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Identification and prioritization of the challenges of using cryptocurrencies in
international transactions

Identificación y priorización de los desafíos del uso de criptomonedas en
transacciones internacionales

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Abstract.

Cryptocurrencies have attracted the attention of many investors, entrepreneurs, regulators and the public today. By popular definition, the cryptocurrency is an asset in a blockchain that can be transferred between actors on the scene of exchange and hence used as a payment instrument. Completely decentralized cryptocurrencies such as Bitcoin have attracted public interest and are far more successful than previous e-money. Despite the importance of these currencies, in third world countries like Iran country, people don't interest in using these types of currencies to their trading. So, in this study, we find and rank the challenges of using cryptocurrencies in international trading. To this end, the challenges of using cryptocurrencies were identified by reviewing the literature. Then, the identified factors were prioritized using the AHP technique. In general, four criteria and twenty-eight criteria were compared. The results show that technical factors are the most important criteria in comparison with the purpose; the risk-taking is the most important person reason; the negative attitude to cryptocurrencies in society is the most important social reason; the lack of sufficient funds to develop the use of cryptocurrencies, and the failure to properly find the parties to the transaction is the most important technical reason which can affect cryptocurrencies adoption in international trading.

Keywords: Cryptocurrencies, Analytical Hierarchical Process, International Transactions

Resumen.

Las criptomonedas han atraído la atención de muchos inversores, empresarios, reguladores y el público de hoy. Por definición popular, la criptomoneda es un activo en una cadena de bloques que puede transferirse entre actores en la escena del intercambio y, por lo tanto, usarse como un instrumento de pago. Las criptomonedas completamente descentralizadas como Bitcoin han atraído el interés público y tienen mucho más éxito que el dinero electrónico anterior. A pesar de la importancia de estas monedas, en países del tercer mundo como el país de Irán, las personas no están interesadas en usar este tipo de monedas para sus operaciones. Entonces, en este estudio, encontramos y clasificamos los desafíos del uso de criptomonedas en el comercio internacional. Con este fin, los desafíos de usar criptomonedas se identificaron mediante la revisión de la literatura. Luego, los factores identificados se priorizaron utilizando la técnica AHP. En general, se compararon cuatro criterios y veintiocho criterios. Los resultados muestran que los factores técnicos son los criterios más importantes en comparación con el propósito; la toma de riesgos es la razón de persona más importante; La actitud negativa hacia las criptomonedas en la sociedad es la razón social más importante; La falta de fondos suficientes para desarrollar el uso de las criptomonedas y la imposibilidad de encontrar adecuadamente a las partes en la transacción es la razón técnica más importante que puede afectar la adopción de las criptomonedas en el comercio internacional.

Palabras clave: criptomonedas, proceso analítico jerárquico, transacciones internacionales

Introduction

Cryptocurrencies are a relatively new and rapidly growing subject in the modern digital economy. It is a digital currency that usually has decentralized accounting and precise control of money and currency supply (Sukharev and Silnov, 2018). The use of cryptocurrencies in response to the financial crises created in year 2 has been considered by governments and the central bank (Weber, 2016). Cryptocurrency is traded similarly to stocks on traditional commodity exchanges. Transactions can be made with Fiat money or bitcoin. Traders typically exchange their Fiat money for bitcoin and then use bitcoin for trading. The cryptocurrency exchange market is commonly known as the Bitcoin market (Kamrat, Suesangiamsakul, and Marukatat, 2018). The cryptocurrencies can be a low-cost alternative to credit and debit card systems (Angel and McCabe, 2015). The cryptocurrencies are today used both as an exchange tool for daily payments and speculation. These currencies, like other currencies, can be exchanged without transaction support, transactions, online shopping, etc. The self-organization of these currencies for different applications as one of the elements of the distinction between these currencies makes the cryptocurrency market unique and makes their prices highly volatile (ElBahrawy et al., 2017). These currencies are based on the blockchain, which is only one notebook (Sai, Buckley, and Le Gear, 2019). Blockchain is a data structure that displays a list of blocks and stores information about the status of the encrypted currency system (Sukharev and Silnov, 2018). Blockchain is a block containing all transactions with that block's hash file as well as the earlier hash block (Ghimire, and Selvaraj, 2018). The block is used to store a list of all encoded currency transactions and information on its provision, sometimes containing user wallet status information (Sukharev and Silnov, 2018). Applications known as wallets and swaps provide user access to this notebook. One important deployment platform for cryptocurrencies wallet are cellphone due to their portable nature. Unlike banks, the range of these currencies is largely uncontrolled (Sai, Buckley, and Le Gear, 2019). Everyone has the right to privacy and non-traceability in his financial transactions, which also applies to cryptocurrencies transactions. Some cryptocurrencies are focused on payment or quick transactions, while others focus on providing users anonymity (Lee, 2019).

Therefore, the debate over creative cryptocurrencies systems has spread in various sciences such as law, computing, finance and economics in recent decades. Most of these studies discuss the precise nature of cryptocurrencies, their persistence or instability, the competition in these markets, the volatility of these markets, and how to cut the risk of cryptocurrencies exchanges. For example, Dyson, Buchanan, and Bell (2019) studied the challenges of cryptocurrencies investment. Kesa and Mahoro (2019) assess the prospects and challenges of developing a cryptocurrency for transactions in Rwanda. Alaeddin and Altounjy (2018) investigate the effect of trust and awareness on cryptocurrencies' intention to use in Malaysian students. Chow et al. (2019) by using the structural equation modeling (SEM) technique assess the factors affecting cryptocurrency acceptance among Malaysian people. Gagarina, Nestik, and Drobysheva (2019) studied the social and psychological predictors of youths' attitudes to cryptocurrency. Arias-Oliva, Pelegrín-Borondo, Matías-Clavero (2019) based on a technology acceptance model assess the variables influencing cryptocurrency use. Tasatanattakool and Techapanupreeda (2018) assess the cryptocurrency weakness and state this weakness is related to Blockchain technology. Valdeolmillos et al., (2019) review the challenges faced by five different cryptocurrencies with the highest market capitalization. Zheng et al., (2018) studied the Blockchain challenges and opportunities. Markov and Schor (2020) study trading and arbitrage in cryptocurrency markets in the US. Hayes (2017) identified the cryptocurrency value formation determinants. Bouoiyour et al., (2016) described bitcoin value using regressing its price against the market price of gold, occurrences of the word 'bitcoin' in Google searches, the velocity of bitcoin, and so on. Baek et al., (2019) provided a model for detecting cryptocurrency transactions. Kamrat, Suesangiamsakul, and Marukatat (2018) study cryptocurrency trading with an emphasis on technical analysis. Chauhan and Arora (2019) review the use of cryptocurrency and portfolio management with its associated challenges. Lee (2019) introduces anonymous cryptocurrencies and states anonymous cryptocurrencies are required to give privacy and fungibility. Ghimire and Selvaraj (2018) survey various topics under Bitcoin such as blocks, blockchains, mining process and proof of work. Sukharev and Silnov (2018) review the existing Ethereum mining algorithm and search for possibilities for speeding up the mining by applying a new asynchronous mining algorithm. Sai, Buckley, and Le Gear

(2019) analyze the privacy and security of cryptocurrency mobile applications. Almukayniz, et al. (2018) find indicators of cyber threats targeting cryptocurrency traders and exchange platforms from hacker activity. Liang et al., (2019) offer analytical insights to help understand cryptocurrency by treating it as a financial asset. Li et al., (2019) offer a breakthrough understanding of the cryptocurrencies through the generated landscape which reports the state of cryptocurrencies and can be used as a framework for cryptocurrency analysis. ElBahrawy et al. (2017) show that the so-called neutral model of evolution can reproduce several key empirical observations, despite its simplicity and the assumption of no selective advantage of one cryptocurrency over another.

The use of cryptocurrency has not been particularly widespread in third world countries, and this may be due to some reasons, but this aspect of research didn't consider by scholars and this study aims to cover this research gap.

This paper is structured as follows. It opens with a general discussion of cryptocurrency and the factors which can affect their acceptance. This section is followed by the conceptual model, the method and the analysis of empirical findings. Finally, the paper outlines the conclusions.

Because of cryptocurrencies' reliance on digital technology and its application by businessmen, and because of the inherent anonymity associated with transactions and wallet holders, hackers and fraudsters seek to gain financial gain, have a great incentive to control cryptocurrency wallets and interfere with transactions. And this reduces the confidence in the currency (Almukayniz, et al., 2018). Failure to comply with high demand may allow developers to publish programs without a proper security and privacy enforcement. This may be of value to attackers because these programs often have monetary assets and lack regulatory oversight (Sai, Buckley, and Le Gear, 2019). If the user does not properly verify the address of the received money address, it is possible to transfer money to some other account. Also, an ordinary cryptocurrency user may not be careful enough in storing their passwords and may increase their chance of being seized (Chauhan and Arora, 2019). Yermack (2013) examines the value of bitcoin as a currency by pointing out that bitcoins (and all others cryptocurrencies) have no intrinsic value

(Hayes, 2017). In their study, Markov and Schor (2020) found that the price deviation of cryptocurrencies between countries was unbelievably high. Arias-Oliva, Pelegrín-Borondo, Matías-Clavero (2019) assess the factors affecting cryptocurrency acceptance and found that performance expectancy, effort expectancy, social influence, facilitating condition, perceived risk and financial literacy can affect cryptocurrencies intention to use. In the investigation, the factors affecting attitude to cryptocurrencies, Gagarina, Nestik, and Drobysheva (2019) show that he tends to use cryptocurrencies directly depends on orientation to independence in actions, confidence in the power of money, age and gender and is inversely dependent on confidence in the government. The effect of effort expectancy, performance expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit on cryptocurrencies behavioral intention were confirmed by Chow et al. (2019). In their study, Alaeddin and Altounjy (2018) proved that awareness and trust affect cryptocurrency intention to use. Dyson, Buchanan, and Bell (2019) stated that fraud detection and trade parties in a cryptocurrency transaction is difficult.

Based on the literature about the cryptocurrency challenges, we can classify cryptocurrency challenges factors as technical, social, financial and individual factors. Figure 1 shows the research model of this study and Table 1 shows the criteria and sub-criteria with their codes.

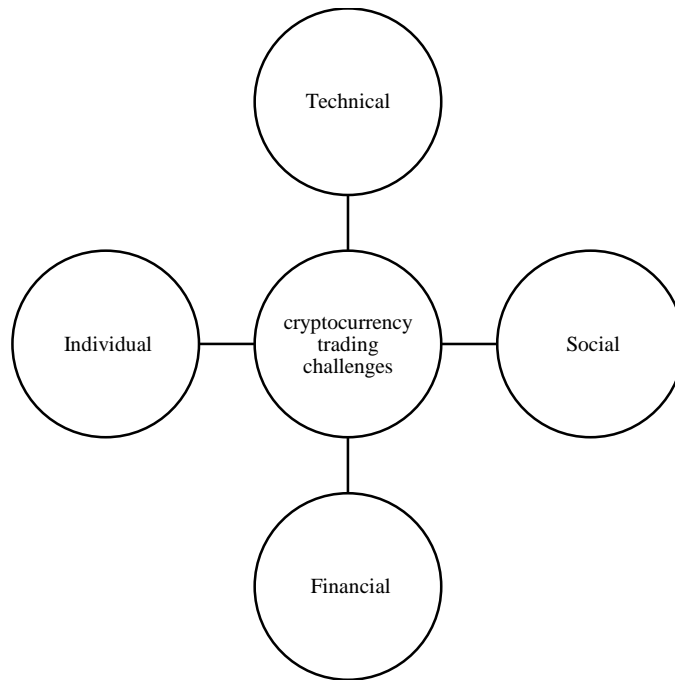


Figure1. Conceptual model

Table 1. Cryptocurrency trading challenges

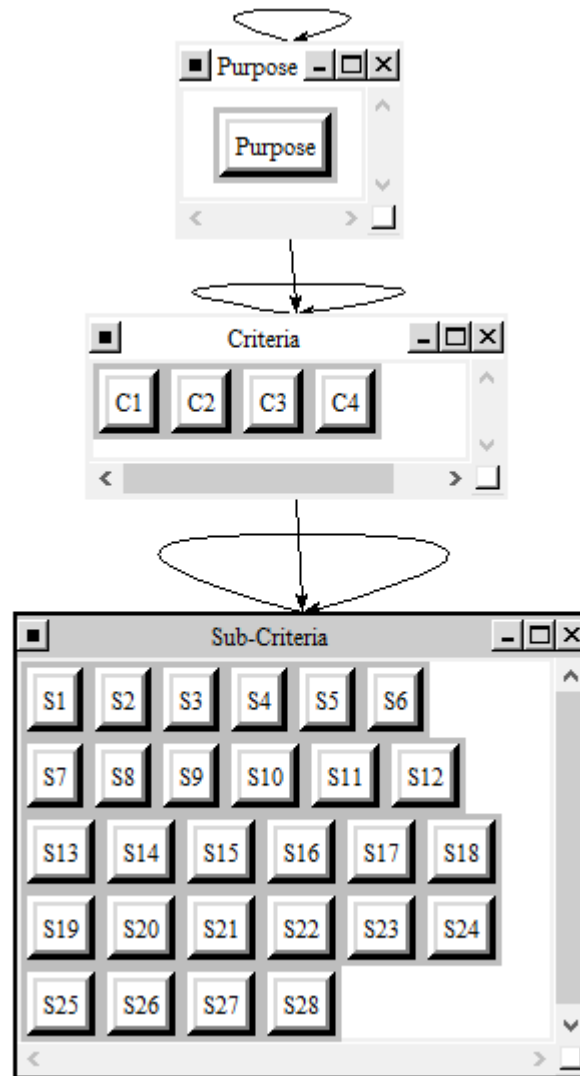
Code	Criteria	Code	Sub-Criteria
C1	Individual	S1	Risk-taking
		S2	Self-confidence
		S3	Trust to market
		S4	Trust to government
		S5	Financial capacity for risk-taking
		S6	Trading knowledge
		S7	Foreign language knowledge
		S8	Gender
		S9	Age
		S10	Confidence in achieving to trading goal
		S11	Confidence in cryptocurrencies trading capabilities
C2	Social	S12	Negative attitude to cryptocurrencies in society
		S13	Unbelief in cryptocurrencies as a superior technology
		S14	Lack of sufficient information resources to inform the use of cryptocurrencies
		S15	Lack of knowledgeable people for guidance on cryptographic currency operations

		S16	Forbidden to use cryptocurrencies legally
		S17	Refusal to accept the use of cryptocurrencies from a jurisprudential perspective
C3	Financial	S18	Expensive cost and energy of transactions
		S19	Uncertainty about the return on investment
		S20	Lack of sufficient funds to develop the use of cryptocurrencies
		S21	Lack of adequate facilities to invest in cryptocurrency
		S22	Insecurity of transactions
C4	Technical	S23	Difficulty detecting fraud
		S24	Failure to properly identify the parties to the transaction
		S25	Low speed and accuracy of transactions
		S26	Difficult to learn how to work with cryptocurrencies
		S27	Transparency of Transactions
		S28	Transaction frequency constraints

Materials and methods

The statistical sample of this study includes trading experts with a minimum bachelor's degree, more than 5 years of work experience and organizational position of management and academic experts in trading management with an associate degree. Based on the purposive sampling the total numbers of 13 experts were selected as sample.

An AHP questionnaire was designed according to purposes, criteria, and sub-criteria. The relationships between criteria and sub-criteria which the questionnaire was designed based on them, are shown in Figure 2. The reliability of the questionnaire was assessed using the inconsistency index and if this index is below 0.1, the questionnaire is reliable. The validity of the questionnaire was assessed using the CVR index and because this index is higher than 0.54 (the valid number in the sample population of 13 people), we can say the questionnaire is valid.



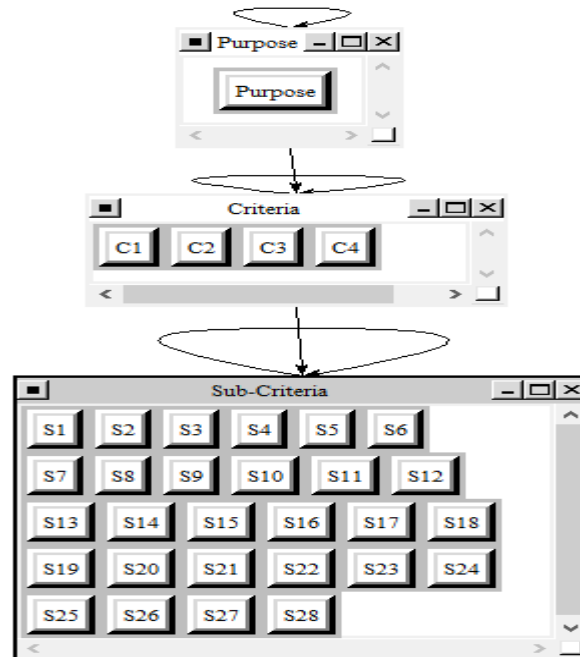


Figure 2. The relationships between criteria and sub-criteria (AHP structure)

After designing the questionnaire, it was completed by a population sample based on the numeral values are shown in Table 3. After data gathering, the data analysis was done using SuperDecision software.

Table 3. Numeral values for items comparison

Numeral value	Degree of importance in pairwise comparison
1	Same preference
2	Same to fairly preferred
3	Fairly preferred
4	Fairly to strongly preferred
5	Strongly preferred
6	Strongly preferred to very strong preferred
7	Very strong preferred
8	Very strong to extremely preferred
9	Extremely preferred

Results

The general information about the characteristics of respondents, including their age, gender, work experience is shown in Table 4. In this study, the majority of respondents were male (10), between 40-50 years old (5), and have between 10 to 15 years of work experience (6). REICE | 236

Table 4. Sample demographic characteristics

Demographic profile	Category	Frequency	Frequency Percent
Gender	Male	11	77%
	Female	2	23%
Age	<30	1	8%
	30-40	4	15%
	40-50	3	38%
	>50	5	23%
Experience	5-10	3	23%
	10--15	4	46%
	>15	6	15%

To implement the AHP analysis, the main criteria, the sub-criteria of each criterion linked to each other, and the main criteria by controlling the effect of each criterion must be compared together. The result of each comparison and the weight of each criterion and sub-criteria are shown below. Results of calculation of compatibility of criteria and sub-criteria indicated that incompatibility was less than 0.1 in all cases, and thus the prioritization of pairwise comparison of matrices was acceptable, and consistency of responses was confirmed; hence, the assigned coefficients were reliable and paired comparisons could be obtained.

Table 5. Pairwise comparison matrix of main criteria in comparison with the purpose

	C1	C2	C3	C4	Normalized	Idealized
C1	1.00	1.52	1.11	0.89	0.27	0.94
C2	0.66	1.00	1.37	0.66	0.22	0.75
C3	0.90	0.73	1.00	0.88	0.22	0.75
C4	1.12	1.52	1.14	1.00	0.29	1.00
Inconsistency	0.02					

Based on the results shown in Table 5 the technical factors are the most important criteria in comparison with the purpose

Table 6. Pairwise comparison matrix of individual sub-criteria

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	Normalized	Idealize
												d	d
S1	1.0	1.3	1.2	1.1	1.2	1.5	1.1	1.2	1.1	1.0	1.7	0.11	1.00
	0	3	2	4	2	9	4	2	5	8	9		
S2	0.7	1.0	1.3	1.1	1.1	1.1	1.1	1.2	1.3	1.4	1.1	0.10	0.92
	5	0	9	1	3	8	4	6	3	1	4		
S3	0.8	0.7	1.0	1.1	1.5	1.2	1.5	1.3	1.6	1.6	1.1	0.11	0.98
	2	2	0	5	9	5	8	3	9	3	8		

S4	0.8 8	0.9 0	0.8 7	1.0 0	1.4 4	1.5 2	1.2 7	1.1 4	1.4 1	1.2 6	1.2 3	0.10	0.92
S5	0.8 2	0.8 8	0.6 3	0.6 9	1.0 0	1.0 8	1.2 6	1.3 3	1.0 5	1.1 1	1.1 4	0.09	0.78
S6	0.6 3	0.8 5	0.8 0	0.6 6	0.9 3	1.0 0	1.0 5	1.4 1	1.2 6	1.3 5	1.3 3	0.09	0.79
S7	0.8 8	0.8 8	0.6 3	0.7 9	0.7 9	0.9 5	1.0 0	1.4 4	1.5 2	0.8 5	1.2 6	0.09	0.78
S8	0.8 2	0.7 9	0.7 5	0.8 8	0.7 5	0.7 1	0.6 9	1.0 0	1.1 1	1.2 6	1.1 4	0.08	0.71
S9	0.8 7	0.7 5	0.5 9	0.7 1	0.9 5	0.7 9	0.6 6	0.9 0	1.0 0	1.4 1	0.7 4	0.07	0.67
S10	0.9 3	0.7 1	0.6 1	0.7 9	0.9 0	0.7 4	1.1 8	0.7 9	0.7 1	1.0 0	1.2 3	0.08	0.69
S11	0.5 6	0.8 8	0.8 5	0.8 1	0.8 8	0.7 5	0.7 9	0.8 8	1.3 5	0.8 1	1.0 0	0.08	0.68
Inconsistency	0.01												

Based on the results shown in Table 6 the risk-taking is the most important individual factor which can affect cryptocurrencies adoption in international trading.

Table 7. Pairwise comparison matrix of social sub-criteria

	S12	S13	S14	S15	S16	S17	Normalized	Idealized
S12	1.00	1.15	1.19	1.23	1.62	1.52	0.20	1.00
S13	0.87	1.00	1.62	1.23	1.02	0.56	0.17	0.82
S14	0.84	0.62	1.00	1.23	1.42	1.33	0.17	0.83
S15	0.81	0.81	0.81	1.00	0.46	1.15	0.13	0.65
S16	0.62	0.98	0.70	2.17	1.00	1.26	0.17	0.84
S17	0.66	1.79	0.75	0.87	0.79	1.00	0.16	0.76
Inconsistency	0.04							

Based on the results shown in Table 7 the negative attitude to cryptocurrencies in society is the most important social factor which can affect cryptocurrencies adoption in international trading.

Table 8. Pairwise comparison matrix of financial sub-criteria

	S18	S19	S20	S21	Normalized	Idealized
S18	1.00	1.23	0.64	1.26	0.25	0.86
S19	0.81	1.00	1.33	0.76	0.24	0.85
S20	1.56	0.75	1.00	1.41	0.28	1.00
S21	0.79	1.31	0.71	1.00	0.23	0.80
Inconsistency	0.04					

Based on the results shown in Table 8 the lack of sufficient funds to develop the use of cryptocurrencies is the most important financial factor which can affect cryptocurrencies adoption in international trading.

Table 9. Pairwise comparison matrix of technical sub-criteria

	S22	S23	S24	S25	S26	S27	S28	Normalized	Idealized
S22	1.00	1.23	0.56	1.26	1.33	1.41	1.33	0.16	0.92
S23	0.81	1.00	1.05	1.26	1.23	1.41	1.32	0.16	0.92
S24	1.79	0.95	1.00	1.36	1.26	1.41	0.85	0.17	1.00
S25	0.79	0.79	0.74	1.00	1.18	1.33	1.26	0.14	0.80
S26	0.75	0.81	0.79	0.85	1.00	1.41	1.33	0.14	0.78
S27	0.71	0.71	0.71	0.75	0.71	1.00	1.14	0.11	0.65
S28	0.75	0.76	1.18	0.79	0.75	0.88	1.00	0.12	0.71
Inconsistency	0.01								

Based on the results shown in Table 9 the failure to properly identify the parties to the transaction is the most important technical factor which can affect cryptocurrencies adoption in international trading.

Conclusions

Bitcoin and other cryptocurrencies can be used for payments without bank intermediaries or other third-party intermediaries. Hence, they can create an efficient payment system. However, they also contain risks that reduce the tendency to use them in international transactions. REICE | 240

Completely decentralized cryptocurrencies such as Bitcoin have attracted public interest and are far more successful than previous e-money. Despite the importance of these currencies, in third world countries like Iran country, people don't interest in using these types of currencies to their trading. So, in this study, we identify and prioritize the challenges of using cryptocurrencies in international trading. To this end, challenges of using cryptocurrencies were identified by reviewing the literature. Then, the identified factors were prioritized using the AHP technique. In general, four criteria and twenty-eight criteria were compared. The results show that technical factors are the most important criteria in comparison with the purpose; the risk-taking is the most important individual factor; the negative attitude to cryptocurrencies in society is the most important social factor; the lack of sufficient funds to develop the use of cryptocurrencies, and the failure to properly identify the parties to the transaction is the most important technical factor which can affect cryptocurrencies adoption in international trading.

According to the results, the weakness of the design of cryptographic currencies and the lack of precise rules and regulations for the exchange of these currencies can be one of the biggest challenges in using them. On the other hand, when individuals are willing to accept the risk of using these currencies, the economic situation is not so low that individuals can invest their money in those currencies, the use of such currencies is not generally acceptable and it is difficult to identify the parties to the transaction. And the probability of fraud is high, there will be no desire to use this tool for international transactions. Therefore, proper design of cryptocurrencies, increasing security of this tool, increasing public awareness of this tool through standard advertising, explaining the rules for using these tools and insuring transactions can encourage market participants to exchange using this tool.

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