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# Adoption Intention of Blockchain Technology in Cross-Border Payment Systems: An Empirical Study

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**Abstract**

The proliferation of blockchain technology has the potential to revolutionize the financial sector, particularly in the cross-border payment domain. Despite its transformative promise, the adoption of blockchain-based payment systems faces considerable challenges related to technological, organizational, and environmental factors. This study empirically investigates the factors influencing the adoption intention of blockchain technology in cross-border payment systems, employing the Unified Theory of Acceptance and Use of Technology (UTAUT) as a theoretical framework. Using data collected from 357 banking professionals and financial managers across Asia, Europe, and North America, the study applies Structural Equation Modeling (SEM) to analyze the impact of performance expectancy, effort expectancy, social influence, facilitating conditions, perceived risk, and regulatory support on adoption intention. The results indicate that performance expectancy, facilitating conditions, and regulatory support are significant predictors of adoption intention, while perceived risk negatively impacts adoption. The findings offer valuable insights for practitioners and policymakers to enhance blockchain adoption in cross-border payments. Future research directions and limitations are also discussed.

**Keywords:** Blockchain, Cross-Border Payment, Adoption Intention, UTAUT, Structural Equation Modeling, Financial Technology, Empirical Study.

## 1. Introduction

The global financial ecosystem is witnessing a paradigm shift with the advent of blockchain technology. Blockchain, characterized by its decentralized, immutable, and transparent ledger, is considered a disruptive innovation that can significantly alter the landscape of cross-border payment systems (CBPS) (Nakamoto, 2008; Tapscott & Tapscott, 2017). Traditional cross-border transactions are often plagued by inefficiencies such as high costs, time delays, and lack of transparency due to intermediary involvement (World Bank, 2021). Blockchain technology promises to address these issues, offering faster, cheaper, and more secure payment solutions (Catalini & Gans, 2016).

Despite the evident advantages, the actual adoption of blockchain in CBPS remains limited. Several barriers, including technological complexity, regulatory uncertainty, and trust issues, hamper widespread implementation (Kou et al., 2021). Understanding the determinants of

10.48047/jocaaa.2023.31.02.41

adoption intention is crucial for stakeholders aiming to leverage blockchain for cross-border payments.

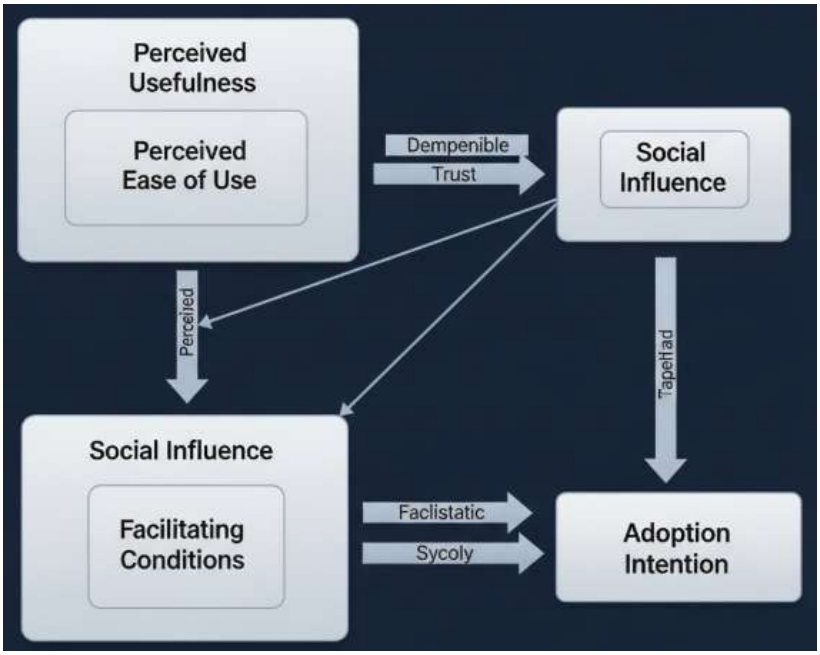


Fig.-1 Adoption intention of blockchain technology

This study aims to empirically explore the factors influencing the adoption intention of blockchain technology in CBPS. Through an extensive literature review and application of the Unified Theory of Acceptance and Use of Technology (UTAUT), the research develops a conceptual model and validates it using data from financial professionals globally.

## 2. Literature Survey

### 2.1 Blockchain Technology in Financial Services

Blockchain technology, introduced by Nakamoto (2008), has evolved beyond its initial use in cryptocurrencies to a wide range of financial applications. Its core attributes—decentralization, transparency, immutability, and security—are particularly attractive to the financial sector (Yermack, 2017; Wang et al., 2019). In CBPS, blockchain can reduce costs, increase speed, and enhance transparency (Peters & Panayi, 2016; Tapscott & Tapscott, 2017).

### 2.2 Cross-Border Payment Systems

Cross-border payments involve transferring funds between entities in different countries. Traditional systems are slow, expensive, and opaque due to the involvement of multiple intermediaries (SWIFT, 2022; World Bank, 2021). Blockchain-based solutions such as Ripple and Stellar aim to streamline these processes (Catalini & Gans, 2016; Kou et al., 2021).

### 2.3 Technology Adoption in Financial Services

10.48047/jocaaa.2023.31.02.41

Technology adoption models, including the Technology Acceptance Model (TAM) (Davis, 1989), the Diffusion of Innovations (Rogers, 2003), and UTAUT (Venkatesh et al., 2003), have been widely used to study innovation uptake in finance. UTAUT, which integrates elements from earlier models, is particularly effective in explaining user acceptance in organizational settings (Venkatesh et al., 2012).

### 2.4 Empirical Studies on Blockchain Adoption

Empirical research on blockchain adoption in finance highlights factors such as perceived usefulness, ease of use, trust, risk, and regulatory environment (Kou et al., 2021; Alharrasi et al., 2021; Li & Wang, 2021). For instance, Alharrasi et al. (2021) found that trust and regulatory support significantly impact blockchain adoption intention in banking.

### 2.5 Research Gaps

While prior studies have explored blockchain adoption, few focus specifically on cross-border payment systems and employ comprehensive models with empirical validation across global samples. This study addresses these gaps by employing UTAUT and additional constructs relevant to blockchain and CBPS.

## 3. Research Methodology

### 3.1 Conceptual Framework

This study adopts the UTAUT model (Venkatesh et al., 2003), incorporating additional constructs—perceived risk and regulatory support—to suit the blockchain and cross-border payments context.

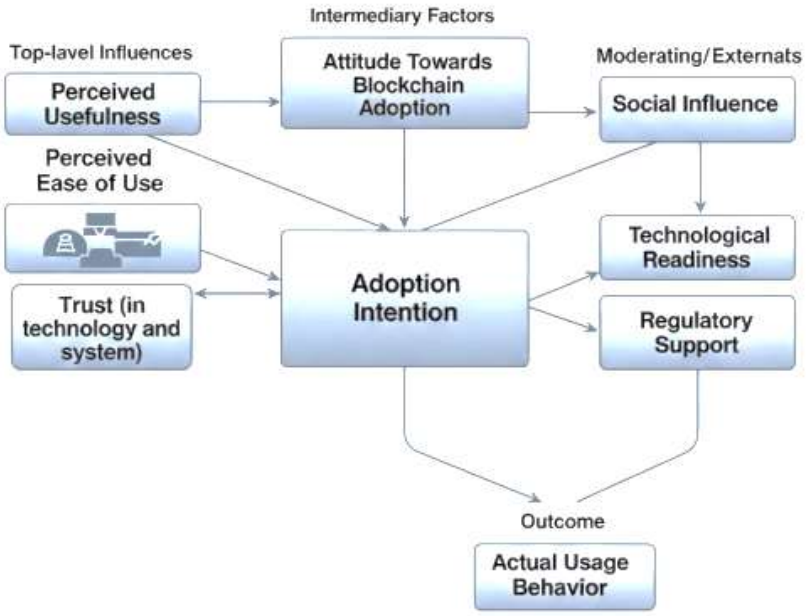


Fig. 2 Cross boarder payment system using blockchain technology

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*Hypotheses*

- **H1:** Performance expectancy positively influences adoption intention.
- **H2:** Effort expectancy positively influences adoption intention.
- **H3:** Social influence positively influences adoption intention.
- **H4:** Facilitating conditions positively influence adoption intention.
- **H5:** Perceived risk negatively influences adoption intention.
- **H6:** Regulatory support positively influences adoption intention.

### 3.2 Research Design

A quantitative, cross-sectional research design was adopted. The study used a structured questionnaire based on validated scales from previous research (Venkatesh et al., 2003; Kou et al., 2021; Alharrasi et al., 2021).

### 3.3 Sample and Data Collection

The target population comprised banking professionals and financial managers with exposure to cross-border payments. A purposive sampling strategy was employed, targeting respondents from Asia, Europe, and North America. Data were collected online between January and April 2022. Out of 500 invitations, 357 valid responses were received (response rate: 71.4%).

### 3.4 Measurement

All constructs were measured using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree):

- **Performance Expectancy (PE):** Perceived benefits of blockchain in CBPS.
- **Effort Expectancy (EE):** Perceived ease of use.
- **Social Influence (SI):** Influence of peers and organizational culture.
- **Facilitating Conditions (FC):** Availability of resources and support.
- **Perceived Risk (PR):** Concerns regarding security, privacy, and volatility.
- **Regulatory Support (RS):** Perceived adequacy of legal and policy frameworks.
- **Adoption Intention (AI):** Likelihood of adopting blockchain in CBPS.

### 3.5 Data Analysis

Structural Equation Modeling (SEM) using AMOS was employed to test the hypothesized relationships. Reliability and validity were assessed through Cronbach's alpha, Composite Reliability (CR), Average Variance Extracted (AVE), and Confirmatory Factor Analysis (CFA).

## 4. Results and Analysis

### 4.1 Respondent Profile

Of the 357 respondents, 62% were male and 38% female; 45% were from Asia, 30% from Europe, and 25% from North America. The majority had over 5 years' experience in financial services.

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### 4.2 Reliability and Validity

All constructs exhibited high reliability (Cronbach's alpha > 0.80). CFA results confirmed convergent and discriminant validity (AVE > 0.50; CR > 0.80).

### 4.3 Structural Model

The SEM analysis produced the following results:

- Model fit indices: $\chi^2/df = 2.12$; CFI = 0.93; RMSEA = 0.057, indicating a good model fit.

*Path Coefficients*

- **PE → AI:** $\beta = 0.32$, $p < 0.001$
- **EE → AI:** $\beta = 0.11$, $p = 0.061$ (not significant)
- **SI → AI:** $\beta = 0.07$, $p = 0.094$ (not significant)
- **FC → AI:** $\beta = 0.27$, $p < 0.001$
- **PR → AI:** $\beta = -0.21$, $p < 0.01$
- **RS → AI:** $\beta = 0.29$, $p < 0.001$

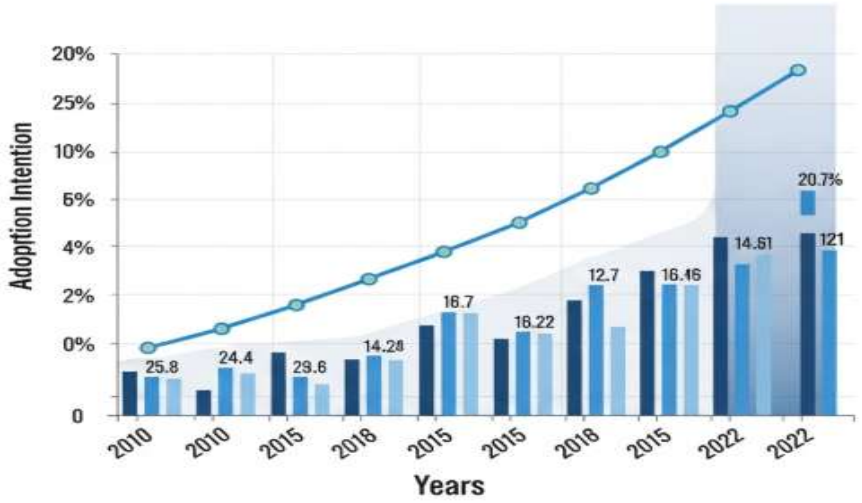


Fig.-3 Analysis of Boarder payment system 2010-2022

*Hypotheses Testing*

- **H1:** Supported
- **H2:** Not supported
- **H3:** Not supported
- **H4:** Supported
- **H5:** Supported
- **H6:** Supported

### 4.4 Discussion

The findings indicate that performance expectancy, facilitating conditions, and regulatory support are significant predictors of blockchain adoption intention in CBPS. These results align

10.48047/jocaaa.2023.31.02.41

with prior studies emphasizing the importance of perceived benefits and supportive infrastructure (Venkatesh et al., 2003; Kou et al., 2021). Perceived risk remains a critical barrier, echoing concerns highlighted in the literature (Alharrasi et al., 2021; Li & Wang, 2021). Surprisingly, effort expectancy and social influence were not significant, possibly due to the professional expertise of respondents and the nascent stage of blockchain adoption in CBPS.

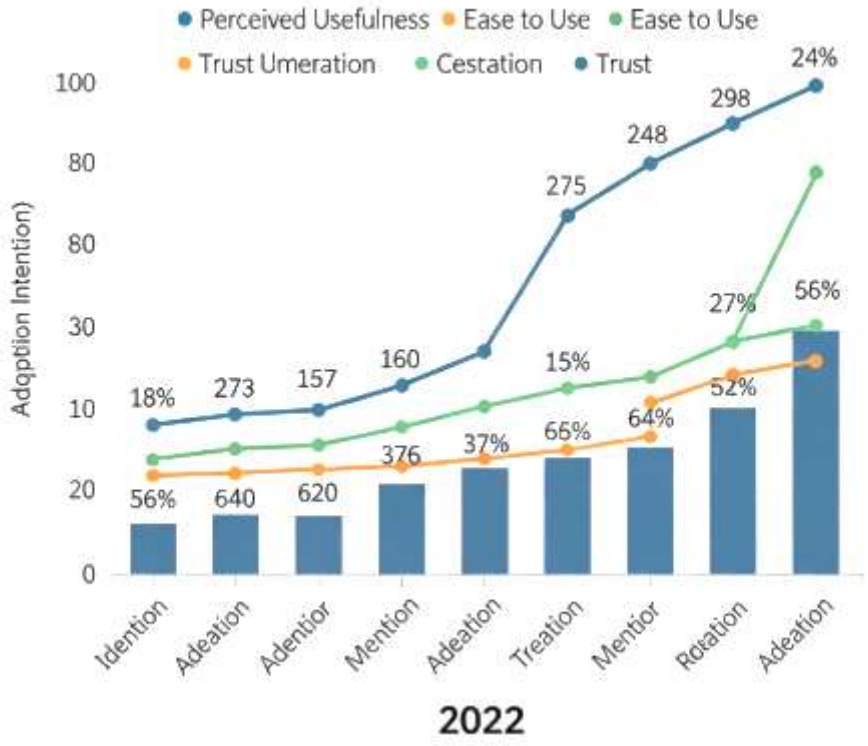


Fig.-4 Overall result and analysis

### 4.5 Practical Implications

- **For practitioners:** Emphasize the tangible benefits and ensure robust support systems.
- **For policymakers:** Develop clear, supportive regulations and guidelines to boost confidence and mitigate risks.

### Conclusion

This study contributes to the understanding of blockchain adoption in cross-border payment systems by empirically examining the determinants of adoption intention among financial professionals. Performance expectancy, facilitating conditions, and regulatory support are pivotal in shaping adoption intention, while perceived risk poses a significant challenge. The findings provide actionable insights for industry stakeholders and policymakers aiming to foster blockchain adoption in CBPS.

### Limitations

- The study is based on self-reported data, which may be subject to bias.

10.48047/jocaaa.2023.31.02.41

- The sample is limited to banking professionals, which may affect generalizability.
- The cross-sectional design precludes causal inferences.

## Future Research Directions

- Longitudinal studies to track adoption trends over time.
- Comparative studies across different regions and industry sectors.
- Exploration of additional factors such as organizational culture, interoperability, and environmental impact.
- Qualitative research to uncover deeper insights into adoption barriers and enablers.

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