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The Choice of Payment Methods for College Students under the Central Bank's Digital Currency

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Abstract

With the rapid development of science and society, the emergence and use of digital currencies of central banks have become an inevitable trend. The central bank's digital currency has higher security and convenience compared to traditional currencies. Therefore, the issuance of digital currencies in the central bank will inevitably have an impact on people's existing payment methods, especially college students who are more interested in emerging things. In order to fully understand the choice of college students' payment methods under the issuance of digital currency issuance, this article adopts hierarchical analysis method to analyze the three payment methods of central bank digital currencies, third -party payment platforms, and cash. Based on the four attributes of currency security, convenience, privacy, and authority, the most ideal payment method of college students is selected. As a conclusion, the central bank's digital currency is the most ideal payment method for college students.

Keywords

Central Bank Digital Currency; Third-party Payment Platform; Cash; Hierarchical Analysis Method.

1. Introduction

The 20th century was an era when computers and the Internet started and developed rapidly. With the "Internet bubble" in the 1990s, the initial digital currency appeared in the market in 1996, called "digital gold coins". Entering the 21st century, with the rapid development of scientific information technology, digital currency ushered in new development opportunities. In the continuous innovation of the private sector to the field of digital currency, the "Bitcoin" in 2008 became the earliest private digital currency in the world. In order to welcome the opportunities and challenges brought by digital currencies, most countries in the world have begun to prepare their own central bank digital currencies. The central bank of China established the research team in 2014 and began to develop digital currencies, and achieved good results in the development of several years. In October 2020, the Shenzhen Municipal People's Government jointly launched a pilot activity of digital RMB, sending a total of 10 million digital RMB red envelopes. This pilot will expand the scope of testing again, and the first test of digital RMB for the public is of great significance for the advancement of digital currency of the People's Bank of China.

As the future of a country, college students are often more interested in emerging things. The existing payment methods of Chinese college students are mainly third -party payment platforms and cash. In order to study the possible impact of the issuance of digital currencies for central banks, we use hierarchical analysis to analyze and select the most ideal payment method for college students.

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2. Literature Review

The concept of the central bank's digital currency has caused fierce discussions in all sectors of society. Luo Cong, Ma Lifer, and Dai Ling pointed out that the characteristics of digital currencies in the central bank are mainly reflected in four aspects: alternative, legal compensation, anonymous, and dual offline payment. [1] The current central bank's digital currency is in the theoretical experiment and has not yet been fully implemented. It is foreseeable that the comprehensive implementation of the central bank's digital currency will affect the existing payment methods represented by cash and third -party payment platforms. Lu Tong believes that there is a certain competition and replacement relationship between the central bank's digital currency and cash. [2] At the same time, Wang Zijin believes that the central bank's digital currency will shake the market share of the third -party payment platform and restrict its development capabilities. [3] The development process of digital currencies in the central bank will coexist with opportunities and challenges. Wang Qinggang and Zhao Ke pointed out that the central bank's digital currency can reduce the cost of cash operation and maintenance and improve the efficiency and reliability of payment. [4] Chen Hua and Gong Xiaokang pointed out that the widespread application of digital currencies of the People's Bank of China will be a gradual and gradual long -term development process, and at the same time, it will face a more intense international competition link. [5]

3. Analysis of the Selection of College Student Payment Methods based on Hierarchical Analysis Method

3.1. The Principle of Hierarchical Analysis Method and Instructions of Related Factors

First, the problem is divided into three layers. The target layer is the ideal payment method of college students. The guidelines are the four attributes of the safety, convenience, privacy and authority of currency. The scheme layer is the three payment methods: the central bank's digital currency, the third -party payment platform, and the cash.

Second, when comparing the importance of the currency attributes in the guideline layer, the ratio of the importance of the currency attribute in the guideline layer is made, quantify, and build a comparative judgment matrix.

Table 1. Symbol Description

Symbol	Symbol Description
A	The target layer is the most ideal payment method
B_1	Security in the guideline layer
B_2	Convenience in the guideline layer
B_3	Privacy in the guideline layer
B_4	Authority in the guideline layer
C_1	The central bank digital currency in the scheme layer
C_2	Third -party payment platform in the scheme layer
C_3	Cash in the scheme layer

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Third, at each currency attribute of the standard layer, the importance of the comparison of the central bank's digital currency, third -party payment platform, and cash, further build a comparative judgment matrix under each criterion.

Finally, according to the comparative judgment matrix, calculate the characteristic vector of the comparative judgment matrix, so as to determine the relatively important degree of the guideline layer and the scheme layer, and finally determine the optimal solution through comprehensive importance.

You can refer to the symbol description of Table 1.

3.2. Scaling and Description

The ability habits of usual qualitative distinction between things are: equally important, slightly more important, more important, more and more important, and absolutely important. When the attributes are difficult to judge between the two nouns, take the value between the two attributes, so as to get 9 Personal attributes are represented by numbers 1-9, which can be referred to Table 2.

Table 2. Relatively important weight

Scaling	Definition
1	Attribute i is equally important as j
3	Attribute i is slightly more important than j
5	Attribute i is more important than j
7	Attribute i is more and more important than j
9	Attribute i is absolutely important than j
2, 4, 6, 8	The intermediate value of two adjacent attributes

3.3. Construction Judgment Matrix

We judge and compare the target layer, guideline layer, and scheme layer, and build a comparative judgment matrix.

Judging the matrix A-B (that is, the most ideal payment method based on the target layer, the importance of various factors of the guideline layer) is shown in Table 3.

Judging the matrix B_1-C (comparison between the importance of different payment methods under security conditions) is shown in Table 4.

Judging the matrix B_2-C (comparison between the importance of different payment methods under convenience conditions) is shown in Table 5.

Judging the matrix B_3-C (comparison between the importance of different payment methods under privacy conditions) is shown in Table 6.

Judging the matrix B_4-C (comparison between the importance of different payment methods under authority conditions) is shown in Table 7.

Table 3. Judgment matrix A-B

A	B_1	B_2	B_3	B_4
B_1	1	2	7	9
B_2	1/2	1	5	7
B_3	1/7	1/5	1	5
B_4	1/9	1/7	1/5	1

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Table 4. Judgment matrix B_1-C

B_1	C_1	C_2	C_3
C_1	1	4	8
C_2	1/4	1	5
C_3	1/8	1/5	1

Table 5. Judgment matrix B_2-C

B_2	C_1	C_2	C_3
C_1	1	3	5
C_2	1/3	1	3
C_3	1/5	1/3	1

Table 6. Judgment matrix B_3-C

B_3	C_1	C_2	C_3
C_1	1	5	3
C_2	1/5	1	1/3
C_3	1/3	3	1

Table 7. Judgment matrix B_4-C

B_4	C_1	C_2	C_3
C_1	1	7	3
C_2	1/7	1	1/6
C_3	1/3	6	1

3.4. Calculate the Characteristic Values, Feature Vectors and Consistency Inspection Indicators of Each Comparative Judgment Matrix

The steps of harmony are:

First, the judgment matrix A is performed by the column: $b_{ij} = a_{ij} / \sum a_{ij}$;

Second, the judgment matrix after the normalization of the norm is summed up according to the line: $c_i = \sum b_{ij} (i = 1,2,3 \dots n)$;

Third, the caminated process of c_i is performed to get the feature vector:

$$W = (w_1, w_2, \dots w_n)^T, w_i = c_i / \sum c_i ;$$

Finally, the maximum feature value corresponding to the feature vector W:

$$\lambda_{max} = \frac{1}{n} \sum_i \left(\frac{(AW)_i}{w_i} \right)$$

For the characteristics, feature vectors, and consistency test of matrix A-B:

Multiple changes to the matrix can get the feature vector of the matrix A-B:

$$W = [0.5320 \quad 0.3255 \quad 0.1035 \quad 0.0389]^T$$

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Calculate the maximum feature value of the matrix according to the formula:

$$\lambda_{max} = \sum_{i=1}^{n} \frac{(AW)_i}{nW_i} = 4.2442$$

According to the principle of hierarchy, the consistency of the difference between the maximum characteristic value λ_{max} and n of the principle of A is used.

$$CI = \frac{\lambda_{max}-n}{n-1} = 0.0841 < 0.1; CR = \frac{CI}{RI} = 0.0905 < 0.1,$$

The RI = 0.89 is learned by the average random consistency indicator through the query Table 8.

Table 8. Average random consistency indicator

n	3	4	5	6	7	8	9	10	11	12
RI	0.58	0.89	1.12	1.26	1.36	1.41	1.46	1.49	1.52	1.54

Similar to the above calculation process, the relevant conclusions of other judgment matrix can be obtained.

For judging the characteristic values, feature vectors, and consistency test of the matrix B_1-C:

$$W = [0.6986 \quad 0.2370 \quad 0.0643]^T, \lambda_{max} = 3.0940, CR = 0.0810 < 0.1$$

For judging the characteristic values, feature vectors, and consistency test of the matrix B_2-C:

$$W = [0.6370 \quad 0.2583 \quad 0.1047]^T, \lambda_{max} = 3.0385, CR = 0.0332 < 0.1$$

For judging the characteristic values, feature vectors, and consistency test of the matrix B_3-C:

$$W = [0.6370 \quad 0.1047 \quad 0.2583]^T, \lambda_{max} = 3.0385, CR = 0.0332 < 0.1$$

For judging the characteristic values, feature vectors, and consistency test of the matrix B_4-C:

$$W = [0.6406 \quad 0.0668 \quad 0.2926]^T, \lambda_{max} = 3.1000, CR = 0.0861 < 0.1$$

3.5. Hierarchical Sorting

After obtaining the relative importance between the target layer, the guideline layer, and the scheme layer, the comprehensive importance of each solution can be calculated:

Comprehensive importance of scheme C_1:0.6699

Comprehensive importance of scheme C_2:0.2236

Comprehensive importance of scheme C_3:0.1064

4. Conclusion

It is learned through the final results that the important degree of the three currency payment methods of the central bank's digital currency, third -party payment platform, and cash is 0.6699, 0.2236, and 0.1064. Therefore, the central bank's digital currency is the ideal payment method for college students. Comprehensive consideration and analysis, combined with the characteristics of the central bank's digital currency, college students' willingness to use digital currencies in the central bank is high. It can be foreseeable that the central bank's digital currency is more acceptable and used after the comprehensive implementation of the central bank's digital currency.

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