Prioritizing Key Factors for the Development of a National Cryptocurrency in Iran: A Multi-Criteria Decision-Making Approach

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Abstract

Cryptocurrencies and blockchain technology have transformed the global financial landscape, offering strategic opportunities for nations. This study explores the key factors influencing the establishment of a national cryptocurrency in Iran, aiming to reduce dependency on foreign currencies, counter economic sanctions, and strengthen the national economy. Through a comprehensive literature review and experts' opinions 10 effective factors on developing national cryptocurrency in Iran were selected. Then, using the Best-Worst Method (BWM), the identified factors were prioritized based on their significance. The average opinions of 19 experts were utilized to construct the inputs of the BWM. The results highlight government support and financial policy-making, resistance economy, and economic stability as the most critical factors. Additionally, blockchain infrastructure development, cryptographic technologies, and international collaborations were identified as important contributors. The findings emphasize the need for a clear legal framework, secure transactions, and public awareness to ensure success. This study offers actionable recommendations for policymakers, including drafting transparent regulations, developing native stablecoins, investing in infrastructure, and enhancing international trade relations, providing a roadmap for developing a sustainable national cryptocurrency.

Keywords: National cryptocurrency, Blockchain, Best-Worst Method, Multi-criteria decision-making, Financial policy-making, Resistance economy.

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1. Introduction

Over the past decade, blockchain technology and cryptocurrencies have significantly transformed global financial and economic systems. Emerging as a decentralized innovation, cryptocurrencies have introduced a paradigm shift in value exchange by eliminating the need for intermediaries and central authorities [1]. Bitcoin, the first cryptocurrency introduced in 2009 by the pseudonymous Satoshi Nakamoto, laid the foundation for the blockchain revolution. Its creation aimed to establish a peer-to-peer electronic cash system that operates on a decentralized ledger, ensuring transparency, security, and trustless transactions [2].

The success of Bitcoin paved the way for the development of numerous other cryptocurrencies, each addressing unique limitations or introducing new applications. Ethereum, launched by Vitalik Buterin, introduced the concept of smart contracts—self-executing agreements programmed to function autonomously when predefined conditions are met. This advancement facilitated the rise of decentralized applications (DApps) and decentralized finance (DeFi), enabling lending, borrowing, and trading outside traditional financial systems [3]. Today, cryptocurrencies have evolved from experimental technology into a global financial phenomenon, with thousands of coins and tokens catering to diverse use cases, from privacy-centric transactions to decentralized governance. This rapid growth has attracted significant investments, regulatory scrutiny, and integration into various sectors, including finance, logistics, and digital identity management [4].

As the cryptocurrency ecosystem matures, nations are exploring the potential of developing their own national cryptocurrencies [5]. These digital assets offer strategic advantages, including reducing reliance on foreign currencies, fostering economic independence, and enhancing financial inclusion. For countries facing international sanctions or economic restrictions, such as Iran, national cryptocurrencies provide a means to bypass traditional financial systems and maintain global trade connectivity. In the context of Iran, the development of a national cryptocurrency aligns with broader economic and political goals. By leveraging blockchain technology, Iran can strengthen its resistance economy, mitigate the adverse effects of sanctions, and increase transparency in financial transactions. Furthermore, a stable and government-backed cryptocurrency could facilitate secure and efficient cross-border trade with allied nations, particularly those facing similar economic pressures. However, implementing national cryptocurrencies involves multifaceted challenges that require careful consideration and strategic planning. A critical challenge lies in the regulatory and legal domain, where establishing clear

guidelines for cryptocurrency issuance, usage, and integration with existing financial systems is essential. Without a robust legal framework, risks such as misuse, fraud, and public distrust may hinder progress [6]. Equally significant are the technical and security considerations. Developing the infrastructure for a secure, scalable, and reliable blockchain platform demands significant investment and expertise. Cybersecurity threats, including hacking and data breaches, pose ongoing risks to both user trust and system integrity. On the economic front, managing price stability, mitigating inflation risks, and addressing potential disruptions to monetary policy are crucial for ensuring the cryptocurrency's long-term viability and compatibility with existing economic frameworks [7]. Social and cultural barriers also play a vital role. Public awareness and acceptance of cryptocurrencies remain limited in many regions, including Iran. Addressing this gap requires comprehensive educational initiatives and trust-building measures to foster widespread adoption. Furthermore, integrating a national cryptocurrency into global financial systems adds an additional layer of complexity, necessitating compliance with international regulations and alignment with global standards for seamless cross-border transactions [8].

Given these challenges, a systematic approach is essential to identify and prioritize the factors critical to the success of a national cryptocurrency. These factors span various domains, including technology, economics, regulation, and societal acceptance, each influencing the overall viability of the project. Multi-Criteria Decision-Making (MCDM) methods provide a structured framework for evaluating and ranking these factors based on their relative importance. By combining quantitative and qualitative data, MCDM methods enable decision-makers to make informed and balanced decisions. Among these methods, the Best-Worst Method (BWM) offers a robust approach to prioritize factors with high consistency and reduced computational complexity [9].

This study aims to explore the key factors influencing the development of a national cryptocurrency in Iran. Using the Best-Worst Method, this study seeks to identify critical factors across technical, economic, regulatory, and social dimensions. The inputs of the BWM are provided through a comprehensive literature review and experts' opinions. The study also aims to prioritize these factors to provide actionable insights for policymakers and propose strategies to address challenges and enhance the likelihood of success. The findings of this research hold significant implications for policymakers and stakeholders in Iran. By understanding the factors critical to the success of a national cryptocurrency, decision-makers can design effective policies and allocate resources strategically. Moreover, the insights gained from this study can contribute

to broader discussions on integrating blockchain technology into national economies, fostering innovation, and navigating the complexities of the digital financial era. The development of a national cryptocurrency represents a unique opportunity for Iran to strengthen its economy, enhance financial sovereignty, and position itself as a leader in the digital economy. This research provides a roadmap for addressing the challenges and leveraging the potential of blockchain technology to achieve these strategic goals.

Using the Best-Worst Method (BWM), this research presents innovations such as reducing the number of pairwise comparisons, increasing the consistency of results, and analyzing the factors affecting the development of a national digital currency. The use of a combination of expert opinions in the fields of economics, policy, and technology, and the provision of a detailed mathematical model are other innovative aspects of this research. The research results provide a comprehensive roadmap for policymakers to overcome existing challenges and create a sustainable national digital currency.

The body of this paper is organized as follows. In the next section the related literature is surveyed. In section 3, the research methodology is presented. Findings and results are presented in section 4 and managerial insights are extracted from the results. Finally, section 5 concludes this paper and offers some future research directions.

2. Literature review

The rapid emergence of cryptocurrencies and blockchain technology has profoundly impacted the financial and economic sectors worldwide, prompting extensive academic and industrial research. Studies have explored various dimensions of cryptocurrencies, including their adoption, technological infrastructure, economic implications, and regulatory challenges. This section reviews significant contributions from international research, offering insights into the diverse methodologies and findings in this evolving field.

Al-Amri et al. [10] conducted a systematic review of the increasing research on cryptocurrencies as an alternative architecture to traditional currencies. Their study analyzed 25 academic papers published between 2014 and 2017, categorizing them into qualitative, quantitative, and mixed-method research. The findings highlighted a significant growth in studies on cryptocurrency adoption during this period, but also identified a gap in research on factors influencing adoption using technology acceptance models.

Bhimani et al. [11] empirically examined factors influencing cryptocurrency adoption across 137 countries. Their regression analysis revealed a positive correlation between cryptocurrency adoption and indicators such as education, human development, and GDP, while negative correlations were observed with corruption control and economic inequality. This study sheds light on the socio-economic variables shaping cryptocurrency adoption and provides critical policy implications for governments seeking to leverage blockchain technology. In a related vein, Kumar et al. [12] investigated factors driving the growth of the cryptocurrency market using a hybrid MCDM methodology. The study identified 16 key drivers and seven barriers to cryptocurrency adoption, offering insights into how these factors interact to shape the industry's trajectory. Their findings emphasized the long-term sustainability of cryptocurrencies as a tool for investment and fundraising, providing a comprehensive understanding of their impact on traditional financial systems.

Mohammad et al. [13] explored the adoption of central bank digital currencies (CBDCs) across 67 countries, analyzing their potential for enhancing monetary policies and reducing transaction costs. Using partial least squares structural equation modeling (PLS-SEM), they found that CBDC adoption is positively correlated with public trust in governance and democracy levels but negatively correlated with regulatory quality and income inequality. Their findings underline the critical role of governance and public trust in facilitating CBDC acceptance. Abdullah and Nor [14] proposed a conceptual framework for assessing whether central banks should issue digital currencies. Their study incorporated quantitative and qualitative methodologies to evaluate the monetary and technological implications of issuing a national cryptocurrency backed by assets such as gold or silver. This research provides valuable insights into designing a stable and functional digital currency within the framework of monetary stability.

Liu et al. [15] examined the impact of blockchain technology on IT infrastructure and organizational decision-making processes. They proposed a multi-attribute group decision-making approach, integrating entropy and the BWM within a fuzzy environment to evaluate blockchain service providers. Their work demonstrated the applicability of advanced decision-making methodologies in addressing blockchain-related challenges and highlighted the importance of combining subjective and objective criteria for robust evaluations.

Aljinović et al. [16] applied the PROMETHEE II model to construct optimal cryptocurrency portfolios based on various financial indicators. Their MCDM approach considered risk, return,

market volume, and other factors, demonstrating the superiority of this model over traditional portfolio selection methods. This study highlights the potential of MCDM methods in optimizing decisions in the cryptocurrency market.

Arias-Oliva et al. [17] investigated consumer behavior regarding cryptocurrency adoption using the technology acceptance framework. Their findings revealed that performance expectancy was the most critical factor influencing cryptocurrency adoption, while perceived risk played a surprisingly minor role. This research emphasizes the need to focus on user-centric attributes to promote cryptocurrency usage. Senkardes and Akadur [18] analyzed the gender dynamics in cryptocurrency investment in Turkey. Their study revealed significant differences in investment behavior between men and women, with men demonstrating higher participation rates and more significant influence from market trust and volatility. These findings provide valuable insights into the socio-psychological aspects of cryptocurrency adoption.

Babazadeh et al. [19] highlighted the role of digital currencies in circumventing financial and banking sanctions. Using the Delphi method, they identified six critical factors, including regulatory frameworks, technological infrastructure, and public promotion, that facilitate cryptocurrency adoption in international trade. This study provides strategic insights for countries like Iran, where digital currencies could mitigate the impacts of economic sanctions. Huang et al. [20] focused on the risks and benefits associated with cryptocurrency use, proposing a dual model based on perceived net value and the theory of reasoned action. They identified financial, legal, and operational risks as significant deterrents while highlighting the role of transaction ease and utility in encouraging adoption. This research underscores the balance between managing risks and emphasizing benefits to enhance user retention.

While extensive research has been conducted on various aspects of cryptocurrencies, several gaps remain unexplored. For instance, the integration of cryptocurrencies with national economic strategies, their potential for promoting financial inclusion, and their role in addressing economic sanctions require further investigation. Additionally, the use of advanced decision-making methodologies, such as BWM, in prioritizing factors for national cryptocurrency development remains limited. The reviewed studies provide a comprehensive understanding of the opportunities, challenges, and methodologies associated with cryptocurrencies and blockchain technology. These insights form the foundation for exploring the factors critical to developing a national cryptocurrency in Iran, as outlined in this study.

3. Research methodology

This section outlines the methodology employed in this research to identify and prioritize the key factors influencing the development of a national cryptocurrency in Iran, referred to as Tether Rial. National cryptocurrencies, backed by domestic fiat currencies, offer numerous advantages, including cost reduction in printing physical currency, enhanced environmental sustainability, and increased efficiency in international trade. The study adopts a structured multi-stage methodology to achieve its objectives systematically.

The conceptual framework guiding this study is illustrated in Figure 1. The research begins with a comprehensive literature review to identify potential factors influencing the development of a national cryptocurrency in Iran. Following this, the identified factors are validated by experts in the field to ensure their relevance and comprehensiveness. Next, a structured questionnaire is developed to facilitate weighting and prioritization of the identified factors. Expert opinions are aggregated, and the Best-Worst Method (BWM) is employed to determine the relative importance of these factors. The BWM methodology is chosen for its ability to produce consistent and reliable weights with minimal comparative data. Averaging of expert opinions was used as an approach to combine the data, and a consistency ratio was calculated to ensure the consistency and accuracy of the opinions. This process ensured that the identified factors were not only comprehensive and relevant, but also consistent with the economic and technological conditions of Iran.
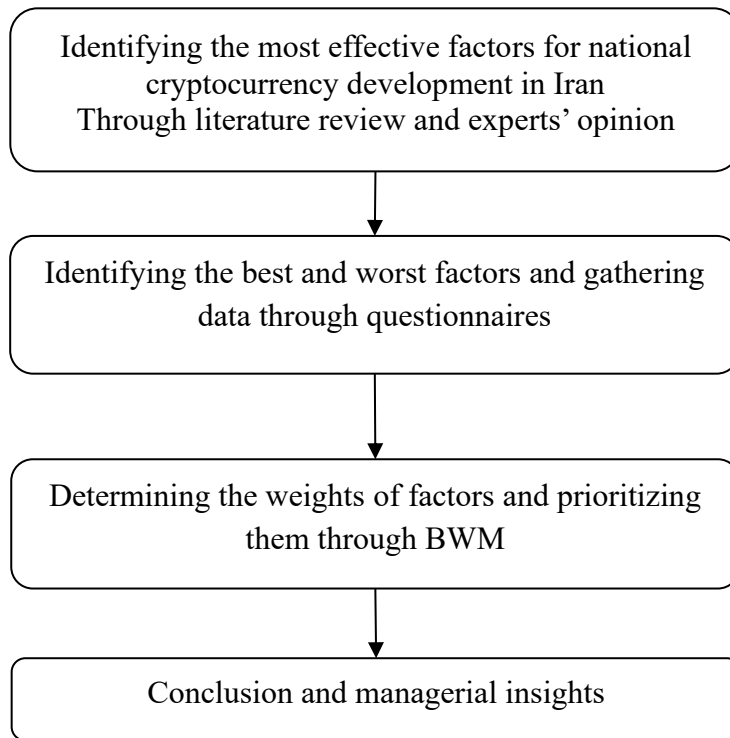
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│  Identifying the best and worst factors and   │
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│  Determining the weights of factors and       │
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Figure 1. Conceptual framework of the study

3.1 Questionnaire Design

The study employs a questionnaire-based approach to collect data from experts. This method is widely recognized for its effectiveness in both qualitative and quantitative research [21] and is particularly suitable for identifying and prioritizing criteria in specialized domains such as cryptocurrency development.

The designed questionnaire consists of three main sections including (1) Demographics: This section gathers information about the respondents, including their area of expertise (e.g., information technology, economics, or policymaking) and professional experience. These details are used to analyze responses and assess the influence of expertise on the results. (2) BWM-Based Evaluation: In this section, experts evaluate the identified factors using the Best-Worst Method. They are asked to compare the most important factor (best) against all other factors and then compare all other factors against the least important one (worst) using a scale of 1 to 9. This scale enables precise judgments about the relative importance of the criteria. (3) Additional Comments: This section allows respondents to propose additional factors or provide feedback on the existing

criteria, enhancing the comprehensiveness of the study. To ensure clarity, the questionnaire is designed with simple and transparent language. Examples and instructions on using the 1-to-9 scale are included to minimize misinterpretations.

Ensuring the validity of the questionnaire is critical to the reliability of the research findings [21]. For this research, face validity is emphasized, with expert reviews ensuring that the identified factors are relevant and comprehensive.

3.2 The Best-Worst Method (BWM)

Multi-Attribute Decision Making (MADM) is a structured approach to problem-solving that focuses on selecting the optimal choice from a limited set of alternatives. It provides a systematic process for evaluating and analyzing indicator information to identify the most suitable option among available choices [22]. MADM models are typically categorized into two main groups including (1) Compensatory Models: In compensatory models—central to this research—tradeoffs between criteria are allowed. This means the weakness or low score of one criterion can be offset by the strength or higher score of another. Such flexibility makes compensatory models highly applicable in scenarios where a holistic evaluation of options is needed. (2) Non-Compensatory Models: Non-compensatory models do not permit trade-offs between criteria. Examples of such models include the max-min method, the elimination by aspects method, and the satisfactory inclusion method. These models are typically employed in contexts where specific criteria must be met without compromise.

The Best-Worst Method (BWM), introduced by Rezaei [23], is a prominent compensatory approach and one of the most recent advancements in MADM techniques. BWM is widely adopted for weighing factors and decision criteria across diverse practical applications. Its primary advantage lies in requiring significantly fewer pairwise comparisons than traditional methods such as the Analytic Hierarchy Process (AHP). By reducing the number of comparisons, BWM not only eases the cognitive burden on decision-makers (DMs) but also enhances the consistency and reliability of their judgments. Unlike AHP, which involves a comprehensive pairwise comparison among all criteria, BWM simplifies the process by focusing on the best (most important or desirable) and worst (least important or desirable) criteria. DMs then compare all other criteria relative to these two, resulting in more structured and precise inputs. The mathematical foundation of BWM ensures that the generated priorities and weights are logically coherent and scientifically

robust, making it a reliable tool for complex decision-making tasks. Key Features of BWM include: (1) Reduction in Comparisons: BWM requires fewer pairwise comparisons than methods like AHP, reducing decision-making complexity. (2) Consistency in Judgments: By focusing comparisons on the best and worst criteria, BWM enhances the logical consistency of the decision-maker's evaluations. (3) Robust Mathematical Framework: The method's mathematical foundation ensures reliable and scientifically sound outputs. (4) Proven Effectiveness: The technique has been successfully applied in various domains, including blockchain service evaluation (Liu et al., 2020) and decision-making in complex scenarios (Pamučar et al., 2020).

To apply the Best-Worst Method, the following steps are undertaken:

- Identify Decision Criteria

Establish a comprehensive set of criteria relevant to the decision-making problem.

- Determine Best and Worst Criteria

The best criterion is the most desirable or important, while the worst is the least desirable or significant.

- Perform Pairwise Comparisons for the Best Criterion

Compare the best criterion against each of the other criteria to determine their relative importance.

- Perform Pairwise Comparisons for the Worst Criterion

Similarly, compare each of the other criteria relative to the worst criterion.

- Compute Optimal Weights Using Mathematical Programming

Transform the comparison data into a mathematical programming model to calculate the optimal weights for each criterion, minimizing the absolute deviation in judgments. The simplicity, efficiency, and consistency offered by BWM have positioned it as a preferred MADM technique, especially in scenarios demanding high accuracy and reduced computational effort.

The following mathematical programming model is utilized to obtain the optimal weights (w_j).

$$\text{minmax}_j \left\{ \left| \frac{w_B}{w_j} - a_{Bj} \right|, \left| \frac{w_j}{w_W} - a_{jW} \right| \right\}$$

$$\sum_j w_j = 1 \qquad\qquad (1)$$

$$w_j \geq 0 \qquad \forall j$$

Where w_B, w_W stands for the weight of the best and the worst criteria. The notation a_{Bj} represents the preference of the best criterion B over criterion j. On the other hand, a_{jW} signifies the preference of criterion j over the worst criterion W.

$$\min \xi$$

$$\left| \frac{w_B}{w_j} - a_{Bj} \right| \leq \xi \qquad \forall j$$

$$\left| \frac{w_j}{w_W} - a_{jW} \right| \leq \xi \qquad \forall j \qquad (2)$$

$$\sum_j w_j = 1$$

$$w_j \geq 0 \qquad \forall j$$

Model (2) can be easily solved by optimization packages like GAMS to obtain the optimal weights. The consistency ratio (ξ) in BWM is a measure of the logical coherence of the pairwise comparisons. It quantifies the discrepancy between ideal and actual comparisons. Smaller values of ξ indicate higher consistency, with values below 0.1 considered acceptable. This ensures the reliability of the calculated weights and enhances the credibility of the results. By employing BWM and assessing the consistency ratio, this study ensures that the derived weights and rankings are robust, accurate, and grounded in expert judgment. The methodology provides a structured approach to identifying and prioritizing critical factors for the successful implementation of a national cryptocurrency in Iran.

4. Findings and results

This section presents the findings and outcomes of the research on identifying and prioritizing factors influencing the development of a national cryptocurrency in Iran. The process began with a comprehensive literature review to identify potential factors, followed by validation through expert reviews. Using the BWM, weights were assigned to the factors, and their rankings were determined.

4.1 Identified Factors Influencing National Cryptocurrency Development

The literature review in section 2 provided a foundation for identifying factors critical to developing national cryptocurrencies. The factors were identified through the following steps: (1) Comprehensive Literature Review: Academic articles, industry reports, and case studies were

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Table 1. The specified factors

Factor	Source
Government Support and Financial Policymaking	Abdullah & Nor (2018), Expert Reviews
Blockchain Infrastructure Development	Liu et al. (2020), Chitta et al. (2019)
Resilient Economy	Babazadeh et al. (2021), Expert Reviews
Support for Economic Stability	Kumar et al. (2023), Expert Reviews
Legal and Security Frameworks	Yussof & Al-Harthy (2018), Expert Reviews
Public Awareness	Arias-Oliva et al. (2019)
International Cooperation	Chang et al. (2020), Expert Reviews
Decentralized Economy	Shahzad et al. (2024)
Environmental and Energy Impacts	Radanliev (2024)
Collaboration with Private Sector	Expert Reviews

At the following, we will concisely explain each of the identified criteria for the development of a national cryptocurrency in Iran:

- Government Support and Financial Policymaking (Best Criterion)

This criterion emphasizes the crucial role of government in designing and implementing supportive policies for the creation and use of national cryptocurrencies. Government-backed legal and financial frameworks are necessary to ensure public acceptance and to protect against misuse.

- Development of Blockchain Infrastructure and Cryptographic Technology

This criterion highlights the importance of having advanced technical infrastructure to implement blockchain and cryptographic algorithms securely. For the development of a national cryptocurrency in Iran, investment in IT infrastructure, particularly in blockchain and cryptography, is essential.

- Resilient Economy and Reduced Reliance on Foreign Currency

This factor focuses on how a national cryptocurrency can be used as a tool to reduce dependence on foreign currencies, especially in times of economic sanctions. It highlights the potential for cryptocurrencies to facilitate international trade and offer an alternative to traditional financial systems.

- Support for Economic Stability

The need for a stable financial instrument, such as a stable coin backed by assets like gold or oil, is emphasized here. This can help improve public trust in the national currency, especially in times of currency volatility.

- Development of Legal and Security Frameworks

This criterion points to the need for clear legal regulations and robust security measures to ensure the legitimacy and protection of cryptocurrency transactions. This includes implementing international standards like Anti-Money Laundering (AML) and Know Your Customer (KYC) regulations.

- Promotion of Public Awareness and Social Acceptance

Raising public awareness and social acceptance of national cryptocurrencies is critical. This includes simplifying cryptocurrency technology for the public, providing user-friendly digital wallets, and offering financial incentives to encourage adoption.

- International Cooperation and Export Development

This criterion emphasizes the importance of using national cryptocurrencies in international trade, especially with countries that are also facing sanctions. It suggests that building bilateral agreements and leveraging international organizations can facilitate the global adoption of Iran's national cryptocurrency.

- Support for Decentralized Economy

In areas with limited access to traditional banking systems, national cryptocurrencies can offer financial inclusion and reduce inequalities. By providing affordable and simple digital wallets, cryptocurrencies can empower local businesses and promote a decentralized economy.

- Environmental and Energy Impacts (Worst Criterion)

While environmental concerns are important, they are currently of lower priority compared to economic and legal issues in Iran, where energy is subsidized. Alternative solutions like Proof-of-Stake (PoS) can address energy concerns without requiring significant investment.

- Collaboration with the Private Sector and Startups

This criterion underscores the importance of involving the private sector and startups in the development of blockchain technologies and digital payment systems. Public-private partnerships can help stimulate innovation and promote the success of national cryptocurrency projects.

These criteria provide a comprehensive view of the key factors that can influence the successful development of a national cryptocurrency in Iran. Each factor plays a role in addressing technical, economic, legal, social, and environmental challenges.

The identified factors were reviewed by three experts to ensure their relevance and comprehensiveness. Experts provided feedback on merging overlapping factors, resulting in the refined list above. The experts identified the best and worst criteria through the following reasons.

- Best Criterion: Government Support and Financial Policymaking

This criterion emerged as the most important due to its pivotal role in the success of national cryptocurrency initiatives. Experts emphasized the following reasons including (1) The necessity of clear and supportive policies for public acceptance and international trade. (2) The critical role of government oversight to prevent misuse and enhance public trust. (3) The centralized nature of Iran's economic structure, requiring government-led initiatives for success.

- Worst Criterion: Environmental and Energy Impacts

Environmental and energy concerns were deemed the least significant, primarily due to: (1) Subsidized energy costs in Iran, which mitigate the immediate impact of energy consumption. (2) The availability of alternative mechanisms like Proof-of-Stake (PoS) to address energy concerns with minimal investment.

Following this, a BWM-based questionnaire was designed and distributed to gather expert opinions. The designed questionnaire was sent via email to 37 experts, and ultimately, 19 fully complete questionnaires were received. The characteristics of the experts are presented in Table 2.

Table 2. Characteristics of the Experts

Attribute	Attribute Categories	Frequency	Percentage of Relative Frequency
Expertise	Information Technology	6	31%
	Management and Economics	10	53%
	Policy-Making	3	16%
Education	Bachelor's Degree	2	10%
	Master's Degree	5	26%

	Doctorate	12	64%
Age	20-29	1	5%
	30-39	15	79%
	40-49	3	16%
Experience	Up to 5 years	5	26%
	5 to 10 years	11	58%
	More than 10 years	3	16%
Gender	Female	7	37%
	Male	12	63%

Experts were asked to compare the most important factor (Best) against others and all other factors against the least important (Worst). The responses were collected from 19 experts with diverse expertise in information technology, economics, and policymaking. The experts' opinions regarding the comparison of the best criterion with other criteria (BO) and the comparison of other criteria with the worst criterion (OW) are presented in Tables 3 and 4, respectively. The average of the experts' opinions was calculated and rounded to the nearest whole number.

Table 3. Experts' Opinions on the Comparison of the Best Criterion with Other Criteria (BO)

Row	Factor	Score
1	Government Support and Financial Policymaking	1
2	Blockchain Infrastructure Development	3
3	Resilient Economy	2
4	Support for Economic Stability	2
5	Legal and Security Frameworks	2
6	Public Awareness	4
7	International Cooperation	3
8	Decentralized Economy	5
9	Environmental and Energy Impacts	8
10	Collaboration with Private Sector	4

Table 4. Experts' Opinions on the Comparison of Other Criteria with the Worst Criterion (OW)

Row	Factor	Score
1	Government Support and Financial Policymaking	8
2	Blockchain Infrastructure Development	7
3	Resilient Economy	7
4	Support for Economic Stability	6
5	Legal and Security Frameworks	6
6	Public Awareness	5
7	International Cooperation	5
8	Decentralized Economy	4
9	Environmental and Energy Impacts	1
10	Collaboration with Private Sector	4

4.2 BWM Results

The BWM non-linear model was programmed in GAMS and solved using the CONOPT solver. The execution time was five seconds. As previously mentioned, the identified criteria and the average of the pairwise comparisons conducted are considered as the input for the BWM. Objective Function Value (ξ) is achieved 0.052589. Table 5 presents the calculated weights and rankings.

Table 5. Weights of criteria and ranking

Criterion	Weight (W)	Rank
Government support and financial policymaking	0.214	1
Resilient economy and reduced reliance on foreign currency	0.133	2
Support for economic stability	0.133	2
Development of legal and security frameworks	0.133	2
Development of blockchain infrastructure and cryptographic technology	0.089	3
International cooperation and export development	0.089	3
Promotion of public awareness and social acceptance	0.067	4
Collaboration with the private sector and startups	0.067	4
Support for decentralized economy	0.053	5
Environmental and Energy Impacts	0.02	6

The consistency ratio, calculated using the formula below, indicates the overall consistency of the pairwise comparisons. It is worth noting that consistency values below 0.1 are considered acceptable.

$$Consistency\ ratio = \frac{\xi}{Consistency\ index} = \frac{0.052589}{5.23} = 0.01005$$

The calculated consistency ratio indicates that the pairwise comparisons are consistent and aligned with logical expectations.

4.3 Managerial implications

The government's role is identified as the most crucial factor, earning the highest rank. The government's involvement is essential in creating a transparent legal framework, offering financial incentives, and setting clear regulations for the use and mining of cryptocurrencies. This emphasizes the necessity of government intervention and support in ensuring the success of a domestic cryptocurrency.

In second place, three criteria are ranked jointly, reflecting their simultaneous importance for the success of the national cryptocurrency in Iran. These criteria address essential aspects of the cryptocurrency's stability and long-term success, particularly in the context of Iran's unique economic situation, including sanctions and financial challenges. These criteria are:

- Resilient Economy and Reducing Dependency on Foreign Currencies
- Support for Economic Stability
- Development of Legal and Security Frameworks

The "Resilient Economy and Reducing Dependency on Foreign Currencies" criterion emphasizes the role of a national cryptocurrency in reducing reliance on foreign currencies and facilitating trade with aligned countries like Russia and China. This is particularly important in the face of economic sanctions and banking restrictions, as a national cryptocurrency can help bypass international financial barriers. Reducing reliance on foreign currencies could help Iran resist global economic pressures and stabilize trade relationships with partner nations.

The "Support for Economic Stability" criterion addresses the need for a stable economic environment. Economic challenges such as currency fluctuations and declining purchasing power can undermine public confidence in a national cryptocurrency. Tools like stablecoins, backed by assets such as gold or oil, can mitigate market volatility and bolster public trust. Economic stability

is essential for the success of a domestic cryptocurrency as excessive fluctuations can undermine public trust and hinder widespread adoption.

The "Development of Legal and Security Frameworks" criterion stresses the need for a solid legal foundation and security measures to protect cryptocurrency transactions. Clear laws governing the use, mining, and trade of cryptocurrencies are necessary, alongside measures to prevent financial fraud and protect user privacy. With a comprehensive legal and security framework in place, the public can gain confidence in using national cryptocurrencies, enhancing their acceptance and use. In the third rank, two criteria are considered equally important:

- Development of Blockchain Infrastructure and Cryptographic Technology
- International Cooperation and Export Development

The "Development of Blockchain Infrastructure and Cryptographic Technology" criterion highlights the importance of establishing advanced blockchain technologies and secure cryptographic systems. Blockchain is the backbone of cryptocurrency, ensuring the transparency and security of transactions. Given Iran's limited access to cutting-edge technologies, significant investment in this area is necessary to ensure the successful implementation of a national cryptocurrency.

The "International Cooperation and Export Development" criterion emphasizes leveraging cryptocurrency to enhance international trade, especially in the face of sanctions. By collaborating with aligned countries and joining regional and global blockchain networks, Iran can reduce its reliance on traditional financial systems and foster international trade. A national cryptocurrency could also help facilitate trade with nations interested in strengthening their economic ties with Iran.

The fourth rank is shared by two criteria, which focus on social and collaborative aspects of implementing a national cryptocurrency:

- Promoting Public Awareness and Social Acceptance
- Collaboration with the Private Sector and Startups

"Promoting Public Awareness and Social Acceptance" emphasizes the importance of educating the public about the benefits, security, and use of cryptocurrencies. For a national cryptocurrency to succeed, public trust and widespread adoption are critical. Without public awareness and acceptance, even the best technology and policies will not achieve the desired outcomes.

"Collaboration with the Private Sector and Startups" highlights the role of private companies and startups in driving innovation, developing services related to cryptocurrencies, and providing technical solutions. Startups can play a key role in the rapid development of the cryptocurrency ecosystem, and government support can accelerate its growth.

Finally, two criteria rank fifth and sixth, indicating their lower priority in the decision-making process for developing a national cryptocurrency:

- Supporting Decentralized Economy (Rank 5)
- Environmental and Energy Impacts (Rank 6 – Worst Criterion)

"Supporting Decentralized Economy" stresses the long-term benefits of reducing reliance on centralized financial institutions. While it is important for fostering economic independence, it is currently less critical compared to the immediate needs for technological infrastructure and economic policy reforms.

"Environmental and Energy Impacts" refers to concerns regarding the environmental cost of cryptocurrency mining, particularly with proof-of-work algorithms. Although these concerns are recognized, they rank lowest in importance compared to economic and security-related issues. Since Iran's energy resources are primarily derived from subsidized fossil fuels, environmental concerns are less pressing compared to other challenges in the current context.

In conclusion, the analysis suggests that while decentralized economy and environmental concerns are important, they are secondary to addressing the immediate economic and technological challenges Iran faces. The success of a national cryptocurrency in Iran largely depends on overcoming economic barriers, developing the necessary infrastructure, and ensuring government support.

Concisely, the practical suggestions extracted from the results which could be utilized by policymakers, private sector and startups, academics and researchers include:

1. The government must establish transparent legal frameworks, conduct public awareness campaigns, and collaborate with private sector players to ensure the successful adoption of a national cryptocurrency. Regulations should align with international standards such as Anti-Money Laundering (AML) and Know Your Customer (KYC) policies to facilitate cross-border financial integration.

2. Developing a stablecoin backed by national resources such as oil or gold can enhance public trust and encourage widespread adoption. This approach addresses the inherent volatility associated with cryptocurrencies.

3. Significant investment in blockchain infrastructure and cryptographic technologies is critical for scalability and security, addressing key technical challenges.

4. Building alliances with nations facing similar financial restrictions can leverage blockchain technology for trade, bypassing traditional financial barriers.

Comparison of this paper compared to other works in the literature is as follows. This study aligns with Abdullah and Nor (2018) and Kumar et al. (2023), who emphasize the importance of a robust legal framework and stablecoin implementation in fostering public trust and cryptocurrency adoption. Unlike prior studies that broadly explore cryptocurrency adoption (e.g., Bhimani et al., 2022), this research specifically prioritizes national economic resilience and stability in the context of sanctions. This study uniquely highlights the role of collaboration with private sectors and startups as a pivotal factor, which is underexplored in earlier research such as Liu et al. (2020).

5. Conclusion

This study has examined the key factors influencing the development of a national cryptocurrency in Iran, providing a strategic roadmap for policymakers and stakeholders. Through the comprehensive literature survey and experts' opinions and the BWM, the research identified and prioritized essential elements, with government support and financial policymaking emerging as the most critical determinants of success. Other significant factors include fostering economic stability, establishing a robust legal and security framework, and promoting public awareness and social acceptance. The findings underscore the potential of a national cryptocurrency to reduce reliance on foreign currencies, strengthen economic resilience, and provide a mechanism to bypass international sanctions. However, challenges such as technological limitations, regulatory uncertainties, and public skepticism remain significant barriers that must be addressed. The study concludes that strategic investments in blockchain infrastructure, international collaborations, and the creation of user-friendly platforms are vital for Iran to harness the full potential of a national cryptocurrency and position itself as a leader in the digital economy.

One way to strengthen Iran's strategy for developing a national digital currency is to study the experiences of similar countries. For example, China, with its digital yuan project, has been able

to provide a comprehensive legal framework for public acceptance and create advanced technical infrastructure. The country has also increased public acceptance by implementing pilot programs in various regions. Russia is also seeking to reduce its dependence on the dollar and counter economic sanctions with its digital ruble. Its experiences in creating international payment systems based on digital currency can be inspiring for Iran. Other countries, such as Nigeria with its eNaira project and Turkey with its digital lira project, have shown that focusing on public awareness and close engagement with the private sector play a significant role in the success of these projects.

Iran can benefit from these experiences and increase its chances of success by creating a transparent legal framework, developing blockchain infrastructure, and increasing public awareness. International comparisons can also help identify potential opportunities and challenges and provide solutions to overcome current constraints.

This study has some limitations which should be considered in implementing its results. Although averaging techniques were employed, the study relies on expert opinions, which might introduce inherent biases. The limited number of 19 expert respondents may not fully represent all perspectives. The findings are specific to Iran's socio-economic and political context, which limits their applicability to other countries. The rapid advancements in blockchain technology may render some identified factors less relevant over time. While the study identifies and prioritizes 10 factors, future research may uncover additional critical factors that were not considered.

While this research provides valuable insights, it also opens several avenues for future exploration. Longitudinal studies can track the real-world implementation of national cryptocurrencies, offering empirical evidence of their economic, social, and technological impacts. The integration of a national cryptocurrency into global financial systems, including compliance with international regulations, warrants further investigation to ensure seamless cross-border transactions. Additionally, socio-cultural dimensions, such as public perceptions and behavioral attitudes toward cryptocurrency adoption, need deeper analysis to enhance societal acceptance. Comparative studies with countries undertaking similar initiatives could yield best practices and lessons for Iran's context. Furthermore, exploring sustainable blockchain technologies like Proof-of-Stake (PoS) could address environmental concerns associated with cryptocurrency mining. Lastly, research on the role of national cryptocurrencies in enhancing financial inclusion and reducing economic disparities could provide actionable strategies for fostering equitable growth.

These directions will contribute to refining strategies for the successful development and implementation of national cryptocurrencies, ensuring their long-term viability and impact.

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