Iranian Journal of Operations Research
Vol. 15, No. 2, 2024, pp. 18-58

The application of multiple methodologies (problem structuring methods) in order to solve the problems of electricity shortage caused by cryptocurrency mining in Iran

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Abstract

The simplest definition of multiple methodology is the use of more than one method in dealing with real-world problems. Decision makers in the real world face different aspects of the world, and each of the hard and soft operations research methods has an advantage to respond to certain aspects. Therefore, can it be claimed that by using two or more combined methods, more levels and dimensions of a problematic situation can be investigated so that the results are more effective and reliable?.In this research, in order to provide more effective solutions to the problem of electricity shortage caused by cryptocurrency mining in Iran, three methods: Strategic choice Approach(SCA), Strategic Option Development and Analysis(SODA), Critical Systems Heuristics(CSH), have been combined. The working method is as follows: the SCA method is placed as the main base of the composition, and the SODA method is implemented in the fourth step and the CSH method is implemented in the eighth step of the SCA.

The results of the research showed that by combining the three mentioned methods, more levels and dimensions of the electricity shortage problem caused by cryptocurrency mining were revealed and as a result, more effective solutions were presented. The SODA method, by fully explaining the research problem, presented 6 strategic priorities for earning income through cryptocurrencies. Also, with the CSH method, both the research problem was investigated and 6 main uncertainties were identified. And finally, the basic decisions that should be taken by government institutions and organizations in solving the problems of electricity shortages caused by cryptocurrency mining were presented with the SCA method. Also, the result and general idea that was revealed by examining the different levels and dimensions of the problem is that one should never ignore the numerous benefits of digital currencies due to the problems of electricity shortage.

Keywords*: electricity shortage, cryptocurrency mining, combining, SCA, SODA,CSH*

1.Introduction

The introduction of cryptocurrencies as a new form of money has attracted a tremendous amount of attention in recent years. This new financial paradigm relies on miners to validate transactions by running

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their cryptocurrency mining devices (CMDs). Nowadays, the significant profitability of the mining business has tempted a large number of private players in the electrical industry to employ their renewable energy resources to mine digital currency [8]. Cryptocurrency miners consume a large amount of electrical energy to run their cryptocurrency mining devices (CMDs). These CMDs have a powerful computational capability to solve a complicated mathematical problem that validates the transactions between the digital currency's holders [6]. In response, they are rewarded in the form of digital currency to compensate for their expenditures. Therefore, one can simply deduce that cryptocurrency miners convert electrical energy to digital currency by running their CMDs [8]. along with the rapid growth of cryptocurrency mining in the world, In Iran, the number of digital currency miners is also increasing. Especial Due to the cheapness of the electricity price in Iran, the footprints of foreign miners are also there can be seen. .In addition to the cheapness of electricity, miners' feet to cattle ranches. Agricultural lands and fields have been opened and the growth of underground home mining has caused. Electricity supply in Iran with the problem of reducing the production of power plants Water has been faced due to the decrease in rainfall and lack of planning to generate more electricity is. And this rapid growth of cryptocurrency mining, which requires significant electricity generation,A bad situation worsens the lack of electricity. lack of electricity and its frequent blackouts. It has become a disturbance in the daily life process of citizens. From home power outage Until the power cut in the offices and the postponement of the client's work and closure Factories and companies that add to the country's problems. Then the increase in electricity consumption due to the extraction of cryptocurrency, even in a situation where the country is limited Direct electricity production will put additional problems on the shoulders of the people and the country.

Now the question arises, what is the solution? And how to solve this problem shall we come Answering these questions becomes more difficult when I know the problems in front of country We are faced with many different stakeholders and conflicts and uncertainties There is abundance among these stakeholders. For example, some stakeholders agree %100 cryptocurrency mining and they say the government should produce more electricity. But Some ordinary people are seriously opposed because of the problems caused by blackouts. Also, questions such as: Why is the government's policy about digital currencies not clear? And Why the main custodians of digital currencies in the country have not been identified yet? Some doubts and the uncertainties of the issue. To better understand the many stakeholders of cryptocurrencies and analyze conflicts and uncertainties It is necessary to know what factors have caused the rapid growth of cryptocurrency mining in Iran? The skyrocketing inflation rate in recent years has caused many people to Maintaining the value of their money, they go to some speculative activities and the same thing It causes liquidity to wander from time to time from one of the currency, coin, car markets And the stock market went up. They seek not to lose the value of their capital There were other markets where they could make more profit. It was here that much From money, people moved towards digital currencies of course, speed The spread of digital currencies in the world and its impact on the people of Iran should not be underestimated remember Maybe the cheapness of the electricity price in Iran sometimes causes the opening of rejection We can introduce the presence of foreigners in the country as another influencing factor do.

Now the main question of this research is what is the solution? In a country that is facing a shortage of electricity and on the other hand is involved in the emerging phenomenon of digital currency mining (which consumes a lot of electricity), how can we address the problem and provide a solution to improve the situation? In this situation, solving these problems and providing practical solutions has been one of the main reasons for the formation of this research. Therefore, according to the structure and situation of the problem, it seems that the best option is to use soft operation research methods. Research methods in soft operations (problem structuring methods) are the best option for making decisions about complex social issues [11]. On the other hand, by combining several methods of structuring the problem (multiple methodology), more levels and dimensions of the problematic situation can be revealed. So this paper presents a new multi-methodological framework that combines three soft operations research methods as a way to deal with complex social and technical phenomena. In fact, the main goal of this research is to prove whether by combining several soft methods, more levels and dimensions of the problematic situation will be revealed. And with this, we can make better decisions. Perhaps we can say that the purpose of this

research is to confirm or reject the hypothesis that multiple methodology helps to make better decisions by revealing more levels and dimensions of the problem. The research method is such that SCA is placed as the basis and foundation of the research method, in the fourth and eighth steps, soda and csh methods are used, respectively. In general, the type of triple combination that was used in this research and only research methods were used in soft and liberating operations can be considered as the innovation of this research, because in previous researches, more of the combination of soft and hard methods was used.

2. Research purposes, Research method, Past researches, Research Gap and Diagram of research implementation stages

The research purposes and methods and Past researches are summarized in Table 1, and Diagram of research implementation stages is shown in Figure 1.

Table 1.The research purposes, methods and Research Gap

Research Purposes		
1-Proving that the combination of structuring methods to the problem (multiple methodology) reveals more levels and dimensions of the problem and with this method, better decisions can be made. 2-Providing a suitable solution to solve the problems of electricity shortage caused by cryptocurrency mining		
Research Method		
In terms of research philosophy, the current research is a qualitative research with an inductive approach, and in terms of orientation, because the research is carried out with the aim of enjoying the results of the findings to solve existing problems in a specific field, it is applied.		
Past Researches		
SCA	SODA	CSH
A multi-methodological combination of the strategic choice approach and the analytic network process: From facts to values and vice versa [13]	Surveying applications of Strategic Options Development and Analysis (SODA) from 1989 to 2018 [1]	Critical Systems Heuristics: a Systematic Review. Systemic Practice and Action Research [14]
The Strategic Choice Approach in shaping public policies [4]	Enhancing public participation in natural resource management using Soft OR—an application of strategic option development and analysis in tactical forest planning [10]	A critical systems approach to business intelligence system development [8]
The Application of Sca (Strategic Choice Approach) Methodology (Case Study: Decision-Making Regarding Conflicts, Complexity, and Uncertainty of the Electricity Shortage Problem Caused by	Challenges and solutions of non-timber forest products businesses in Finland - analysis by SODA method [12]	Critical Systems Heuristics, Journal of Systems Thinking [6]

Cryptocurrency Mining in Iran [2]		
Research Gap		
According to the studies done in the background of the research, the most important research gap in the mentioned studies is that they are not comprehensive, so that each study examines one of the research methods in soft operations. While in this research, three research methods are combined in soft operations. In fact, the type of combination of the three mentioned methods is considered as research innovation		

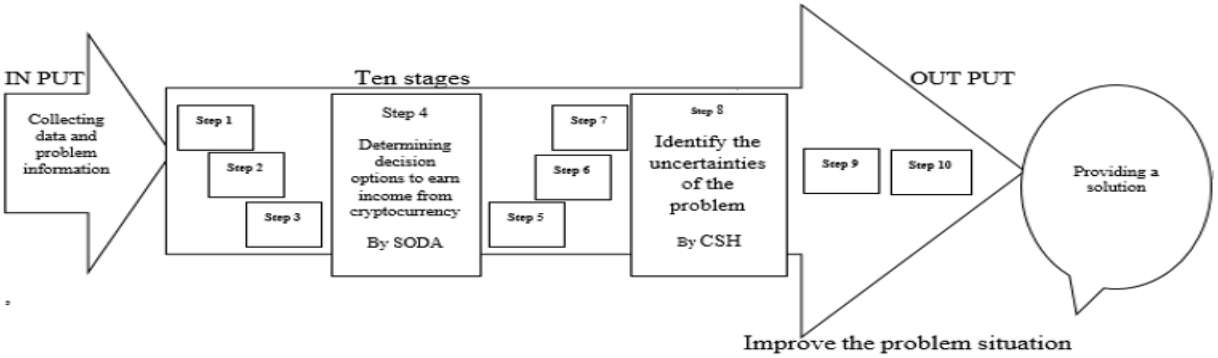

Figure 1,Diagram of research implementation stages

3.Implementation and execution.

Due to the reduction of the volume of the article, the researchers refrained from giving the relevant explanations and went directly to the implementation of the three mentioned methods.

3.1. Stages of implementing the strategic choice approach(۱۰ Step)

Step 1: Determining decision-making areas

In this study, a group of 12 stakeholders and digital asset experts was chosen for the workshop. In this workshop, participants were arranged in a semi-circle facing the facilitators. The researchers of this article were introduced as the facilitators of the workshop. The session starts with the facilitators establishing a baseline concept of "decision areas" regarding cryptocurrencies. During the sessions, some issues that are lightly influenced by participants' input are better recorded in a separate list called "Uncertainty Areas." This is necessary to identify different types of uncertainties [3]. To better identify decision-making areas and gain a better understanding of the issues, their root causes were explored and presented in Table 2. It should be noted that in all SCA stages, instead of using abbreviations for each decision areas, shortened titles of decision areas are used. Additionally, a question mark (?) is placed in front of each decision areas title for identification purposes.

Table 2- problem, root causes, and decision areas (Editing: Collectors)

problem	The root causes of the problem	Decision-making areas	The title of the areas - decision-making
The need for fundamental transformation in the field of digital currencies	-In recent years, with the increase in popularity and public interest in digital currencies, the speed of approval and implementation of regulatory laws has not increased -The government and parliament have not looked at it as a new industry -In recent years, due to the lack of electricity caused by the growth of cryptocurrency mining, it has created problems close to a crisis for the country	What are the most important transformative measures in the field of cryptocurrencies in the country?	**Transformational actions?**
So far, the government has focused more on mining and has not paid attention to other aspects of blockchain.	-The problem of lack of electricity caused by the growth of underground mining -He does not consider block chain as a transformative technology that pays attention to its other dimensions -The abandonment and uncertainty of cryptocurrency exchange and payment platforms inside the country	What solutions are there for the government to comprehensively focus on all aspects of the block chain and not just mining?	**The government's focus on all aspects of the block chain?**
Unreasonable growth of illegal (underground) mining	-Increasing home extraction -Prohibition of legal mining and reduction of issuing mining licenses by the government increases illegal mining -Low electricity price in Iran -Absence of an intelligent, online and real-time monitoring system of electricity consumption at all levels of production, transmission and distribution	What are the optimal and basic solutions to prevent illegal extraction?	**Basic and optimal ways to prevent illegal mining?**
There is not enough electricity to mine cryptocurrencies and the low electricity tariff encourages people and even foreigners to mine in Iran.	- Subsidies paid by the government - So far, no proper planning has been done in providing electricity through renewable sources such as solar, wind and nuclear. - The electricity tariff is not different for mining in the cold and hot seasons	What work method should we use to supply the required electricity and create a suitable and optimal tariff system?	**Appropriate and optimal electricity supply and price solutions?**

	- The power of the private sector has not been used to produce electricity		
The threat-oriented, passive, mandated, negative and permission-oriented view of the field of cryptocurrencies by the government	-So far, the government has not reached a general consensus on cryptocurrencies -Lack of appropriate and codified laws -Failure to pay attention to the concerns of the private sector in the field of digital currencies	How will the threat-oriented, passive, mandated, cryptocurrency look change to an opportunity-oriented, active governance system, and new regulatory methods?	**Changing the government's view of the state of cryptocurrencies?**
Weakness in macro-management of crypto-currencies, the existence of disturbances in the field of mining industry	-Failure to estimate the positive effects of the digital currency industry, especially from the aspects of macroeconomics, energy and environment -Lack of preparation of legal, software and hardware infrastructures for the implementation of macro policies regarding cryptocurrencies. -Illegal entry of mining equipment and devices, or counterfeit, scrapped devices and equipment -Absence of appropriate and codified laws in the field of extraction, which is a sign of the government's lack of planning	What solutions can we use to cover the weaknesses in the macro management of cryptocurrencies and solve the problems in the country?	**Appropriate solutions to cover the weakness in the macro management of crypto-currencies and solve the problems of mining?**
The inappropriateness of the government's regulatory policies in the field of asset management and asset maintenance has created risks for people's activities in the cryptocurrency market.	-Service infrastructures, relevant technologies, investment funds and supporting institutions have not been established in this case -There is no proper insurance and tax mechanism in this case -It is not clear whether cryptocurrencies are currency or assets (if it is a currency, it is related to the central bank, and if it is an asset, it is related to the stock exchange) -Lack of development of institutional capacities and capital market tools	What solution is suggested for improper regulation in the field of asset management policies and keeping cryptocurrencies, which currently creates risks for people's activities in this field?	**Appropriate regulation in the field of cryptocurrency management policies?**
In the field of consensus algorithms, block	-Lack of awareness of their benefits, which can improve the	In the field of consensus algorithms, block	**Necessary measures in the field of cryptocurrencies?**

chain, functional tokens, personal wallet, and conversion of metal assets into digital assets (necessities of cryptocurrencies), valuable measures have not been taken by the government.	economic and political situation of the country -Academic research has not been optimally used either in software or hardware -Considering the scope of the issue and the large volume of transactions, and its users, we need advanced and expensive technologies	chain, utility tokens, personal wallets, and converting metal assets into digital assets, what measures should be taken by the government?	
The need for quality and suitable devices and equipment for extraction	-Prohibiting or reducing the issuance of mining licenses and the growth of illegal mining causes smuggled, scrapped, counterfeit and low-quality devices and equipment to enter the country. -Block chain, creation of functional tokens, cryptocurrency, etc., due to the large volume of users and their transactions, in order to verify the identity and the possibility of public participation, it needs new technologies to build devices and equipment, which currently these technologies are There is no complete in the country - lack of attention to the features of each device according to the type of extraction	What is the solution in the field of manufacturing or buying suitable and high-quality extraction devices and equipment?	**Making or buying suitable and quality devices and equipment?**
Missed opportunities in exploiting the strategic capacities of cryptocurrencies in the field of payment and exchange	-The necessary standards for the exchange of cryptocurrencies have not been developed with emphasis on customer recognition, maintenance rules, validation, etc. -Prohibition of direct exchange of cryptocurrencies with goods and services inside the country and lack of monitoring, supervision and control of payment and settlement tools in goods and services transactions by creating an integrated technical infrastructure -Failure to create or strengthen internal cryptocurrency exchanges.	How to compensate for the lost opportunities in exploiting the strategic capacities of cryptocurrencies in the field of payment and exchange?	**Compensation for lost opportunities in using the capacities of payment and exchange?**
Lack of serious involvement of the executive branch and the legislative branch	-Maybe they are not aware of the importance of the issue that the problems and problems caused by blackouts affected by	How can the government and parliament help to organize the	**Organization of the mining situation by the government and parliament?**

regarding cryptocurrency mining	cryptocurrency mining may cause the country to have a crisis.	cryptocurrency mining situation?	
Failure to determine the duties of businesses in the field of digital currencies	-Ignorance that it can generate income for the people and the country -Due to the sanctions, it is not possible for Iranians to operate in all foreign exchanges, or the capital of Iranian users may be blocked due to the sanctions.	What are the suggestions for digital currency businesses to help improve the power shortage situation?	**The status of businesses in the field of digital currencies?**
Development or non-development and participation or non-participation with foreigners in the creation and development of mining fields in the country	-Although the development of mining farms can be a source of income for the country, but industries and factories, manufacturing and service companies and organizations, ordinary people, etc. suffer due to blackouts caused by mining. -Unfortunately, no effective action has been taken by the government in this case	According to the current situation of the country, should mining farms be developed or banned? And should we cooperate with foreigners in this field?	**Development or non-development, participation or non-participation with foreigners in establishing mining fields?**
Using cryptocurrency mining (digital currencies in general) to earn income for the country	-Cryptocurrency mining is a major source of income that has not been used in Iran - Cryptocurrencies can be used instead of dollars in business transactions	How to use cryptocurrency mining (digital currencies in general) to earn income for the country?	**Earning income from cryptocurrency mining (digital currencies)?**
Non-cooperation of the general public regarding rational extraction and helping to solve the problem of electricity shortage	-Lack of education and awareness of the issue -Some unpleasant characteristics of Iranians, such as personal profiteering, make them not accept that the profit or loss resulting from the extraction goes to themselves in the first stage.	In what ways can we promote the country's public about rational extraction and help to solve the problem of electricity shortage?	**Promoting ordinary people to avoid illegal mining?**

2 and 3 step: Relationship between decision areas and determining the center of focus

In the next stage, the "decision-making" diagram is created, in which certain decision areas are connected by straight lines, usually referred to as "decision relationships." It is worth mentioning that unlike other methods, the strategic option approach does not use arrows to indicate causal or sequential relationships between decision areas. A decision diagram or graph is used to have a broader view of the problem structure. A decision graph is a two-dimensional map that shows a collection of decision areas,

connections, and disconnections between decision areas. Figure 2 illustrates the type of decision-making diagram in this workshop, which has been approved after some discussion and conversation among the participants. Some conventions used in this stage to construct Figure 2 are described as follows:

-Different styles of line drawing (dashed line, dotted line, etc.) are used to record the relationships between elements where there is disagreement or uncertainty.

-Decision areas with high importance or urgency are indicated by a circle with a solid line around them.

-The group must choose a center of focus after examining.

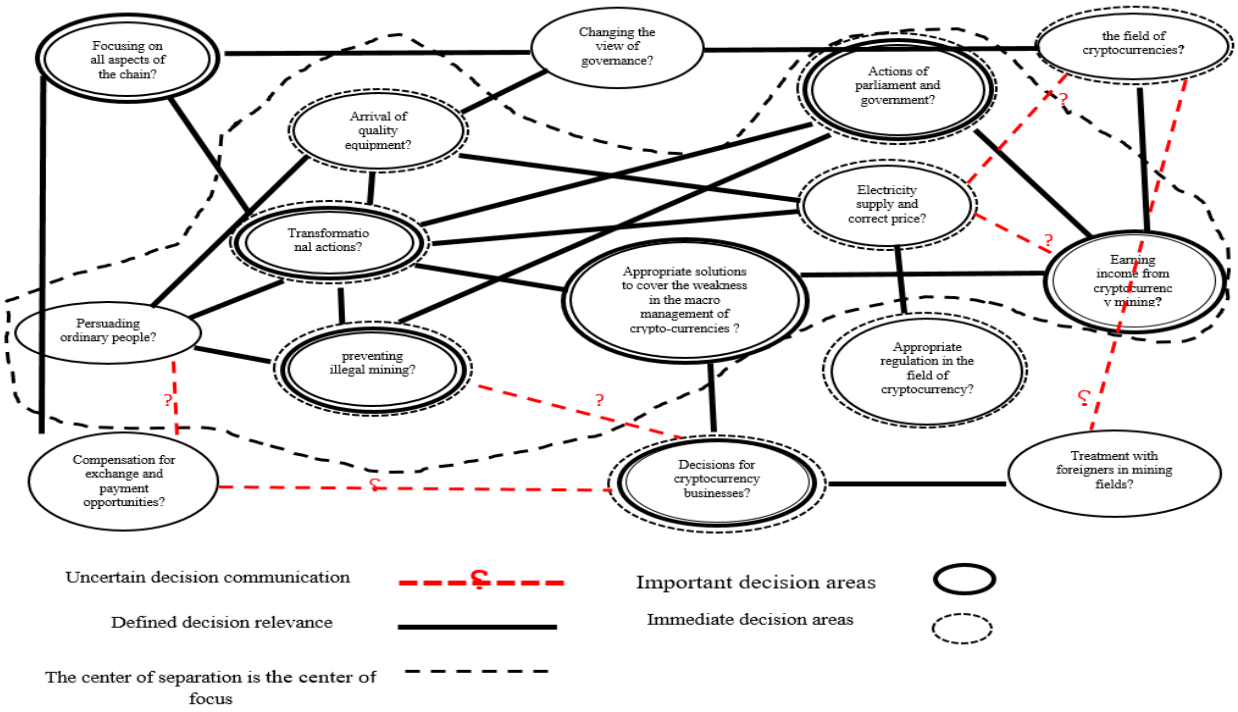

Figure 2- decision-making diagram and Focus Center (Editing: Collectors)

Since the number of areas present in the decision-making diagram and the complex relationships between them seem difficult, in this step, a subset of these decision areas is selected based on "importance and significance," "need for immediate action," and the decision relationship "defined" and "uncertain" with other decision areas, as the focal point of the issue. Regarding the decision areas that are set aside, it does not mean that they do not require immediate and significant action, but rather that decision-making about these decision areas can be done almost independently and does not require additional resources in the decision-making process due to the complexity of the process. However, as a principle, it should be known that the final choice of the focus center lies with the users (facilitators) because the choice of the focus center is not a technical issue but a matter that should be entrusted to the judgments of the participants' values.

step4 : determining decision options

When a problem focus center is selected with a reasonable number of decision areas and is approved, the next step is to agree on the set of options within each decision areas. Table 3 The options identified within each decision area are displayed.

Table 3 - Creating options for decision areas within the focus center (Editing: Collectors)

Row	The title of decision-making areas	Decision making options
1	Persuading ordinary people?(Advocating the general public of the country to avoid illegal mining?)	-Cultivation and education -The electricity tariff should be different in the hot and cold seasons, and the time of electricity consumption should be divided into three parts: critical, limited and normal, in which extraction should be completely prohibited in critical conditions.
2	Transformational actions?	-From the threat-oriented, passive, directive, negative and license-oriented governance system of cryptocurrencies to the opportunity-oriented, active and positive governance system with a risk management approach and modern regulatory methods; -From focusing only on the cryptocurrency mining industry to the comprehensive attention of all dimensions of block chain technology and from services based on centralized reference bases to distributed services based on distributed ledger (strengthening all three fields of extraction (mining), maintenance (holding) and transaction (trading)) and, as a result, creating functional tokens, national cryptocurrencies, and converting and exchanging physical assets into digital currencies -Both methods
3	Preventing illegal mining?(Prohibition of unauthorized extraction (underground)?)	-Creating a smart and online monitoring system for electricity consumption at all levels of production, transmission and distribution, using the capacity of public reports, reforming the energy subsidy system and currency policies and increasing the popularity and public interest in cryptocurrencies, the speed of legislation, and monitoring of laws should also be increased. and it is necessary for governing institutions to look at it as a new industry -In the field of cryptocurrency mining (mining), it has been emphasized on the development of the production of products with optimal efficiency and increasing the export of electricity along with consumption management and promoting the consumption of domestic goods along with planning to improve quality and competitiveness in production
4	Arrival of quality equipment?(Making and buying quality equipment?)	-Manufacturing or importing quality devices and equipment, depending on the type of cryptocurrency and the more profitable the device, the higher its price, and also legalizing the import of devices and equipment in order to prevent the entry of smuggled and counterfeit devices -Using academic and academic capacity to build devices and equipment -Allocating part of the income of cryptocurrency producers to the import of mining devices and equipment

5	Solutions to compensate for the weakness in the macro management of cryptocurrencies and solve the existing problems?	-The creation of cryptocurrency tradable investment funds in the stock market requires the development of institutional capacity and capital market tools to manage investment risks in the cryptocurrency market. -Formation of digital assets depository institution and cryptocurrency deposit company -Developing the infrastructure of cryptocurrency custody services of the stock exchange and cryptocurrency investment advisory services with an emphasis on increasing the production capacity of cryptocurrencies in the country and adopting appropriate tax and insurance measures
6	Electricity supply and correct price?	-Using the power of the private sector to produce electricity and to supply cryptocurrency miners with the electricity they need, as well as connecting cryptocurrency miners to the power grid and purchasing the required electricity -The Ministry of Energy should use renewable sources, including solar, water, geothermal and especially nuclear, to supply electricity to mining farms and home miners, and supply energy from the place of increasing productivity, such as generating electricity from flare gas and reducing electricity losses. Production in the transmission network
7	Actions of parliament and government?	-To resolve the uncertainty in the field of blockchain in the field of exchange, tariffs and the activity of foreign platforms and in general the uncertain situation, to introduce cryptocurrencies as assets and be included in the field of capital market supervision (not that they are presented as currencies and in the field of be supervised by the central bank) -Creation and strengthening of cryptocurrency exchanges with Iranian platforms in the country and in the short term by forming the National Headquarters of Cryptocurrencies with the mission of recognition, explanation, policy making, division of duties between the ministries and related institutions and supervision of the proper implementation of assigned duties and activation of all capacities of this To improve the current situation.
8	Earning income from cryptocurrency mining (digital currencies)?	By DODA

Before entering the 5th step, the researchers use the SODA method to determine the decision options in decision area of ″Earning income from cryptocurrency mining (digital currencies)?″ Due to the greater importance of this decision area, researchers have chosen it.

3.2. Stages of implementing the strategic options development and analysis(SODA)

1-Individual interview: The goal in this stage is to understand the mind of the interviewee. In this stage, the situation of the problem is entered and with the help of interviews and various meetings with each and every expert, the required information is obtained. About digital currencies and the mining industry, it was collected from every expert.

2: Formation of the map related to each expert: in this step, according to the data collected through interviews with each expert, a map of each expert is formed. In order to extract the map, the main concepts

have been identified and during several meetings with experts, the types of relationships of these concepts have been determined.

3: Integrating maps and forming a consolidated map: after the second stage and completing the interviews and putting together the maps obtained in this stage, the facilitator consolidates the maps and maps He gets the whole. At this stage, the concepts and relationships between them, which were obtained from separate interviews with experts, were placed next to each other, the relationships were combined and integrated and finally became a single map. The final mapping obtained in this research can be seen in Figure 3.

4: Establishing a workshop: After drawing the integrated map, a workshop (a meeting of experts with facilitators) is organized and the experts exchange opinions and modify the integrated map. The main goal at this stage is to understand this point for experts and people involved in solving the problem - that their thoughts can be connected with each other [3].

5-Modeling: In this step, the facilitator forms the model of the problem using Explorer Decision software. (Due to reducing the size of the article, it has been avoided to bring the figures in this section.

6-Analysis: In this step, the map obtained from the previous steps is analyzed using Explorer Decision software. In this analysis, the mapping components prepared in the SODA approach include "goals", " Important issues ", and "options".

Figure 3: Integrating maps (Editing: Collectors)

3.2.1.Mapping components prepared in the approach SODA

Goals: A clear starting point for identifying goals is to examine the upper points of the model, the nodes from which there is no communication to other nodes are the goals. According to the map obtained in the previous step: "Improving the economic condition of the people" "Reducing the use of dollars in foreign trade and increasing the value of the rial" "Earning income from digital currencies for the government (providing the country's budget)" have been identified as goals.

Important(Key) issues: There are two analysis to identify key issues, which are:

1- Domain analysis: In this analysis, the number of inputs and outputs of each node is determined. It basically calculates the busyness of each node. The higher the number obtained for each node, the more important that node is.

2- Central analysis: The second method of analysing important nodes is central analysis, which examines the structure of the model in such a way as to determine which opinions are more central [5].

In this research, by identifying those comments which nodes have obtained the most points in both domain and central analysis, it is possible to gain more confidence in identifying important topics (important nodes). The results of domain and central analysis can be seen in Table 4:

Table 4: domain and central analysis (Editing: Collectors)

Row	Central analysis	Score	Domain analysis	Score
1	The development of Iranian exchanges and platforms, and the formation of a national cryptocurrency	**19**	The development of Iranian exchanges and platforms, and the formation of a national cryptocurrency	**13**
۲	Development of mining farms	**13**	Earning dollars(no rial) for the people of Iran	**4**
۳	Development of trade exchanges with China and especially Russia through digital currencies	**13**	Forcing blockchain to enter the country's businesses	**4**
۴	Forming a headquarters dedicated to digital currencies	**12**	Forming a headquarters dedicated to digital currencies	**۴**
۵	Iran's Sanctioners strategies to Earning income through cryptocurrencies	**12**	Cooperation with other countries to develop mining fields	**3**
۶	Establishment of specialized mining settlements	**12**	Development of trade exchanges with China and especially Russia through digital currencies	**3**
۷	Allocation of part of the income of cryptocurrency miners for the entry of equipment	**12**	Allocation of part of the income of cryptocurrency miners for the entry of equipment	**3**
۸	Cooperation with other countries to develop mining fields	**12**	Establishment of specialized mining settlements	**3**
۹	Development of international discourse to expand foreign exchanges with digital currencies	**11**	Iran's Sanctioners strategies to Earning income through cryptocurrencies	**3**
۱۰	Development of infrastructures and technological platforms	**11**	Development of mining farms	**3**
۱۱	Using an efficient tax and insurance system	**11**	Preventing Iranian users from entering foreign exchanges whose assets may be blocked due to sanctions	**3**
۱۲	Formation of support funds and investments in the field of digital currencies	**11**	Improving the economic condition of the people	**2**

۱۳	New policies and guidelines regarding cryptocurrencies	**10**	Big investment in the mining sector	**2**
۱۴	Investing in the construction and purchase of cryptocurrency equipment and devices	**10**	Encouraging people in different ways, for example, giving subsidies to domestic mining	**2**
۱۵	Earning dollars(no rial) for the people of Iran	**9**	Permission to use it for import and export	**2**
۱۶	Preventing Iranian users from entering foreign exchanges whose assets may be blocked due to sanctions	**8**	Removal of mining obstacles	**2**
۱۷	Forcing blockchain to enter the country's businesses	**8**	Formation of support funds and investments in the field of digital currencies	**2**
۱۸	Removal of mining obstacles	**7**	Using an efficient tax and insurance system	**2**
۱۹	Big investment in the mining sector	**7**	Development of infrastructures and technological platforms	**2**
۲۰	Expansion of mining in free trade zones	**6**	Development of international discourse to expand foreign exchanges with digital currencies	**2**
۲۱	Targeting at least 10 years for mining and acquiring cryptocurrencies	**6**	Reducing the use of dollars in foreign trade and increasing the value of the rial	**1**
۲۲	Job creation during the employment crisis in the country	**6**	Earning income from digital currencies for the government (providing the country's budget)	**1**
۲۳	Increasing the economic and financial literacy of the people	**6**	Helping Iranian freelancers to work with foreign institutions	**1**
۲۴	Financing startups through digital currencies	**6**	Financing startups through digital currencies	**1**
۲۵	Helping Iranian freelancers to work with foreign institutions	**6**	Increasing the economic and financial literacy of the people	**1**
۲۶	Improving the economic condition of the people	**5**	Job creation during the employment crisis in the country	**1**
۲۷	Buying people's mined cryptocurrency and granting permission to use it for import and export	**4**	Targeting at least 10 years for mining and acquiring cryptocurrencies	**1**
۲۸	Encouraging people in different ways, for example, giving subsidies to domestic mining	**4**	Expansion of mining in free trade zones	**1**
۲۹	Earning income from digital currencies for the government (providing the country's budget)	**3**	Investing in the construction and purchase of cryptocurrency equipment and devices	**1**

۳۰	Reducing the use of dollars in foreign trade and increasing the value of the rial	**3**	New policies and guidelines regarding cryptocurrencies	**1**

According to the above analysis:1- The development of Iranian exchanges and platforms, and the formation of a national cryptocurrency. 2- Development of mining farms. 3- Development of trade exchanges with China and especially Russia through. 4- Establishment of specialized mining settlements. 5- Iran's Sanctioners strategies to Earning income through cryptocurrencies. 6- Establishment of specialized mining settlements. 7- Allocation of part of the income of cryptocurrency miners for the entry of equipment. 8- Cooperation with other countries to develop mining fields, They are considered as important issues respectively.

As it is known, " The development of Iranian exchanges and platforms, and the formation of a national cryptocurrency " as the most important factor in earning money through digital currencies, alone can cause the success and failure of the entire chain, so investigating different ways for The development of exchanges, Iranian platforms and the national currency, as well as the identification of key factors affecting it, is vital, which will be addressed in the next step.

Options: The lower points of the model are usually our options, and among these options, the important options are important for us. Important options are those options that have more effects on issues and goals.

Considering the agreed plan: 1- Investing in the construction and purchase of cryptocurrency equipment and devices 2- New policies and guidelines regarding cryptocurrencies 3- Development of infrastructures and technological platforms 4- Formation of support funds and investments in the field of digital currencies 5- Using an efficient tax and insurance system 6- Development of international discourse to expand foreign exchanges with digital currencies, has the greatest impact on the most key issue identified in the previous stage, i.e. "The development of Iranian exchanges and platforms, and the formation of a national cryptocurrency, and are considered as important options. In the approach of SODA, as its name suggests, our focus should be on strengthening these key options that have a significant impact on important issues, and important issues also lead to achieving the goal at a higher level.

3.2.2.Conclusion(SODA)

By examining the final mapping of the problem, all research goals can be reached. In this stratification map of Earning income from digital currencies, the relationship between all its components and strategic components was determined that after identifying the important issues and options, experts can develop their strategies. express to achieve the goal. In this part of the SODA, experts should prepare their main strategies for each of the above key options, which the researchers of this article refrained from mentioning these strategies in order to reduce the size of the article, and while re-expressing them in the conclusion section of the SODA, them in table 3(SCA section) wrote:

1- Investing in the construction and purchase of cryptocurrency equipment and devices
2- New policies and guidelines regarding cryptocurrencies
3- Development of infrastructures and technological platforms
4- Formation of support funds and investments in the field of digital currencies

5- Using an efficient tax and insurance system

6- Development of international discourse to expand foreign exchanges with digital currencies

We go back to step 5:

Step 5: Examining compatibility between options and creating compatible plans

When a set of two or more options are agreed upon in each decision areas, the next step is to examine the compatibility of these options between different decision areas that are within the focus of the problem. The selected options from different decision areas, which themselves are within a focal point, are examined and judged in pairs to what extent they can be combined together.

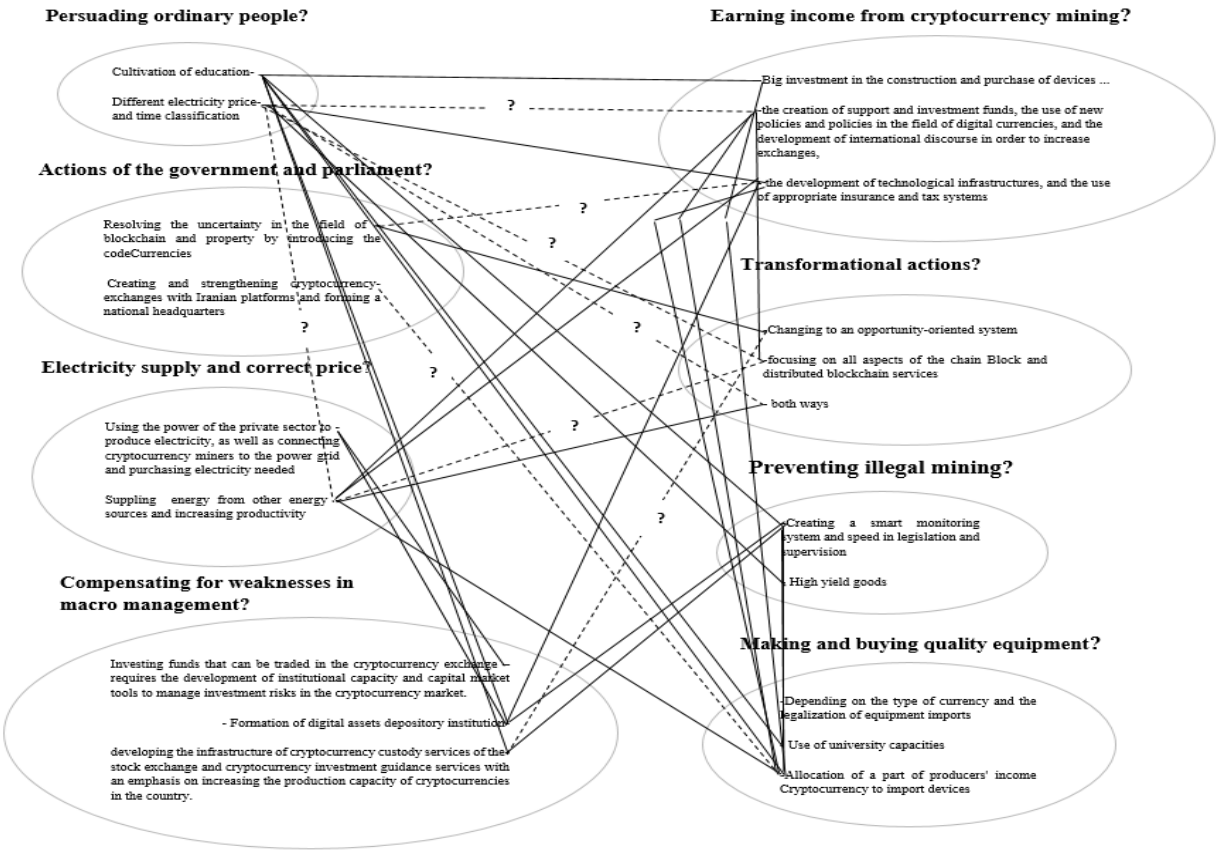

Figure 4- represents a graphical view of the compatibility between options [18]

It may seem strange that the lines connecting the options in the graph, instead of showing the compatibility relationship between the two options, actually show their incompatibility. In any case, experience shows that the number of incompatible relationships is often less than the number of compatible relationships, and a simpler graph is always drawn by using this rule [3]. By expanding each part of the decision diagram and turning it into an option diagram, the decision relationship is replaced by a binary option pair. Binary option pairs are formed when two combined options are incompatible and present a

conflicting situation when combined. Incompatibility can arise due to logical inconsistency or judgmental inconsistency (such as high cost of option combination or unacceptable consequences of option combination). This process is done through drawing a compatibility network or a compatibility matrix. In Figure 4, the decision areas within the focus are shown in the compatibility network. For the sake of simplicity and ease of concept transfer, the following symbols are used:

(x) denotes an incompatible and conflicting combination (binary option pair).

(?)denotes questionable compatibility.

(*)indicates a compatible combination.

It may seem strange that the connecting lines between options in the graph represent their incompatibility instead of showing the relationship between the two options. However, experience shows that the number of incompatible relationships is usually smaller than the number of compatible relationships, and following this rule, a simpler graph can always be drawn[3]. The best way to obtain an accurate count of combinations is to consider decision areas in agreement and sequentially, then systematically assess the probability of each relationship occurring until all possible combinations are reached. Moreover, the feasibility of each combination should be controlled at each stage. The logic of this method is explained in Figure 5.

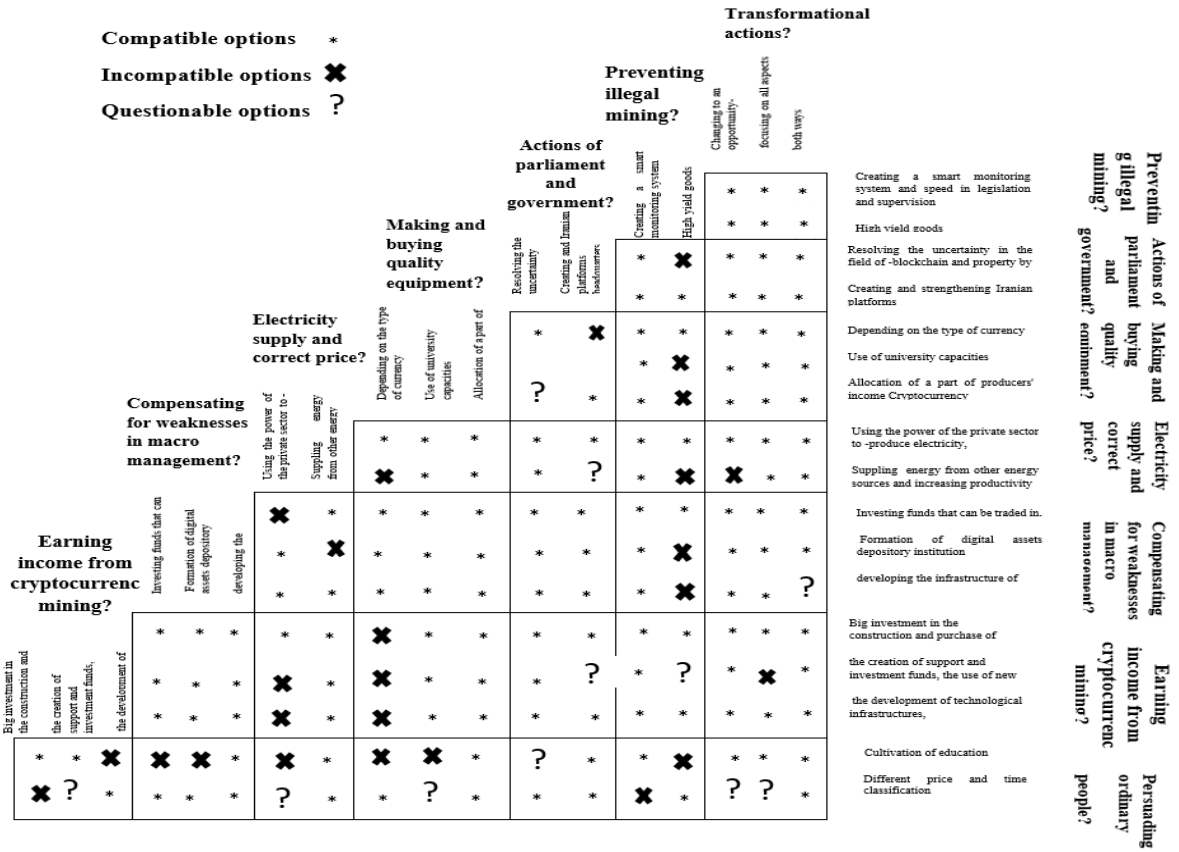

Figure 5 Compatibility and Incompatibility Network of Decision Areas in the Center of Focus (Editing: Collectors)

According to Figure 5, the decision areas in the center of focus are listed in a specific order from left to right, which in this case, the order of Table 3(Figure2) is used. Then, each of the options is individually analyzed so that at each point, the compatibility of the last option being analyzed with the previous options in the chain is examined. The result of implementing this procedure reduces the number of possible combinations to 10 cases (Figure 6). To explain the method in detail, all possible branches are individually examined. In this chart, referred to as the "decision tree", whenever we reach a binary option pair, we draw a multiplication sign at the end of the branch. Any combination that does not result in a binary option pair is considered as a possible decision pattern. In fact, the branches that have a multiplication sign are eliminated as closed or dead branches.

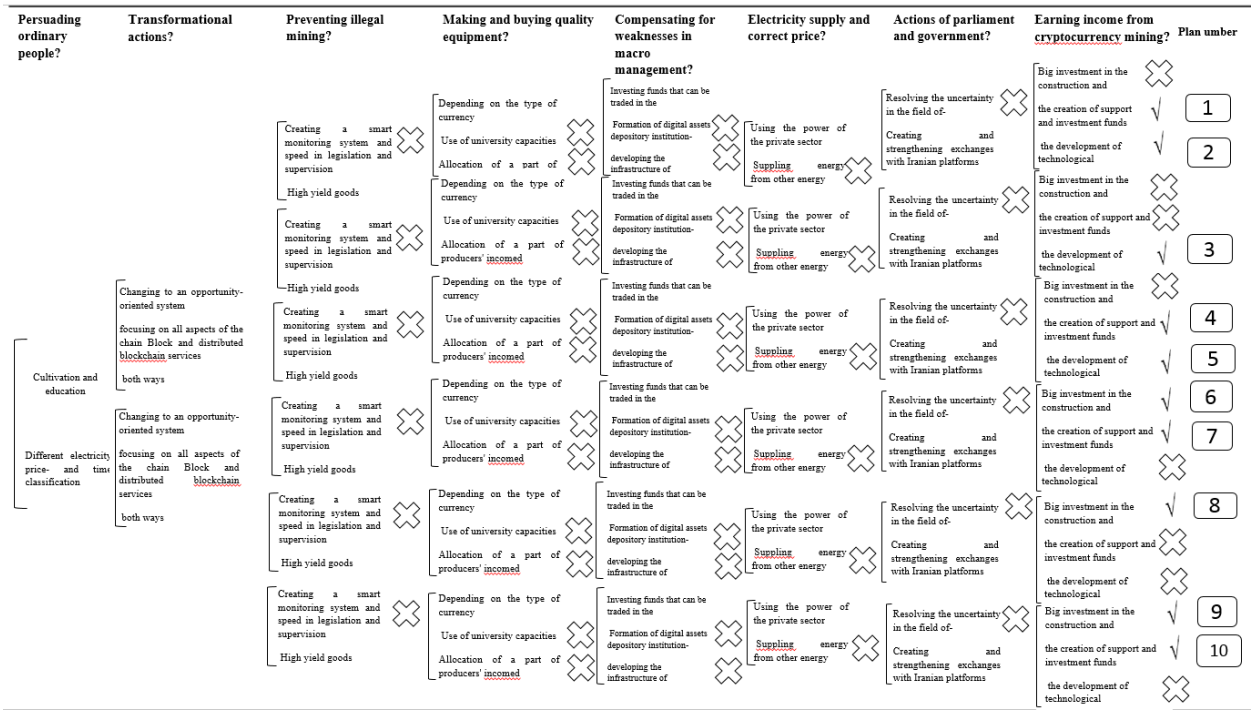

Figure 6 - Production of Practical Decision-making Plans through Selection Trees (Editing: Collectors)

As discussed in the identification of options within a decision area, it is natural for different participants to have different perspectives on combining options, considering some as possible and others as impossible. Such differences can be a starting point for working towards clearer shared perspectives on the structure of the decision problem for the decision-maker. In this section, after eliminating plans that have resulted in dead ends, 10 potential plans are shown in Figure 7. It should be noted that in this study, according to consensus, even disputed combinations have been considered as compatible combinations.

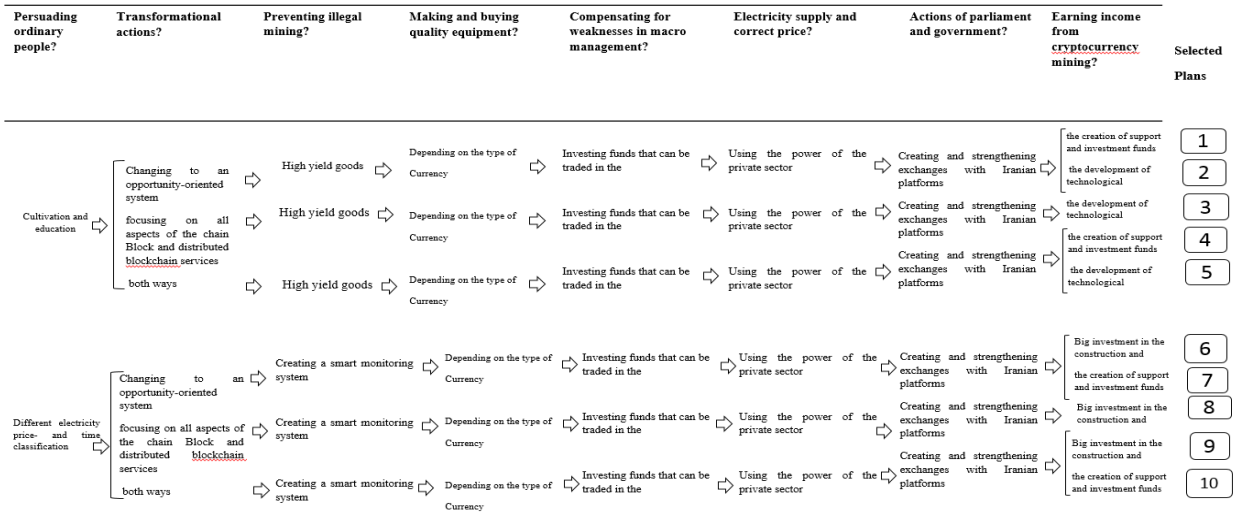

Figure 7- Selected Plans (Editing: Collectors)

Step 6: Identifying the areas of comparison

Table 5 shows an example of four comparison areas that have been agreed upon by the members in this section. This list has been obtained through discussion and exchange of views among participants.

Table 5 - Comparison areas (Editing: Collectors)

Comparison title	The field of comparison
Implementation costs and resources	The cost, financial, human and technological resources of project implementation
Execution time	Project implementation time
Possible result	The possibility of achieving the plan
Income (output)	Income (output) of the plan

Step 7: Comparing Different Plans

When a large number of decision plans are created, especially if the goal is to extract important information about areas of process uncertainty, comparing all of these plans simultaneously based on all agreed-upon criteria is difficult. A set of 10 decision plans has been created, presented in Figure 8, and to be simultaneously assessed based on the 4 comparison areas, it will be a large set. In practical workshops, a rotational approach is often used as a tool to deal with the diversity problem in comparing decision plans. For example, comparing plan 3 and plan 6 (pairwise comparisons and elimination to reduce the number of feasible plans) is shown in Figure 8.

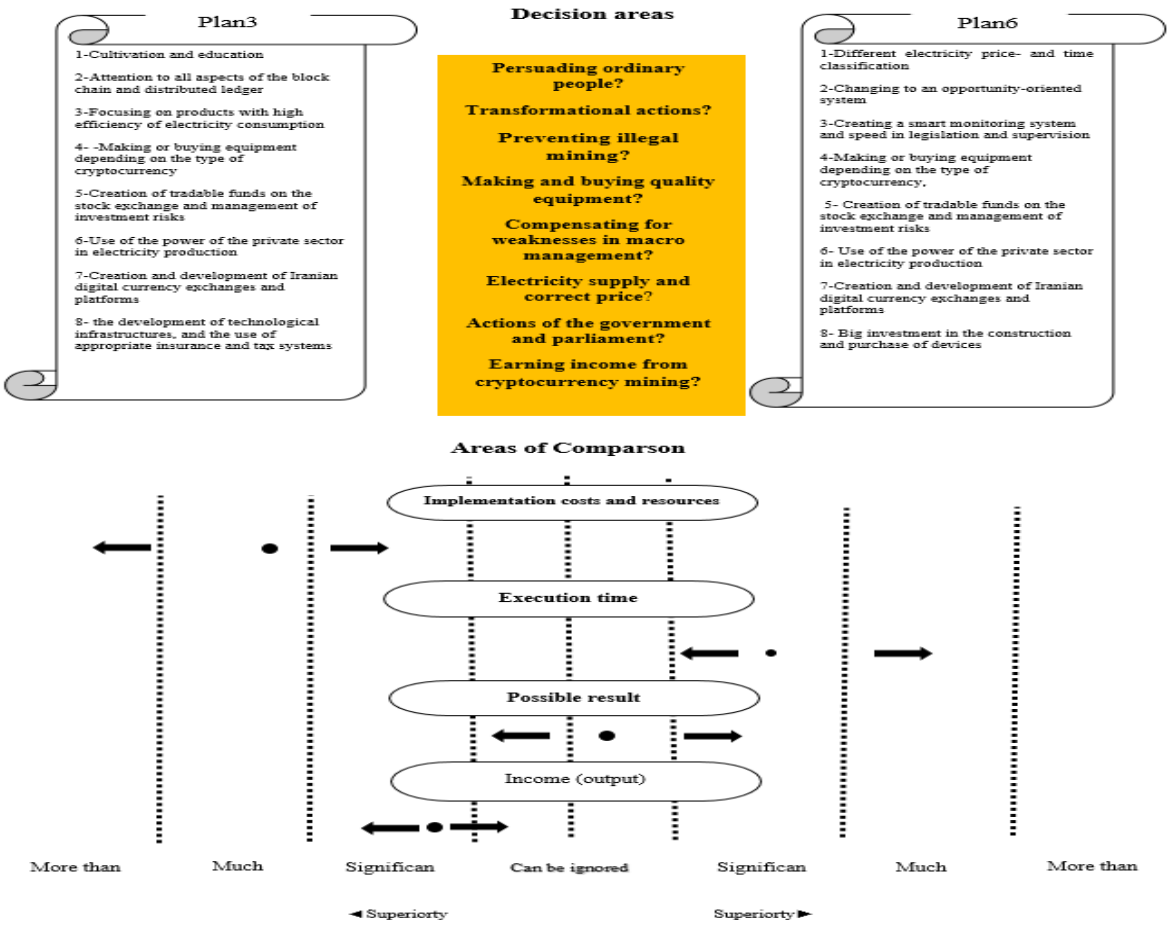

Figure 8- shows a network comparison chart between phan 3 and 6 [18].

Before performing the eighth step(Identifying approaches for dealing with uncertainties): Using the csh method, researchers determine the doubts and uncertainties in the problem of electricity shortage caused by cryptocurrency mining.

3.3.Critical systems heuristics (CSH)

With using concepts of Critical systems, Ulrich developed a heuristic paradigm (such as a learning tool) that became known as critical systems heuristics. This heuristic pattern identifies 12 key boundary decisions. Each of these decisions is identified in two directions: an "objective" state (what "are" or "were" the boundary options) and a "normative" state (What "ought to" the boundary options). The dialectic of comparing "is" with "ought to" identifies the source of boundary criticism [3]. The mentioned heuristic pattern regulates the ingredients and components of a system and its environment into four major categories [15].

Ulrich [16] emphasizes that the CSH method examines the pragmatic principle regarding the four mentioned boundary problems. For each boundary problem, CSH has three categories: In the first category, each group refers to a significant type of shareholders, which means that people are concerned about the

situation, either because they are involved or not involved. Either way, they are actually or potentially affected. The second category deals with the issue that we cooperate with the stakeholders of the problem. The last category refers to the type of difficulty and problem that may arise due to concerns in the question; for example, because they are competing with the other, they cannot be resolved entirely (as a characteristic of the real-world situation in problem-solving). Accordingly, Ulrich [16] presents a table of question titles, boundary issues, and the type of concentration of questions categorized according to Figure 9.

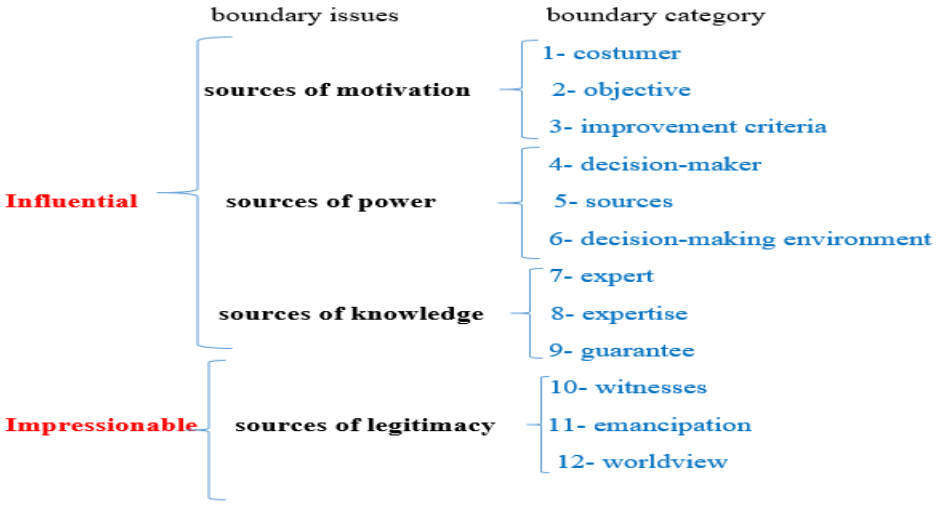

Figure 9- Boundary category [17]

As mentioned, as a rule in this method, every question should be asked in two forms: "is" and "ought to." The answer to the question of "ought to" reveals the views of the claims about the current situation and evaluates these claims in this way. There is also much difference between the "is" and the "ought to" answer. The answer to these questions alone needs to provide the information needed to understand boundary issues, and the boundary between the issues needs to be specified. In CSH, however, it combines "is" and "ought to" states in a specific way to identify critical boundaries that are of great importance [16].

3.3.1.The research findings

During the research process, in relation to the boundary questions developed in person according to the CSH method, interviews with twelve experts who were fully aware of the research problem were conducted in the form of roundtables. These twelve people were selected and classified as experts in three groups of four. In these groups, it has been tried to include influential experts in the problem and experts in the affected role of the problem. Of course, although there may be differences between the opinions of influential and impressionable people in some cases, the contract is based on the consent, consensus, and agreement of all four people. The interview session was convened three times, and each time with one group lasted about two to three hours (although there was no obstacle for other groups to attend the meeting). First, the interviewer explained each question to the interviewee, and the answers were written in the form of notes taken by the researchers, briefly in the form of a questionnaire. The audio file of each interview is also recorded for multiple reviews. Each question was explained to the interviewee according to the context of the problem, and if there was ambiguity, the researchers provided supplementary

explanations. The researchers avoided asking questions that might have influenced the interviewee's response. They only asked questions more accurately and about the contents of the initial answers when the interviewee's proper reflection was not made. Each interviewee's opinions, claims, and suggestions have been reviewed several times. The detailed description of each question will be reviewed.

3.3.2.Detailed review of expert opinions

In this section, the opinions of each group of experts are presented separately for each question to explore their analytical description. In each question, different and essential points of view extracted from the interviews are mentioned, and if, after reviewing the answers and criticizing the state of "is" and "ought to," a new requirement is raised at the end of each question, it is referred to it. Based on the CSH framework, a complete description of boundary questions and a reflection of experts' opinions to provide solutions to improve the problem's performance is obtained, summarized in Table 6.

Table 6- Critical systems heuristics framework [3]

	What (interests)	**Who (stakeholders)**		**Key issues**	
		Objective		**Customer or beneficiary**	**Improvement criteria**
	The state of "is"	**First group**	Reducing electricity consumption	Ordinary people and some industrial, agricultural, and service businesses that are just electricity consumers suffer from cryptocurrency mining due to electricity shortages.	Increasing energy production
		Second group	Preventing or reducing cryptocurrency mining	Livestock and large agricultural farms engage in illegal mining due to the electricity subsidy, and some government institutions have started to create large mining farms.	Preventing and reducing illegal mining with a forced approach to the problem
		Thirdgroup	Solving problems caused by frequent shutdowns	Unauthorized domestic miners and even foreigners who have turned to mining in Iran because of cheap electricity tariffs	Each stakeholder considers his benefit, and there are different improvement criteria.
		First group	All items mentioned in the "is" state are	Looking at technology, legalizing digital currencies and paying attention to all	Virtual currencies and distributed ledgers are capable of improving the

Sources of motivation			considered objectives.	aspects of the blockchain will benefit the majority of people.	welfare of citizens and economic development.
	The state of "ought to"	**Second group**	Digital currencies include more than just mining, and paying attention to all aspects of this industry is necessary. The benefits of systematically mining cryptocurrency far outweigh the ban on mining just because of the lack of energy.	The government and the entire people of the country are evading sanctions and making money from digital currencies	Creating an innovative and online monitoring system for electricity consumption at all levels of production, transmission, and distribution; using the capacity of public reports; reforming the energy subsidy system and currency policies; with the increase in popularity and public interest in cryptocurrencies, the speed of legislation and monitoring of laws should also be increased, and it is necessary for governing institutions to look at cryptocurrency mining as a new industry.
		Third group	Increasing electricity production through other energy sources such as nuclear, wind, and solar means existing threats should be turned into opportunities (for example, circumvention of sanctions).	The stakeholders of digital currencies are comprehensive, and perhaps it is not easy to define the customer or the beneficiaries.	In the short term, with the formation of the National Crypto Headquarters with the mission of recognition, clarification, policy, division of tasks between ministries and related agencies, supervising the excellent performance of assigned tasks, and activating all capacities in this field to improve the current situation.
	Criticism of "is" based on "ought to"	1- The point of view that negates cryptocurrency mining is not wise, and mining has positive aspects that should be considered because the lack of electricity caused by it cannot be considered as the reason for the elimination of this industry. 2- Can't we use the revenue we earn from		1- It may need to accurately define customers or beneficiaries of digital currencies because many people need relevant knowledge, and literacy may avoid its interests. Secondly, the stakeholder can be in two roles: the beneficiary by mining crypto and the affected by frequent	1- The government is against the spread of cryptocurrencies, so it has emphasized prohibiting the direct exchange of cryptocurrencies with goods and services within the country. However, according to the government's transformation document for cryptocurrencies, the necessary standards should be developed within the

		mining to build power plants? It comes with planning.	blackouts due to the lack of electricity.	framework of rules governing the contract of exchange so that in compliance with the regulations of preventing and combating money laundering, innovative businesses can be developed by the principles of exchange of cryptocurrencies in Rial and the use of Rial in payment and settlement of exchanges of goods and services within the country. 2- The many conflicts between the stakeholders of the problem cause each to think about their interests, and different improvement measures emerge; in particular, the value of the mental image created from the activities taken to solve the problem will not be apparent to each stakeholder. 3- Amendment of some existing laws in the field of digital currencies and cryptocurrency mining seems necessary, and a kind of flexibility in the kind of governance view on digital currencies should be created so that while taking a scientific and technological look at digital currencies, they introduce it as a valuable new industry.

Continued table 6

	What (interests)	**Who (stakeholders)**	**Key issues**	

		Sources		Decision-maker	Decision-making environment
Sources of power	**The state of "is"**	**First group**	The low tariff on electricity is considered a useless resource.	Judiciary and police forces want to prevent the mining of cryptocurrency.	The decision-making environment of this industry is unknown and has many contradictions and uncertainties, so it is difficult to identify factors outside the control of decision-makers.
		Second group	Physical and hardware resources, including devices and equipment needed for mining, may sometimes be low-quality or counterfeit due to the illegality of their import	The Ministry of Energy and the Central Bank, and to some extent, the Securities and Exchange Organization	Factors such as the failure of the stock market and the growth of digital currencies in the world have caused an influx of people from the country to this industry, and by strengthening the stock market, we can contribute to the success of the issue (less mining and no shortage of electricity).
		Third group	The relevant knowledge has grown mainly in the context of virtual networks	The government (transitory and part-time)	In addition to strengthening the stock market, the growth and prosperity of the coin and gold market, as well as property and construction, are among the uncontrollable environmental factors that contribute to the success of the issue.
		First group	It requires a proper and efficient tax and insurance system, and nuclear energy planning is essential for electricity generation.	The government should be the supervisor and controller rather than directly turn to mining.	Internal exchange and transaction markets should be transparent and healthy and avoid corrupt actions and fields in monetary, commercial, and currency. The point to consider in this section is the preservation of the value of the national currency.

	The state of "ought to"	**Second group**	It is necessary to use the scientific and academic capacities of the country to build the devices and equipment needed for mining.	A headquarters will be formed with the presence of the Vice President for Economic Affairs, the Central Bank, the Ministry of Economic Affairs and Finance, the Ministry of Information and Communications Technology, and the Ministry of Intelligence. Moreover, the Organization of administrative and employment affairs and the Vice President for Economic Affairs, along with the three ministries of Economy, Communication, and Intelligence, are required to design a suitable structure and mechanism in order to prepare the necessary legal, software, and hardware infrastructures for the realization of the macro-policies of cryptocurrencies, emphasizing the use of the capacity of the non-governmental sector.	Fortunately, we live in some country rich in marine, mineral, oil, and gas resources and scientific knowledge. We should use these God-given conveniences to produce more electricity.
		Third group	Service infrastructure, blockchain technologies, support and investment funds, formation of digital asset trustee institutions, and exchange-traded investment funds are among the primary sources.	The mentioned opinions of the first and second groups are considered sufficient.	Considering the country's sanctions conditions, it is the best situation for the government to use digital currencies for its foreign trade while avoiding the sanctions.
		1- In any case, we need the energy to create technological infrastructures, pay attention to all dimensions of the		1- It has not yet been determined whether digital currencies are considered assets or	1- The current situation shows the sloth and dissatisfaction of the government with

	Criticism of "is" based on "ought to"	blockchain, and generally develop the mentioned industry, which, until now, basic measures have not been taken to produce electricity from other energy sources such as nuclear, wind, hydro and solar. For example, developing nuclear energy as the primary source of electricity production is necessary to solve the problem that the future needs to be completely clear in the country's current situation. 2- If cryptocurrency miners have established their power plant, or in other words, if they, for example by installing solar panels on the roof, supply the electricity needed for mining outside of the primary electricity grid (regional electricity), they will not have to turn off their devices during peak electricity consumption hours.	currency; if it is assumed to be an asset, it is placed in the decision area of the stock exchange, and if it is assumed to be a currency, it is in the decision area of the central bank. 2- In response to the government's lack of interference and investment in cryptocurrency mining, it should be acknowledged that due to the heavy onslaught of sanctions and the nature of the digital currency industry, the government's direct intervention seems necessary.	the issue of digital currencies because the above problem can be solved only through other energy sources.

Continued table 6

	What (interests)	**Who (stakeholders)**		**Key issues**	
	The state of "is"	**Expertise**		**Expert**	**Guarantee**
		First group	Technical, hardware, and software knowledge of mining devices and equipment	Most people who are active informally in virtual networks, as well as unauthorized miners	So far, with low electricity tariffs, the growth of unauthorized extraction is a guarantee of the problem.
		Second group	Electricity and electricity and energy generation methods	Some exchanges that are active in this field and foreign experts who have established large mining farms in cooperation with some government institutions	Iranian users' income in educational platforms of virtual networks and unauthorized buying and selling of mining equipment has guaranteed the system's survival.
			It is an interdisciplinary	People who work in the	

Sources of knowledge		**Third group**	science and includes various fields such as electronics, mechanics, computer science and communication technology, sociology, and law.	Ministry of Energy to prevent unauthorized mining can be presented as experts to some extent.	
	The state of "ought to"	**First group**	All expertise related to creating a blockchain or distributed ledger, functional tokens, national cryptocurrency, the ability to convert physical assets into cryptocurrency, and authentication conditions for a large number of users in this industry	Most Iranian users can be considered experts if mining is developed and legalized.	Tax breaks in cryptocurrency exchanges and mining and privatization of electricity supplies that have worked in some countries can improve the situation.
		Second group	Knowledge and expertise used to produce electricity from other energy sources	The experience of people who have tried even illegally in these years should be used.	Firstly, cryptocurrency miners will supply the electricity they need from other energy sources such as nuclear and solar, and secondly, intelligent monitoring of unauthorized miners is one of the factors that guarantee the improvement of the problem.
		Third group		We need experts in both hardware and software sections in this industry.	Development of Iranian exchanges and platforms in order to earn money from cryptocurrencies

	Criticism of "is" based on "ought to"	1- It should be noted that during the embargo period, it will not be possible to acquire knowledge and expertise related to digital currencies to make or buy the required devices and equipment (due to the advanced technologies of these equipment).	1- The nature of digital currencies is such that even with the best analyses and experts, users may be unable to make the necessary predictions and suffer because the digital currency industry has yet to be legalized in the country. As long as the government has yet to have a comprehensive plan in this matter, the definition and recognition of experts in this industry need to be clearly defined.	1- The set of programs and measures that are taken to improve the situation of the problem should be set up in such a way that will benefit all stakeholders rather than benefit some stakeholders and disadvantage others.

Continued table 6

	What (interests)	**Who (stakeholders)**		**Key issues**	
		Emancipation		**Witnesses**	**Worldview**
		First group	The idea that the Iranians are doing the opposite means that if they are told not to mine illegally or use less electricity, they will turn to unauthorized mining and consume more electricity.	The general public, trade unions, large labor unions, government organizations, and institutions that do not engage in any activities in the field of digital currencies but suffer due to the lack of electricity caused by mining	Discrimination in the face with the digital currency industry compared to other industries of the country (the government does not have a scientific and practical view of digital currencies like other industries)
			The idea is that the proceeds from	The Anti-Money Laundering Council, which has	The view that the problem of electricity shortages

Sources of legitimacy	**The state of "is"**	**Second group**	cryptocurrency mining through the construction of large mining farms with the help of foreigners are only for the government, and ordinary people do not benefit from it.	not made any specific decisions in the field of cryptocurrencies	can only be solved by prohibiting mining (especially unauthorized mining) is wrong.
		Third group	The idea that "we cannot."		The digital currency and mining industry is worthless due to power outages and blackouts and should be folded.
	The state of "ought to"	**First group**	The opposite idea of "is" state	That is enough	The mining industry is valuable and necessary for the country, and with some measures, it is possible to provide the electricity it needs.
		Second group	Spreading a culture of commitment, effort, and solidarity to solve problems	Although, from the point of view of the sanctioners, helping the countries in the field of resistance is money laundering and terrorism financing. However, in the current situation, digital currencies are the best option.	From the threat-oriented, passive, directive, negative, and license-oriented governance system of cryptocurrencies to the opportunity-oriented, active, and positive governance system with risk management and modern regulatory methods
		Third group	The idea that "we can" and "If learning were suspended in the highest parts of heaven, the	Future generations and our environment are the most important things that will be significantly affected by the system's	From focusing only on the cryptocurrency mining industry to the comprehensive attention to all aspects of

			Persians would attain it."	performance in the future.	blockchain technology
	Criticism of "is" based on "ought to"	1- Legal powers are not enough to eliminate the above negative thoughts in the country. The big obstacle is the resistance of the culture ruling the country with several ethnicities. What should be important in the first place, education and cultural development are before everything that provides the basis for the growth and excellence of any nation. 2- The government's income by evading sanctions is consumed by itself (current expenses), and the same benefit may not reach everyone.		1- An example of the effects that influential and impressionable stakeholders will face is that digital currencies can provide the context for money laundering and terrorist financing. However, these effects are considered an opportunity for the country.	1- Virtual currencies and distributed ledger plans also have risks (such as money laundering within the country) that must be resolved principally and appropriately to gain trustworthiness. 2- From the point of view of jurisprudence and Islamic issues, there are some restrictions in this industry that religious experts should check.

3.3.3.Discussion and conclusions

This research is about an action research project based on the CSH method, in which the detection of different dimensions of the problem, the discovery and explanation of conflicts, and the identification of the essential needs of the power shortage caused by mining have been dealt with by the critical systems heuristics paradigm. In this method, CSH boundary questions are well represented by the actual and idealized situations related to the system's boundaries. From different viewpoints among stakeholders and reflection of experts' opinions about these questions, reasonable solutions were presented, and suggestions were proposed to improve the system in the future. CSH's boundary questions exposed the boundary judgments of stakeholders. As seen in Table 7, each expert evaluated the system's problems according to their experiences and values related to their situation. Despite some common points in the interviewees' criticisms of the current system, there needs to be more transparent sharing of ideas on solutions to problems, or a different angle of view of the issue prevents the creation of wholly shared insight into the structure of the problem. CSH allows for the review of opinions by conducting separate interviews and reflecting boundary judgments. According to the general viewpoints, the cases found can be re-examined in the system. The results obtained from the investigation of boundary judgments and discoveries obtained from comparing the answers in the current state with the ideal condition (criticism of the state "are" based on "ought to") are classified in Table according to boundary issues.

Table 7- Boundary judgments explored in boundary issues (Editing: Collectors)

Outcomes of boundary judgments explored in boundary issues		
		Completely denying cryptocurrency mining and preventing it due to lack of electricity is not a correct view, and cryptocurrency mining can bring good income to the country.

The nature of the boundary issue	**Motivation**	It may need to accurately define the customers or beneficiaries of digital currencies because many people who need relevant knowledge and literacy may avoid its interests. Secondly, the stakeholders can benefit from the exploitation of crypto and are affected by frequent blackouts due to the lack of electricity.
		The government is against the spread of cryptocurrencies. The current situation shows dissatisfaction and laziness of the government in this field. However, according to the government's transformation document for cryptocurrencies, which has recently been prepared, fundamental and transformative measures should be taken in this regard, and it is necessary to correct the existing situation.
		The many contradictions between the stakeholders of the problem cause each to think about their interests, and different improvement measures emerge.
	Power (control)	We need energy to create technological infrastructures, pay attention to all aspects of the blockchain, and develop the industry above. Until now, basic measures have not been taken to produce electricity from other energy sources such as nuclear, wind, hydro, and solar. For example, developing nuclear energy as the primary source of electricity production is necessary to solve the problem that the future needs to be completely clear in the country's current situation.
		It has not yet been determined whether digital currencies are considered assets or currency; if it is assumed to be an asset, it is placed in the decision area of the stock exchange, and if it is assumed to be a currency, it is in the decision area of the central bank. Therefore, this duality must be resolved.
	Knowledge	It should be noted that during the embargo period, it will not be possible to acquire knowledge and expertise related to digital currencies to make or buy the required devices and equipment (due to the advanced technologies of these equipment).
		Due to the complex nature of digital currencies and also because the digital currency industry has not been legalized in the country, and as long as the government does not have a comprehensive plan in this regard, the definition and recognition of experts in this industry are not clearly defined.
		The set of programs and measures that are taken to improve the situation of the problem should be set up in such a way that will benefit all stakeholders rather than benefit some stakeholders and disadvantage others.
	Legitimacy	More than legal powers are needed to eliminate the country's negative thoughts on digital currencies. The big obstacle is the resistance of the culture ruling the country with several ethnicities. What should be important in the first place, education and cultural development are before everything that provides the basis for the growth and excellence of any nation.
		From the point of view of jurisprudence and Islamic issues, religious experts should check some restrictions in this industry and that it may create the field of money laundering and terrorism financing.

We go back to step 8:

Step 8: Identifying approaches for dealing with uncertainties

In addition to the uncertainties obtained from the csh method, there are also a series of uncertainties that are identified during the execution of the sca method. In this research, a total of 9 uncertainties were identified, after scoring them, 6 uncertainties were selected (Table 8). To prevent confusion between the decision areas and the uncertainty areas, a question mark (?) is placed before the label of the uncertainty areas.

Table 8- compares options for further research and investigation in areas of uncertainty [18]

Profit	Delay	Cost	Options for further research (exploratory)	Areas of uncertainty
... ++	... **	... #	▪ Failure to take action ✓ Negotiating and consulting with the government for the rapid implementation of the digital transformation document, as well as preparing a comprehensive plan to be submitted to the parliament for approval	?Today's nature of digital currencies that are under the supervision of the central bank as a currency or an asset under the supervision of the stock exchange
++ ...	** ...	## ...	▪ Negotiating with relevant government officials and managers ✓ Failure to take action	?Agreeing with 5+1 and reaching the conclusion of JCPOA
++ ... +	* ... ***	# ... ###	✓ Consultation for the formation of an economic expert team in the Ministry of Economy, specialized in cryptocurrencies ▪ Failure to take action ▪ Putting the issue on the agenda of the government	?Potential growth of gold, coin, dollar and stock markets
++ ++ ...	** * ...	### # ...	▪ Negotiation with key and effective managers ✓ Simulation of the problem with software ▪ Failure to take action	?The value of the mental image created after solving the problem, for each of the stakeholders
... + ++	... *** **	... ## #	▪ Failure to take action ▪ Open negotiations ✓ Consultation and clarification meeting with the country's ambassadors	?Iran's Sanctioners strategies to Earning income through cryptocurrencies or digital currencies
... ++ +	... * ***	... # ###	▪ Failure to take action ✓ Negotiation to be included in the agenda of the government board ▪ Consultation with miners	?The amount of destruction and cost that mining can have on the environment or the planet

The next issue is what actions can be taken to reduce uncertainty in key areas. Any action taken to address doubts and uncertainties within an area of uncertainty is referred to as an "exploratory option". Table 8 provides a framework for encouraging discussion and exchange of ideas on this issue. One option for dealing with uncertainty is always "Failure to take action" (meaning it is a neutral option but visually emphasized since reducing uncertainty can sometimes be so difficult that taking no action may be the best choice). It should also be noted that every exploratory effort in investment leads to a reduction in uncertainties within each area of uncertainty, or not (at what cost and when?).

Step 9: Prioritizing decision areas and presenting confidence-building plans

We have now reached a point where we can express the relative advantage of options in decision areas that have a higher priority based on their relative flexibility in determining the future of other decision areas. This is done by retrieving the decision plan layout based on the level of priority. Decision areas with higher priority are moved to the beginning of the list. Here, the structure of the option tree is the same structure as presented in Figure 10. With the difference that the areas with high priority have been moved to the beginning of the decision areas list of the center of focus. Here, the option decision area "Transformational actions?" has the highest priority compared to other areas.The procedure is exactly the same as step 5, and due to the reduction of the size of the article, its details have been avoide. Among the 13 proposed plans listed in Figure 10, 7 more probable and superior decision plans have been extracted. These plans have been selected based on a limited number of more important comparative areas.At this stage, participants have focused on analyzing new aspects of the problem situation in order to select more reliable plans, and ultimately, these 7 plans were chosen. However, as mentioned before, in this study, questionable plans have also been considered as compatible plans.

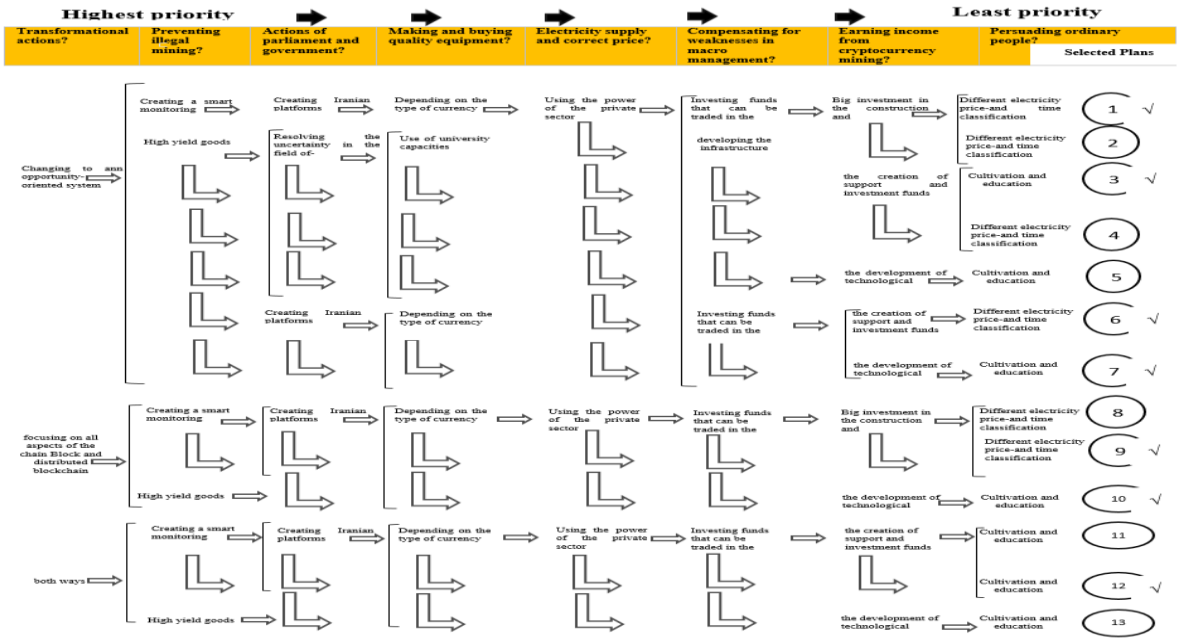

Figure 10- Selected Plans (Editing: Collectors)

Step 10: Providing Commitment Package(improvement package)

Now, attention must be paid simultaneously to making initial decisions and managing uncertainty. Usually, a network diagram is used as a framework and infrastructure for the process of integration, which has gained popularity as a commitment package, or abbreviated as an improvement package[3]. As shown in Tables 9 and 10, each commitment package includes a set of proposals for how to move towards a commitment over time. In the "Present" column, immediate decisions or actions and an exploratory option are considered for each decision area, and in the "Future" column, decisions that need to be made in the future for exploratory options and necessary contingency planning for decisions that have immediate action for them are specified for each decision area. Finally, after examining and analyzing the problem, facilitators presented the commitment package with the help of the commitment package working group in Tables 9 and 10

Table 9 - Commitment package in the present time [18]

	Actions to be taken in the present	
	Decision areas-Actions	**Areas of uncertainty -further research and investigation**
Some of the main players in the field of digital currency include basic companies such as banks, accounting and legal companies, technology companies and startups	**Deciding on businesses in the field of cryptocurrencies?** **(Setting up a two-year plan)**	**?The value of mental image** **(Problem simulation with software)**
Parliament and the government except the Ministry of Economy, Ministry of Energy and Ministry of Foreign Affairs	**Transformational actions?** **(Change to an opportunity-based system)**	**?Potential growth of gold, coin, dollar and stock markets…** **(Consultation for the formation of an economic expert team in the ministry of economy, specialized in cryptocurrencies)**
Ministry of Economy, Central Bank and Stock Exchange	**Making appropriate decisions about cryptocurrency policies?** **(Providing infrastructure, funds, etc.)**	**?The nature of cryptocurrencies** **(Negotiations and consultations with the government for the rapid implementation of the digital transformation document and also the preparation of a comprehensive plan to be submitted to the parliament for approval)**

Ministry of Power	**Preventing illegal mining?** **(Creating a smart monitoring system and high-yield goods)**	**?The amount of environmental destruction** **(Negotiation to be included in the agenda of the government board)**
Ministry of Foreign Affairs		**?Iran's Sanctioners strategies to Earning income through cryptocurrencies or digital currencies** **(Consultation and explanation meetings with the country's ambassadors)**

Table 10-Commitment package in the futuer [18]

	Actions Actions that have been postponed until some time in the future	
	Decision areas	**Areas of uncertainty**
Some of the main players in the field of digital currency include basic companies such as banks, accounting and legal companies, technology companies and startups	**Compensating the weakness in macro management of cryptocurrencies?** **Compensation for lost opportunities in exploiting the capacities of exchange and payment?**	
Parliament and the government except the Ministry of Economy, Ministry of Energy and Ministry of Foreign Affairs	**Actions of parliament and government?** **Cooperation or non cooperation with foreigners in the creation and development of mining fields?**	**?Legal, Islamic and customary restrictions**

Ministry of Economy, Central Bank and Stock Exchange	**Making and Buy of quality mining equipment and devices?** **Necessary actions in the field of requirements and requirements of cryptocurrencies?**	**?Definition and recognition of customers and experts**
Ministry of Power	**Persuading ordinary people not to extract illegally/Supply ?** **Supply of electricity required for extraction and proper electricity tariff?**	**?Development of nuclear energy for electricity generation**
Ministry of Foreign Affairs	**Earning income through cryptocurrencies?**	**?Agreement on the JCPOA**

3.4. SCA Method Conclusion

According to the above tables, the proposed solutions for solving the problem of electricity shortage caused by mining are shown in two decision areas and areas of uncertainty in present and future time. In the decision areas, according to Figure 10, the decision area " Transformational actions?" with the decision option " Change to an opportunity-based system" and the decision area " Preventing illegal mining?" with the options " Creating a smart monitoring system and speed in legislation and supervision " and "High-yield Goods" have the highest priority that should be pursued and implemented by the Parliament, the government, and the Ministry of Energy. Regarding the six decision areas in the center of focus, in the future, delayed and fundamental actions should be taken through the relevant ministries or organizations. These decision areas are displayed in red and bold font. Among the decision areas that were not in the center of focus, the two decision areas " Deciding on businesses in the field of cryptocurrencies?" and " Making appropriate decisions about cryptocurrency policies?" that have considerable priority according to Figure 2, and three decision areas " Compensation for lost opportunities in exploiting the capacities of exchange and payment?", " Cooperation or non cooperation with foreigners in the creation and development of mining fields?", and " Necessary actions in the field of requirements and requirements of cryptocurrencies?" have been selected by the working group members without official analysis and agreement. They should be pursued and implemented in the future.

In the areas of uncertainty, according to Table 8, five areas of uncertainty along with the option for further research and investigation are: "?Value of mental imagery" (simulating the problem with software), ?Potential growth of gold, coin, dollar and stock market, etc." (Consultation for the formation of an economic expert team in the Ministry of Economy, specialized in cryptocurrencies), "?The nature of cryptocurrencies" (negotiating and consulting with the government for the rapid implementation of the digital document transformation and preparing a comprehensive plan for approval by the Parliament), "?The amount of environmental destruction " (negotiation to be included in the agenda of the government board), and ″?Strategies of sanctioners to Earning income through digital currencies " (consultation and explanation

meetings with the country's ambassadors). These areas should be pursued and acted upon by the relevant ministries and organizations to help solve the electricity shortage problem. These areas are displayed in green font and bold. The area of uncertainty "Agreement on JCPOA?" According to table 5, no action is going to be taken about it, and Three areas of uncertainty "?Legal, Islamic and customary restrictions", "?Definition and recognition of customers and experts?", and ?Development of nuclear energy for electricity generation",should also be pursued and acted upon in the future.

4- Researh Conclusion , Limitations and future suggestions

Maybe in a way we can say that our hypothesis was completely confirmed, that is, more levels and dimensions of the electricity shortage problem caused by cryptocurrency mining in Iran were revealed, and we reached good results at every stage. Knowing these levels and the details of the dimensions of the problem allows us to make better decisions.A 12-member working group of various cryptocurrency stakeholders and experts collaborated in this research for a year. These people examined 30 parts and sections of the issue of digital currencies and earning income from them with the SODA method. They revealed many details of the problem by answering 36 questions in the CSH method. But the most important investigation was done in SCA method. By explaining the roots and main factors of electricity shortage caused by cryptocurrency mining, the aforementioned working group identified 15 areas of decision making and 7 areas of uncertainty, and finally, specified the basic measures that Iran's government organizations and institutions should take. So using multiple methodologies, no part of the research problem remains unexamined. But Along with the decisions that were proposed during the process of implementing the three SCA, SODA, and CSH methods, the most important decision is that one should not ignore the numerous benefits and advantages of digital currencies due to the problems and dilemmas caused by cryptocurrency mining, and it is better to be able to Increase the country's electricity production.

There were also limitations in this study: the first limitation was the organization and coordination of conference participants, which posed many challenges for the researchers. The second limitation was related to the costs of the conferences. These costs included the cost of renting the venue, hosting the participants, and other expenses, all of which were paid for by the researchers.

In fact, research in the world is considered valuable if it both develops relevant knowledge and solves a problem in society. Therefore, it is recommended that future researchers combine other operations research methods (soft and hard) and apply them to topics such as inflation, cyberspace, etc. But the most important issue that the researchers have in mind is that they can "invent a new method" in this field by combining several methods of soft operations research. Although this may be very ambitious, it is certainly not impossible. Therefore, it is hoped that the readers and users of this research will be able to achieve this and create a new method in the paradigms of soft operations research.

Statements and Declarations

Ethical Approval

All surveys, interviews or focus groups, etc. conducted in this research according to Ethics approval is by the Human Research Ethics Committee (HREC), duly constituted All subjects gave their informed consent before participating in the study..and Important ethical concerns were considered. During the manuscript, the ethical principles of writing, including ethics, fraudulent publication, plagiarism, duplicate publication, authorship and possible conflict of interest, have been observed. All experts and interviewees have participated in this research with their consent and all scientific principles and rules have been

correctly implemented in these interviews. Also, all the authors are fully satisfied with the publication of the information of this article

Competing interest

Informed consent was obtained from all individual participants included in the study and We have no conflicts of interest to disclose. The authors do not have any financial or non-financial interests that are necessary to submit this article for publication, directly or indirectly.

Funding

This research has no budget and all costs are borne by the authors. And no organization, administration or government institution has been the investor of this research. And this declaration is "not enforceable".

Availability of data and materials

The main data of this research was obtained through interviews with experts, stakeholders and experts who have complete knowledge of digital currencies and cryptocurrency mining. This data is freely available to the public. The authors provide a data availability statement indicating that the data, methods used in the analysis, code and materials used to conduct the research can be made available to any researcher in order to reproduce the results or replicate the method.

A 12-member working group of various cryptocurrency stakeholders and experts collaborated in this research for a year. These people examined 30 parts and sections of the issue of digital currencies and earning income from them with the Soda method. In the Siasach method, they revealed many details of the mentioned problem by dealing with 12 boundary questions of three states

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