UNIVERSITY OF WESTMINSTER

BANKING TECHNOLOGY | 7FNCE031W

Critical Review of FinTech Research Papers

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1. Article Identification

This essay comprises a review of two journal articles related to the innovation and implications of the FinTech innovation, as stated below.

a. "How Valuable Is FinTech Innovation?"

Authors:

Mark A. Chen, Qinxi Wu and Boazhong Yang

Publication Source:

It was published in "The Review of Financial Studies", Volume 32, Issue 5, Pages 2062-2106. Publication date: May 2019. Citation: (Chen, et al., 2019)

b. "Blockchain Disruption and Smart Contracts"

Authors:

Will Cong and Zhiguo He

Publication Source:

It was published in "Review of Financial Studies", Volume 32, Issue 5, Pages 1754-1797. Publication Date: May 2019. Citation: (Cong & He, 2019)

2. Justification of Selected Articles

Fintech, or Financial Technology, integrates the latest technologies into financial industry tools and services. FinTech can be best defined as disrupting traditional finance and banking models with new technologies and ideas that help people manage their finances efficiently.

The 2023 research predicts the global FinTech market will reach USD 16,652,680 million by 2028, exhibiting a compound annual growth rate (CAGR) of 13.9% (Business Research Insights (BRI), 2023). Despite potential growth, a lack of research necessitates a deeper understanding of FinTech's real-world scope and impact.

The chosen articles by (Chen, et al., 2019) and (Cong & He, 2019) offer a comprehensive overview of the value of FinTech and how it disrupts the traditional market, making them justifiable for the review.

3. Article (a): “How Valuable is FinTech Innovation”

3.1. Properties

Objective:

The research aims to comprehensively analyse FinTech innovations, focusing on their value to investors and their impact on the financial sector. It addresses a knowledge gap by offering large-scale evidence on the occurrence and value of FinTech innovation.

Data Set and Period:

The study utilises a novel dataset of published FinTech patent applications from 2003 to 2017. This extensive time frame allows for a longitudinal examination of trends and patterns in FinTech innovation. A list of 487 finance-related terms was used to exclude non-financial patent applications.

Main Findings:

1. FinTech innovations are generally valuable, with a median private value of $46.7 million for innovators.
2. Blockchain, cybersecurity, and robo-advising are the most valuable types of FinTech innovation.
3. Disruptive FinTech innovations from young, non-financial firms can negatively impact established financial industries.
4. Market leaders who invest heavily in their R&D are less vulnerable to such harm.
5. FinTech can bring about lower costs and increased convenience for financial services, but it also raises concerns about automation and potential job losses.

Limitations:

The study acknowledges certain limitations, noting that patent applications offer partial insights into innovation, omitting unsuccessful attempts and innovations protected by trade secrets. Challenges in measuring direct costs and relying on stock prices as a value measure are acknowledged, recognising that this method may not fully represent the impact on non-US, private, or individual stakeholders.

3.2. Summary

The article explores the value and impact of FinTech innovations, focusing on their significance to investors and the financial sector from 2003 to 2017. Using a dataset of published FinTech patent applications, it addresses the lack of a standardised definition for FinTech. The study establishes a data-

based classification system covering seven technology categories: cybersecurity, mobile transactions, data analytics, blockchain, peer-to-peer, robo-advising, and the Internet of Things (IoT) (Appendix).

The research indicates that publicly traded companies contribute minimally to FinTech innovations, with private companies and non-firm individuals representing a significant majority. Cybersecurity and mobile transactions have witnessed the highest total innovation, while blockchain is the fastest-growing category despite currently being the smallest. The study revealed blockchain, cybersecurity, and robo-advising are the most valuable FinTech innovations.

The paper distinguishes between disruptive and non-disruptive innovations based on their industry value impact. Disruptive innovations initially decrease value but lead to long-term benefits. Meanwhile, non-disruptive innovations complement existing business models and positively impact industry value by improving existing processes or creating new value propositions. The article explores the potential harm caused by FinTech innovations, particularly when they involve disruptive technologies from nonfinancial startups. However, market leaders who heavily invest in their innovation can mitigate these adverse effects.

The study introduces a measure of technology disruptiveness based on how negatively FinTech patent filings from non-firm innovators impact an industry's value. Young, nonfinancial firms are identified as the largest competitive threat, potentially disrupting the industry. Additionally, innovations based on radical new technologies are more likely to be disruptive than those leveraging existing technologies.

In conclusion, the research underscores the value of FinTech innovations, their potential for disruption, and the need for managing the transition to a FinTech-powered future through understanding the disruptive potential and encouraging R&D among incumbent firms, with specific attention to the source of innovation and the nature of the technology involved.

3.3. Critical Review

The study significantly contributes to our understanding of FinTech, demonstrating strengths in its novel methodology, economic focus, and transparent acknowledgement of limitations. Employing a large patent dataset for a comprehensive, objective analysis, it explores FinTech's economic impact on innovators, financial institutions, and consumers, providing insights into various advancements. Acknowledging limitations in data and methodology enhances the findings' credibility, allowing cautious interpretation.

However, the study reflects overreliance on patent data, potentially underestimating the scope of non-patented FinTech innovations. It primarily assesses FinTech's value impact on the financial system,

lacking a broader analysis of potential socioeconomic implications. While highlighting challenges from disruptive FinTech innovations, it lacks specific policy recommendations.

Future research should supplement patent data for a holistic view of FinTech innovation, considering broader socioeconomic implications. Acknowledging that the value of FinTech innovation in a developing country contrasts from that in developed countries with better technological infrastructure (Sampat, et al., 2023), as the population in emerging markets is generally unaware of FinTech services and their associated innovations, posing a risk of failure to FinTech startups. Addressing employment concerns, such as labour being replaced by new technologies (Lederman & Zouaidi, 2022), and potential benefits for financial inclusion would enrich the analysis. Proposing specific policy recommendations for addressing challenges and leveraging opportunities in FinTech could offer valuable guidance for regulators and policymakers. Addressing these suggestions would strengthen the research, contributing to an actionable understanding of FinTech innovation and its potential to shape the future of finance.

4. Article (b): "Blockchain Disruption and Smart Contracts"

4.1. Properties

Objective

The study thoroughly analyses the economic impact of blockchain on business and finance, considering its disruptive potential and addressing scepticism about its innovation and practicality. It assesses how blockchain can enhance information transparency and market competition but acknowledges risks due to its decentralised consensus mechanism, which may harm market welfare.

Methodology:

The authors use a theoretical model with a game-theoretic analysis of seller behaviour in a blockchain environment, case studies of specific blockchain applications, like trade finance, and a literature review of existing research on blockchain and collusion.

Main Findings:

1. Blockchain technology can potentially disrupt industries like the internet did for offline commerce.
2. Decentralized consensus on blockchains improves information transparency and facilitates entry by authentic and high-quality sellers.

3. However, the information distribution inherent in consensus generation and decentralisation can enable sellers to collude and harm consumer welfare.
4. Smart contracts contingent on delivery success can mitigate information asymmetry and deter collusion.
5. Policy interventions like adding regulatory nodes or separating usage from consensus generation can further reduce collision risks.
6. Blockchain technology also raises data privacy concerns and needs to comply with regulations like the General Data Protection Regulation (GDPR).

Limitations:

The studies focus on the theoretical model of a specific market structure and a limited scope of case studies and may not generalise to all scenarios. Further empirical research is needed to validate the theoretical findings and evaluate the effectiveness of proposed solutions.

4.2. Summary

The article explores the potential impact of blockchain technology on business and financial services, drawing parallels between its transformative potential and the disruptive nature of the internet. While some industry practitioners acknowledge the potential for blockchain to revolutionise commerce, others express scepticism, citing concerns about its innovativeness, real-world applicability, and associations with illicit activities.

All blockchains aim to create a decentralised database system, allowing joint recording and maintenance without persistent individual control. Blockchain's core lies in decentralised consensus through distributed ledger mechanisms, evolving from Bitcoin technology to enable applications like smart contracts and initial coin offerings (ICOs). The decentralised consensus enhances system resilience and reduces reliance on centralised intermediaries.

The research contributes to two main areas: (1) mechanisms for generating and maintaining decentralised consensus and (2) real-world implications of blockchain functionality. It underscores the universal trade-off in blockchain technology and examines its impact on industrial organisations.

The study suggests that decentralised consensus blockchains can eliminate information asymmetry as a barrier to entry, fostering greater competition and enhancing welfare in a "blockchain world." However, it also highlights that blockchain technology may lead to increased collusive behaviour among sellers, posing a potential threat to market competitiveness.

The research further explores how blockchains could hinder competition, especially in permissioned blockchains with powerful financial institutions as exclusive members. It introduces separating usage and consensus generation as a potential solution to mitigate collision risks. The role of regulators is discussed, suggesting measures to reduce collusion on blockchains and the potential for regulators to participate in the protocol design.

In conclusion, the article provides a perspective on blockchain technology, acknowledging its potential benefits in enhancing transparency, reducing information asymmetry, and facilitating smart contracts. However, it also raises concerns about the potential for collusion and emphasises the importance of regulatory measures to ensure market competitiveness. The separation of usage and consensus generation is proposed as a novel economic trade-off, signalling directions for future policy discussions regarding blockchain applications.

4.3. Critical Review

This research comprehensively explores the economic implications of blockchain, addressing its disruptive potential and the scepticism surrounding its real-world applicability. While the study covers relevant topics and introduces novel concepts, a critical review reveals several aspects that warrant discussion.

Commendably, it navigates various aspects of blockchain, emphasising trade-offs, industrial impact, and regulatory considerations, providing a comprehensive understanding. The article introduces the "separation of usage and consensus generation" as an innovative solution to mitigate collusion risks, contributing novel perspectives to the discussion. It recognises the need for regulatory measures in mitigating collusion risks on blockchains. It offers insights into potential interventions, such as adding a regulatory node to the blockchain and participating in the protocol design. Considering long-term effects, such as the potential dominance of a single blockchain and the role of regulators in preventing collusion, adds value. It prompts readers to consider the evolving landscape of blockchain technology.

However, weaknesses include lacking specific examples, limited empirical evidence, and the complexity of introduced concepts. A more robust critique of blockchain scepticism is suggested to enhance credibility. The authors could more elaborately explore blockchain technology's potential policy options and legal implications. As stated (Schrepel, 2019), the ever-evolving nature of technology complicates the application of law to the blockchain.

Improvements could involve incorporating real-world examples, conducting a comparative analysis of blockchain implementations, and exploring buyer collusion. Examining the long-term dynamics of collusion and the impact on existing regulatory frameworks further enhances the research.

5. Comparison of Both Articles

Both articles acknowledge the transformative potential of blockchain in terms of transparency, efficiency, and reducing information asymmetry. However, they differ in their research scope and methodology.

The first article primarily focuses on the occurrence and value of FinTech innovation, using a dataset of FinTech patent applications; however, the second article has a broader focus on the economic implications of blockchain, especially regarding collusion and competition. The first article employs a data-driven approach with machine-learning algorithms, offering concrete findings. In contrast, the second article has a more theoretical methodology, emphasising the need for empirical evidence to support its discussions on blockchain's economic impact.

Opinion on Findings:

1. The first article's findings align with expectations, recognising blockchain, cybersecurity, and robo-advising as valuable. Acknowledging disruptions from nonfinancial startups is realistic.
2. The second article provides valuable insights into blockchain technology, with intriguing concepts like the "separation of usage and consensus generation." However, empirical validation is needed for some theoretical aspects.

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Appendix

Table 1
Categories of FinTech

Category definition	Key technologies	Real-world examples
Cybersecurity: Hardware or software used to protect financial privacy or safeguard against electronic theft or fraud	Encryption, tokenization, authentication, biometrics	*Diebold iris-scanning ATM, Mastercard Biometric Card, USAA face recognition login, Experian CreditLock*
Mobile transactions: Technologies that facilitate payments via mobile wireless devices, such as smartphones, tablets, and wearables	Smartphone wallets, digital wallets, near-field communication	*Apple Pay, Android Pay, PayPal Mobile Express Checkout, Venmo, Square*
Data analytics: Technologies and algorithms that facilitate the analysis of transactions data or consumer financial data	Big data, cloud computing, artificial intelligence, machine learning	*Equifax NeuroDecision credit scoring, JPMorgan Contract Intelligence (COiN), Bloomberg Social Sentiment Analytics*
Blockchain: Distributed ledger technologies with a primary application to financial services	Cryptocurrency, proof-of-work, smart contracts, directed acyclic graphs	*Bitcoin, Ripple Payment Network, Visa B2B Connect, Nasdaq Linq asset trading platform*
Peer-to-peer (P2P): Software, systems, or platforms that facilitate consumer-to-consumer financial transactions	Crowdfunding, P2P lending, customer-to-customer payments	*GoFundMe, Kickstarter, Lending Club, Prosper Marketplace, Zelle*
Robo-advising: Computer systems or programs that provide automated investment advice to customers or portfolio managers	Artificial intelligence, big data, machine learning	*Betterment, E-Trade Core Portfolios, Schwab Intelligent Portfolios, Vanguard Personal Advisor Services*
Internet of things (IoT): Technologies relating to smart devices that gather data in real time and communicate via the internet	Smart devices, near-field communication, wireless sensor networks, actuators	*UnitedHealthcare Motion F.I.T. tracker, Nationwide SmartRide telematics, Travelers Insurance smart home sensors*

This table shows a proposed typology of FinTech. The definitions, technologies, and examples listed are based on the authors' reading of news articles, industry reports, and surveys.

Source: (Chen, et al., 2019)