

Analysis of Influencing Factors of DECP Circulation based on Analytic Hierarchy Process

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Abstract

In recent years, with the vigorous development of mobile Internet and blockchain technology, as well as the popularity of various mobile terminal devices, the promotion and use of central bank digital currency has shown a good momentum in the world, and the transaction scale continues to grow year by year. Based on the research background of the DECP, this paper adopts the analytic hierarchy process (AHP) to explore and analyze the circulation factors of the DECP. According to the research needs, the corresponding survey questionnaire is conducted, and the influencing factors of the circulation of the DECP are constructed to construct the index system. Analysis software is used to carry out hierarchical analysis of the first-level index system and the second-level index system, and the corresponding results are obtained, and the reasons for promoting the circulation speed of the central bank's digital currency are summarized.

Keywords

DECP; Currency Circulation; Influencing Factors; Analytic Hierarchy Process.

1. Introduction

In recent years, our country's mobile payment industry developed rapidly. Represented by Alipay, wechat pay and flash payment, it provided convenient and efficient retail payment services for the public. Along with the main digital economy development, it also cultivated the public's habit of digital payment. According to the 2019 China Payment Journal Survey conducted by the People's Bank of China, the number and amount of mobile payment transactions accounted for 66 percent and 59 percent, respectively, and 46 percent of respondents had no cash transactions during the survey period[1]. The public's demand for convenience, security, universality and privacy of retail payment is increasing day by day. DECP has a high security level and supports controllable anonymity, which is conducive to the protection of personal privacy and user information, and has become the best choice for the public demand. The People's Bank of China has taken an active and prudent attitude towards the launch of the DECP. Since 2014, the People's Bank of China has set up a special team to conduct special research on the digital currency. By the end of 2019, the DECP has been piloted in several regions successively. By the end of 2020, the DECP pilot program has been expanded to "10+1" in an orderly way, covering the Yangtze River Delta, Pearl River Delta, Beijing-Tianjin-Hebei, central, western, northeast and northwest regions, and covering various aspects of the payment field. Operating subjects have been expanded to Bank of China, Agricultural Bank of China, Industrial and Commercial Bank of China, Construction Bank, Bank of Communications, Postal Savings Bank, China Merchants Bank, MyBank and WeBank, and other small and medium-sized banks will also provide DECP services[2].

2. Overview of the Development of DECP

The People's Bank of China has taken an active and prudent attitude towards the launch of the DECP. Since 2014, the People's Bank of China has set up a special team to conduct special

research on the digital currency. By the end of 2019, the DECP has been piloted in several regions successively[3]. By the end of 2020, the DECP pilot program has been expanded to "10+1" in an orderly way, covering the Yangtze River Delta, Pearl River Delta, Beijing-Tianjin-Hebei, central, western, northeast and northwest regions, and covering various aspects of the payment field[4]. Operating subjects have been expanded to Bank of China, Agricultural Bank of China, Industrial and Commercial Bank of China, Construction Bank, Bank of Communications, Postal Savings Bank, China Merchants Bank, MyBank and WeBank, and other small and medium-sized banks will also provide DECP services. The pilot since 2019 has effectively verified the technical design, system stability, product usability and scenario applicability of the DECP business, mainly reflected in the following aspects: First, the pilot has covered all areas of the existing payment system[5]. At the end of 2019, pilot tests of the digital yuan were launched in Xiongan, Suzhou, Chengdu, Shenzhen and the Beijing Winter Olympics. In October 2020, six new DECP pilot test areas were added in Shanghai, Changsha, Hainan, Qingdao, Xi'an and Dalian, thus forming a "10+1" pattern. In April 2021, China's central bank announced, Eleven cities, Tianjin, Chongqing, Guangzhou, Fuzhou, Xiamen, Hangzhou, Ningbo, Wenzhou, Huzhou, Shaoxing and Jinhua, will be listed as the pilot areas for the DECP[6]. In particular, the Beijing Winter Olympics has provided a full scene pilot for the DECP, covering the needs of seven key areas, including food, housing, travel, tourism, shopping, entertainment and medical services. Meanwhile, cross-border payment has been successfully piloted in Hong Kong[7]. Second, the public's understanding of the DECP has been enhanced through the pilot, and the DECP has formed a certain scale. By December 31, 2021, more than 8,085,100 DECP pilot scenarios have been opened, with 261 million individual wallets and 87.565 billion yuan of transactions. Third, the successful launch of DECP APP has further accelerated the promotion of DECP. The launch of the DECP (pilot version) APP on January 4, 2022 has further accelerated the use of DECP, and a number of commercial banks are connecting to it one after another[8].

3. Theoretical Model Design and Analysis

There are many factors that can affect the circulation of DECP. By combing the existing research results and combining the characteristics of DECP, it can be analyzed from the following four aspects: the policy level, the technical level, the social level and the transaction level (See Figure 1). And each level can be subdivided into different indicators, so this paper through the use of scale design to questionnaire situation.

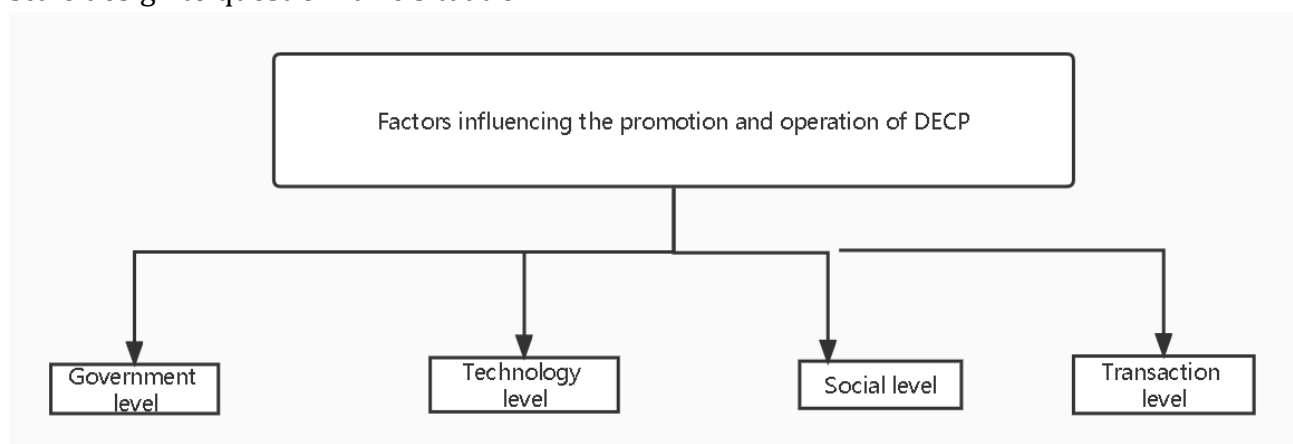


Figure 1. AHP evaluation model

The Analytic Hierarchy Process (AHP) was created by Saaty, an American operations research scientist, in the 1970s, making comprehensive use of multi-objective comprehensive evaluation and network system theory. The structure of complex problems is divided according to

different levels of standards, the connection between different levels of structures is established, and the weight of each indicator layer item is calculated, so as to rank the influencing factors in the hierarchy hierarchically, so as to obtain the final weight. The weight of each item is presented in a quantitative way, thus helping decision-makers to formulate decision-making methods under the same principle. This method is simple and convenient, and can comprehensively consider the advantages and disadvantages of qualitative and quantitative analysis to analyze and make decisions. Analytic Hierarchy Process (AHP) has been widely used in China's social and economic fields, and has received considerable attention. This method also provides a feasible analysis idea for analyzing the influencing factors of DECP circulation and constructing the weight analysis of evaluation indicators.

Based on expert scores, the judgment matrix of the criterion layer is built as shown in the following table.

Table 1. Criterion layer judgment matrix

Indicators	Government level	Social level	Technology level	Transaction level
Government level	1	3	0.25	3
Social level	0.333	1	0.2	3
Technology level	4	5	1	5
Transaction level	0.333	0.333	0.2	1

The weight calculation results of the analytic hierarchy process (AHP) are shown in [Table 2](#). The weight of the government level is 22.507%, that of the social level is 12.289%, that of the technical level is 58.11% and that of the transaction level is 7.095%.

Table 2. AHP hierarchical analysis results

Indicators	Eigenvalue vector	weighted value (%)	Maximum characteristic root	CI
Government level	1.225	22.507	4.252	0.084
Social level	0.669	12.289		
Technology level	3.162	58.11		
Transaction level	0.386	7.095		

The calculation results of the analytic hierarchy process (AHP) are shown in [Table 3](#). The maximum characteristic root is 4.252. According to the RI table, the corresponding RI value is 0.882, so $CR=CI/RI=0.095<0.1$, passing the consistency test.

Table 3. AHP hierarchical analysis results

Maximum characteristic root	CI	RI	CR	Consistency test result
4.252	0.084	0.882	0.095	Passed

4. Conclusion

According to the weight ranking of each factor obtained by the comprehensive evaluation of the influencing factors of the circulation of DECP through analytic hierarchy process, it can be analyzed that: the development support ability of DECP plays a key role in the smooth circulation of DECP; Secondly, it is the technical supervision and storage capacity of the DECP

application system, which directly determines the future online supervision efficiency of DECP and plays a pivotal role in the property security of the country, users and other relevant subjects. Then, in the circulation of DECP, it is the national credit ability endowed by the government that holds the dominant right of discourse. Once users realize that they have national credit as a guarantee, the circulation and use of DECP will have a basic guarantee. Thirdly, the legal status and the stability of the value of the DECP play a very important role in the preservation and appreciation of the wealth of market users. The DECP must have clear provisions on its currency status in the legislation, and the corresponding laws and regulations should be continuously improved. Users tend to have stable coins and have great expectations for the stability of the currency value in the future. The technology developed by the People's Bank of China in collaboration with other relevant departments must also have sufficient security capabilities to protect users' property in times of crisis. The change of economic environment also has a huge impact on the circulation and use of DECP. For the places with a big economic gap between the east and the west of China, the economically developed places have relatively complete financial infrastructure, which brings great convenience to the circulation and use of DECP. However, due to the financial infrastructure and other related factors, the circulation and use of DECP will be hindered. As for the pilot area of Shenzhen, which is an economically developed area, the promotion of DECP in Shenzhen is very smooth. Finally, when DECP enters the circulation stage, users will pay special attention to transaction security, privacy protection, transaction cost, transaction speed, transaction efficiency and other factors in the transaction process.

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