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Construction of a Scale to Assess the Attitude Towards Digital Money among Indians

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ABSTRACT

The Budget Announcement for F.Y. 2022-23 has brought a positive impetus to the world of crypto-trading. By regulating the income from Virtual Digital Assets like cryptocurrencies and NFTs, the government has given a green signal for the growth of digital money in the Indian Market. To further embrace the opportunities that can be opened through the crypto-market, the government has introduced the Digital Rupee, which will be a Central Bank Digital Currency (CBDC) launched and regulated by RBI. In this situation, it is imperative to assess the public's attitudes towards digital assets in order to be able to predict their consumption and investment behaviour. Despite the steady popularity of digital assets and their gradual acceptance, there is still a lack of availability of a suitable attitude scale to measure people's attitude towards digital money, especially in the Indian context.

In this paper, an attempt has been made to construct a reliable attitude scale that can accurately assess the attitude of Indians towards digital money. The scale was administered on 104 Indian nationals and a 5-point Likert scale was used for rating. Exploratory Factor Analysis was used for statistical analysis. Findings revealed a highly reliable (Cronbach alpha=0.86) six-dimensional attitude scale with 25 statements.

INTRODUCTION

Human Beings, or Homo Sapiens to be precise, are salient in two aspects—trade (Schulz, 2022) and advanced abstract thought (Gabora, 2010). These two abilities have not only distinguished us from other animals, but also are largely responsible for our speedy progression to become the dominant species of Earth.

Money is defined as anything that is generally acceptable as a means of exchange and at the same time, acts as a measure and a store of value (Cowther, 1972). It is the central device that makes global trade and commerce possible. Before money, humans used to trade using the barter system. Slowly they developed metal coins, which then transitioned to paper money (cash), then to plastic money (debit/credit cards) and now to electronic and digital currency (Beattie, 2022).

Electronic payments are the transactions using digital devices such as mobile wallets, online fund transfers and UPI payments. Digital currency, or digital money, refers to any kind of currency using financial technologies like blockchain. Examples of digital money include cryptocurrencies issued by private organizations (Bitcoin, Ethereum), virtual currencies and central bank digital currencies (Shi & Sun, 2020).

The Demonetization initiative of the Government of India on November 2016 has accelerated the adoption of digital payments and reduced the usage of paper money (Fouillet et al., 2021). Though digital currency exchanges bloomed in India during 2012-2017, investors were still reluctant to engage in crypto-trading as it was largely unregulated and unrecognized by National agencies (Ranade & Joshi, 2018). It was also found that the low impact of crypto-market on Indian stock market was due to lack of legal recognition which had negatively impacted public acceptance of such virtual currencies (Mallick & Mallik, 2021). Indian public, in

general, are largely lacking in proper awareness about virtual currencies (Motwani & Jain, 2018). Despite these, many Indian Crypto-trading platforms like WazirX, CoinSwitch Kuber, Unocoin, etc have emerged and have recorded 105 million users holding crypto-assets (Dave, 2021). Even though the digitization increased the appeal of digital currency, herding effect and anchoring bias played a detrimental role in investment behaviour, thus hinting on Government intervention necessary to reduce the risks associated with crypto-trading (Khandelwal, 2022). Hence, when in the Union Budget of the financial year 2022-23, the finance minister not only introduced tax regulations on crypto-trading, but also announced the launch of RBI's own Digital Rupee (National Portal of India, 2022), it is expected to influence public opinion on digital money. Unfortunately, there is an absence of appropriate and relevant tool to assess these attitudes. Thus, in this paper an attempt has been made to construct a reliable attitude scale to assess people's opinion on digital money in India.

LITERATURE REVIEW

A thorough review of earlier literature is important to assess the gaps in research and formulate a relevant research design on this topic.

Attitude towards digital money depends on demographic factors like age (Jora & Nandal, 2021) and gender (Jora & Nandal, 2020) with young people and men holding more positive attitudes. Gagarina et.al. (2019) have found that attitude towards cryptocurrencies is positively associated with positive attitude towards money and desire for financial independence. Further, they found attitude to be strongly dependent on government interventions and trust on other financial institutions.

Though millennials are more likely to hold positive perspectives towards the use of digital money, it is highly dependent on the level of awareness and trust that they have towards the digital token (Alaeddin & Altounjy, 2018). Negative attitude towards crypto is also due to lack of uniform regulations across different countries around the world, which makes global transactions complex (Sokolenko et al., 2019).

Back in 2018, despite lack of encouragement from RBI regarding crypto-trade and low level of awareness, a large number of Indians have found to show confidence and trust in digital money (Jani, 2018). Thus, now in 2022, with positive impetus from the Government, it is expected that the attitude towards digital money would be further strengthened.

Though there have been researches assessing the attitude towards digital money (Schaupp & Festa, 2018; Knezevic et. al., 2020), these studies mostly used unvalidated surveys to take data. Even in Indian researches (Patil, 2019), the medium for primary data collection was limited to interview method.

The objective of this paper is to construct a scale to assess the public attitude on digital money.

METHODOLOGY

SAMPLE

University students comprised a good sample to test when trying to estimate the likelihood of using an innovative product (Szmigin & Bourne, 1999). As digital money falls under the category of innovative product, the sample is comprised of 70 Indian University students. The questionnaire was also administered on 34 for middle-aged adults. The total sample size was 104 (65 females and 39 males) with ages ranging from 21 to 65 years (mean age=31.47 and SD=13.379).

PROCEDURE

Firstly, the domains of the scale "Attitude towards digital currency" were selected. The domains are:-

- i. Risk factor
- ii. Easy to use
- iii. Knowledge
- iv. Happiness
- v. Ethics
- vi. Viability

On the basis of these domains the positive and negative statements were prepared. Then, following the 14 informal criteria of Edward, the statements were modified.

Risk factor:

1. I feel digital currency raises serious privacy concerns
2. I feel digital currency increases price volatility
3. I feel that digital currency could be frozen or confiscated
4. I often experience small business find it difficult to operate through digital currency and may get hollowed out
5. I feel that digital currency can be a threat to national sovereignty
6. I feel that any natural disaster that disrupts or neutralizes the internet could cripple digital currency transaction
7. I feel that mistaken transaction could take place through digital currency

Easy to use:

1. I feel digital currency facilitate global transactions.
2. I think that conducting transactions through digital currency is trouble free.
3. I think payments through digital currency saves time.
4. I think that it is easy to pay large amounts through digital currency.
5. I feel that technology for digital transactions is difficult to access.
6. I think that the payment process of digital currency is difficult to understand
7. I think that digital currency is not accepted everywhere
8. I can perform transaction any time anywhere through digital money.

Knowledge:

1. I feel that there is enough awareness regarding digital currency among people
2. I feel digital currency is more favorable than hard money
3. I think digital currency has the potential to replace hard money.
4. I find digital currency is more economic in nature.
5. I feel hard money requires less knowledge as compared to digital currency.
6. I believe digital currency helps to keep in check illegal activities.
7. I find digital currency complex to understand.
8. I think hard money can be easily lost or stolen.
9. I feel digital currency is equivalent to hard money.
10. I feel digital currency is easy to track by the user.
11. I think that hard money is easily accessible

Happiness:

1. I don't feel particularly pleased with the idea of digital currency
2. I find digital currency amusing
3. I often experience joy while transferring money through one e-wallet to another.
4. I always look forward to use my e-wallet

5. I feel digital money is rewarding in many ways.

Ethics:

1. I feel digital currency tend to misuse personal information for unethical objective
2. I think that digital currency reduces government control over money supply manipulation
3. I think that digital currency reduces redistribution through money production
4. I think that digital currency makes people more future oriented
5. I think there are more chances of fraud using hard money.

Viability:

1. I think that digital currency is the need of the day for economic development
2. I feel that e-commerce cannot thrive without digital currency

After this qualitative analysis was done and then, some statements were edited. Then, the questionnaire of 37 statements was administered to 30 experts for pre-test analysis. The mean, SD and t- score was calculated for the 37 statements and indexed in Table 1.

Table 1: The questionnaire with mean, SD and t-score of each item

SL. NO.	STATEMENT	MEAN	SD	t-score	p-value
1.	I think that digital currency is the need of the day for economic development	3.45	1.06	9.00	.000
2.	I feel that e-commerce cannot thrive without digital currency	3.51	1.26	-#	-
3.	I feel digital currency increases price volatility*	3.68	0.94	12.98	.000
4.	I feel digital currency raises serious privacy concerns*	3.97	1.02	9.03	.000
5.	I feel that digital currency could be frozen or confiscated*	3.48	1.12	11.58	.001
6.	I often experience small business find it difficult to operate through digital currency and may get hollowed out	4.00	1.03	12.98	.000
7.	I feel that digital currency can be a threat to national sovereignty*	3.10	1.37	10.93	.000
8.	I feel that any natural disaster that disrupts or neutralizes the internet could cripple digital currency transaction*	4.19	1.25	3.97	.000
9.	I feel that mistaken transaction could take place through digital currency*	3.90	1.51	23.00	.001
10.	I don't feel particularly pleased with the idea of digital currency*	2.13	1.76	9.00	.000
11.	I find digital currency amusing	3.19	1.92	11.88	.001
12.	I often experience joy while transferring money through one e-wallet to another.	3.45	2.09	18.52	.001
13.	I feel digital money is rewarding in many ways.	3.53	1.01	9.67	.000
14.	I can perform transaction any time anywhere through digital money.	4.27	0.78	14.35	.000
15.	I feel digital currency facilitate global transactions.	4.20	0.92	17.00	.001
16.	I think that conducting transactions through digital currency is trouble free.	3.27	1.20	12.96	.000

17.	I think payments through digital currency saves time.	4.07	0.94	13.75	.001
18.	I think that it is easy to pay large amounts through digital currency.	3.90	1.12	9.98	.000
19.	I feel that technology for digital transactions is difficult to access.*	3.17	1.32	11.88	.000
20.	I think that the payment process of digital currency is difficult to understand.*	2.97	1.16	11.00	.001
21.	I think that digital currency is not accepted everywhere.*	4.17	0.79	7.00	.001
22.	I feel that there is enough awareness regarding digital currency among people.	2.80	1.16	10.63	.002
23.	I feel digital currency is more favourable than hard money.	2.97	1.10	10.69	.001
24.	I think digital currency has the potential to replace hard money.	3.03	1.03	11.53	.001
25.	I find digital currency is more economic in nature	3.47	1.01	9.67	.000
26.	I feel hard money requires less knowledge compared to digital currency.*	4.20	1.09	9.03	.001
27.	I believe digital currency helps to keep in check illegal activities.	3.47	1.14	7.78	.000
28.	I find digital currency complex to understand.*	3.13	1.31	12.73	.000
29.	I think hard money can be easily lost or stolen.	4.00	1.20	16.80	.001
30.	I feel digital currency is equivalent to hard money.	2.53	1.96	10.28	.001
31.	I think there are more chances of fraud using hard money.	2.90	1.06	11.28	.001
32.	I feel digital currency is easy to track by the user.	3.77	1.65	9.74	.001
33.	I think that hard money is easily accessible.*	3.93	1.42	8.10	.000
34.	I feel digital currency tend to misuse personal information for unethical objective.*	3.80	1.09	9.35	.000
35.	I think that digital currency reduces government control over money supply manipulation.*	3.53	1.04	7.66	.001
36.	I think that digital currency reduces redistribution through money production.*	3.50	0.97	9.00	.000
37.	I think that digital currency makes people more future oriented.	3.97	1.03	13.23	.000

*These items are negative and are reverse scored.

#The t score could not be computed here since the SD of the top and bottom 25% of responses were both 0.

The updated questionnaire with 36 items was administered to 104 individuals. The questionnaire consists of 20 positive items and 16 negative items. A 5-point Likert scale has been incorporated for scoring. In case of positive items, a score of 5 was assigned to “Strongly agree”, 4 to “Agree”, 3 to “Neutral”, 2 to “Disagree” and 1 to “Strongly Disagree”. For negative items, a score of 1 was assigned to “Strongly agree”, 2 to “Agree”, 3 to “Neutral”, 4 to “Disagree” and 5 to “Strongly Disagree”.

STATISTICAL ANALYSIS AND DISCUSSION

The statistical analyses of the attitude scale were done using the software IBM SPSS 26.0. The Cronbach alpha was computed to check the internal consistency of the scale. Table 2 shows that the Cronbach alpha coefficient was found to be 0.86, which implies that the attitude scale is a reliable assessment tool.

Table 2: Reliability Statistics of the Attitude Scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.863	0.870	36

The item-total correlations, as presented in Table 3, reveal that there are no significant changes in the internal consistency of the scale due to the omission of any item so all items are considered for factor analysis.

Table 3: Item-Total Statistics of the scale items

Item-Total Statistics					
	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted		Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item 1	0.491	0.857	Item 19*	0.328	0.860
Item 2*	0.066	0.865	Item 20*	0.027	0.867
Item 3*	0.363	0.859	Item 21	0.297	0.861
Item 4*	0.360	0.859	Item 22	0.619	0.853
Item 5*	0.200	0.863	Item 23	0.543	0.854
Item 6*	0.288	0.861	Item 24	0.557	0.855
Item 7*	0.165	0.864	Item 25*	0.044	0.866
Item 8*	0.220	0.863	Item 26	0.500	0.856
Item 9*	0.441	0.857	Item 27*	0.363	0.859
Item 10	0.511	0.856	Item 28	0.366	0.859
Item 11	0.447	0.857	Item 29	0.312	0.860
Item 12	0.590	0.855	Item 30	0.393	0.858
Item 13	0.552	0.856	Item 31	0.535	0.856
Item 14	0.450	0.858	Item 32*	0.242	0.862
Item 15	0.629	0.853	Item 33*	0.168	0.864
Item 16	0.395	0.859	Item 34	0.283	0.861
Item 17	0.479	0.857	Item 35	0.250	0.861
Item 18*	0.221	0.863	Item 36	0.549	0.855

The Principal Components Analysis (PCA) was conducted with the 36 items. The factor reduction exercise extracted 9 factors with eigenvalues of >1 (as shown in the scree plot in Fig. 1). The KMO and Bartlett's test of sphericity showed acceptable results (KMO= .749 and $\chi^2 = 1982.033$; $p < 0.001$), which deems the factor analytic model, utilizing these items under consideration, a fit one (Silva et al., 2014). Then, the model was subjected to Exploratory Factor Analysis utilizing the PROMAX (oblique rotation) technique. Of the 9 factors originally derived in PCA, the last two factors (Factors 8 and 9) contained only one items each. Given that a factor is not legible enough if does not load at least 3 items, the Exploratory Factor Analysis (EFA) was conducted by fixing the number of extracted factors at 7. Table 4 shows the EFA where the cutoff for the loadings was .50 (Hulland, 1999). The loadings below this cutoff were suppressed in the table. Similarly, the cutoff for the communalities (h^2) was set at .40 (Osborne et al., 2008). Only item 17 had an h^2 below the cutoff and is **boldfaced** in Table 4. The items with cross-loadings across two or more factors are also **boldfaced**. All the **boldfaced** items, owing to low h^2 and/or cross-loadings were subject to removal, which finally led us to retain the non-boldfaced items only.

Fig 1: The Scree Plot

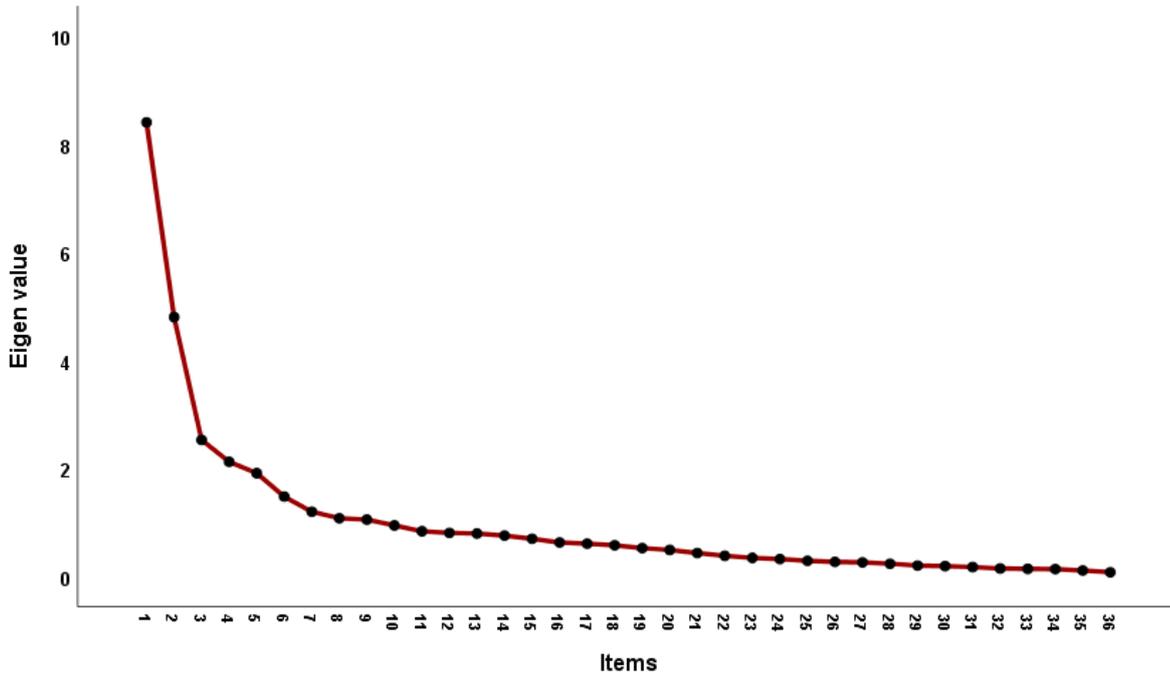
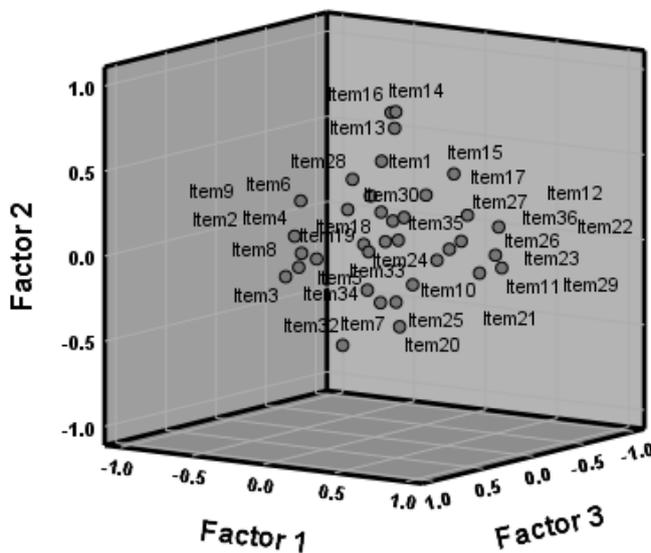


Fig. 2: The Component Plot of PCA



Hence, Factor 1 is found to be composed of the following six items: 10, 11, 12, 21, 22 and 23, which explains the highest variance in the model (23.33%). Factor 2 contains items: 13, 14, 16 and 31 with a variance explained of 13.33%. Items 2, 3, 4, 6, 7 and 8 make up the third factor, which explains a variance of 7.02%. Factor 4 is composed of items 18, 19, 20 and 27, explaining a variance of 5.9%. Factor 5 contains the items 30 and 34, explaining a variance of 5.31%. Finally, the factors 6 and 7 are composed of the items 25, 32, 33 and 5, 25 respectively (combined variance explained: 7.44%).

Table 4: Exploratory factor analysis using PROMAX rotation

Items	1	2	3	4	5	6	7	h^2
11	.818							.728
23	.813							.707
22	.798							.756
12	.723							.603
10	.719							.626
26	.653				.506			.578
15	.633	.590						.70
21	.629							.517
36	.605				.580			.683
14		.788						.678
13		.755						.655
16		.754						.63
31		.532						.556
17								.36
3			.764					.655
8			.753					.602
4			.699					.589
2			.694					.63
6			.609					.582
7			.597					.589
19				.800				.673
18				.783				.687
27				.617				.552
9			.519	.604				.557
20				.524				.57
34					.801			.722
30					.714			.689
24	.698				.707			.728
28		.565			.660			.611
29	.517				.541			.496
25						.765		.668
33						.759		.665
32						.503		.474
35							.677	.572

19. I think that digital currency is not accepted everywhere*	0.524
20. I find digital currency complex to understand*	0.617
21. I think there are more chances of fraud using hard money	0.714
22. I think that digital currency reduces government control over money supply*	0.801
23. I feel hard money requires less knowledge compared to digital currency*	0.765
24. I think that hard money is easily accessible*	0.503
25. I feel digital currency tend to misuse personal information for unethical objective*	0.759

Factor 1: This factor contains positive items from Happiness domain and Knowledge domain. So, this factor is aptly named “Interest towards Digital Money”.

Factor 2: The factor contains positive items from Easy-to-use domain, and is thus named “Ease of Usage of Digital Money”

Factor 3: The factor contains negative items from Risk Factor domain and is named “Risk associated with Digital Money”

Factor 4: The factor contains negative items from Easy to use and Knowledge domains, and is named “Complexity of Digital Money”

Factor 5: The factor contains both positive and negative items from Ethics domain, and is named “Ethical Concerns regarding Digital Money”

Factor 6: The factor contains negative items from the Ethics and Knowledge domains. It has been named “Resistance to Digital Money”.

CONCLUSION

A reliable measurement tool to evaluate public attitude towards digital currency has thus been constructed and named as “Attitude towards Digital Money Scale”. The item pool was created to measure attitude towards digital currency across 6 domains—Risk factor, Easy to use, Knowledge, Happiness, Ethics and Viability. Both positive and negative statements were generated, analyzed and pretested on 30 experts. Then the scale was administered on 104 University graduates for further statistical analysis.

The final scale consists of 25 statements with 11 positive items and 14 negative items. A 5-point Likert scale is used for rating. The Cronbach alpha reliability coefficient of the scale is 0.86, which is significantly high.

Due to the lack of a theoretical model, exploratory factor analysis was used to reveal the factors underlying the attitude scale. Both the KMO and Bartlett’s test of sphericity showed acceptable adequacy of the sample for factor analysis. The Attitude towards Digital Money was found to have five dimensions, namely, Interest towards Digital Money, Ease of Usage of Digital Money, Risk associated with Digital Money, Complexity of Digital Money, Ethical Concerns regarding Digital Money and Resistance to Digital Money. The Cronbach alpha coefficients of each factor were found to be more than 0.6.

Though the sample size was limited and a restricted number of domains were considered, the results revealed that it is indeed possible to construct a reliable measurement tool for assessing the attitude towards digital money.

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