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Providing an Information System Based on Virtual Currency Data in the Banking Industry

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ABSTRACT

This research aims to provide an information system based on virtual currency data in the banking industry in Iran. Data is one of the most significant assets of the organization.
This research is applied in terms of purpose. The population includes university professors in marketing and experts, including managers of the banking industry. Sampling in the qualitative section was done purposefully, and the criteria of expertise were at least a graduate degree and ten-year of relevant work experience. Finally, 20 people were selected as samples. The method used is SWARA's quantitative prioritization method. The index of using virtual currency in Iran's sanctions situation (Q67) with a weight of 0.12 is the first. The index of entrepreneurial acceleration based on the new payment system (Q56) with a weight of 0.11 is the second priority. The index of general uncertainty about the nature of virtual currencies (Q16) with a weight of 0.09 is the third priority. The index of improving communication and interactions between customers and the bank (Q63) with a weight of 0.0859 is the fourth priority. The index of alignment of banking processes with global standards (Q61) with a weight of 0.07 is the fifth priority.
Extracting useful information from the database and converting it into actionable results is the main challenge that companies face. Therefore, results show that one of the ways to the success of cryptocurrencies is the use of data-oriented information systems and data mining techniques. The data-oriented information system is one of the recent developments in data management technologies. **©authors**

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1. Introduction

Data is one of the most important assets of the organization. Applying a data-driven approach in production does not only lead to vague improvements (Younus et al., 2022). Rather, it significantly improves the production capacity and increases the income of the organization. In the field of digital currency, data is considered an important pillar. In fact, digital currency refers to any value created in the digital platform. This is important compared to physical intermediaries such as bank notes or coins. Digital currency has similar features to physical currencies, but generally, digital currency capital transfer transactions can be done quickly and without borders between people (Li et al., 2022). Like physical money, digital money is used to buy goods and services and can be limited to use in specific gatherings. For example, a virtual currency can be defined as a game or social network. Digital currencies such as Bitcoin and Ethereum are known as “decentralized digital currencies”; This means there is no center to produce this money (Bouriet al., 2019:401). Creating a single data system and integrating all the independent systems involved in the production process can be challenging. This data must be mapped and shared seamlessly across all parts of the business to minimize resource wastage. The use of sensors based on the Internet of Things, which has the ability to detect possible equipment errors, can be one of the ways to minimize errors in the data exchange process (Zitouni, 2018).

Statistics show that producers tend to dominate data (Khademan et al., 2021: 328). However, the implementation of digital changes in organizations often fails due to the lack of support from the leaders of organizations (Chipere, 2018: 37). Using advanced technologies is like taking a risk for most managers, and there is always a fear for them that new technologies will take the place of employees (Nouri and Navabpour, 2017: 52). Therefore, only 31% of organizations consider themselves to have data-driven production, which has decreased compared to the last 2 years, which was estimated at 37% (Ciaian et al., 2018: 173). Many industries such as health and transportation and various businesses and financial institutions such as the stock exchange are trying to use digital currency for their needs and desires. Two important features of Bitcoin and other digital currencies that distinguish them from common world currencies such as the dollar and the euro are: decentralized and limitless distribution; Anonymity of traders; These two advantages can turn digital currencies into a tool to bypass sanctions (Askarzadeh and Dehghanizadeh, 2017).

In the digital currency data-driven system, although extensive financial transfers are made, they cannot be identified, and the identity of the person who uses the digital currency is only a number of unidentifiable numbers; So, we see all the information of people but we don't know who it is for. This important feature of digital currencies can be effectively used to circumvent sanctions (Aghamohammadi et al., 2019). Iran is one of the few countries that has abundant oil reserves in the world. However, the country's capacity to export and use these reserves has been severely limited due to the US embargo over the past decade (Hota et al., 2015).

This has caused the Iranian government to turn to Bitcoin mining because it is one of the potential tools to convert its energy into a product that the country can benefit from (Sales et al., 2019).

Banking and e-commerce play a vital role in national and global economic exchanges. Electronic money and virtual money, a new monetary variable that affects the money market and monetary policy, is one of the most widely used and vital tools in this field (Hicks et al., 2019). An effect that may affect the central bank's supervisory ability as a monetary policy maker. On the other hand, today's economy has intensified the difficulties of conducting global transactions due to the presence of many intermediaries, including international organizations.

As a result, the virtual money information system was created to reduce the influence of intermediaries and facilitate monetary and

commercial transactions. One of the most important reasons for the spread of virtual currency is the advantages it provides to consumers, such as high speed and efficiency in payments - especially payments international as well as reducing additional operational costs received by intermediary institutions (Caporale et al., 2018: 34).

Despite the developments that have created the expansion of virtual currencies and the advantages that these currencies make for the economy. The fact that many of their angles are still unknown is considered a challenge for individuals and companies.

In these currencies, there is always the challenge of price fluctuations and lack of stability, and the prices of these currencies have faced many ups and downs in the past years (Diyorova et al., 2022).

On the other hand, unlike traditional currencies, virtual currency does not have clear rules and regulations, and this can become an important challenge for any government of any country. Even expanding the use of these currencies leads to the weakening of the central bank of countries. In terms of the digital nature of these assets, the emergence of security problems is undeniable, and the electronic nature of the cryptocurrency brings challenges such as loss, hacking of the user's account, and electronic theft; More importantly, in case of a wrong transaction, the destination of the money cannot be identified and returned. There are these and many other cases that make these currencies a major challenge in Iran (Kashefi and Majdi, 2021).

Therefore, it is important to create a knowledge and data-oriented information system in the field of virtual currencies. Accordingly, it is necessary not only in Iran but also in all countries to identify the creation of a knowledge and data-oriented information system.

Because of the emergence of new electronic currency systems has been significantly welcomed by criminals and terrorists to launder money and transfer funds globally to avoid the enforcement of banking laws and regulations. Data-oriented system in this field can reduce the challenges of virtual currency in the banking industry.

Also, over the last decade, recent developments in anti-money laundering laws have created several legal frameworks governing various aspects of payments, especially in the case of payment services and electronic money.

However, in some cases, virtual currencies have provided challenges in the field of illegal money transfer and currently, it must be admitted that only a few provisions are applicable in the anti-money laundering rules.

In Iran, due to the positive and negative functions of these currencies, it is necessary to accomplish a deep identification based on qualitative and fundamental analysis of the challenges and opportunities of virtual currencies in the marketing of Iran's banking industry, so that by relying on the opinions of elites and experts in this field, many threats of virtual currencies can be identified and turned into an opportunity. Therefore, the main question of the present research is, what is the information system based on virtual currency data in the banking industry?

2. Literature Review

2.1 Data-oriented information system

Unexpected data-driven insights using advanced analytics can create more opportunities for quick and accurate decision-making (Tomanek et al., 2022). The correct data allows manufacturers to focus on the most significant problems and opportunities. Understanding whether a manufacturer is measuring the right things about any problem using KPIs can help solve that problem. Data-driven manufacturing processes require high levels of accuracy, continuous quality improvement, and the highest quality of maintenance processes. For this reason, artificial intelligence facilitates these processes (Sonksen, 2022). The use of artificial intelligence makes the production cycle more data-oriented and increases the amount of profit and productivity (Chauhan et al., 2022). It also helps manufacturers to pave the way for continued growth by applying many AI-based analytical programs, including intelligent maintenance, predictive

intelligence, and human-robot collaboration (Abdulriza et al., 2022).

2.2 Virtual currency

Virtual currency refers to currencies that are stored and transferred electronically and their base is zero and one (Ang et al., 2022). The most important discussion in the policy process of a new phenomenon is to identify the challenges caused by it.

Therefore, legislators and policymakers should have a comprehensive understanding of all aspects of the cryptocurrency challenge. The main challenge of virtual currencies, which makes it difficult to regulate digital currency, is the decentralized and minimally intrusive structure of governments which increases the possibility of abuse due to the lack of adequate supervision (Lee et al., 2021). Another point is that this type of exchange is welcomed by criminal gangs and illegal groups because they do not leave any traces and facilitate any transactions (Akcora et al., 2022). In the following, studies in line with the research objectives have been reviewed:

Whig et al. (2022) conducted a study titled "Demystifying Federated Learning for Blockchain: A Case Study". They stated that consumers and institutional regulators need to be well-informed about the risks of Bitcoin and its alleged power to challenge the concept of money.

Vermedal & Wang's (2022) study titled "Evaluating Common Bitcoin Valuation Models – How Do They Work and How Do They Work Today?" showed strong evidence from the two Bitcoin markets. It was roughly inefficient between 2010 and 2017, with the exception of a few periods when it was calm directly after the bubble-like increases in price. Nie (2022) conducted a study titled Analysis of Important Events in the Correlation Dynamics of Digital Currency Market.

Based on rating data for a subset of apps, existing studies show that interest in bitcoin increased, particularly in countries where banks are struggling. The results showed that even though downloads of Bitcoin apps increased after the news, the effect observed in countries whose banking systems were thought to be in trouble at the time was not significantly prominent.

Khademan et al. (2021) conducted a study titled identifying the legal nature of cryptocurrencies by analyzing their structure in Iran's legal system. Regarding the issues related to cryptocurrencies, including their nature, several resolutions and regulations have been issued by various bodies, but these legal texts are often incomplete and have been drafted outside the limits of authority, so the official legislative authority of the country has entered into the issues of this area and drafted the law. It is necessary to be comprehensive and complete.

All research in this field points to the lack of data and information continuity in the field of virtual currency. Therefore, it seems necessary to identify and provide an information system for virtual currency based on the extraction of important factors in this field.

3. Method

This research is applied in terms of purpose. The population includes university professors who specialize in marketing and experimental experts, including managers of the banking industry. Sampling in the qualitative section was done purposefully. The expertise criteria were having at least a graduate degree and ten years of relevant work experience. Finally, 20 people were selected as samples. The method used in this research is the Step-Wise Weight Assessment Ratio Analysis (SWARA)'s quantitative prioritization method. The factors evaluated in this research, shown in Table 1, were identified in an article by Aghanouri et al. (2021), using the grounded theory method. The validity of the indicators identified based on CVR and CVI criteria was also confirmed. Swara method (SWARA) means gradual weighting evaluation ratio analysis method. The Swara method is one of the new multi-criteria decision-making methods introduced in 2010. This method is used to calculate the weight of the criteria. In the Swara method, experts first sort the criteria in order of importance. The most important criterion is placed first and gets a score of one. Finally,

the criteria are ranked based on average values of relative importance. In this method, experts have an important role in determining the weight of the criteria. The main feature of this method is that the experts can estimate the importance of criteria in the process of determining their weight. Swara's method is useful for gathering and harmonizing information obtained from experts. The application of this technique is simple and experts in different fields can easily grab the main purpose of this method.

Table 1. *Validity evaluation of the identified indicators*

Questionnaire items	CVR	CVI	Result
1. Lack of new hardware and up-to-date virtual currency technologies	0.60	0.85	Confirmed
2. Lack of necessary software in the field of virtual currencies	0.80	0.95	Confirmed
3. Problems and security issues associated with virtual currencies	1.000	1.000	Confirmed
4. Lack of synchronization with new technologies in the field of cryptocurrencies	0.90	0.80	Confirmed
5. Complications and ambiguity with cryptocurrency technology	0.60	1/000	Confirmed
6. Inadequate expertise in cryptocurrency technology	0.70	0.80	Confirmed
7. Money laundering and fraud in transactions	0.70	0.80	Confirmed
8. Book value of digital currency mining equipment	0.70	0.80	Confirmed
9. Non-monetary nature	1.000	0.80	Confirmed
10. Non-recognition of digital currencies	0.90	0.80	Confirmed
11. High cost of Bitcoin mining	0.50	0.80	Confirmed
12. Price fluctuations	0.90	1.000	Confirmed
13. High investment risk	0.70	0.85	Confirmed
14. The real economic threat	0.80	0.85	Confirmed
15. Lack of familiarity of the public with cryptocurrencies and virtual currencies	1.000	0.80	Confirmed
16. Public uncertainty surrounding the nature of virtual currencies	0.60	1.000	Confirmed
17. Lack of sufficient experience with virtual currencies among people	0.70	0.90	Confirmed
18. Uncertainty about the future of virtual currencies among people	0.50	0.90	Confirmed
19. Preference of people to use conventional banking methods	0.80	0.80	Confirmed
20. More people's trust in traditional banking methods	1.000	0.80	Confirmed
21. Low digital literacy in society	0.60	0.95	Confirmed
22. The country's infrastructure does not support virtual currency	0.50	0.90	Confirmed
23. Problems caused by the mismatch of international financial exchanges	0.80	1.000	Confirmed
24. Low purchasing power of the people caused by the general economic conditions and high inflation in the country	0.90	0.90	Confirmed
25. Drafting the policy without considering the considerations of the executives	0.60	0.95	Confirmed
26. Negative influence of influential groups (politics)	0.60	1.000	Confirmed
27. The negative effect of interest-seeking groups (companies that import mining devices)	0.60	1.000	Confirmed
28. International and political situation of the country	0.50	0.80	Confirmed
29. Deceptive practices in trade	0.90	0.95	Confirmed
30. Unlicensed or unregistered monetary and payment operations	0.60	0.95	Confirmed
31. Monetary concerns (monetary regulations for digital currencies)	1.000	1.000	Confirmed
32. Absence of legal and government supervision over digital assets	0.60	0.85	Confirmed
33. Movement and departure of uninspected currency from the country	0.90	0.85	Confirmed
34. Internet blackmail	1.000	0.80	Confirmed
35. Increase in drug and organ trafficking	0.90	0.95	Confirmed
36. Tax evasion	0.50	0.80	Confirmed
37. Increase in cyber crimes	0.90	1.000	Confirmed
38. Financing hostile groups	0.60	0.85	Confirmed

39. Establishing joint R&D centers with international financial organizations	1/000	0.80	Confirmed
40. Creation of tax incentives in production and entrepreneurship in virtual currency	0.80	0.85	Confirmed
41. Revision of macroeconomic/political policies to support and develop a digital currency	1.000	0.80	Confirmed
42. Strictness in drafting and implementing regulations governing the implementation of security standards for virtual currency mining	0.90	0.80	Confirmed
43. Amending regulations and tariffs for electricity export (through currency extraction)	0.60	1.000	Confirmed
44. Compilation of a comprehensive virtual currency program	0.90	0.90	Confirmed
45. The need to review the implementation of virtual currency laws	0.50	0.90	Confirmed
46. Proper planning of human resources based on needs assessment and future research	0.80	0.95	Confirmed
47. The multifacetedness of virtual currencies and the challenge of regulation	0.70	1.000	Confirmed
48. Not accepting the virtual currency as money (general public mentality)	1.000	0.95	Confirmed
49. Uncertain mechanisms of legal action	1.000	1.000	Confirmed
50. The developing and uncertain future of virtual currency	0.60	1.000	Confirmed
51. Weak operational planning to implement policies in mining virtual currency	0.60	0.80	Confirmed
52. Lack of access to modern production technology and the difficulty of importing devices	0.70	0.95	Confirmed
53. Weakening of the central bank and intermediate institutions	0.70	0.80	Confirmed
54. Growth of production and investment	0.50	1.000	Confirmed
55. Export growth and international trade	0.80	0.85	Confirmed
56. Acceleration of entrepreneurship based on the new payment system	0.80	0.85	Confirmed
57. Proximity of financial standards to global standards	0.80	0.90	Confirmed
58. Increasing tourist attraction	1.000	0.95	Confirmed
59. Creating coordination between the information technology unit	0.60	1.000	Confirmed
60. Creation of an interbank digital transformation team	1.000	1.000	Confirmed
61. Alignment of banking processes with global standards	0.50	1.000	Confirmed
62. Improving the provision of services and products	0.60	1.000	Confirmed
63. Improving communication and interactions between customers and the bank	0.60	0.85	Confirmed
64. Establishing an independent digital transformation unit in the bank	0.50	0.85	Confirmed
65. Reducing the power of US dollar sanctions against Iran's economy	0.90	0.95	Confirmed
66. Decentralization of the financial system with friction	0.70	0.85	Confirmed
67. Use of virtual currency in Iran's sanctions situation	0.70	0.95	Confirmed
68. High speed in international and cross-border transfers	0.70	0.95	Confirmed
69. Financing allied groups	0.70	0.85	Confirmed

4. Findings

Table 2 displays the demographic characteristics of the experts participating in the interviews are presented by gender, age, education and work experience.

Table 2. *Demographic characteristics of experts*

Demographic characteristics		Frequency	Percentage
gender	Man	12	60%
	Female	8	40%
Age	Less than 35 years	2	10%
	35 to 45 years	8	80%
	45 years and more	10	50%
education	Masters	9	45%
	P.HD	11	55%

Work Experience	Between 5 and 10 years	3	15%
	10 to 20 years	7	35%
	Over 20 years old	10	50%
	Total	20	100%

Finally, research indicators have been prioritized using the Swara method. In the Swara method, experts first sort the criteria in order of importance. The most important criterion is placed first and gets a score of one. Finally, the research components are ranked based on the average relative importance values. Then, the relative importance of each criterion compared to the previous criteria is determined. These values are listed in the "Average relative importance" column in the table below, which is the same as (S_i). The linear normalization method was used to calculate the final weight. In this way, the final weight of each element was obtained.

Step one: Sorting the criteria

At first, the desired criteria are written in order based on their importance. The most important criteria are placed in higher categories and the less important criteria are placed in lower categories.

Step two: Determining the relative importance of each criterion (S_i)

In this step, the relative importance of each criterion compared to the previous criteria is determined. In the Soura method process, this value is represented by (S_i)

Step three: Calculating the coefficient K_j

The coefficient K_j, which is a function of the relative importance of each criterion, is calculated using equation 1:

Relationship 1:

$$K_j = S_j + 1$$

Step four: Calculating the initial weight of each criterion

The initial weight of the criteria is calculated through equation 2. In this regard, it should be noted that the weight of the first criterion, which is the most important criterion, is considered equal to 1.

Relationship 2:

$$Q_j = \frac{Q_{j-1}}{K_j}$$

$$Q_j = Q_{j-1} / K_j$$

Step five: Calculating the final normal weight

In the last step of the Suara method, the final weight of the indicators, which is also considered the normalized weight, is calculated through equation 3. Normalization is done by a simple linear method.

Relationship 3:

$$W_j = \frac{Q_j}{\sum Q_j}$$

As mentioned, the main feature of the SWARA method is that it is possible to evaluate the opinions of experts or evaluation groups regarding the importance of indicators in the process of determining their weight (Keršuliene et al., 2010).

Table 3. *Prioritization of research components with the Swara method*

Criterion	Average relative importance	K_j	initial weight	Normal weight
The use of virtual currency in Iran's sanctions situation (Q67)	1	1	1	0.122
Acceleration of entrepreneurship based on the new payment system (Q56)	0.09	1.09	0.917	0.1119
General uncertainty about the nature of virtual currencies (Q16)	0.24	1.24	0.74	0.0902
Improving communication and interactions between customers and the bank (Q63)	0.05	1.05	0.705	0.0859
Alignment of banking processes with global standards (Q61)	0.19	1.19	0.592	0.0722

Price fluctuations (Q12)	0.27	1.27	0.466	0.0569
Problems and security issues associated with virtual currencies (Q03)	0.11	1.11	0.42	0.0512
High cost of Bitcoin mining (Q11)	0.05	1.05	0.4	0.0488
Amendment of electricity export regulations and tariffs (Q43)	0.09	1.09	0.367	0.0448
More people trust traditional banking methods (Q20)	0.12	1.12	0.328	0.04
Increase in cybercrimes (Q37)	0.21	1.21	0.271	0.033
Increase in drug and organ trafficking (Q35)	0.18	1.18	0.23	0.028
Deceptive practices in trade (Q29)	0.25	1.25	0.184	0.0224
Creating an interbank digital transformation team (Q60)	0.18	1.18	0.156	0.019
Establishing joint R&D centers with... (Q39)	0.31	1.31	0.119	0.0145
Creating tax incentives in production and entrepreneurship in virtual currency (Q40)	0.04	1.04	0.114	0.0139
Creating an independent digital transformation unit in the bank (Q64)	0.11	1.11	0.103	0.0125
Creating coordination between the information technology unit (Q59)	0.21	1.21	0.085	0.0104
Internet blackmail (Q34)	0.09	1.09	0.078	0.0095
Revision of macroeconomic/political policies... (Q41)	0.013	1.013	0.077	0.0094
Proper planning of human resources based on... (Q46)	0.09	1.09	0.071	0.0086
Weak operational planning to implement... (Q51)	0.12	1.12	0.063	0.0077
Non-recognition of digital currencies (Q10)	0.22	1.22	0.052	0.0063
Improving the provision of services and products (Q62)	0.31	1.31	0.039	0.0048
Low level of digital literacy in society (Q21)	0.07	1.07	0.037	0.0045
Money laundering and fraud in transactions (Q07)	0.011	1.011	0.036	0.0045
Complexities and ambiguities associated with cryptocurrency technology (Q05)	0.09	1.09	0.033	0.0041
The negative impact of influential groups (politics) (Q26)	0.21	1.21	0.028	0.0034
The negative impact of interest-seeking groups (companies that import mining equipment) (Q27)	0.04	1.04	0.027	0.0032
Financing of hostile groups (Q38)	0.06	1.06	0.025	0.0031
Financing of allied groups (Q69)	0.16	1.16	0.022	0.0026
Insufficient expertise in cryptocurrency technology (Q06)	0.31	31.1	0.017	0.002
Development of a comprehensive virtual currency program (Q44)	0.05	1.05	0.016	0.0019
Developing a policy without considering... (Q25)	0.19	1.19	0.013	0.0016
Preference of people to use conventional banking methods (Q19)	0.27	1.27	0.01	0.0013
Weakening of the central bank and intermediary institutions (Q53)	0.05	1.05	0.01	0.0012
Decentralization of the financial system with friction (Q66)	0.19	1.19	0.008	0.001
Real economy threat (Q14)	0.27	1.27	0.007	0.0008
Movement and departure of uninspected currency from the country (Q33)	0.11	1.11	0.009	0.0011
The multifacetedness of virtual currencies and the regulatory challenge (Q47)	0.05	1.05	0.009	0.0011
The developing and uncertain future of virtual currency (Q50)	0.09	1.09	0.008	0.001
Monetary concerns (monetary regulations for digital currencies) (Q31)	0.08	1.08	0.008	0.0009
Production and investment growth (Q54)	0.12	1.012	0.024	0.0029
Export growth and international trade (Q55)	0.06	1.06	0.022	0.0027
High investment risk (Q13)	0.06	1.06	0.026	0.0032
Uncertain mechanisms of legal action (Q49)	0.21	1.21	0.022	0.0026
Strictness in formulating and implementing regulations governing... (Q42)	0.18	1.18	0.018	0.0022
High speed in international and cross-border transfers (Q68)	0.08	1.08	0.017	0.0021
The necessity of revising the implementation of virtual currency laws (Q45)	0.12	1.12	0.015	0.0018
People's uncertainty about the future of virtual currencies (Q18)	0.12	1.12	0.013	0.0016
Lack of familiarity of the public with cryptocurrencies and virtual currencies (Q15)	0.06	1.06	0.013	0.0016
The country's infrastructure does not support virtual currency (Q22)	0.06	1.06	0.016	0.0019
Lack of access to modern production technology and... devices (Q52)	0.21	1.21	0.013	0.0016
Not accepting virtual currency as money (general public's mentality) (Q48)	0.18	1.18	0.011	0.0014
Absence of legal and governmental supervision over digital assets (Q32)	0.18	1.18	0.009	0.0012

Lack of synchronization with new technologies in the field of cryptocurrencies (Q04)	0.06	1.06	0.014	0.0017
Unlicensed or unregistered monetary and payment operations (Q30)	0.12	1.12	0.007	0.0008
Tax evasion (Q36)	0.06	1.06	0.006	0.0008
Lack of sufficient experience about virtual currencies among people (Q17)	0.06	1.06	0.008	0.0009
Lack of new hardware and up-to-date virtual currency technologies (Q01)	0.21	1.21	0.006	0.0008
People's low purchasing power due to general economic conditions and... (Q24)	0.18	1.18	0.005	0.0007
The proximity of financial standards to global standards (Q57)	0.08	1.08	0.005	0.0006
Reducing the power of US dollar sanctions against Iran's economy (Q65)	0.12	1.12	0.004	0.0005
Non-monetary nature (Q09)	0.12	1.12	0.004	0.0005
Problems caused by the mismatch of international financial transactions (Q23)	0.06	1.06	0.004	0.0005
Lack of necessary software in the field of virtual currencies (Q02)	0.06	1.06	0.005	0.0006
Book value of digital currency mining equipment (Q08)	0.21	1.21	0.004	0.0005
The international and political situation of the country (Q28)	0.18	1.18	0.003	0.0004
Increasing tourist attraction (Q58)	0.06	1.06	0.004	0.0005

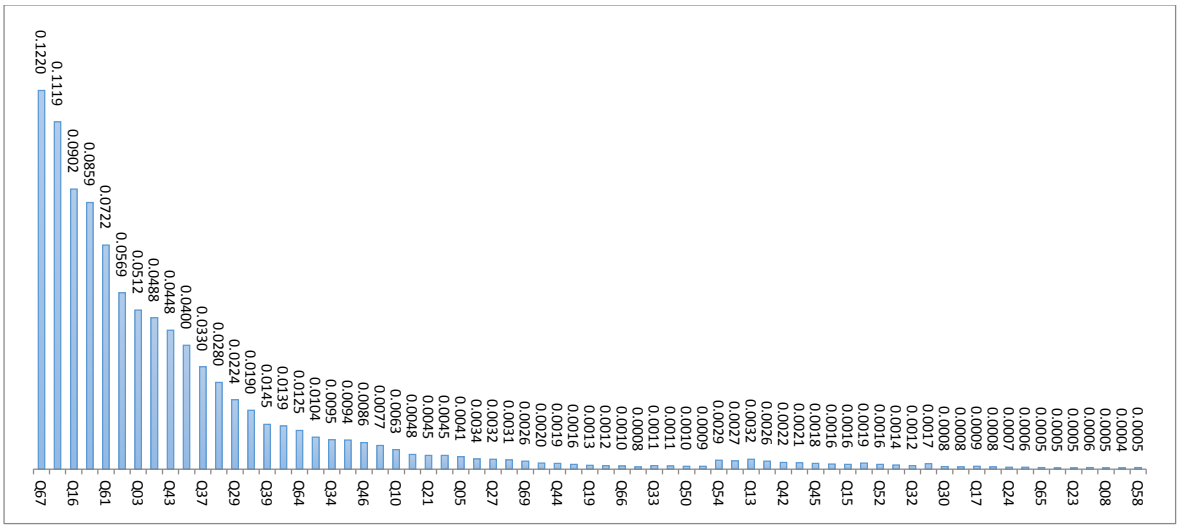

Figure 1. *The final weight of research components using the Swara method*

The index of using virtual currency in Iran's sanctions situation (Q67) with a weight of 0.12 is in the first priority. The index of entrepreneurial acceleration based on the new payment system (Q56) with a weight of 0.11 is in the second priority. The index of general uncertainty about the nature of virtual currencies (Q16) with a weight of 0.09 is in the third priority. The index of improving communication and interactions between customers and the bank (Q63) with a weight of 0.08 is in the fourth priority. The index of alignment of banking processes with global standards (Q61) with a weight of 0.07 is in the fifth priority.

In this analysis, the inconsistency rate of 0.017 was obtained, which is less than 0.1 and is confirmed.

4. Discussion

With the priority of factors affecting the data-based information system for virtual currency, it is clear that in the age of information explosion, individual companies will generate and collect a large amount of data every day. Extracting useful information from the database and converting the information into practical results is the main challenge that companies face. Considering the progress of the country in the field of information technology and special views on electronic government and the penetration of the use of computer systems in the industry

and the creation of large databases by government departments, the need to use data mining is deeply felt in banks and private sectors. Therefore, the results show that one of the ways to the success of cryptocurrencies is the use of data-oriented information systems and data mining techniques. Data-oriented information system is one of the recent developments in data management technologies.

By supporting the country's infrastructure with virtual currency and solving the problems caused by the incompatibility of international financial exchanges, the relevant managers should provide the necessary preparations to increase the purchasing power of the people. Also, controlling inflation in the country with the help of drafting a policy, taking into account the considerations of the executives, also provides the necessary ground to solve the challenges of virtual currency in the banking industry. It is also suggested to reduce the negative effect of influential groups (politicians) and profit-seeking groups (companies that import mining equipment) by taking appropriate measures. Solving the challenges of virtual currency will lead to the improvement of the country's international and political situation.

By providing new and up-to-date hardware and software of virtual currency technologies, can solve the problems and security issues associated with virtual currencies. With the help of synchronizing with new technologies in the field of cryptocurrencies and solving the complexities and ambiguities along with the technology of cryptocurrencies, the relevant managers can facilitate the use of cryptocurrencies. Also, with the cooperation of experts in the field of cryptocurrency technology, money laundering and fraud in transactions can also be prevented. In the meantime, by adjusting the book value of digital currency mining equipment and recognizing digital currencies, the existing challenges can be overcome to some extent. Relevant managers are able to overcome the threat of the real economy by reducing price fluctuations and reducing the risk of investing in virtual currencies. Also, increasing public familiarity with cryptocurrencies and virtual currencies will also lead to public disambiguation about the nature of virtual currencies. The higher the level of experience around virtual currencies among people, the more confident people are about the future of virtual currencies and the fewer people prefer to use conventional banking methods. Most people trust traditional banking methods due to the low level of digital literacy in society, which should be investigated by the relevant managers.

To solve the challenges related to virtual currencies by creating joint R&D centers with international financial organizations and creating tax incentives in production and entrepreneurship in virtual currency. Also, the review of macroeconomic/political policies to support and develop digital currency and strictness in the compilation and implementation of regulations regarding the implementation of security standards for virtual currency mining will also help in this field. It is suggested that relevant managers should amend the regulations and tariffs of electricity export (through currency extraction) with the help of compiling a comprehensive virtual currency program. In addition to the mentioned cases, the need to review the implementation of virtual currency laws along with proper planning of human resources based on needs assessment and future research is also felt.

Examining the multifacetedness of virtual currencies and the challenge of regulating them increases the acceptance of virtual currencies among people. This will be possible with the help of improving the mentality of the general public. Also, specifying the mechanisms of filing a lawsuit also helps to solve the challenges of virtual currency, and the operational planning of managers to implement policies in mining virtual currency also reduces existing risks. With access to the technology of modern production and import of devices, relevant managers can strengthen the central bank and intermediary institutions financially, and this will be a big step towards solving the challenges of virtual currencies.

Finally, by implementing the mentioned strategies, achieving production and investment growth indicators, export growth and international trade, entrepreneurial acceleration based on the new payment system, financial standards close to global standards, increasing tourist attraction, creating coordination between the information technology unit, creating the inter-bank digital transformation team, aligning banking processes with global standards, improving the provision of services and products, improving communication and interactions between customers and the bank, creating an independent digital transformation unit in the bank, reducing the power of the US dollar embargo against Iran's economy, decentralizing the financial system. Along with friction, the use of virtual currency in Iran's sanctioned conditions, high speed in international and cross-border transfers, and financing of allied groups as consequences of the establishment of the virtual currency challenge model in the marketing of Iran's banking industry will not be far from expected.

5. Conclusion

This research is a combination of three categories of technological challenges, economic challenges, and individual challenges. In particular, regulatory factors are very important in terms of application; Because the experience of the countries that are ahead of Iran in the use of digital secrets in the financial industry shows that all these countries, based on the identified data and the integration of information, quickly passed laws related to the supervision of businesses based on cryptocurrencies. and the specific example of which is the United States of America. Lack of new and up-to-date hardware of virtual currency technologies, lack of necessary software in the field of virtual currencies, problems and security issues associated with virtual currencies, lack of synchronization with new technologies in the field of cryptocurrencies, complexities, and ambiguities associated with cryptocurrency technology, insufficient expertise in the field of technology Cryptocurrencies are also mentioned. All these factors define the infrastructure of a data-oriented information system for virtual currency.

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