



The Impact of Electronic Payment Systems on Banking Sector Liquidity in Iraq (2010–2022)

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Abstract. The study analyzes the transforming effects of electronic payment systems (EPS) on liquidity indicators in the Iraq banking sector since 2010 and 2022. This article uses advanced financial approaches to check important systems such as Real -Time Gross Settlement System (RTGS), automatically. Taylor Machine (ATM) and electronic clearing mechanisms have changed the dynamics of liquidity. Despite the existing systemic structural difficulties, the data shows a high collaboration between the use of these methods and improvement of liquidity measures. The study emphasizes the increasing use of digital technologies in economic operations, especially their ability to reduce liquidity restrictions, improve operational efficiency and build sustainable economic ecosystems. Through intensive study of these EPs, research localized not only them in the Iraqi banking sector, but also specific recommendations that will increase their efficiency to support economic stability and liquidity flexibility.

Keywords: Banking Sector, Electronic Payment Systems, Liquidity Indicators.

1. INTRODUCTION

Electronic payment system (EPS) is important for upgrading economic infrastructure worldwide. Since 2003, installation of these systems has been an important component of Iraq's economic reform, with a view to raising domestic banking institutions to international standards. Real -Time Gross Settlement System (RTGS), electronic clearing processes and ATM networks are all important components of this shift. Overall, these methods address operational efficiency, low transaction costs and systemic liquidity difficulties.

Liquidity, which means that the bank's ability to fulfill its immediate financial obligations is an important indicator of operational stability and flexibility. In the context of the turbulent economic climate in Iraq, which is characterized by geopolitical instability and repetitive external shocks, effective liquidity management is important. This study sees how EPS adoption affects liquidity indicators such as the relationship between cash and assumption, deposits and credit and financing intervals. By focusing on this interaction, the study provides a detailed assessment of how EPS helps to eliminate disabilities and create flexible economic ecosystems in transitional economies such as Iraq. Furthermore, the study situates Iraq's development in EPS within the broader global discourse on digital financial integration, offering insights into the complex problems and opportunities that this transition entails.

2. METHODOLOGY

This study employs an inductive analytical framework, combining descriptive and quantitative analysis to evaluate the influence of digital payment systems (EPS) on liquidity indicators. Data were acquired from the Central Bank of Iraq's official bulletins, augmented by institutional datasets and secondary literature. Advanced econometric methods, such as time-collection forecasting and fashion analysis, had been used to uncover causal connections and dynamics within the dataset.

The look at concentrates on the subsequent key additives of EPS:

- Real-Time Gross Settlement System (RTGS): This system enables instantaneous settlement of high-value transactions, significantly reducing risks associated with deferred payments. RTGS is essential to interbank liquidity management and has performed a pivotal position in stabilizing monetary structures.
- Automated Clearing House (ACH): ACH systems optimize transactional transparency, reduce operational delays, and facilitate wider financial interest via efficiently clearing and settling low-cost transactions.
- Automated Teller Machine (ATM) Networks: These networks provide extensive access to cash and electronic banking services, especially in areas of poor infrastructure, encourage economic integration and ensure uniform liquidity flow.

Comparative reviews compare Iraq's EPS developments versus international requirements, displaying structural impediments to adoption and imparting opportunities for targeted intervention. Qualitative insights from important stakeholders supplement the quantitative findings, increasing the study's contextual depth and giving meaningful recommendations.

3. RESULTS AND ANALYSIS

3.1 Development of Electronic Payment Systems in Iraq

3.1.1. Concept and Evolution of Electronic Payment Systems

Electronic payment systems consist of digital methods for transferring funds, effectively replacing traditional payment instruments such as checks and cash. These systems rely on secure, scalable infrastructures for efficient, real-time processing, optimizing operational workflows, and reducing transaction costs (Hamid & Sultani, 2022). In Iraq, adopting EPS has been instrumental in driving financial inclusion, fostering economic modernization, and reducing reliance on cash-based transactions. By 2022, EPS had significantly expanded in both reach and functionality, aligning Iraq's financial landscape with global technological advancements. (Electronic Money Payment Services System, 2014: 3).

3.1.2. Types of Electronic Settlement Systems

1. Real-Time Gross Settlement System (RTGS): RTGS facilitates high-value, time-critical payments with finality, minimizing systemic risks. Over the study period, RTGS usage surged, particularly post-2018, underscoring its essential role in stabilizing interbank liquidity. (Hamidi, Zaghdar, 2015: 10-11)
2. Net Settlement Systems (ACH): ACH aggregates transactions for periodic clearing, offering cost-efficient solutions for low-value payments. This system has been vital in supporting Iraq's transactional infrastructure for consumer and business activities. (Badri, Abdul Rahim, 2012:242)
3. Correspondent Banking Systems: These systems enable international payments through bilateral agreements between banks, fostering cross-border trade and financial connectivity (Husseini, 2019: 25).

3.1.3. Types and Means of Modern Electronic Payment Systems

3.1.3.1. Modern EPS tools include:

- ATM and POS Networks: These systems ensure real-time access to funds and facilitate retail transactions with minimal delays. (Nazaritehrani & Mashali, 2020: 6).
- Internet and Mobile Banking Platforms: These platforms empower users with remote access to account management, fund transfers, and bill payments, significantly enhancing convenience. (Qasim, 2011: 24).
- Smart Cards and Digital Wallets: By offering enhanced security and portability, these tools accelerate the transition toward a cashless economy and bolster transactional efficiency. (Khudair, Sobhi, 2014:40).

3.2. Analysis of Liquidity Indicators

3.2.1. Cash-to-Asset Ratio

The cash-to-asset ratio, an indicator of a bank's liquidity, improved significantly over the study period, rising from 9.65% in 2010 to 32.42% in 2022. This trend highlights the role of EPS in bolstering liquidity preparedness and operational efficiency. Figure 1 illustrates this upward trajectory, demonstrating EPS's capacity to enhance short-term liquidity management. The increase can be attributed to improved cash flow mechanisms facilitated by the widespread use of ATMs and real-time banking systems, which ensured that banks maintained adequate reserves.

Table 1: Evolution of the Cash-to-Total Assets Ratio Index for the Period (2010-2022) (Million Dinars).

| Year | Cash | Total assets of banks | Cash / Total Assets Ratio (%) |
|------|------------|-----------------------|-------------------------------|
| 2010 | 35,087,024 | 363,492,595 | 9.65 |
| 2011 | 38,266,165 | 143,803,608 | 26.61 |
| 2012 | 41,477,528 | 191,355,465 | 21.68 |
| 2013 | 45,231,042 | 206,554,047 | 21.90 |
| 2014 | 42,111,769 | 226,821,881 | 18.57 |
| 2015 | 34,677,722 | 222,998,575 | 15.55 |
| 2016 | 32,204,155 | 221,362,663 | 14.55 |
| 2017 | 32,109,023 | 156,691,129 | 20.49 |
| 2018 | 33,754,578 | 123,171,226 | 27.40 |
| 2019 | 36,821,369 | 133,254,099 | 27.63 |
| 2020 | 33,813,062 | 138,642,977 | 24.39 |
| 2021 | 44,399,940 | 159,592,747 | 27.82 |
| 2022 | 64,411,412 | 198,661,832 | 32.42 |

Source: based on the data of the statistical bulletin of the Central Bank of Iraq for separate years, Department of Statistics and Research (2010-2022)

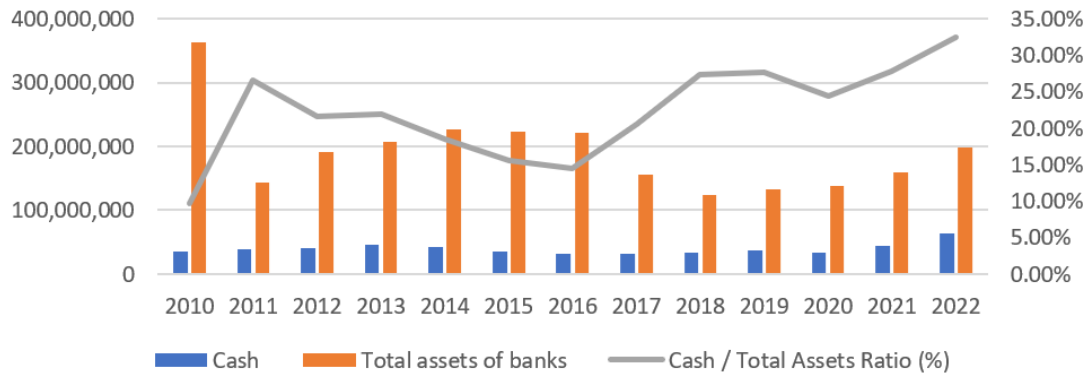


Figure 1: Evolution of the cash index to total assets in Iraq.
Source: Based On the data of Table (1).

3.3. Reserve Requirement Ratio

Fluctuations in reserve requirements peaked at 66.58% in 2010 before stabilizing at 46% in 2022. These trends, depicted in Figure 2, reflect effective regulatory oversight and the gradual adaptation of policies to balance liquidity with macroeconomic stability. The decrease in reserve ratios post-2014 correlates with the adoption of digital payment systems, which optimized banks’ cash reserves and reduced the need for higher mandatory holdings.

Table 2: Evolution of the LRR Ratio for the Period (2010-2022) (Million Dinars).

| Year | Balances With the Central Bank | Total Deposits of The Banking Sector | Statutory Reserve Ratio (%) |
|------|--------------------------------|--------------------------------------|-----------------------------|
| 2010 | 31,921,888 | 47,947,232 | 66.58 |
| 2011 | 34,396,082 | 56,150,094 | 61.26 |
| 2012 | 36,286,370 | 62,005,935 | 58.52 |
| 2013 | 39,596,459 | 68,855,487 | 57.51 |
| 2014 | 38,299,676 | 74,073,336 | 51.71 |
| 2015 | 30,947,859 | 64,344,061 | 48.10 |
| 2016 | 29,047,870 | 62,398,733 | 46.55 |
| 2017 | 28,215,678 | 67,048,631 | 42.08 |
| 2018 | 29,988,161 | 76,893,927 | 39.00 |
| 2019 | 32,625,222 | 82,106,425 | 39.74 |
| 2020 | 27,768,926 | 84,924,168 | 32.70 |
| 2021 | 39,364,395 | 96,071,378 | 40.97 |
| 2022 | 59,375,867 | 129,083,322 | 46 |

Source: based on the data of the statistical bulletin of the Central Bank of Iraq for separate years, Department of Statistics and Research (2010-2022)

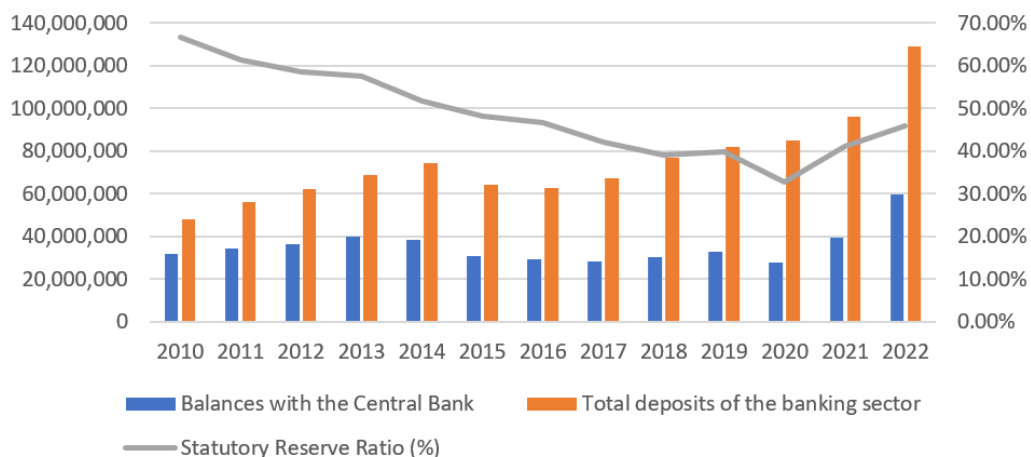


Figure 2: Evolution of the legal reserve ratio for the period (2010-2022).
Source: based on the data of Table (2).

3.4. Financing Gap Index

The financing gap widened considerably during the study period, reaching 113.09% in 2022. Figure 3 illustrates this divergence, emphasizing the critical need for credit optimization strategies to fully leverage the deposit mobilization facilitated by EPS adoption. The growth in this index reflects a lag in credit expansion compared to deposits, underscoring the potential for policy interventions aimed at stimulating lending activities

without compromising liquidity.

Table 3: Evolution of the annual financing gap of the Iraqi banking sector for the period (2010-2022) (million dinars)

| Year | Cash Credit | Total Deposits | Funding Gap (%) | Growth Rate (%) |
|------|-------------|----------------|-----------------|-----------------|
| 2010 | 11,721,535 | 47,947,232 | -309.05 | - |
| 2011 | 20,344,076 | 56,150,094 | -176.00 | -43.05 |
| 2012 | 28,438,688 | 62,005,935 | -118.03 | -32.94 |
| 2013 | 29,952,012 | 68,855,487 | -129.89 | 10.04 |
| 2014 | 34,123,067 | 74,073,336 | -117.08 | -9.86 |
| 2015 | 36,752,686 | 64,344,061 | -75.07 | -35.88 |
| 2016 | 37,180,123 | 62,398,733 | -67.83 | -9.65 |
| 2017 | 37,952,829 | 67,048,631 | -76.66 | 13.03 |
| 2018 | 38,486,947 | 76,893,927 | -99.79 | 30.17 |
| 2019 | 42,052,511 | 82,106,425 | -95.25 | -4.55 |
| 2020 | 49,817,737 | 84,924,168 | -70.47 | -26.01 |
| 2021 | 52,971,508 | 96,071,378 | -81.36 | 15.46 |
| 2022 | 60,576,014 | 129,083,322 | -113.09 | 39.00 |

Source: based on the data of the statistical bulletin of the Central Bank of Iraq for separate years, Department of Statistics and Research (2010-2022).

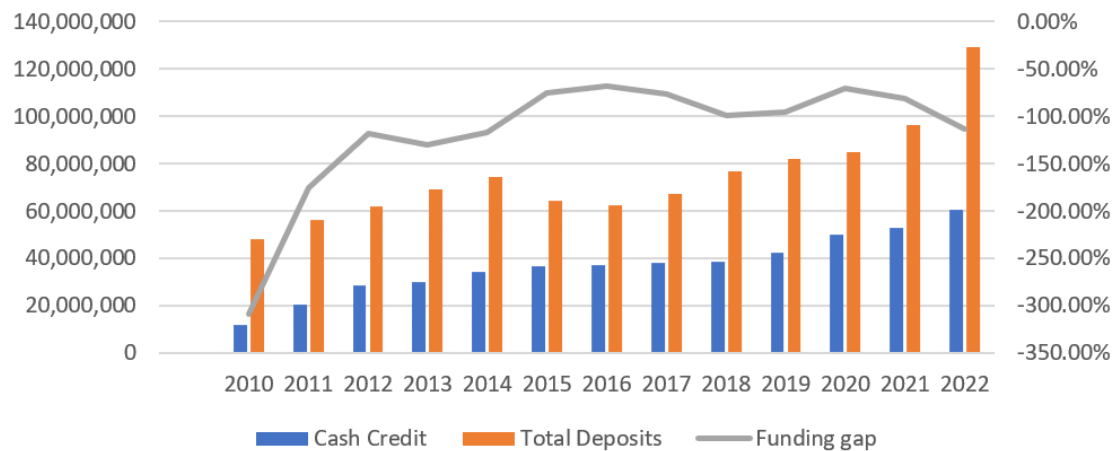


Figure 3: Evolution of the annual financing gap of the Iraqi banking sector for the period (2010-2022).
Source: Based on the data of Table (3).

3.5 Analysis of Electronic Payment System Indicators in Iraq

3.5.1. RTGS Transactions

The volume of Real-Time Gross Settlement (RTGS) transactions has exhibited a consistent upward trajectory, underscoring the increasing dependence on real-time, high-value payment mechanisms. Between 2010 to 2022, the average annual growth rate was approximately 9.59%, driven by advancements in infrastructure and regulatory incentives. This notable growth has played a pivotal role in reducing settlement risks and enhancing the efficiency of interbank liquidity management.

Table 4: Evolution of the electronic settlement system in Iraq for the period (2010-2022) (million dinars)

| Year | The Total Value of Settlements | Growth Rate % |
|------------------------|--------------------------------|---------------|
| 2010 | 4,362,817,205,421 | - |
| 2011 | 4,311,176,523,955 | -1.18 |
| 2012 | 4,469,386,502,795 | 3.67 |
| 2013 | 8,675,505,117,002 | 94.11 |
| 2014 | 8,443,866,045,791 | -2.67 |
| 2015 | 8,065,703,973,168 | -4.48 |
| 2016 | 5,335,488,093,233 | -33.85 |
| 2017 | 4,030,709,630,701 | -24.45 |
| 2018 | 5,523,306,496,488 | 37.03 |
| 2019 | 7,129,405,025,915 | 29.08 |
| 2020 | 6,687,317,435,740 | -6.20 |
| 2021 | 8,052,306,730,410 | 20.41 |
| 2022 | 13,714,703,829,287 | 70.32 |
| Compound Growth Rate % | %9.59 | |

Source: Based on the data of the statistical bulletin of the Central Bank of Iraq for separate years, Department of Statistics and Research (2010-2022).



Figure 4: Evolution of the electronic settlement system in Iraq For the period (2010-2022).
Source: based on the data of Table (4).

3.5.2. ATM Usage Trends

The expansion of ATM networks has contributed significantly to EPS adoption. By 2022, Iraq had over 2,223 ATMs, compared to just 326 in 2010. This growth has supported cash withdrawal convenience, reduced over-the-counter transactions, and strengthened public trust in banking systems.

Table 5: Evolution of the number of ATMs in Iraq for the period (2010-2022).

| Year | Number of ATMs | Growth Rate % | Number of ATMs per 100,000 inhabitants |
|------------------------|----------------|---------------|--|
| 2010 | 326 | - | 2.6 |
| 2011 | 467 | 43.3 | 2.172 |
| 2012 | 467 | 0.0 | 2.171 |
| 2013 | 647 | 38.54 | 1.076 |
| 2014 | 337 | -47.91 | 1.608 |
| 2015 | 580 | 72.11 | 1.862 |
| 2016 | 660 | 13.8 | 2.382 |
| 2017 | 656 | -0.61 | 2.853 |
| 2018 | 865 | 31.9 | 3.653 |
| 2019 | 1014 | 17.23 | 4.162 |
| 2020 | 1340 | 32.15 | 5.349 |
| 2021 | 1566 | 16.9 | 6.065 |
| 2022 | 2223 | 1.954 | 9.3 |
| Growth rate Composite% | %17.35 | | %11.21 |

Source: based on the data of the statistical bulletin of the Central Bank of Iraq for separate years, Department of Statistics and Research (2010-2022).

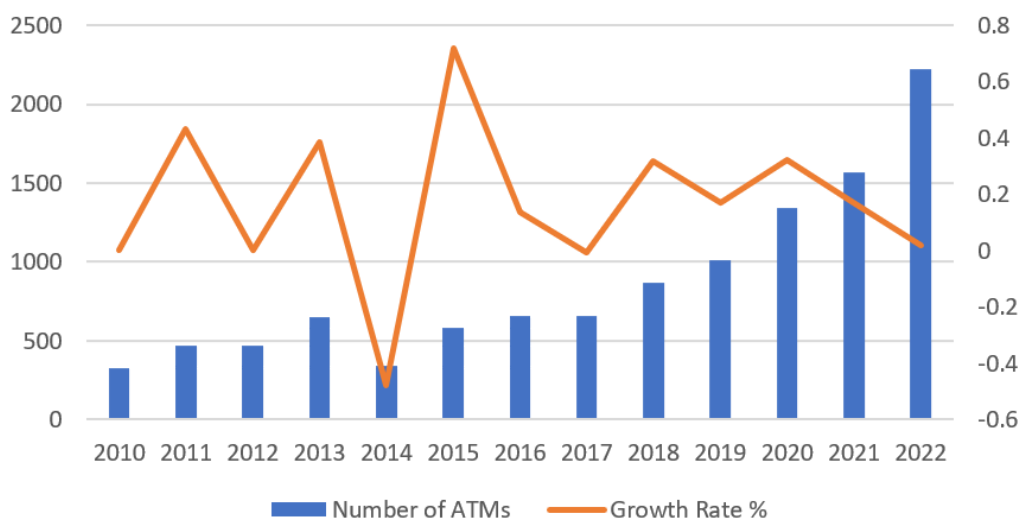


Figure 5: Evolution of the number of ATMs in Iraq for the period (2010-2022).
Source: Based on the data of Table (5).

3.5.3. C-ACH Transactions

By 2022, Central Automated Clearing House (C-ACH) systems accounted for over 70% of low-value payment processing, reflecting a significant shift towards efficient, cost-effective settlement methods for both businesses and consumers. The rapid adoption of these systems highlights their critical role in enhancing the scalability and

liquidity circulation within the banking sector.

Table 6: Development of electronic clearing in Iraq for the period (2010-2022) (million dinars).

| Year | Total value Transfers Clearing Electronic | Growth Rate (%) |
|------------------------|---|-----------------|
| 2010 | 103,520,195,200 | - |
| 2011 | 181,089,968,011 | 74.93 |
| 2012 | 1,747,715,162,331 | 865.11 |
| 2013 | 9,710,755,677,409 | 455.63 |
| 2014 | 27,653,112,061,036 | 184.77 |
| 2015 | 24,972,713,002,685 | -9.69 |
| 2016 | 23,098,109,796,745 | -7.51 |
| 2017 | 25,811,589,080,675 | 11.75 |
| 2018 | 35,516,726,615,208 | 37.60 |
| 2019 | 47,590,700,077,057 | 34.00 |
| 2020 | 40,260,007,724,890 | -15.40 |
| 2021 | 45,657,570,810,864 | 13.41 |
| 2022 | 61,462,803,259,321 | 34.62 |
| Rate Growth Composite% | %70.27 | |

Source: based on the data of the statistical bulletin of the Central Bank of Iraq for different years, Department of Statistics and Research (2011-2022).

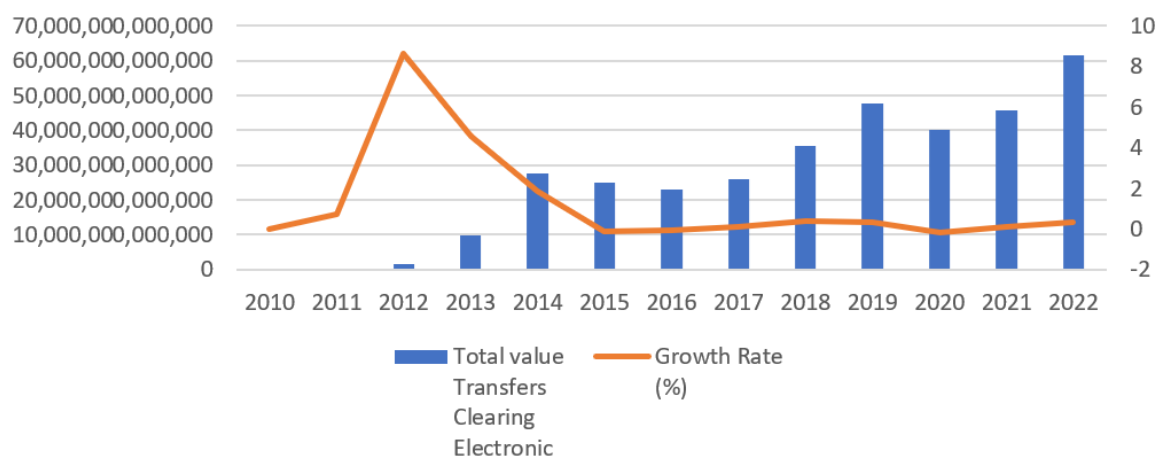


Figure 6: Development of electronic clearing in Iraq.

Source: Based on the data of Table (6).

4. CONCLUSIONS AND INSIGHTS

- RTGS adoption has significantly enhanced the efficiency and reliability of high-value liquidity management, particularly in periods of economic recovery. This system's real-time settlement capabilities have minimized risks associated with interbank transfers.
- The expansion of ATM networks has greatly improved accessibility to banking services, mitigating operational bottlenecks and advancing financial inclusion, particularly in rural and underserved regions.
- C-ACH systems have bolstered the capacity for low-value transaction settlements, positively influencing overall liquidity metrics by reducing transaction processing times and associated costs.
- The continuous enhancement of cash-to-asset ratios emphasizes the vast impact of electronic payment systems (EPS) in strengthening liquidity frameworks, ensuring that economic institutions are capable of assembling their on the spot obligations.
- Stabilization of reserved requirements emphasizes the necessary role of the regulations to develop the economic landscape, and ensures that the bank remains flexible in front of macroeconomic instability.
- The expansion reflects the unused capacity for the financing difference's credit extension. Addressing this imbalance is important for adapting resource allocation and promoting economic growth.
- Increasing EPS has increased more and more confidence between banks, and contributed to a more stable and harmonious economic ecosystem.

5. RECOMMENDATIONS FOR FUTURE DEVELOPMENTS

- Expand the implementation of ATM and Point-of-Sale (POS) infrastructure in underserved areas to sell financial inclusion and enhance access to liquidity.
- Enhance cybersecurity protocols to defend electronic charge systems (EPS) and hold the general public's self assurance in persisted usage.
- Launch digital literacy sports to sell EPS adoption among varied demographics.
- Encourage public-non-public partnerships to promote digital price technology and enhance infrastructure scalability.

- e) Use advanced analytics to display liquidity developments, locate dangers, and manual policy choices.
- f) Improve communicate among regulatory companies and monetary establishments to reduce adoption hurdles and combine EPS into larger economic frameworks.

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