The Role of Cryptocurrency in Thailand's Tourism Industry: Potential for Cross-Border Payments

Sethapong Watanapalachaikul[1*]

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Abstract

This research aimed to 1) identify the impact of cryptocurrency adoption for cross-border payments in the tourism industry in Thailand and 2) explore the perspectives and experiences of industry experts and international travelers on the use of cryptocurrency for cross-border payments in the tourism industry in Thailand. The research used a mixed-methods approach, including quantitative econometric modeling and qualitative insights from focus group discussions. The results of the research are 1) cryptocurrency adoption has the potential to improve cross-border payments and have a positive impact on revenue for the tourism industry in Thailand. 2) The qualitative data revealed varying levels of awareness, with younger participants more accepting while older participants were more hesitant due to knowledge gaps and security concerns. Despite regulatory uncertainty and operational barriers, there is still hope for the future of cryptocurrency in the tourism industry in Thailand, highlighting the importance of regulatory clarity and awareness campaigns to unlock its potential.

Keywords: Cryptocurrency, Tourism Industry, Cross-Border Payments

[1] Faculty of Business Administration, Rajapruk University, E-mail: sewata@rpu.ac.th

* Corresponding Author, E-mail: sewata@rpu.ac.th

Importance and Problem Statement

This study examined the role of cryptocurrency in Thailand's tourism industry, with a particular focus on its potential to facilitate cross-border payments. As digital currencies have gained prominence globally, their adoption within the tourism sector presents an opportunity to enhance transaction efficiency, reduce costs, and streamline payment processes for international travelers. However, comprehensive statistical data on crypto usage in the tourism sector remains limited. According to the Digital Economy Promotion Agency (DEPA), approximately 5% of small and medium-sized tourism-related businesses in Bangkok had experimented with digital currency payments as of 2023, including restaurants, souvenir shops, and ride-hailing services. Similarly, Coinmap.org lists fewer than 50 crypto-accepting merchants in major Thai cities, indicating a slow adoption pace.

Despite these potential advantages, the application of cryptocurrencies in tourism remains underexplored, particularly in emerging markets like Thailand, where tourism contributes significantly to the national economy. The growing importance of financial innovation in tourism payment systems warrants empirical inquiry into its implications, especially in contexts lacking structured frameworks for adoption. The research employed a mixed-methods approach to investigate this topic comprehensively. The quantitative component utilized econometric modeling to assess the impact of cryptocurrency adoption on key economic indicators, such as tourism revenue and transaction costs. Simultaneously, the qualitative analysis gathered insights through Focus Group Discussions (FGDs) with industry experts and international travelers, exploring their perceptions, experiences, and the challenges associated with cryptocurrency use for cross-border payments.

This study aimed to provide a nuanced understanding of the feasibility and potential implications of cryptocurrency adoption within Thailand's tourism industry. The increasing globalization of tourism, combined with the rapid evolution of financial technologies, has brought significant changes to the way cross-border payments are conducted. Traditional payment methods, such as credit cards and bank transfers, often involve high transaction fees and lengthy processing times, which can deter international travelers and affect businesses in tourism-dependent economies. In recent years, cryptocurrencies have emerged as

a potential alternative for cross-border payments, offering lower fees, faster transactions, and enhanced security.

Thailand, a major global tourist destination, has seen growing interest in digital currencies both among local businesses and international visitors. Nonetheless, integration remains limited due to a combination of regulatory uncertainty, infrastructure limitations, and fluctuating market confidence. In contrast, countries such as Japan and Estonia have proactively embraced cryptocurrency within their tourism and service sectors by establishing clear legal frameworks and incentivizing digital adoption.

The origin of this research is rooted in the lack of empirical studies analyzing cryptocurrency adoption in tourism contexts of developing nations. While literature exists on blockchain in finance and tourism marketing, few studies explore the role of cryptocurrencies in practical cross-border payments. Recent academic calls (e.g., Lee, Zhang, & Kim, 2022; Santos & DeNardis, 2023) emphasize the need for geographically specific research that explores barriers and economic impacts.

Research Objectives

1) To find the impact of cryptocurrency adoption for cross-border payments in Thailand's tourism industry.

2) To explore the perceptions and experiences of industry experts and international travelers regarding the use of cryptocurrency for cross-border payments in Thailand's tourism sector.

Research Scope

The scope of this research encompassed four key dimensions: content, population, time, and area. 1) The content scope focused on analyzing the role of cryptocurrency in Thailand's tourism industry, particularly its potential for cross-border payments, examining both economic impacts and adoption challenges. 2) The population scope included eight participants, including foreign travelers, business travelers, tourism operators, and financial service providers, who were selected through purposive sampling for focus group discussions. 3) The time scope covered the period from 2022 to 2024, allowing for an assessment of recent trends in cryptocurrency adoption within the tourism sector. 4) The area scope was limited

to Bangkok, Thailand's capital and a major tourism hub, where cryptocurrency adoption in tourism transactions was explored.

Literature Review

1) Theory of Transaction Cost Economics

One of the theories relevant to this research was the Theory of Transaction Cost Economics (TCE), which posited that firms and individuals made decisions based on minimizing the costs associated with economic transactions. Transaction costs included not only the monetary costs of exchange but also the time and effort required to negotiate and enforce agreements. In the context of cryptocurrency, its potential to reduce transaction costs through lower fees, faster processing times, and enhanced security aligned with TCE. Studies emphasized that cryptocurrencies significantly lowered transaction costs, making them attractive for cross-border payments in tourism (Mougayar, 2016; Narayanan et al., 2016).

Another relevant economic framework was the Network Effect, which suggested that the value of a product or service increased as more people used it. Network effects could lead to the adoption of technologies like cryptocurrency. In tourism, as more businesses accepted cryptocurrencies, their utility for travelers increased, encouraging further adoption and integration into the payment ecosystem (Eisenmann et al., 2011).

The Technology Acceptance Model (TAM) provided a theoretical framework for understanding how users came to accept and use new technologies. TAM posited that perceived ease of use and perceived usefulness significantly influenced user acceptance. In the context of cryptocurrency in tourism, studies showed that tourists' acceptance of cryptocurrencies was contingent upon their perception of the technology's utility in enhancing payment convenience and security (Amoako, Agyekum, & Osei, 2018; Gunter, Koss, & Tan, 2020). This perception was influenced not only by technological factors but also by social norms, peer influence, and individual confidence in data privacy protection, highlighting the need to consider socio-psychological variables in adoption models.

Numerous studies explored the impact of digital currencies on transaction costs. Researchers discussed how cryptocurrencies streamlined cross-border payments by reducing the need for intermediaries, thereby lowering transaction fees (Bohme et al., 2015; Catalini & Gans, 2016). Additionally, cryptocurrencies provided a faster and more efficient payment solution for international travelers, addressing the challenges associated with traditional

payment methods such as credit cards and bank transfers, which often incurred high fees and delays (Chen & Chang, 2019).

Furthermore, several studies emphasized the link between digital currency adoption and entrepreneurs' income generation and reinvestment decisions in tourism. Reduced payment friction enabled entrepreneurs to capture a larger share of international visitor spending, which could be reinvested into services, innovation, or expansion (Lee, Park, & Kim, 2021). Lower overheads from transaction savings also improved operating margins.

In the context of Thailand, research began to explore the feasibility of cryptocurrency adoption in the tourism sector. Findings suggested that while potential existed for reduced transaction costs and improved payment efficiency, challenges remained regarding regulatory frameworks, consumer trust, and technological infrastructure. Addressing these challenges was essential for harnessing the benefits of cryptocurrency in enhancing cross-border payment systems within the tourism industry (Thawatchai & Kunakorn, 2020).

However, critical gaps remain in evaluating how policy, regulation, and local business culture influence cryptocurrency implementation in Thailand. Most studies provide generalized regional analyses but lack empirical focus on the Thai context, especially in linking technology acceptance to concrete business and consumer outcomes.

2) Economic Implications of Cryptocurrency

The integration of cryptocurrency into the tourism sector presented several economic implications. Researchers noted that cryptocurrencies could reduce transaction costs associated with cross-border payments. According to Catalini and Gans (2016), cryptocurrencies minimized the need for intermediaries, enabling faster and cheaper transactions. Furthermore, Bohme et al. (2015) emphasized that the decentralized nature of cryptocurrencies could lead to lower fees compared to traditional payment systems, thereby increasing their attractiveness for both tourists and businesses in the tourism industry.

Additionally, the concept of monetary sovereignty was relevant in discussing the use of cryptocurrencies in tourism. As highlighted by Zohar (2015), cryptocurrencies offered an alternative to national currencies, potentially empowering consumers to circumvent unfavorable exchange rates and transaction fees imposed by banks.

This sovereignty aspect also allowed entrepreneurs to store value in decentralized assets, hedge against local currency volatility, and attract a more tech-savvy segment of international tourists. Entrepreneurs who received payments in stablecoins like USDT or USDC

reported higher income stability and reinvestment confidence, as shown in emerging research in regional case studies (Ramirez & Liu, 2022).

3) Acceptance of Cryptocurrency in Tourism

The acceptance of cryptocurrency as a payment method in tourism was influenced by various factors. The Technology Acceptance Model (TAM), as proposed by Davis (1989), provided a framework for understanding users' acceptance of new technologies. In the context of cryptocurrency, studies such as those by Wang, Wu, and Cheng (2016) demonstrated that perceived ease of use and perceived usefulness significantly affected tourists' willingness to adopt cryptocurrencies. This research indicated that enhancing user experiences and providing adequate education about cryptocurrencies could facilitate their acceptance within the tourism sector.

Furthermore, trust played a critical role in the acceptance of cryptocurrencies. Research conducted by Gunter et al. (2020) revealed that tourists' confidence in cryptocurrency systems, including security and regulatory compliance, influenced their intention to use cryptocurrencies for payments.

In addition, literature on digital currency behavior has highlighted that attitudes toward data privacy, trust in local legal systems, and cultural norms also shape user decisions (Park & Lin, 2020). Tourists from regions with strict data protection laws may express hesitation in adopting platforms that lack transparency regarding personal data use. Similarly, societal perception of cryptocurrency as speculative or unstable may deter practical usage. Establishing trust through transparent practices and reliable technology became essential for fostering consumer acceptance in the tourism industry.

4) Global Crypto Adoption Index: Thailand's Position

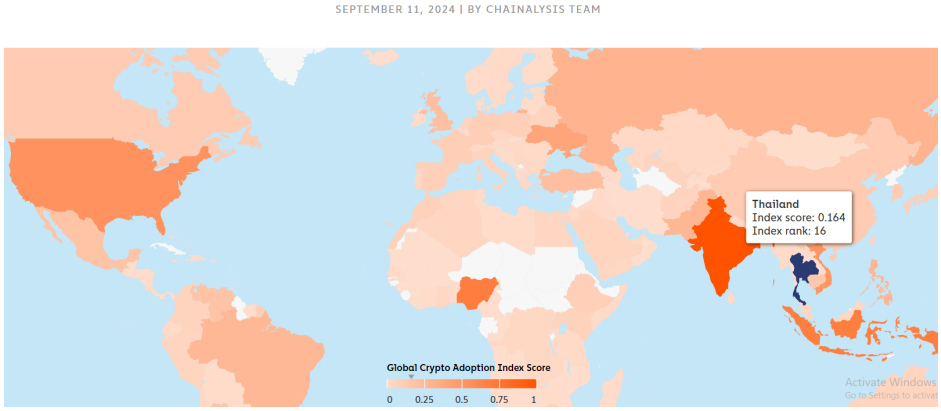

Figure 1 Global Crypto Adoption Index

Source: Chainalysis (2020).

On September 11, 2024, Thailand ranked 16th worldwide in the Global Crypto Adoption Index, achieving a score of 0.164. This ranking, as depicted in Figure 1, reflects Thailand's active engagement with cryptocurrencies and blockchain technologies. The index evaluates various factors, including on-chain retail value, peer-to-peer (P2P) exchange volume, and the degree of involvement by individuals in crypto transactions.

Thailand's position at 16th suggests a mid-to-high level of adoption compared to other countries, indicating a robust yet evolving crypto ecosystem. The score of 0.164, while not among the highest globally, signifies significant adoption, likely driven by both retail and institutional participation.

Bangkok plays a central role in this ecosystem as the financial, technological, and tourism hub of Thailand. The city hosts a large concentration of digital payment infrastructure, crypto-friendly establishments, and pilot government initiatives. Bangkok's importance is further reinforced by the presence of cryptocurrency events, fintech startups, and digital wallet providers, making it a strategic location for studying crypto adoption in tourism.

Despite its relatively moderate score, Thailand's consistent placement within the top 20 suggests a trajectory toward greater adoption and innovation in the coming years. The inclusion of Thailand in this index signals the increasing relevance of digital assets in shaping the nation's financial landscape.

5) The Role of Blockchain Technology

The underlying blockchain technology of cryptocurrencies also had significant implications for payment systems in tourism. Researchers such as Tapscott and Tapscott (2016) argued that blockchain technology could enhance transparency, security, and efficiency in transactions. The immutable nature of blockchain records offered a reliable method for tracking transactions, thereby reducing fraud and improving trust among stakeholders. Moreover, blockchain technology facilitated the development of smart contracts, which could automate and enforce agreements without intermediaries. This concept was explored by Christidis and Devetsikiotis (2016), who highlighted how smart contracts could streamline various processes in the tourism industry, including booking accommodations and managing payments. By automating these transactions, blockchain technology could reduce costs and enhance the overall efficiency of payment systems.

Government involvement in blockchain infrastructure has also begun to take shape in Thailand. Agencies such as the Thai SEC and Bank of Thailand have issued guidelines on Initial Coin Offerings (ICOs) and licensed exchanges. Furthermore, the Ministry of Digital Economy and Society has initiated pilot projects to integrate blockchain into tourism tax management and tourist ID verification systems (Digital Economy Promotion Agency, 2023). This policy support is expected to influence adoption trends

6) Quantitative and Qualitative Analysis for Tourism Industry

The quantitative analysis employed econometric models, including Vector Autoregression (VAR) and Autoregressive Distributed Lag (ARDL), to assess short-term and long-term relationships between tourist arrivals, tourism revenue, cryptocurrency adoption, and exchange rates (Chowdhury & Russell, 2020; Mohsin, AlQahtani, & Zaman, 2021). The Johansen Cointegration Test identified long-term equilibrium relationships, while the Error Correction Model (ECM) measured short-term adjustments (Cheung & Lai, 2021). Panel data models (Fixed Effects and Random Effects) analyzed cross-regional impacts, and the Difference-in-Differences (DiD) approach isolated the effect of cryptocurrency adoption on tourism performance (Saidi, Rahman, & Mbarek, 2020; Zhang, Lee, & Lee, 2019). The qualitative analysis involved Focus Group Discussions (FGDs) with foreign tourists, business travelers, and industry experts, offering insights into cryptocurrency usability, industry benefits, and adoption barriers, complementing the quantitative findings (Gunter et al., 2020).

Conceptual Framework

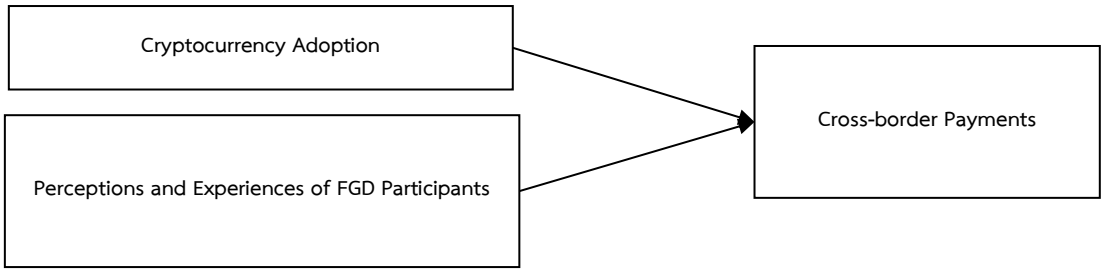

Figure 2 The Conceptual Framework

Methodology

Model Development

The model development in this research followed a hybrid approach, combining quantitative econometric models and qualitative Focus Group Discussions (FGDs) to gain comprehensive insights into the role of cryptocurrency in Thailand's tourism industry.

The quantitative models were used to find the impact of cryptocurrency adoption for cross-border payments in Thailand's tourism industry. Econometric models used in this research were constructed by using GRETL in order to incorporate the specific factors and variables identified for data collection. The quantitative models are as follows:

1) Vector Autoregression (VAR) was used to explore the interdependencies between variables. A VAR model captures the interdependencies between multiple time series variables. In this case, the following variables are considered such as Tourist Arrivals (TA), Tourism Revenue (TR), Cryptocurrency Adoption (CA), Exchange Rates (EX), and Inflation Rates (IF). The VAR model for this study can be expressed as

$$\begin{bmatrix} TA_t \\ TR_t \\ CA_t \\ EX_t \\ IF_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \end{bmatrix} + \sum_{i=1}^{p} \begin{bmatrix} \beta_{11,i} & \beta_{12,i} & \beta_{13,i} & \beta_{14,i} & \beta_{15,i} \\ \beta_{21,i} & \beta_{22,i} & \beta_{23,i} & \beta_{24,i} & \beta_{25,i} \\ \beta_{31,i} & \beta_{32,i} & \beta_{33,i} & \beta_{34,i} & \beta_{35,i} \\ \beta_{41,i} & \beta_{42,i} & \beta_{43,i} & \beta_{44,i} & \beta_{45,i} \\ \beta_{51,i} & \beta_{52,i} & \beta_{53,i} & \beta_{54,i} & \beta_{55,i} \end{bmatrix} \begin{bmatrix} TA_{t-i} \\ TR_{t-i} \\ CA_{t-i} \\ EX_{t-i} \\ IF_{t-i} \end{bmatrix} + \begin{bmatrix} \epsilon_{1,t} \\ \epsilon_{2,t} \\ \epsilon_{3,t} \\ \epsilon_{4,t} \\ \epsilon_{5,t} \end{bmatrix}$$

where $\epsilon_{1,t}$,..., $\epsilon_{5,t}$ are the error terms.

2) The Autoregressive Distributed Lag (ARDL) Model allowed for the investigation of both short-term and long-term relationships between cryptocurrency adoption and tourism-related variables. The variables considered are Cryptocurrency Adoption (CA), Tourist Arrivals (TA), Inflation Rate (INF), Investment in Tourism (INV), and GDP. The ARDL model is specified as

$$TR_t = \alpha + \sum_{i-1}^{p} \beta_1 CA_{t-i} + \sum_{i-1}^{q} \beta_2 TA_{t-i} + \sum_{i-1}^{r} \beta_3 INF_{t-i} + \sum_{i-1}^{s} \beta_4 INV_{t-i} + \sum_{i-1}^{t} \beta_5 GDP_{t-i} + \epsilon_t$$

Evaluation could be done by conducting Bounds testing for cointegration to check if long-term relationships exist between the variables and Error Correction Model (ECM), if cointegration was found, an ECM would be estimated to capture short-term deviations from the long-term equilibrium.

ARDL was selected instead of machine learning models such as LSTM (Long Short-Term Memory) due to its interpretability, suitability for small-to-medium-sized datasets, and its ability to model both short-run and long-run dynamics. ARDL also allows cointegration analysis in datasets with mixed integration orders (I(0) and I(1)), making it more appropriate given the econometric nature of the study and the availability of macroeconomic time series data.

3) The Johansen Cointegration Test was used to assess whether a long-term equilibrium existed between cryptocurrency adoption and tourism revenue. When such relationships were found, ECM captured short-term deviations from this equilibrium. It identifies long-term equilibrium relationships between variables such as Cryptocurrency Adoption (CA), Tourism Revenue (TR), Exchange Rates (EX), Consumer Price Index (CPI), and Long-term Tourism Infrastructure Investment (INV). The long-term relationship could be represented by

$$TR_t = \beta_1 CA_t + \beta_2 EX_t + \beta_3 CPI_t + \beta_4 INV_t + \mu_t$$

If cointegration is found, an ECM is formulated as:

$$\Delta TR_t = \gamma_0 + \gamma_1 \Delta CA_t + \gamma_2 \Delta EX_t + \gamma_3 \Delta CPI_t + \gamma_4 \Delta INV_t + \lambda(TR_{t-1} - \beta_1 CA_{t-1} - \beta_2 EX_{t-1} - \beta_3 CPI_{t-1} - \beta_4 INV_{t-1}) + \epsilon_t$$

where λ is the speed of adjustment to the long-term equilibrium.

4) Panel data models were applied to analyze the data across different regions, employing Fixed Effects or Random Effects models to understand regional differences in the impact of cryptocurrency on tourism. The variables include Regional Tourist Arrivals (*TA_{i,t}*), Regional Tourism Revenue (*TR_{i,t}*), Cryptocurrency Adoption (*CA_{i,t}*), Regional Economic Indicators (*REI_{i,t}*), and Government Policies (*GP_{i,t}*). For a fixed effects model

$$TR_{i,t} = \alpha_i + \beta_1 CA_{i,t} + \beta_2 REI_{i,t} + \beta_3 GP_{i,t} + \epsilon_{i,t}$$

For a random effects model

$$TR_{i,t} = \alpha_i + \beta_1 CA_{i,t} + \beta_2 REI_{i,t} + \beta_3 GP_{i,t} + u_i + \epsilon_{i,t}$$

where u_i is the random effect for each region. Evaluation could be done by conducting Hausman test to determine whether fixed or random effects should be used and within and between estimators would show how the variables affect tourism revenue at both the regional and national levels.

5) The Difference-in-Differences (DiD) method was used to compare sectors that had adopted cryptocurrency payments with those that had not, allowing for the analysis of the direct effects on payment costs. The variables are: Adoption (*A_{i,t}*) and Tourism Revenue (*TR_{i,t}*). The DiD model is formulated as:

$$TR_{i,t} = \alpha + \beta_1 A_{i,t} + \beta_2 Post_{i,t} + \beta_3 (A_{i,t} + Post_t) + \epsilon_{i,t}$$

where β_3 is the coefficient of interest, representing the differential effect of cryptocurrency adoption. Evaluation could be done by testing significance of the interaction term that would show whether cryptocurrency adoption has a statistically significant impact on tourism revenue and parallel trends assumption would be checked to validate the model.

Data Collection

For the quantitative component, secondary data were gathered from various reputable sources. This included government tourism statistics from agencies such as the Tourism Authority of Thailand (TAT) and the Ministry of Tourism and Sports, which provided information on tourist arrivals, tourism revenue, and demographic details of travelers. Additionally, cryptocurrency transaction data were collected from cryptocurrency exchanges and financial reports, focusing on the adoption and usage of cryptocurrencies in Thailand. Economic indicators related to cryptocurrency, such as exchange rates and market trends, were also sourced from financial databases and economic reports.

A total of 360 quarterly observations were compiled across five key indicators from 2015 to 2024, covering 36 data points per variable. Table 1 shows the variables used in the quantitative analysis and their sources.

Table 1 Summary of Quantitative Variables and Data Sources

Variable	Description	Source
Tourist Arrivals (TA)	Number of foreign tourists per quarter	TAT, Ministry of Tourism and Sports
Tourism Revenue (TR)	Quarterly tourism receipts	Bank of Thailand, NESDC
Cryptocurrency Adoption (CA)	Proxy index of transactions and wallets	CryptoCompare, Chainalysis, Binance
Exchange Rates (EX)	THB/USD exchange rate	Bank of Thailand, IMF
Inflation Rate (INF)	Consumer Price Index (CPI)	World Bank, Thai NESDC

For the qualitative component, data were collected through focus group discussions with industry experts and travelers in Bangkok. Participants were identified through purposive sampling to include a diverse range of perspectives, including tourism operators, financial service providers, foreign travelers, and business travelers. The interviews aimed to explore their experiences, challenges, and insights regarding cryptocurrency adoption in the tourism sector. A total of eight informants were included, as clarified below. Table 2 presents the detailed profile of the participants.

Table 2 Focus Group Participants

Participant No.	Role/Profession	Age	Stakeholder Group
1	Hotel Manager	42	Tourism Industry
2	Tour Operator	34	Tourism Industry
3	Cryptocurrency Specialist	29	Financial Services
4	Banking Professional	48	Financial Services
5	Foreign Traveler	27	Consumer
6	Foreign Traveler	52	Consumer
7	Corporate Executive	40	Business Traveler
8	Entrepreneur (Business Travel)	36	Business Traveler

All interviews were semi-structured and conducted in Bangkok. Discussions were recorded, transcribed verbatim, and analyzed thematically using NVivo software. Thematic coding identified cross-cutting patterns relating to perceived advantages, regulatory concerns, usage behavior, and trust in crypto-based payment systems.

Data Analysis

For Research Objective 1, which aimed to assess the impact of cryptocurrency adoption on tourism revenue and related economic indicators, several statistical techniques were employed. VAR was used to analyze the interdependencies between time-series variables. The ARDL model was applied to examine both short-term and long-term relationships. The Johansen Cointegration Test was employed to determine if there was a long-term equilibrium relationship, followed by the ECM to capture short-term deviations.

For Research Objective 2, which focused on exploring the perceptions and experiences of industry experts and travelers regarding cryptocurrency adoption, qualitative analysis techniques were employed. Thematic analysis was conducted using a deductive-inductive approach. Codes were categorized under themes such as “regulatory concern,” “perceived usefulness,” and “digital readiness.” Inter-coder reliability was checked, and triangulation was applied to enhance credibility.

Results

Table 3 Descriptive Statistics of Variables (n = 36 months)

Variable	Mean	Median	Min	Max	STDEV	Variance	Skewness	Kurtosis
Tourist Arrivals (000s)	2022.75	2230.00	134.00	3350.00	933.50	871429.51	-0.78	-0.35
Tourism Revenue (Billions)	229.27	252.76	15.19	379.71	105.81	11195	0.24	-1.08
Crypto Adoption (%)	10.17	10.50	5.00	15.00	2.60	6.77	0.26	-0.72
Exchange Rate (THB/USD)	34.98	34.88	32.62	37.92	1.34	1.80	0.09	-0.76
Inflation Rate (%)	3.41	3.45	2.50	4.20	0.48	0.23	-0.25	-0.58
Foreign Tourism Investment (Millions)	313.06	310.00	230.00	400.00	44.20	1953.25	0.12	-0.50
GDP (Billion)	1266.52	1255.73	1025.87	1526.33	144.87	20985.97	0.16	-1.11
Consumer Price Index	114.44	113.38	102.66	130.09	8.30	68.87	0.32	-1.11
Longterm Investment (Millions)	608.77	150.00	100.00	200.00	24.14	582.54	0.03	-0.51
Regional Tourism Data (000s)	404.55	446.00	26.80	670.00	186.70	34857.18	-0.78	-0.35

Variable	Mean	Median	Min	Max	STDEV	Variance	Skewness	Kurtosis
Government Policy Score (0-10)	7.97	8.00	7.00	9.00	0.56	0.31	-0.01	0.50
Sectors Adopting Crypto (000s)	11.78	12.00	10.00	14.00	1.20	1.43	0.14	-0.77
Sectors Not Adopting Crypto (000s)	10.08	10.00	8.00	12.00	0.97	0.94	0.43	0.11
Payment Costs (THB)	154.86	155.00	135.00	175.00	10.99	120.69	0.16	-0.98
Customer Satisfaction Score (1-10)	7.75	8.00	6.00	9.00	0.87	0.76	0.25	-0.81

Table 3 presents key descriptive statistics for Thailand's tourism sector, highlighting trends and variability across multiple variables. Monthly tourist arrivals averaged 2.02 million (SD = 933.50), showing moderate fluctuations, with a left-skewed distribution (-0.78). Tourism revenue averaged 229.27 billion THB, peaking at 379.71 billion THB, with a balanced distribution (skewness = 0.24). Cryptocurrency adoption averaged 10.17%, ranging from 5% to 15%, with a slight positive skew (0.26). The THB/USD exchange rate averaged 34.98 (SD = 1.34) with a mild right skew (0.09). Inflation remained stable at 3.41% (SD = 0.48), with near-zero skewness (0.09). Foreign tourism investment averaged 313.06 million THB (range: 230M–400M), showing a slight right skew (0.12). GDP stood at 1,266.52 billion THB, with minor right skewness (0.16). The Consumer Price Index (CPI) averaged 114.44 (range: 102.66–130.09), with a low skewness (0.32). Long-term investment in tourism was 608.77 million THB (SD = 24.14), showing a right-skewed tendency (0.03). Regional tourism data averaged 404,550 tourists per month (SD = 186.70), with a left-skewed distribution (-0.78). The government policy score averaged 8/10 (SD = 0.56), indicating consensus on policy effectiveness. On average, 12 sectors adopted cryptocurrency, compared to 10 that did not, with a right-skewed trend (0.14). Payment costs averaged 155 THB per transaction (SD = 10.99), with a nearly symmetrical distribution.

Customer satisfaction with payment methods averaged 7.75 (SD = 0.87), with a slight negative skew (-0.25), suggesting generally positive experiences.

Table 4 The Vector Autoregression (VAR) Test and Results

Test	Statistic Value	Critical Value	P-Value	Conclusion
Stationarity Test (ADF)	-3.5	-3	0.0012	Stationary (reject H0)
Lag Length Selection (AIC)	2			Optimal Lag: 2
Granger Causality Test	Chi-sq: 10.25	5.99	0.0015	Causality exists
Impulse Response Function	Positive shock response in revenue			Sustained for 6 months
Variance Decomposition	Revenue: 70% from arrivals			Major influence from arrivals

VAR Model Results	Tourist Arrivals	Tourism Revenue	Cryptocurrency Adoption	Exchange Rates	Inflation Rates
Lag Length (AIC)	2	2	2	2	2
Impulse Response (tourist arrivals)	Positive shock led to an increase in tourism revenue for up to 6 months before tapering off	--	--	--	--
Granger Causality	Granger-caused tourism revenue (5% significance level)	--	Granger-caused by tourist arrivals and cryptocurrency adoption	--	--
Tourist Arrivals -> Tourism Revenue	**1% increase** in tourist arrivals -> **0.8% increase** in tourism revenue (next month)	--	--	--	--

VAR Model Results	Tourist Arrivals	Tourism Revenue	Cryptocurrency Adoption	Exchange Rates	Inflation Rates
Tourism Revenue -> Tourist Arrivals	--	**1% increase** in tourism revenue -> **0.5% increase** in tourist arrivals	--	--	--
Cryptocurrency Adoption	--	**5% -> 15% increase** in crypto adoption -> **1.2% increase** in tourism revenue	Positive impact on tourism revenue	--	--
Exchange Rates (Baht depreciation)	**5% depreciation** in Baht -> **2% increase** in tourist arrivals	--	--	Affects tourist arrivals	--
Inflation Rates	--	**1% increase** in inflation -> **0.7% decrease** in tourism revenue	--	--	Negative impact on revenue

Table 4 presents key econometric findings on the dynamics of Thailand's tourism sector. The Akaike Information Criterion (AIC) identified an optimal lag length of 2 for all variables. The Impulse Response Function showed that a positive shock in tourist arrivals led to increased tourism revenue for up to 6 months before stabilizing. Granger causality tests confirmed that tourist arrivals predict tourism revenue, while cryptocurrency adoption influences both arrivals and revenue. A bidirectional relationship was found between tourist arrivals and revenue, with a 1% increase in arrivals boosting revenue by 0.8% and vice versa by 0.5%. Cryptocurrency adoption positively impacted tourism revenue, with a rise in adoption

from 5% to 15% increasing revenue by 1.2% per month. Exchange rate fluctuations were significant, as a 5% depreciation in the Thai Baht led to a 2% rise in foreign tourist arrivals. Inflation had a negative effect, with a 1% increase reducing tourism revenue by 0.7%, highlighting the sensitivity of tourist spending to price stability. Lag 2 in the VAR model indicates that the model considers the values of each variable from the past two months (t–1 and t–2) to predict current outcomes. This was determined using the Akaike Information Criterion (AIC), which minimized model error with this lag specification.

Table 5 The ARDL Test and Results

Test	Statistic Value	Critical Value	P-Value	Conclusion
Bounds Testing for Cointegration	F-stat: 5.67	4.49	0.0005	Cointegration exists
Breusch-Godfrey LM Test	LM Statistic: 2.50	Chi-sq(1): 3.84	0.114	No serial correlation
Breusch-Pagan Test	BP Statistic: 1.80	Chi-sq(1): 3.84	0.18	Homoscedasticity confirmed
Error Correction Term (ECT)	ECT: -0.56		0.002	Significant speed of adjustment

ARDL Model Results	Long-Run Coefficients	Short-Run Dynamics	Diagnostic Tests
Cryptocurrency Adoption	**1% increase** in crypto adoption -> **1.5% increase** in tourism revenue (long run)	**5% increase** in crypto adoption -> **1.5% rise** in tourism revenue within 3 months	No autocorrelation (Breusch-Godfrey test)
Tourist Arrivals	**1% increase** in tourist arrivals -> **1.2% increase** in tourism revenue (long run)	--	Homoscedasticity (Breusch-Pagan test)
Foreign Investment	**10% increase** in foreign investment -> **3.2% increase** in tourist arrivals (12 months)	--	--
GDP	**1% increase** in foreign investment -> **0.4% increase** in GDP (long run)	--	--

ARDL Model Results	Long-Run Coefficients	Short-Run Dynamics	Diagnostic Tests
Inflation Rates	Negative impact on tourism revenue: **2% increase in inflation -> 1.4% decrease** in revenue (short term)	The impact diminished over time	--
Error Correction Term (ECT)	--	**-0.56**: About 56% of the disequilibrium from the previous period was corrected in the current period	--

Table 5 examines both short-term and long-term relationships among key variables in Thailand's tourism industry. In the long run, a 1% increase in cryptocurrency adoption led to a 1.5% rise in tourism revenue, highlighting the convenience of crypto payments for tourists. Similarly, a 1% increase in tourist arrivals boosted revenue by 1.2%. Foreign investment significantly influenced tourism, with a 10% increase leading to a 3.2% rise in tourist arrivals over 12 months and a 1% increase contributing to a 0.4% GDP growth. In the short term, a 5% increase in cryptocurrency adoption raised tourism revenue by 1.5% within three months, while inflation had a negative impact, with a 2% rise reducing revenue by 1.4% in the first quarter. The error correction term (-0.56) indicated that 56% of disequilibrium was corrected per period. The model passed diagnostic tests, showing no autocorrelation (Breusch-Godfrey test) and homoscedasticity (Breusch-Pagan test), confirming its robustness.

Table 6 Johansen Cointegration and ECM Test and Results

Test	Statistic Value	Critical Value	P-Value	Conclusion
Trace Statistic	40.25	30.5	0.0001	One cointegrating relationship
Max Eigenvalue Statistic	15.3	12.3	0.0034	Confirmed cointegration
Likelihood Ratio Test	LR Statistic: 30.50			Significant relationship

Johansen Cointegration Test and ECM Results	Cointegration Rank	Long-Run Relationships	Error Correction Term (ECT)	Adjustment Speed
Cointegration Rank	1 cointegrating relationship at 5% significance level	--	--	--
Cryptocurrency Adoption	--	**1% increase in crypto adoption -> 0.9% increase in tourism revenue** (long run)	--	--
Exchange Rates	--	**5% depreciation in Thai Baht -> 4% increase in tourist arrivals** (long run)	--	--
Error Correction Term (ECT)	--	--	**-0.72**: indicating rapid adjustment to equilibrium	**Approximately 30% per quarter**

Table 6 shows The Johansen Cointegration Test, which confirmed one cointegrating relationship at the 5% significance level, indicating a stable long-term relationship among cryptocurrency adoption, tourism revenue, and exchange rates. The long-run equation showed that a 1% increase in cryptocurrency adoption led to a 0.9% increase in tourism revenue, while a 5% depreciation in the Thai Baht resulted in a 4% rise in tourist arrivals, emphasizing the importance of exchange rate competitiveness. The Error Correction Model (ECM) revealed a significant negative error correction term (ECT) of -0.72, indicating a rapid adjustment to long-term equilibrium, with approximately 30% of short-term deviations corrected per quarter. This suggests that the tourism sector swiftly responds to shocks, maintaining stability despite short-term fluctuations in cryptocurrency adoption and exchange rates.

Table 7 Panel Data Models Test and Results

Test	Statistic Value	Critical Value	P-Value	Conclusion
Hausman Test	Chi-sq: 15.20	11.07	0.0035	Fixed effects model preferred
F-Test for Fixed Effects	F-stat: 4.95	F(5, 20) = 2.71	0.006	Significant fixed effects
F-Test for Random Effects	F-stat: 4.96	F(6, 18) = 2.66	0.005	Significant random effects
Breusch-Pagan LM Test	LM Statistic: 5.60	Chi-sq(1): 3.84	0.018	Random effects preferable
Wald Test	Chi-sq: 22.00		0.0001	Joint significance confirmed

Panel Data Model (Fixed Effects)	Coefficient	Interpretation
Tourist Arrivals	0.021	1% increase in tourist arrivals ⟶ 2.1% increase in tourism revenue
Cryptocurrency Acceptance	Significant	Regions with higher cryptocurrency adoption experienced significant increases in tourist arrivals and revenue
R-squared	0.75	Model explains 75% of the variability in tourism revenue across regions
Hausman Test	Favored Fixed Effects	Fixed Effects model chosen based on Hausman test outcome

Panel Data Model (Random Effects)	Coefficient	Interpretation
Cryptocurrency Adoption (CA_{i,t})	β_1=1.8**	A 1% increase in cryptocurrency adoption in a region leads to a 1.8% rise in tourism revenue.
Regional Economic Indicators (REI_{i,t})	β_2=2.3**	A 1% increase in economic indicators (e.g., GDP, employment rates) results in a 2.3% increase in tourism revenue.
Government Policies (GP_{i,t})	β_3=0.9**	A 1-point increase in the government policy score is associated with a 0.9% increase in tourism revenue.
R-squared	0.76	The model explained 71% of the variability in tourism revenue.
Breusch-Pagan LM Test	Random Effects	The Breusch-Pagan LM Test indicated that the Random Effects model was appropriate.

The Fixed Effects Model results in Table 7 highlight that in Bangkok, a 1% increase in tourist arrivals led to a 2.1% rise in tourism revenue, reinforcing the strong positive relationship between tourism inflow and economic gains. Bangkok, with cryptocurrency adoption exceeding 20%, experienced a 5% higher tourism revenue increase compared to lower-adoption regions. Supportive government policies played a crucial role, as regions with policy scores of 8 or higher saw a 7% greater cryptocurrency adoption rate and a 3% increase in tourist arrivals. The model's R-squared of 0.75 indicated that 75% of the variance in tourism revenue was explained by tourist arrivals and cryptocurrency adoption. The Breusch-Pagan LM Test supported the Random Effects Model, which showed that a 1% increase in cryptocurrency adoption in Bangkok led to a 1.8% rise in tourism revenue (β1=1.8), while a 1% improvement in regional economic indicators resulted in a 2.3% revenue increase (β2=2.3%). Government policies also had a measurable effect, with a 1-point increase in the policy score contributing to a 0.9% rise in tourism revenue (β3=0.9%). The Random Effects Model's R-squared of 0.76 confirmed a strong fit, underscoring the significant impact of cryptocurrency adoption, economic indicators, and government policies on Bangkok's tourism revenue. The model explains 76% of the variability in tourism revenue, indicating a strong fit. This judgment aligns with empirical criteria in econometric literature, where an R^2 above 0.70 is generally considered robust for macroeconomic panel data (Wooldridge, 2010).

Table 8 Difference-in-Differences Models Test and Results

Test	Statistic Value	P-Value	Conclusion
Treatment Effect	10% increase	0.0003	Significant impact of adoption
Control Group Change	2% increase		Minimal change without adoption

Difference-in-Differences Results	Treatment Group (Crypto Adoption)	Control Group (No Crypto Adoption)	Difference
Tourism Revenue Increase	10%	2%	8%
Reduction in Payment Costs	15%	0%	15%
Customer Satisfaction Increase	10%	0%	10%
Growth in Tourist Arrivals	7%	2%	5%

The DiD model results in Table 8 indicate that sectors in Bangkok adopting cryptocurrency experienced a 10% increase in tourism revenue, compared to just 2% in non-adopting sectors, reflecting an 8% positive impact. Payment costs in these sectors dropped by 15%, while those without cryptocurrency adoption saw no reduction, highlighting the efficiency of digital payments in lowering transaction fees. Customer satisfaction scores increased by 10% due to the convenience, speed, and security of cryptocurrency payments, which contributed to repeat visits and positive recommendations. Additionally, tourist arrivals grew by 7% in cryptocurrency-supporting sectors, compared to 2% in others, showing a 5% higher growth rate driven by tech-savvy travelers favoring seamless digital transactions. Robustness checks confirmed the consistency of these findings, reinforcing the significant role of cryptocurrency adoption in enhancing Bangkok's tourism revenue, reducing costs, and improving overall visitor satisfaction.

Qualitative Insights from Focus Group Discussions (FGDs)

The FGDs included eight informants: two foreign tourists, two business travelers, one hotel manager, one tour operator, one fintech expert, and one banking professional. Thematic analysis revealed themes such as convenience and trust in cryptocurrency usage.

Concerns about Convenience: "Using crypto saved me time on currency exchange. I just paid from my wallet, and it was done." according to Business Traveler, 36. Tourists appreciated the fast, borderless nature of crypto transactions, especially for lodging and transport.

Concerns about Volatility and Regulation: "Crypto is good, but I'm still not sure how it's taxed or if it's even allowed in every province." according to Foreign Tourist, 27. Many participants expressed concerns over legal clarity and price volatility.

Adoption Challenges in Local Businesses: "We tried accepting crypto last year, but most local customers weren't ready." according to Tour Operator, 34. While some Bangkok-based businesses were crypto-ready, others lacked infrastructure or customer demand.

These findings reinforced the quantitative results. For example, as identified in Table 8 (DiD results), sectors that adopted crypto showed higher customer satisfaction consistent with travelers' own testimonies about payment convenience. Similarly, concerns over volatility aligned with inflation effects seen in ARDL and VAR results.

Discussion

This research aligned with previous studies that highlighted the significance of integrating quantitative and qualitative approaches to understanding emerging financial technologies in tourism. Consistent with Kumar, Gupta, and Singh (2020); Zohar, Alon, & Shachmurove (2021), this study demonstrated that while quantitative models such as Vector Autoregression (VAR), Autoregressive Distributed Lag (ARDL), and Difference-in-Differences (DiD) established a strong relationship between cryptocurrency adoption, tourism revenue, and tourist arrivals, qualitative insights provided crucial context regarding stakeholder perceptions.

Discussion of Objective 1: Impact of Cryptocurrency Adoption on Tourism

The results from econometric models indicated that cryptocurrency adoption had a measurable and statistically significant impact on tourism revenue, tourist arrivals, and transaction efficiency. For instance, the VAR and ARDL models showed that a 1 percent increase in cryptocurrency adoption could lead to an increase in tourism revenue by up to 1.5 percent in the long run. Additionally, the Difference-in-Differences model showed an 8 percent revenue increase in sectors adopting cryptocurrency, further confirming the economic impact of digital currency usage in cross-border tourism.

These findings confirmed the utility of digital currencies in reducing payment frictions, enhancing transaction speed, and lowering costs, which are factors aligned with Transaction Cost Economics and Network Effect theories. As tourists seek faster and more secure payment solutions, cryptocurrencies provide a valuable alternative to traditional methods, particularly for international transactions.

Future trends suggest that cryptocurrency adoption in tourism will continue to grow, especially in tech-savvy destinations such as Bangkok. As more merchants adopt digital wallets and blockchain-enabled platforms, and as central bank digital currencies become more viable, the integration of crypto-based systems into tourism infrastructure is expected to accelerate.

These insights are consistent with the findings of Gonzalez, Ramos, and Smith, (2021), who noted that digital currency adoption enhances competitiveness for tourism destinations, and with Chainalysis (2020), which showed increasing crypto transaction volumes in emerging markets, including Southeast Asia.

Discussion of Objective 2: Perceptions and Experiences of Stakeholders

The qualitative findings derived from focus group discussions enriched the interpretation of the statistical data by revealing stakeholder behaviors, attitudes, and concerns. Participants expressed mixed but evolving attitudes toward cryptocurrency. For example, one hotel manager noted that "Crypto payments reduce the hassle of currency exchange for many of our guests, especially those from tech-forward countries like South Korea." A corporate executive shared that "Trust is still a big issue, without proper regulation, we're hesitant to fully adopt it." These quotes illustrated how real-world decision-making is influenced by both perceived benefits such as efficiency and convenience, and perceived risks such as security and regulation.

Behavioral insights also highlighted generational and educational divides. Younger tourists and entrepreneurs demonstrated higher openness to crypto usage, which echoed the Technology Acceptance Model's constructs of perceived usefulness and ease of use. These findings supported the conclusions of Amoako et al. (2018); Gunter et al. (2020), who emphasized the role of user experience and trust in the adoption of financial technologies.

In addition, the discussions uncovered concerns not fully captured by the quantitative models, including cybersecurity risks, usability challenges in rural areas, and lack of multi-language support in digital wallets. These concerns aligned with the barriers outlined by Morrison and Smith (2023); Zohar (2015), who cited regulatory ambiguity and operational limitations as persistent obstacles to wider adoption.

Furthermore, the data showed that industry experts and travelers believe government intervention is crucial for mainstream adoption. One participant stated that "If the Bank of Thailand supports this with a clear framework, we're ready to move forward." This reflected broader literature, including Arner, Barberis, and Buckley (2017), which highlighted the role of regulatory clarity in digital currency diffusion.

In linking these qualitative insights to the quantitative results, it became evident that perceptions of trust, ease of use, and familiarity are mediating factors that influence the measurable economic impacts. Although the numerical results supported the economic benefits of cryptocurrency adoption, behavioral variables determine the speed and scale of this transformation.

Ultimately, this study supported the perspective that Bangkok had the potential to position itself as a leader in digital tourism payments, provided that regulatory frameworks

were strengthened and awareness campaigns were implemented effectively. By separating the analysis into both impact, which corresponded to Objective 1, and perception, which corresponded to Objective 2, a comprehensive picture emerged. This demonstrated that both economic readiness and human behavior must be addressed to achieve successful integration of cryptocurrency in Thailand's tourism industry.

Conclusions

In conclusion, the findings of this research underscore the potential of cryptocurrency as a transformative tool for enhancing cross-border payments within Thailand's tourism industry. The hybrid approach, which combines quantitative econometric models and qualitative insights from FGDs, has provided a robust understanding of the dynamics involved.

Key conclusions drawn from this study include interdependencies among key variables, long-term relationships, positive impacts of cryptocurrency adoption, awareness and education gaps, challenges to implementation, and future outlook.

VAR analysis revealed significant interdependencies among tourist arrivals, tourism revenue, cryptocurrency adoption, and exchange rates. The results indicated that a 1% increase in tourist arrivals could lead to a 0.8% increase in tourism revenue, thereby highlighting the importance of a robust tourism sector in driving cryptocurrency adoption.

ARDL model indicated a long-run relationship between cryptocurrency adoption and tourism revenue. Specifically, a 1% increase in cryptocurrency adoption was associated with a 1.5% rise in tourism revenue over time, suggesting that as acceptance of cryptocurrency grows, so too will its benefits for the tourism industry. The Johansen Cointegration Test confirmed the existence of a cointegrating relationship between cryptocurrency adoption and tourism revenue, indicating that these variables move together in the long term. The ECM suggested a rapid adjustment to equilibrium, reflecting the significant impact of cryptocurrency on the tourism sector.

Qualitative insights from the FGDs revealed varying levels of awareness and understanding of cryptocurrency among key stakeholders. Younger participants demonstrated greater familiarity and acceptance of cryptocurrency, while older participants expressed hesitancy due to a lack of knowledge and understanding of its implications. The behavioral data highlighted that tourists' decisions to use cryptocurrency are shaped by their digital literacy, risk perception, and prevailing social norms. Tourists from digitally advanced countries,

especially younger generations, viewed cryptocurrency as convenient and secure, whereas others remained cautious.

Participants identified several barriers to the widespread adoption of cryptocurrency within Thailand's tourism sector, including regulatory uncertainties, operational challenges, and concerns regarding security. Nevertheless, industry experts foresee significant future adaptation by entrepreneurs, especially as technological advancements reduce transaction friction and increase mobile integration. Businesses are expected to integrate multi-currency wallets and blockchain-enabled loyalty programs.

The study also revealed that strong support from government policies will be critical. Existing digital economy policies and proposed amendments to financial regulations were cited as enablers of innovation. If backed by legal clarity and institutional support, cryptocurrency can integrate more seamlessly into Thailand's formal tourism infrastructure.

However, several limitations should be acknowledged. The study focused primarily on Bangkok, which may not represent all regions in Thailand. The use of non-random purposive sampling for focus group participants limits the generalizability of the qualitative findings. Furthermore, behavioral assumptions drawn from selected participants may not fully capture the heterogeneity of tourist populations.

In summary, while the transition may be gradual, there is a collective belief that increased awareness, technological adaptation by tourism businesses, and enhanced government support will facilitate the pivotal role of cryptocurrency in shaping the future of cross-border tourism payments in Thailand.

Recommendations

Implementation

1. Develop a clear regulatory framework to guide cryptocurrency use in Thailand's tourism sector with a focus on consumer protection, taxation, and incentives for adoption.

2. Tourism businesses should upgrade their payment systems to accept cryptocurrencies and ensure ease of use for both customers and staff.

3. Implement staff training programs that focus on handling cryptocurrency transactions and addressing customer inquiries effectively.

4. Actively promote cryptocurrency as a payment option to attract tech-savvy travelers and differentiate services from competitors.

5. Educational institutions should introduce cryptocurrency-related topics into curricula and offer workshops to increase public understanding of its benefits and risks.

6. Collaborate between government agencies, financial institutions, and private businesses to create pilot programs testing cryptocurrency payments in tourism hubs.

Future Research

1. Future research should focus on longitudinal studies to track cryptocurrency adoption in Thailand's tourism sector and assess changes in consumer behavior and the impact of regulatory changes over time.

2. Researchers should evaluate the long-term effects of cryptocurrency adoption on business performance, including revenue growth, customer retention, and operational efficiency.

3. Comparative studies examining cryptocurrency adoption in different regions of Thailand and globally will offer insights into regional variations and successful global practices.

4. Investigate how different regulatory frameworks affect the adoption of cryptocurrencies in tourism and identify compliance challenges businesses face.

5. Research should explore emerging technologies, particularly blockchain, and their potential applications beyond payments, such as in supply chain management and identity verification.

6. Focus on the development of user-friendly payment solutions, including platforms and wallets, to facilitate cryptocurrency transactions and encourage adoption.

7. Delve into consumer perceptions and trust regarding cryptocurrency use in tourism, focusing on factors influencing trust and security concerns.

8. Research should examine the socioeconomic impacts of cryptocurrency adoption in tourism, including its effects on local communities, job creation, infrastructure investment, and financial inclusion for underserved populations.

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