishing.

[32] Allen F, Gu X, Jagtiani J. A survey of fintech research and policy discussion. Review of Corporate Finance. 2021 May; 1:259-339.

[33] Kim S. ISMS Implementation and Maintenance in Compliance with Finland's National Cybersecurity Requirements.

[34] Dorfleitner G, Hornuf L. FinTech and Data Privacy in Germany. Springer International Publishing; 2019.

[35] Grimes RA. Hacking multifactor authentication. John Wiley & Sons; 2020 Oct 27.

[36] Ciriani V, Vimercati SD, Foresti S, Jajodia S, Paraboschi S, Samarati P. Combining fragmentation and encryption to protect privacy in data storage. ACM Transactions on Information and System Security (TISSEC). 2010 Jul 30;13(3):1-33.

[37] Mokoena T. The Effectiveness of Encryption Methods in Mitigating Information Technology Security Risks. University of Johannesburg (South Africa); 2016.

[38] Aldawood H, Skinner G. Reviewing cyber security social engineering training and awareness programs—Pitfalls and ongoing issues. Future internet. 2019 Mar 18;11(3):73.

[39] Alenzi MA, Rusho MM. A Field Study on the Impact of the Level of Knowledge of Human Resources Employees About the Principles and Applications of Cybersecurity on Human Resources Laws, Between the Theoretical Aspect and the Practical Application Reality.

[40] Hernández E, Öztürk M, Sittón I, Rodríguez S. Data protection on FinTech platforms. InHighlights of Practical Applications of Survivable Agents and Multi-Agent Systems. The PAAMS Collection: International Workshops of PAAMS 2019, Ávila, Spain, June 26–28, 2019, Proceedings 17 2019 (pp. 223-233). Springer International Publishing.

[41] Oyewole AT, Oguejiofor BB, Eneh NE, Akpuokwe CU, Bakare SS. Data privacy laws and their impact on financial technology companies: a review. Computer Science & IT Research Journal. 2024 Mar 18;5(3):628-50.

[42] Tang J, Cui Y, Li Q, Ren K, Liu J, Buyya R. Ensuring security and privacy preservation for cloud data services. ACM Computing Surveys (CSUR). 2016 Jun 6;49(1):1-39.

[43] Borgogno O, Colangelo G. Data sharing and interoperability: Fostering innovation and competition through APIs. Computer Law & Security Review. 2019 Oct 1;35(5):105314.

[44] Frank E. Balancing Innovation and Compliance in Fintech AI. EasyChair; 2024 May 18.

[45] Zeadally S, Adi E, Baig Z, Khan IA. Harnessing artificial intelligence capabilities to improve cybersecurity. Ieee Access. 2020 Jan 20;8:23817-37.

[46] Gao W, Hatcher WG, Yu W. A survey of blockchain: Techniques, applications, and challenges. In2018 27th international conference on computer communication and networks (ICCCN) 2018 Jul 30 (pp. 1-11). IEEE.

[47] Syed NF, Shah SW, Shaghaghi A, Anwar A, Baig Z, Doss R. Zero trust architecture (zta): A comprehensive survey. IEEE access. 2022 May 12; 10:57143-79.

[48] Agidi RC. Biometrics: the future of banking and financial service industry in Nigeria. International Journal of Electronics and Information Engineering. 2018 Dec 1;9(2):91-105