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The Evolution of Digital Payments: UPI, E-Rupee and the Future of Currency - in the Context of Urban Patna

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Abstract
E-rupee and digital payment systems are having a significant impact on India's financial landscape. The e-rupee is designed to promote financial inclusion, reduce reliance on cash, and establish a transparent financial ecosystem. Digital payment systems such as UPI and mobile wallets have already made considerable progress in bringing a vast number of people into the formal financial sector, reducing dependence on cash, and fostering a more efficient digital economy. These innovations offer convenience, efficiency, and security in financial transactions, aligning with government initiatives such as "Digital India" and policies that promote a less-cash economy. The continuous evolution of these systems is expected to further influence how individuals and businesses participate in India's financial ecosystem. The study examines the digital payment system in urban Patna, utilizing both primary and secondary data. The data was collected using designed questionnaires distributed through Google Forms and complemented with personal interviews. Secondary sources like e-journals, government reports, magazines, and newspapers were referred to enrich the analysis. It offers an in-depth understanding of how the usage patterns of E-Rupee and UPI payments can potentially bring about a transformative impact. The research outcomes provide valuable insights for policymakers, businesses, and financial institutions, assisting them in navigating the digital landscape in urban Patna.
***Keywords:** Digital Payment, Currency, UPI, E-rupee, Digital India.*

1. Introduction
The Indian government's sweats to contemporize frugality and promote fiscal inclusivity led to the preface of digital payments in India. The launch of Cashless India' in 2016, following the demonetization of high-denotation currency notes, aimed to exclude black plutocrats and encourage digital deals. This led to a significant increase in demand for digital payment results and accelerated the growth of digital frugality. The Unified Payments Interface (UPI) was introduced in 2016, enabling instant fund transfers between bank accounts on a mobile platform. UPI revolutionized the digital payments geography in India due to its simplicity, low freights, and comity across colourful banks. The Public Payments Corporation of India (NPCI) was established in 2006 as a marquee association for digital payment systems in India. To ease easy access to fiscal services, open-source technology was promoted, and platforms like Aadhaar, and the public identification system, were integrated. The government also encouraged private fintech companies alongside traditional public sector banks to foster competition and brisk relinquishment of innovative technologies. As a result of these enterprises, India has endured exponential growth in digital payments, with

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billions of deals each time. The government continues to invest in digital structure and supports the creation of a cashless frugality while maintaining a focus on fiscal addition and access to digital services for all citizens. The Digital Rupee, also known as e-Rupee or e-INR, is a digital interpretation of the Indian Rupee proposed in January 2017. It was launched on December 1, 2022, by the Reserve Bank of India (RBI) as a central bank digital currency (CBDC). The e-Rupee is a digital representation of paper currency that's issued by the RBI and is fairly honoured as a form of payment. Unlike private virtual currencies similar to Bitcoin, the e-Rupee is regulated by the RBI and isn't a commodity or claim on goods. It uses blockchain distributed-tally technology and is identifiable and regulated by the central bank, with the RBI having liability. The perpetuation of the Digital Rupee aims to remove the cost of publishing physical currency, which is borne by the general public, businesses, banks, and RBI. The e-rupee is issued in the same appellations as paper currency and coins and is distributed through interposers similar to banks. The RBI launched two performances of the Digital Rupee, the Digital Rupee for Wholesale (e ₹- W) for fiscal institutions and the Digital Rupee for Retail (e ₹- R) for retail deals. The digital rupee allows for cross-border fiscal deals and can be held by non-residents to grease new deals. Thee-Rupee is anticipated to gain early adequacy and commercialization given the growth of digital deals in India [4-7].

2. Objectives

- To analyze the potential impact of the e-rupee on traditional currency
- To examine the adoption & usage patterns of UPI payment methods

3. Limitation

It is important to note that the conclusions drawn from this study may not apply to rural areas or other urban centres outside of Patna. By solely focusing on urban Patna, the study may introduce an urban bias and overlook the perspectives and experiences of residents in rural areas or smaller towns where attitudes and adoption of digital payments may differ [8]. The data was collected in February 2024 with a sample size of 150 respondents from various sectors, including IT, Banking, Education, self-employed, students, etc.

4. Research Methodology

This research paper adopts a qualitative research methodology to investigate the impact of the e-rupee. The study particularly focuses on the introduction of the Digital Rupee and its adoption and usage in urban Patna, Bihar. The research relies on primary data sources, such as data collected through questionnaires, personal interviews, and official reports from the Reserve Bank of India (RBI), to provide insights into the introduction of the Digital Rupee. Additionally, secondary data sources, including academic literature and news articles to provide a broader context [9, 10].

5. Analysis & Discussion

5.1 Evolution Digital Payment System

Digital payment systems have undergone significant transformations over the years and their usage patterns have changed alongside. The banking industry first implemented computers in the 1960s, and the first credit card was issued in the late 1970s to early 1980s. Since then, technology has led to the introduction of online bill payment and banking in 1994, mobile web payments (WAP) in 1997, and the wave of mobile payment apps we are currently using.[2] With the rise of digital markets, it has become essential for business owners to rely on digital payment systems as the fastest mode of payment. This trend is growing globally, as seen in the increasing user base and modes of use of digital payment apps like Google Pay, Samsung Pay, and Apple Pay. These apps are increasingly being downloaded and preferred by most consumers compared to their mobile banking counterparts.[1] The digital economy is more accessible to the underbanked and unbanked through mobile payment solutions, which are often more cost-effective than traditional payment methods due to lower expenses related to physical payment processing infrastructure [2, 11]. The surge in popularity of digital payment systems can be attributed to their compatibility with mobile phones.

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Additionally, the user-friendly features of most digital payment providers make them an appealing alternative to credit cards [1]. Digital payment systems have made significant progress since their inception, becoming increasingly popular due to their mobile compatibility, user-friendly features, and cost-effectiveness. However, they still face several challenges, including social, technical, economic, awareness, and legal challenges. For instance, most customers in developing countries lack adequate access to a sufficiently developed financial system [12]. Additionally, some digital payment solutions have certain disadvantages that must be taken into account. Therefore, while digital payment systems have evolved to meet the needs of modern consumers, it is crucial to address these challenges to ensure their widespread adoption and continued success [13].

5.2 Introduction to E- rupee

The Reserve Bank of India has issued a digital version of the Indian Rupee called the Digital Rupee or e-INR, which is tokenized and referred to as a central bank digital currency (CBDC) [3]. The Digital Rupee was launched on December 1, 2022, and it utilizes blockchain distributed-ledger technology. Its primary goal is to provide a secure, convenient, and efficient alternative to physical currency. The Digital Rupee is designed to maintain the stability and trust associated with traditional currencies and is pegged at par with the Indian Rupee. There are two primary categories of Digital Rupee: Wholesale Digital Rupee (e₹-W) and Retail Digital Rupee (e₹-R). The Wholesale Digital Rupee is intended for financial institutions for interbank settlements, while the Retail Digital Rupee is aimed at the general public for everyday transactions. As of February 2023, the Digital Rupee had reached approximately 50,000 users and 5,000 merchants. "The Reserve Bank of India (RBI) is planning to broaden the range of its use cases." It has introduced digital tokens that replicate physical currency denominations and can be exchanged on a one-to-one basis. These tokens are provided to commercial banks and authorized financial institutions for distribution. Users can obtain the Digital Rupee by utilizing digital wallets provided by authorized financial entities or other endorsed platforms. Tokens can be withdrawn, and cash can be converted to E-Rupee through a UPI gateway. Moreover, users can also transfer wallet tokens to their linked bank accounts [14-17].

5.3 Impact of E-Rupee on Traditional Currency

The introduction of e-Rupee, India's digital currency, is expected to have a significant impact on the Indian economy. One of the biggest benefits of adopting digital currency is that it is cost-effective and saves a significant amount of money compared to printing, distributing, managing, and storing physical notes. The primary goal of the Reserve Bank of India (RBI) is to reduce dependence on cash and introduce a new currency. This can be achieved through the increased use of e-Rupee. In addition, the digital currency allows for cross-border financial transactions and can be held by non-residents to facilitate new transactions. The payment landscape is expected to shift with the introduction of the e-rupee, and the fintech industry is anticipated to benefit greatly from the quicker disbursements and increased security of online payments. The digital rupee can be stored on any type of device, together with mobile phones, pen drives, and other devices. However, there are certain challenges to it as well, such as the lack of means to recover it in case of misuse [18, 19]. The transition from physical cash to digital currency is expected to have its complexities and will involve issues such as privacy, cyber, monetary, technological, and legal risks and challenges. Despite these challenges, the adoption of a digital Rupee can have a significant positive impact on the Indian economy and generate fiscal revenue in the long run. In Figure 1, Data was collected from 150 respondents living in Urban Patna and aged between 15 to 50 years old. The survey was conducted to determine the level of awareness regarding the concept of e-rupee and UPI. The findings show that 38% of the population is still unaware of the e-rupee concept, while 62% know both UPI and e-rupee and only 2% of the population is unaware of both [20].

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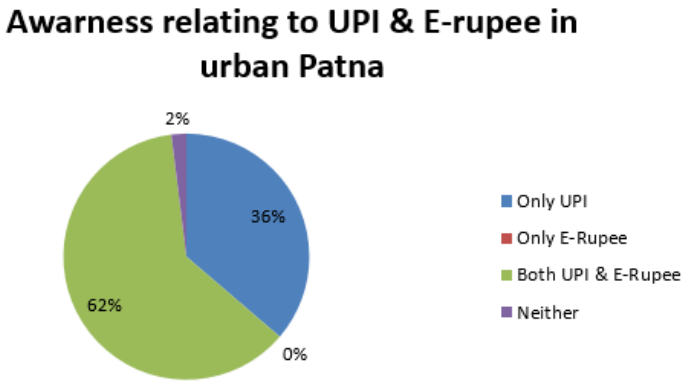

Figure 1 Awareness of UPI & E-rupee in Urban Patna

5.4 Adoption & Usage Patterns of UPI Payment Methods

- **In India**

The e-Rupee is India's digital currency, which is expected to have a significant impact on the Indian economy due to its cost-effectiveness and ease of use compared to physical notes. The Reserve Bank of India (RBI) aims to decrease dependence on cash and introduce a new currency by promoting the use of e-Rupee. The digital currency enables cross-border financial transactions and can be used by non-residents for new transactions. The payment landscape is expected to shift, benefiting fintech industries with quicker disbursements and increased security. The digital Rupee can be stored on various devices, including mobile phones and pen drives. However, there are challenges such as the lack of recovery means for misuse. The transition from physical cash to digital currency will involve privacy, cyber, monetary, technological, and legal risks. A digital Rupee adoption can benefit the Indian economy and generate revenue in the long run [21].

- **In Urban Patna**

According to the findings of the study shown in Figure 2, 20% of people would switch to e-rupee if there was an additional cost for UPI transactions, while 29% would make the switch even if there was no additional cost. On the other hand, 25% of people would not switch to e-rupee even if UPI transactions incurred additional costs, and 23% would not switch even if there were no additional fees. Additionally, 16% of people are uncertain about switching to e-rupee in case of UPI transaction fees, while 48% are unsure if there are no additional fees. Finally, for 39% of the population, the adoption of e-rupee depends on the transaction amount and cost difference [22].

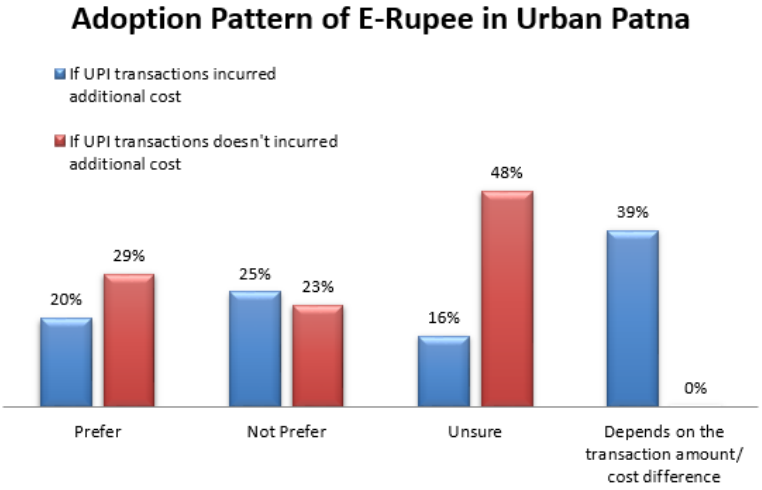

Figure 2 Adoption Pattern of E-rupee

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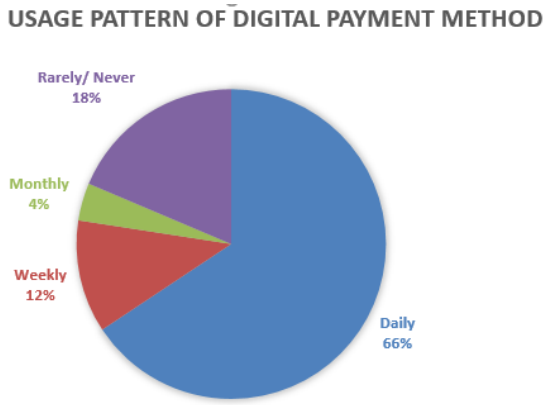

Figure 3 Usage pattern of Digital Payment Method

According to Figure 3, 66% of the population uses digital payment methods on a daily basis, 12% use them on a weekly basis, 4% use them on a monthly basis, and 18% rarely or never use digital payment methods.

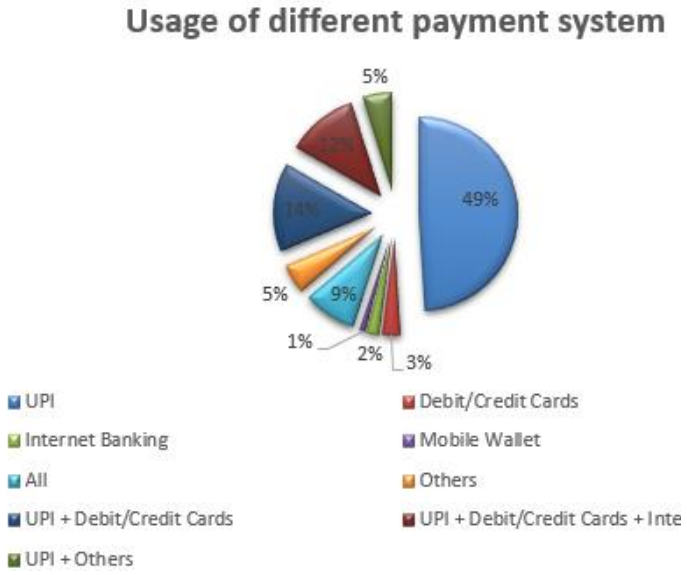

Figure 4 Usage of Different Payment System

According to the findings of the study shown in Figure 4, 49% of the population exclusively uses UPI as their payment method. Additionally, 9% of people use all payment methods including UPI, debit/credit cards, internet banking, and mobile wallets. 5% of the population relies on other payment methods such as cash and bank transfers, while 31% use various combinations of payment methods that include UPI in every combination.

5.5 Factors Affecting the Usage of Digital Payments

Digital payments adoption is influenced by various factors, including convenience, consumer awareness, ease of use, and low cost. Access to digital payment solutions is vital for snowballing adoption rates in both developing and developed countries. However, lack of technology, internet connectivity, and smartphones pose significant obstacles. Security is essential for trust in digital transactions, and a reliable system promotes financial inclusion and economic growth. Infrastructure for digital payments should include consumer education and awareness programs to help people understand how digital payments work, protect themselves from fraud, and handle potential issues. Overall, a reliable digital payment system promotes financial inclusion and contributes to economic growth.

According to the findings presented in Figure 5, the study indicates that individuals between the ages of 15 to 35 tend to prefer digital modes of payment over cash. On the other hand, those aged 35 and above tend to favour cash over digital payment methods, as shown in Figure 6.

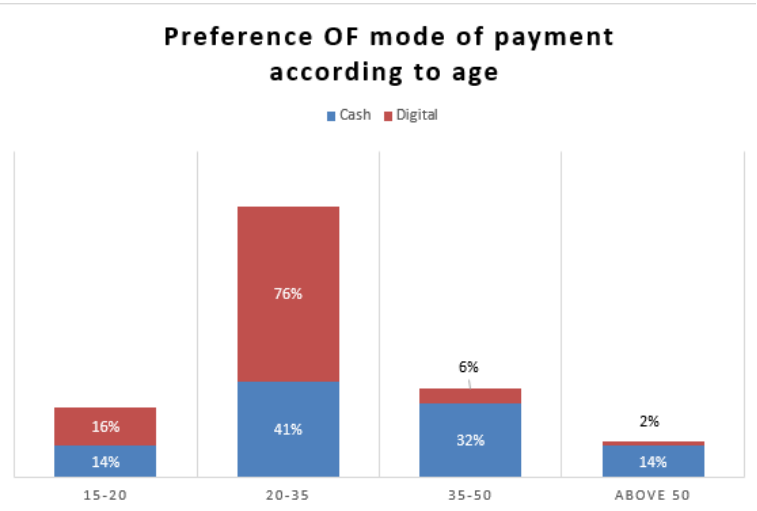

Figure 5 Preference of Mode of Payment according to Age

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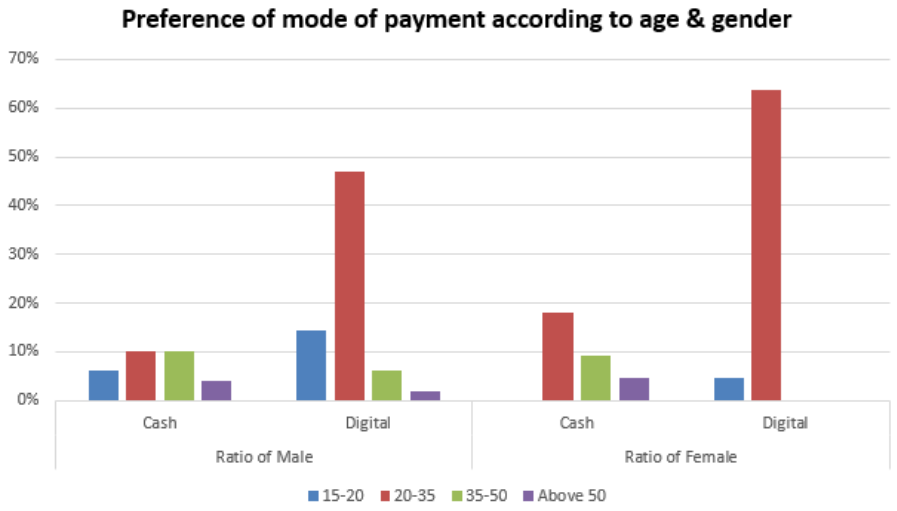

Figure 6 Preference of Mode of Payment according to Age & Gender

5.6 Factors Affecting/ Challenges in the Adoption of the Digital Payment System

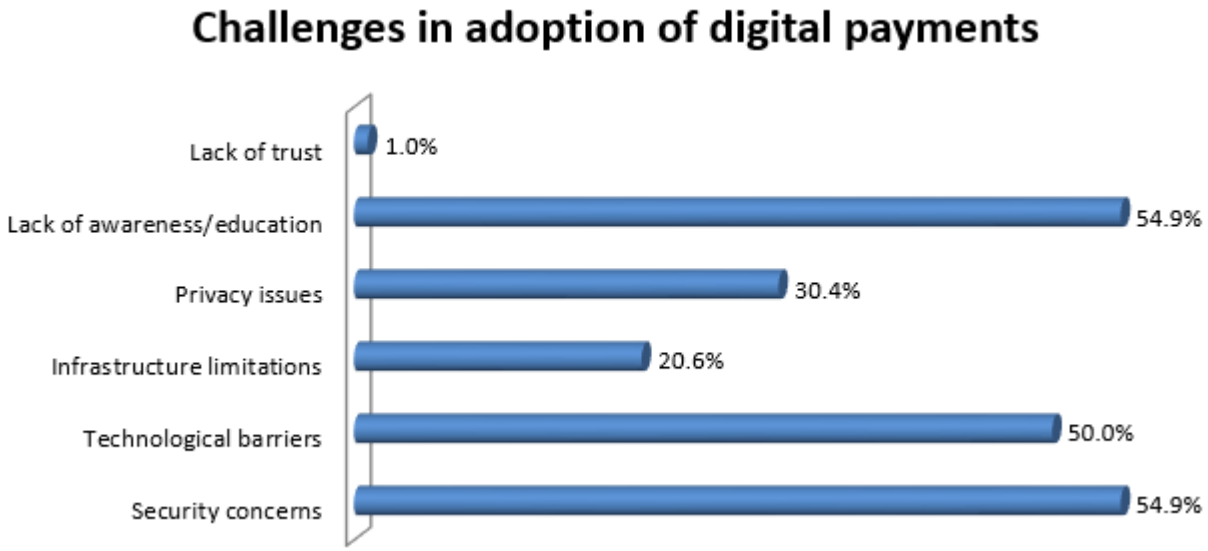

Figure 7 Challenges in Adoption of Digital Payment System

Users may be hesitant to adopt digital payments due to a variety of reasons, as shown in Figure 7. One of the most common concerns is a **lack of trust in the security, reliability, and potential for fraud** associated with digital payment platforms. Additionally, many people may not fully understand the benefits or functionalities of digital payment methods, leading to reluctance to use them over traditional cash-based transactions. **Privacy issues** are also a concern, as users may worry about their personal and financial information being vulnerable to hackers, data breaches, or unauthorized access when making digital payments. This can lead to a lack of confidence in these methods. **Infrastructure limitations** can also hinder the widespread adoption of digital payments. In areas with **poor internet connectivity** or limited access to electronic devices, the infrastructure may not support digital payments, making it difficult for users to access them. **Technological barriers** can also pose a challenge to users, as some may struggle with the complexity of digital payment platforms or lack the necessary

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technological literacy to use them effectively. Finally, **security concerns are also a factor**, as users may be apprehensive about the potential for cyber-attacks, identity theft, or other security breaches associated with digital payment systems. This can lead to a lack of confidence in the safety and reliability of these platforms.

5.7 Future of Currency

The future of currency in India is nearly linked to the emergence of Central Bank Digital Currencies (CBDCs) and the expansion of digital deals, as shown in Figure 8. The Governor of the Reserve Bank of India (RBI) has stated that CBDCs are likely to become the unborn currency of the world. India is presently in the airman phase of its CBDC and aims to achieve one million diurnal deals by the end of 2023. This shift towards digital currency has the implicit to revise fiscal deals both in India and encyclopedically. likewise, the use of digital rupees can grease transnational fiscal deals for non-resident Indians (NRIs). The adding relinquishment of digital payment styles in India is apparent, with digital currency deals surpassing one million per day in December 2024. As India continues to embrace digital finance, it's anticipated that the geography of currency and deals within the country will suffer significant changes.

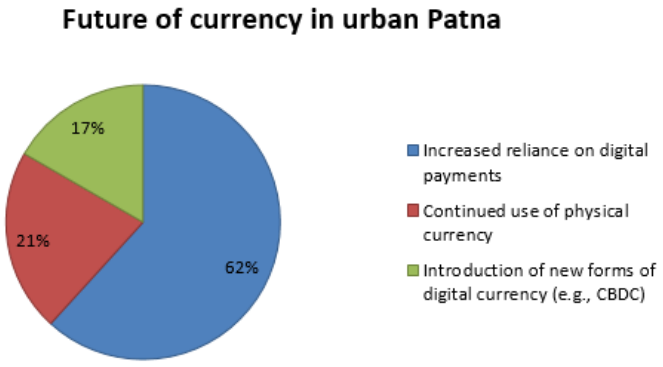

Figure 8 Future of Currency

According to a recent study, 62% of the population believes that there will be a growing dependence on digital payment methods in the coming years. However, 21% of the population still believes that physical currency will remain in use, while 17% believe that new forms of digital currency will be introduced.

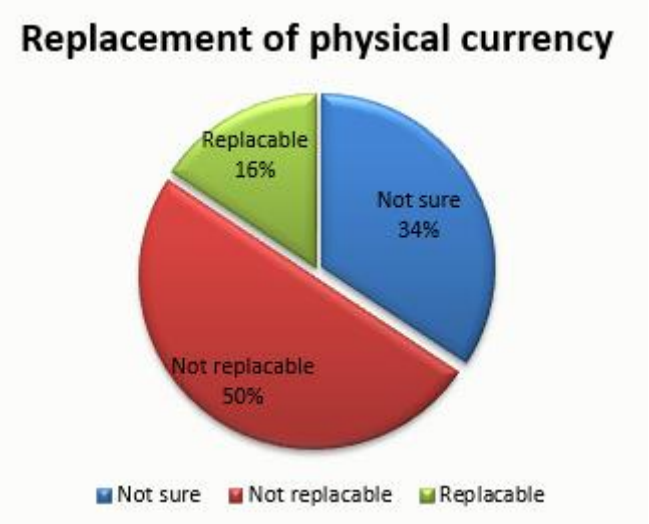

Figure 9 Replacement of Physical Currency

50% of the population believe digital payments cannot entirely replace physical currency, while 16% believe they can, as per Figure 9.

Conclusion

This study explores the role of e-Rupee and digital payment systems in the civic geography of Patna. It sheds light on crucial aspects that affect payment patterns, socio-economic impacts, and the technology behind them. The study used mixed styles of research to provide a nuanced discussion, combining quantitative data from structured questionnaires and qualitative insights from personal interviews. The findings reveal a dynamic digital payment geography in civic Patna, with varying payment patterns across sectors such as IT, banking, education, healthcare, and among students. The study highlights the significance of demographic factors, including age, occupation, and gender balance, in understanding the nuances of digital payment usage [23]. However, the study has limitations. It only focuses on civic Patna, which may not fully represent the diversity of digital payment dynamics in rural areas or other urban centres. Also, the temporal constraints of the data collection period introduce the possibility of overlooking recent developments in the rapidly evolving digital payment landscape. Despite these limitations, the study provides valuable insights into the ongoing conversation on digital payments in India. The mixed-style approach allowed for a

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holistic discussion of trends, perceptions, and challenges. The findings can inform policymakers, financial institutions, and businesses on strategies for fostering a more inclusive and user-friendly digital payment ecosystem.

As we navigate the ever-evolving landscape of digital finance, it's apparent that understanding specific nuances, sector-specific trends, and demographic preferences is crucial for designing effective programs and innovations. Future research should expand the geographical scope and conduct longitudinal studies to capture the dynamic nature of digital payment trends over time. In conclusion, this study provides a snapshot of the digital payment landscape in civic Patna, offering insights into the role of e-Rupee and digital payment systems. It serves as a foundation for further discussion and encourages a continued dialogue on shaping the future of digital finance in India.

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