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A Statistical analysis of knowledge-attitude-practice on crypto currency in Madurai City

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Abstract
This research explores the dynamic landscape of crypto currency through a comprehensive statistical analysis based on survey data. Investigating various aspects of crypto currency adoption and perceptions, the study delves into user behaviors, preferences, and attitudes within the rapidly evolving crypto ecosystem. Employing advanced statistical methods, the research aims to uncover patterns, trends, and correlations, shedding light on factors influencing crypto currency usage. By synthesizing survey responses, the study provides valuable insights for industry stakeholders, policymakers, and enthusiasts, contributing to a nuanced understanding of the current state and future trajectory of crypto currencies.

Keywords: Crypto currency, blockchain, statistical analysis, trends, and correlations

1. Introduction
Crypto currency, a revolutionary form of digital currency, has rapidly transformed the financial landscape since the advent of Bitcoin in 2009. This introduction aims to unravel the intricate fabric of crypto currency, exploring its technological foundations, diverse types, and the evolving regulatory landscape. At its core, crypto currency operates as a decentralized medium of exchange, facilitated by a computer network and safeguarded by cryptographic techniques. Unlike traditional currencies, crypto currencies exist solely in digital form, relying on a distributed ledger, commonly known as blockchain, to record ownership and transactions securely.

Crypto currencies leverage blockchain technology for decentralized ledgers, ensuring transparency and security through cryptographic principles. They are recognized as a distinct asset class with varied regulatory treatments, often classified as commodities or securities. Bitcoin, introduced in 2009, is the pioneering decentralized crypto currency, with numerous alternatives known as "Altcoins" emerging, showcasing innovation in consensus mechanisms and purposes. As of March 2022, there are 18,465 crypto currencies, but only 10,363 remain active, reflecting continuous evolution. Blockchain, the backbone of crypto currencies, ensures secure and decentralized transaction documentation, giving rise to applications like DeFi, NFTs, and smart contracts. The global regulatory landscape is evolving, with India imposing a 30% tax on crypto trading income and planning to launch a Central Bank Digital Currency (CBDC). This regulatory clarity reflects the government's commitment to monitor and regulate digital currencies. In conclusion, this overview sets the stage for a deeper exploration of the dynamic crypto currency world, emphasizing the importance of understanding its nuances amid ongoing technological, regulatory, and market changes.

2. Review of literature
Mubarak, Hosmani Manjunath (2021) [1] have analysed about the investment risks in both Bitcoin and Gold countries have responded in terms of regulations & legislations towards crypto currencies to develop a clear picture of its impact on various laws in India in order to regulate it.

Sunita Dasman (2021) [2] explored Bitcoin's investment potential in Indonesia, conducting a comprehensive analysis of its returns compared to stock, gold, and the rupiah exchange rate from 2011 to 2020. The study, based on 120 data points for each investment instrument, revealed that Bitcoin outperformed with an 18% return and a 61% standard deviation, emphasizing its distinct characteristics in contrast to other investments.

This research provides valuable insights for potential Bitcoin investors and contributes to crypto currency development in Indonesia, offering pertinent information for government stakeholders.

Sejung Park and Han Woo Park (2020) demonstrated the effectiveness of Tableau and semantic network analysis for visual analytics in the blockchain domain, analyzing sentiment and communication strategies on Twitter. Their comparative study found that while emotional language did not influence crypto currency reputations, reputable firms employed diverse cultural and social media marketing strategies for broader outreach, underscoring the informative role of visual big data analytics in shaping well-informed business policies.

Muhammad Ashraf FAUZI *et al*. (2020) [3] has discussed about the opportunities in the crypto currency such as the security of its technology, low transaction cost and high investment return and discussed within law and regulation, high energy consumption, possibility of crash and bubble, and attacks on network.

Muhammad Umar *et al*. (2020) [4] has studied the connectedness between crypto currency and major stock markets by using asymmetric dynamic conditional correlation and wavelet coherence approaches they conclude that potential avenues for diversification for investors across crypto currencies and major stock markets.

Višnja Jurić *et al*. (2019) [5] have analyzed the comparison of the most 30 influential crypto currencies based on the "CoinMarketCap" web page. Over the last few years, an increasing number of the world's population is investing in the crypto currency market. The emphasis is placed on Bitcoin, which is the absolute leader in this market. The difference between electronic money and virtual currency is explained by the history of crypto values.

Vladimir N. Soloviev *et al*. (2019) [6] showcased the potential for constructing indicators of critical and crash phenomena in both the crypto currency and traditional stock markets. By integrating the empirical cross-correlation matrix with Random Matrix Theory, their study focused on examining the statistical properties of cross-correlation coefficients, demonstrating that the largest eigenvalue serves as a sensitive predictor of market falls in both sectors.

3. About data study and Objectives

3.1 problem of the study

As per the report of 2021, India recorded the second-highest number of crypto currencies users around the world. Though the government of India has not legalized crypto currency trading, as per the Union Budget 2022, the government has regularized crypto assets. The above statements explain the current position of crypto currency in India. So, in this paper we focus on the crypto currency awareness and perception of the people of Madurai city.

3.2 Objectives

- To analyze which age groups are interested in crypto currency trading.
- To study whether social media has an influence on crypto currency trading.
- To know about a person who trades on Share Market shows the same interest in crypto currency trading.

3.3 Sources of data

In this paper 170 (primary) data have been collected from both online and offline data collection methods. For online data collection, Google forms are used. 106 data collected through online and the remaining 64 data have been collected through the offline method.

3.4 Variables

Twenty seven variables have been collected. Among them eight variables contain demographic information, such as, Name, Age, Gender, Marital status, Area of living, Education, Occupation, and Salary. Among them, three variables were answered by all 170 respondents. These variables contain information about their level of trading experience, their share market trading experience, and their awareness of crypto currency.

Those who are aware of crypto currency answer the following these three section of questions.

- Knowledge
- Attitude
- Practice

The “Knowledge” section contains six variables, which measures their knowledge about crypto currency. The “Attitude” section contains five variables that measure their opinion about crypto currency. The “Practice” section contains five variables that measure their crypto currency trading experience. The options in each question are either multiple choice or Likert Scale Rating type.

4. Analysis-interpretation

4.1 Observation in Madurai City on Crypto Currency (Descriptive Statistics)

- 29.41% of people are well known about crypto currency, 38.24% of people partially known about crypto currency and 32.35% of people are unaware about crypto currency.
- 41.7% of people are having low level knowledge about crypto currency, 57.4% having moderate level of knowledge about crypto currency and 0.9% of people having high level knowledge about crypto currency.
- 73.91% of people acknowledged about less than 10 number of crypto currencies, 22.61% of people acknowledged about 10-50 number of crypto currencies and remaining 3.48% of people acknowledged about more than 10 number of crypto currencies.
- 26.96% of people came to acknowledge about crypto currency only because of the Union Budget 2022.
- 27.83% of people came to know about crypto currency because of their friends/well wishers, the majority of the people (60.87%) came to know about crypto currency only because of Social Media and remaining 11.30% people came to know about crypto currency by other sources.
- Majority of people’s (46.96%) opinion about Crypto currency is ‘More risk’.
- 23.48% of people not consider crypto currency as an alternative investment and remaining 76.52% of people consider crypto currency as an alternative investment.
- 23.48% of people not consider crypto currency as a replacement of fiat currencies and remaining 76.52% of people consider crypto currency as a replacement of fiat currencies.
- 86.95% of people are aware about the Union Budget 2022.
- 69.57% of people wants Crypto currency Regulation.
- 55.29% of people having lowest trading knowledge, 42.94% people having moderate trading knowledge and 1.76% having highest trading knowledge.
- Male having higher percentage of crypto knowledge and they are showing more interest in crypto currency trading.

- Though '20- 30' age group people having knowledge about crypto currency and considering crypto as an alternative investment '30- 40' age group people shows more interest in crypto trading.
- Married people shows more interest in crypto currency trading.
- People whose having private job shows more interest in crypto currency trading.
- People with higher monthly salary shows more interest in crypto currency trading.
- 30.9% of people specify their reason for not traded on crypto currency as 'technically not strong'. 26.6% of people specify their reason as 'Economically not strong'. 14.9% of people specify their reason as 'Value fluctuations'. 12.8% of people specify their reason as 'Controlling given to friends/well wishers' and 14.9% of people specify other reasons.

4.2 Correlation Tests among the study on crypto currency:

Table 1: Spearman's Rho Correlation test among the different variables

S. No	Spearman's Rho Correlation Test	Sig. (2-tailed)
1	Crypto trade & Share Market Trade	0.000
2	Trading experience & Crypto Trade	0.014
3	Crypto knowledge & Crypto Trade	0.000
4	Salary & Crypto trade	0.000
5	Occupation & Crypto trade	0.000

Results

1. As, $p<0.05$, there is significance. Hence we conclude that there is a significant relationship between Crypto trading and Share Market trading.
2. As, $p<0.05$, there is significance. Hence we conclude that there is a significant relationship between trading experience and Crypto trading.
3. As, $p<0.05$, there is significance. Hence we conclude that there is a significant relationship between Crypto knowledge and Crypto trading.
4. As, $p<0.05$, there is significance. Hence we conclude that there is a significant relationship between Salary and Crypto trading.
5. As, $p<0.05$, there is significance. Hence we conclude that there is a significant relationship between Occupation and Crypto trading.

4.3 Chi-square test for goodness of fit among the study on crypto currency

H_0: There is no significant difference among the information factors of Crypto knowledge.
H_1: There is a significant difference among the information factors of Crypto knowledge.

Table 2: Calculations for Chi-square on Information factors of Crypto knowledge

Information Factors	Frequency	Percent	Chi-Square value	P-Value
Friends/ Well-wishers	32	27.83	43.948	0.000
Social Media	70	60.87		
Others	13	11.30		
Total	115	100		

Result: As, $p<0.05$, there is significance. The above table shows that among the information factors Social media impacts larger than the others.
H_0: There is no significant difference among the Crypto wallet users.
H_1: There is a significant difference among the Crypto wallet users.

Table 3: Calculations for Chi-square on types of crypto wallet users

Types of Crypto wallet	Frequency	Percent	Chi-Square value	p-value
Paper wallet	2	9.5	17.429	0.000
Software wallet	16	76.2		
Hardware wallet	3	14.3		
Total	21	100		

Result
As, $p<0.05$, there is significance. From the above table, 76.2% Crypto traders uses Software wallets.
H_0: There is no significant difference among the Crypto exchange app users.
H_1: There is a significant difference among the Crypto exchange app users.

Table 4: Calculations for Chi-square on Crypto exchange app users

Crypto exchange apps	Frequency	Percent	Chi-square value	p-value
Coinbase	4	19.0	3.286	0.656
Zebpay	2	9.5		
CoinSwitch	4	19.0		
WazirX	6	28.6		
Vauld	0	0		
Binance	3	14.3		
Others	2	9.5		
Total	21	100		

Result
As, $p>0.05$, there is insignificance. From the above table, 28.6% people use Wazir X, 19% people use Coinbase and Coin Switch, 14.3% people use Binance, 9.5% people use Zebpay and 9.5% people use other exchange apps.
H_0: There is no significant difference among the influencing factors.
H_1: There is no significant difference among the influencing factors.

Table 5: Calculations for Chi-square on influencing factors

Influencing factors	Frequency	Percent	Chi-Square value	p-value
Personal interest	5	23.8	1.143	0.565
Suggestions given by friends/well-wishers	7	33.3		
Suggestions given by social media influencers	9	42.9		
Total	21	100		

Result
Since, $p>0.05$, There is insignificance. Though there is an insignificance difference among the influencing factors, the above table shows that 40% people's app selection and Crypto wallet selection decisions are influenced by Social Media influencers.

H_0: There is no association between Age and Crypto trading

H_1: There is an association between Age and Crypto trading

Table 6: Calculations for Chi-square on Age and Crypto trading

Crypto trade	Age						Total	Chi- square value	P value
	20-30	30-40	40-50	50-60	60-70	70-80			
Yes	7 (33.3) [6.6]	10 (47.6) [37.0]	4 (19.1) [23.5]	0 (0.0) [0.0]	0 (0.0) [0.0]	0 (0.0) [0.0]	21 (100.0) [12.4]	23.211	0.000
No	99 (66.4) [93.4]	17 (11.4) [63.0]	13 (8.7) [76.5]	14 (9.4) [100.0]	2 (1.4) [100.0]	4 (2.7) [100.0]	149 (100.0) [87.6]		
Total	106 (62.4) [100.0]	27 (15.9) [100.0]	17 (10.0) [100.0]	14 (8.2) [100.0]	2 (1.2) [100.0]	4 (2.3) [100.0]	170 (100.0) [100.0]		

Note: 1.The value within ( ) refers Row percentage
2. The value within [ ] refers Column percentage

Result

Since, $p<0.05$, there is an association between age and Crypto trading. Among 12.4% Crypto traders
47.6% traders are from the age group of 30-40.

H_0: There is no association between Share Market trading and Crypto trading

H_1: There is an association between Share Market and Crypto trading

Table 7: Calculations for Chi-square on Share Market and Crypto trading

Crypto trade	Share Market trade		Total	Chi-square value	p-value
	Yes	No			
Yes	19 (90.5) [50.0]	2 (9.5) [1.5]	21 (100.0) [12.4]	64.064	0.000
No	19 (12.8) [50.0]	130 (87.2) [98.5]	149 (100.0) [87.6]		
Total	38 (22.4) [100.0]	132 (77.6) [100.0]	170 (100.0) [100.0]		

Note: 1.The value within ( ) refers Row percentage,
2. The value within [ ] refers Column percentage

Result

Since, $p<0.05$, we concluded that there is an association between Share Market trading and Crypto trading. From the above table, it shows that 50% share market traders are also trades on Crypto currency.

H_0: There is no association between Salary and Crypto trading

H_1: There is an association between Salary and Crypto trading

Table 8: Calculations for Chi-square on Salary and Crypto trading

Crypto trade	Salary					Total	Chi- square value	p-value
	Nil	Below 15,000	15,000-30,000	30,000-45,000	Above 45,000			
Yes	2 (9.5) [2.2]	4 (19.0) [20.0]	3 (14.3) [18.8]	3 (14.3) [23.1]	9 (42.9) [32.1]	21 (100.0) [12.4]	22.135	0.000
No	91 (61.1) [97.8]	16 (10.7) [80.0]	13 (8.7) [81.2]	10 (6.7) [76.9]	19 (12.8) [67.9]	149 (100.0) [87.6]		
Total	93 (54.7) [100.0]	20 (11.8) [100.0]	16 (9.4) [100.0]	13 (7.6) [100.0]	28 (16.5) [100.0]	170 (100.0) [100.0]		

Note: 1.The value within ( ) refers Row percentage
2. The value within [ ] refers Column percentage

Result

Since, $p<0.05$, we concluded that there is an association between Salary and Crypto trading. From the above table, it shows that, 42.9% people, whose salary is above 45,000 are showing more interest on crypto trading.

H_0: There is no association between Occupation and Crypto trading

H_1: There is an association between Occupation and Crypto trading

Table 9: Calculations for Chi-square on Occupation and Crypto trading

Crypto trading	Occupation						Total	Chi- square value	P- value
	Government job	Private job	Business	Daily wages	Students	Other s			
Yes	2 (9.5) [25.0]	11 (52.4) [21.6]	6 (28.6) [46.2]	0 (0.0) [0.0]	2 (9.5) [2.8]	0 (0.0) [0.0]	21 (100) [12.4]	28.66	0.00
No	6 (4.0) [75.0]	40 (26.8) [78.4]	7 (4.7) [53.3]	4 (2.7) [100]	70 (47.0) [97.2]	22 (14.8) [100]	149 (100) [87.6]		
Total	8 (4.7) [100]	51 (30.0) [100]	13 (7.6) [100]	4 (2.4) [100]	72 (42.4) [100]	22 (12.9) [100]	170 (100) [100]		

Note: 1.The value within ( ) refers Row percentage
2. The value within [ ] refers Column percentage

Result

Since, $p<0.05$, we concluded that there is an association between Occupation and Crypto trading. From the above table, it shows that 52.4% people who works on private job shows more interest on Crypto currency trading.

H_0: There is no association between Gender and Crypto trading

H_1: There is an association between Gender and Crypto trading

Table 10: Calculations for Chi-square on Gender and Crypto trading

Crypto trade	Gender		Total	Chi-square value	p-value
	Male	Female			
Yes	15 (71.4) [18.5]	6 (28.6) [6.7]	21 (100.0) [12.4]	5.432	0.020
No	66 (44.3) [81.5]	83 (55.3) [93.3]	149 (100.0) [87.6]		
Total	81 (47.6) [100.0]	89 (52.4) [100.0]	170 (100.0) [100.0]		

Note: 1.The value within ( ) refers Row percentage
2. The value within [ ] refers Column percentage

Result

Since, $p<0.05$ we concluded that there is an association between Gender and Crypto trading. From the above table, among the crypto traders, 71.4% are male traders.

H_0: There is no association between Marital Status and Crypto trading

H_1: There is an association between Marital Status and Crypto trading

Table 11: Calculations for Chi-square on Marital Status and Crypto trading

Crypto trading	Marital Status		Total	Chi-square value	p-value
	Single	Married			
Yes	6 (28.6) [6.0]	15 (71.4) [21.4]	21 (100.0) [12.4]	9.0593	0.003
No	94 (63.1) [94.0]	55 (36.9) [78.6]	149 (100.0) [87.6]		
Total	100 (58.8) [100.0]	70 (41.2) [100.0]	170 (!00.0) [100.0]		

Note: 1.The value within ( ) refers Row percentage
2. The value within [ ] refers Column percentage

Result

Since, $p<0.05$, we concluded that there is an association between marital status and Crypto trading. From the above table, it shows that, among the 12.4% crypto traders, 71.4% are Married traders.

4.4 Mann Whitney U-test among the study on crypto currency

1. H_0: There is no significant difference between Mean Rank of gender with respect to Crypto opinion.

H_1: There is significant difference between Mean Rank of gender with respect to Crypto opinion.

2. H_0: There is no significant difference between Mean Rank of gender with respect to Level of knowledge about crypto currency.

H_1: There is significant difference between Mean Rank of gender with respect to Level of knowledge about crypto currency.

3. H0: There is no significant difference between Mean Rank of gender with respect to Experience of trading knowledge.

H1: There is significant difference between Mean Rank of gender with respect to Experience of trading knowledge.

Table 12: Calculations for Mann Whitney U-test on Mean Rank of gender with respect to different variables

Variables	Mean Rank of Gender		p-value
	Male	Female	
Crypto opinion	65.47	50.91	0.004
Level of knowledge About crypto currency	65.81	50.58	0.011
Trading Experience	94.27	77.52	0.011

Results

1. As, $p<0.05$, hence we conclude that there is significant difference between Mean Rank of gender with respect to Crypto opinion.
2. As, $p<0.05$, hence we conclude that there is significant difference between Mean Rank of gender with respect to Level of knowledge about crypto currency.
3. As, $p<0.05$, hence we conclude that there is significant difference between Mean Rank of gender with respect to Experience of trading knowledge.

4.5 Kruskal-wallis test among the study on crypto currency

H_0: There is no significant difference between Mean Rank of occupation with respect to Experience of trading knowledge.

H_1: There is significant difference between Mean Rank of occupation with respect to Experience of trading knowledge.

Table 13: Calculations for Kruskal-wallis test on Mean Rank of occupation with respect to Experience of trading knowledge

Variable	Mean rank of Occupation						Chi- square value	p- value
	Government Job	Private Job	Business	Daily wages	Students	Others		
Experience of trading knowledge	78.81	89.03	111.73	47.50	86.93	66.48	13.081	0.02

Result

As, $p<0.05$, hence we conclude that there is significant difference between Mean Rank of occupation with respect to Experience of trading knowledge.

H_0: There is no significant difference between Mean Rank of Salary with respect to Experience of trading knowledge.

H_1: There is significant difference between Mean Rank of Salary with respect to Experience of trading knowledge.

Table 14: Calculations for Kruskal-wallis test on Mean Rank of Salary with respect to Experience of trading knowledge

Variable	Mean Rank of Salary					Chi- square value	p-value
	Nil	<15,000	15,000-30,000	30,000-45,000	>45,000		
Experience of trading knowledge	79.82	68.38	109.66	92.46	99.55	13.376	0.010

Result

As, $p<0.05$, hence we conclude that there is significant difference between Mean Rank of Salary with respect to Experience of trading knowledge.

4.6 Correspondence analysis among the study on crypto currency

1. The relationship between Crypto currency as an Alternative investment and Crypto currency as a Fiat currency replacement.

Table 15: Calculations for Correspondence analysis on Crypto currency as an Alternative investment and Crypto currency as a Fiat currency replacement

Alternative investment	Fiat replace			
	Yes	No	May be	Active Margin
Yes	12	6	14	32
No	2	15	10	27
May be	9	6	41	56
Active Margin	23	27	65	115

5. Conclusion and Findings

1. Among 170 respondents, 67.65% of people are aware of crypto currency and, 12.4% of people traded.
2. People consider trading in crypto currency to be very risky but it is an alternative investment.
3. Social media plays an important role in crypto currency trading. Since among 115 respondents, 60.87% of people are aware only because of social media, and among 21 crypto traders, 42.9% of people are influenced by social media influencers.
4. Union Budget 2022 informs 26.96% of people about crypto currency.
5. Most people give good ratings about the taxation of virtual digital assets whereas Male respondents showed more interest in crypto trading; 30-40 age group people showed more interest in crypto trading and Married persons showed more interest in crypto trading.
6. People who have private jobs and have higher salaries showed more interest in crypto trading.
7. People who traded on the share market showed the same interest in crypto trading. Among 38 Share Market traders, 50% of people also trade in crypto currency.
8. Among 21 Crypto traders, most of the people prefer software wallets as their crypto wallet.
9. Most of them prefer WazirX as their crypto exchange app.

6. Suggestions

1. Crypto currency usage may be increased with an implementation of legalizing or keeping crypto currency trade under the control of government.
2. Authorized agents or officers to be developed for monitoring crypto currencies.
3. To avoid the loosing of current currencies through theft or any other activity the replacement of crypto currencies will solve these issues.

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