



INDIA'S DIGITAL PAYMENT TRANSFORMATION: A DECADE OF UPI GROWTH, FINANCIAL INCLUSION AND EMERGING CHALLENGES

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Abstract:

The study researches patterns in digital payment adoption in India by focusing on the influence of factors and constraints in the elapsed time since 8 November 2016, which made India take the first step towards achieving a less-cash economy (RBI, 2016). An analysis is used on an all-secondary source of data that includes RBI, NPCI, PIB, and multiple reports from PwC, Worldline, and IMF. The study analyses the growth curve of UPI, along with other modes of payment between Fiscal Year (FY) 2016-17 and FY 2025-26. The key observations include: from approximately 2 crore transactions in FY 2016-17, UPI transactions peaked at over 24,162 crore transactions in FY 2025-26, the RBI-DPI, which grew over quadrupled from March 2019 to March 2024, and UPI accounts for over four fifths of total retail transaction volume. As against DPI, FI Index pace is much slower, and instances of fraudulent transactions, even though fraud losses reduced in 2022, continue to pose a problem. Also, nearly four fifths of the UPI space remains dominated by two apps. The Indian digital payment ecosystem not only stands tall for real-time transactions globally, yet, for meaningful financial inclusion and robust infrastructure for preventing fraud, and controlling concentration of players, policymakers and the industry are on an incomplete task.

Keywords: Digital Payments, UPI, India, Cashless Economy, Financial Inclusion, RBI Digital Payments Index

1. INTRODUCTION

Digital payments have, in recent years, radically altered the financial landscapes of nations around the world, and in this sphere too India has made an interesting trajectory. The digital payments journey of India is a fascinating tale of an unprecedented jump from being a less-cash economy by the adoption of digital payments under the impact of Indian Government's 2016 demonetisation policy (Reserve Bank of India, 2016). Almost a decade down the line this audacious move seems to have yielded results far beyond the expectations at the time of initiating the policy. The sheer magnitude of growth was best depicted in RBI annual report 2024-25 as, UPI in FY25 witnessed a total of 185.9 billion transactions, increasing by 41.7 percent from the earlier 131.1 billion in FY 2023-24, thereby constitutes for

almost 84 percent of the total volume transacted through India's retail payment systems (Reserve Bank of India, 2025a). Indian parliament received figures showing UPI's yearly volume surpassing 24,162 crores transacted for close to 314 lakh crores in FY 2025-26, a far cry from a mere 2 crore transactions valued for 0.07 lakh crores in FY 2016-17 – it corresponds to a massive increase in volume by almost 12000 times over this duration (Press Information Bureau, 2026).

The digital payment market in India has since progressed in order to become the largest in the world, with IMF acknowledging UPI in June 2025, as world's largest real-time retail payment systems which accounts for almost half of the global real-time transactions (International Monetary Fund, 2025). India's population pyramid, rapidly growing middle class, increasing smartphone penetration and enabling government policy frameworks such as (Digital India, Jan Dhan Yojana, UPI and Bharat Interface for Money-BHIM) have together fostered rapid growth in India's digital payment system (Ministry of Electronics and Information Technology, 2018). However, the future path continues to be punctuated by a few challenges in terms of infra bottlenecks, security, digital literacy divides and urban- rural dichotomies (PwC, 2025). This paper seeks to expand on the original conceptualisation of drivers and obstacles involved in Indian digital payments; it aims to collect and analyse the latest data available on various credible sources such as RBI, NPCI, PIB and reliable industry data to put forward an updated perspective regarding India's current digital payment journey.

2. REVIEW OF LITERATURE

The adoption of digital payments in India has witnessed a paradigm shift in the recent past due to technological, governmental, and consumerist factors. One of the common themes in the works of the authors is the role played by smartphones and the Internet in enabling the use of digital payments. Ghosh (2020) explains that the expansion of mobile networks and the Internet, especially in rural areas, has facilitated the uptake of mobile wallets, UPI, and digital banks. The government's agenda of financial inclusion through Digital India and Jan Dhan Yojana has created the enabling environment for the emergence of smartphones as the new payment gateway; Kumar and Singh (2021) assert that these policies have fostered accessibility, thus enabling millions of previously unbanked Indians to access the digital payment ecosystem for the first time.

Another common theme in the articles is the role played by policy interventions in promoting the adoption of digital payments. Gupta, Choudhury, and Sharma (2019) agree that it was the demonetization agenda that triggered Indians to adopt mobile wallets and cards. At the same time, Bansal and Sharma (2022) argue that the Reserve Bank of India's (RBI) sustained efforts in terms of enhancing the security of transactions using UPI, such as the use of two-factor authentication and the UPI architecture, have promoted consumer trust in the system. Additionally, the low transaction charges associated with UPI have made it the preferred payment method among Indians; according to Bansal and Sharma (2022), they have been a significant factor in the popularity of UPI. As a result, the payment method has displaced cash and traditional modes of payments, such as debit and credit cards, to a significant extent. The final common theme is consumer inclination toward the adoption of digital payments. Iyer and Kumar (2020) explain that consumers' trust in digital payment platforms has improved, given the enhanced security features and the rewards and

cashbacks on offer. Additionally, firms have adopted artificial intelligence and machine learning to make the payment process intuitive, thus promoting their adoption and use.

However, the articles also highlight some of the challenges encountered in the adoption and use of digital payments in India. Sharma and Singh (2021) highlight the low level of digital literacy among Indians as a significant hindrance to the uptake of digital payments. The World Bank (2020) reports that even though Indians in urban centers are technologically savvy, rural Indians are not skilled in the use of smartphones and the Internet. Consequently, the former adopts digital payments at a higher rate than the latter. Additionally, Bansal and Sharma (2022) identify security concerns as a significant challenge hindering the adoption of digital payments in India. The fear of being robbed of financial information, despite the security features embedded in the use of UPI, has discouraged potential Indian consumers from adopting digital payments as a trusted and reliable payment method; interestingly, as revealed by the findings of this study, this fear is not unfounded. Overall, the articles reveal that though government policies, incentives, and enhanced consumer trust have promoted the adoption of digital payments in India, several factors, such as digital illiteracy, infrastructural shortcomings, and security concerns, have hindered Indians from adopting the trends at a higher rate. In fact, the findings of this study support and expand on the findings of the authors in order to reveal the current state of digital payments in India.

3. STATEMENT OF THE PROBLEM AND RESEARCH GAP

The adoption of digital payments in India has had a rapid rise, but most of the existing academic literature on the subject either predates the post-pandemic surge in UPI usage or uses data from the early years of demonetisation. Government initiatives such as Digital India have broadened access to digital platforms, but there are still significant segments of the population that are hindered by their lack of digital literacy, patchy internet infrastructure, a sense of insecurity and socio-economic constraints. What is less well covered in existing studies on this subject is a cohesive, up-to-date trend analysis which collates the latest RBI, NPCI and industry data to demonstrate just how far the adoption has proceeded, where the residual gaps lie and whether the rise in transaction numbers has been accompanied by an equal rise in genuine financial inclusion and transaction security. This study attempts to address this gap by using more recent secondary data (until FY 2025–26) to re-examine the trends, drivers and challenges in the adoption of digital payments in India with a specific focus on whether the headline growth in payments is matched by that in inclusion and security indicators.

4. OBJECTIVES OF THE STUDY

- To analyse the trend of digital payment adoption in India, with emphasis on UPI, during the FY 2016–17 to FY 2025–26 period.
- To study the trends in RBI Digital Payments Index (RBI-DPI) and Financial Inclusion Index (FI-Index) as an indicator of the deep of digital payment adoption.
- To discover the key drivers of the growth of digital payments in India as per secondary sources.
- To evaluate the major constraints, frauds, market concentration and the rural-urban divide that continue to hinder complete adoption.

- To provide policy insights for the regulators, financial institutions and payment service providers.

5. RESEARCH METHODOLOGY

This study utilizes a descriptive-analytical research design, which is predominantly based on secondary data. Given that this study's objective is to determine and describe trends that have occurred over a specific period (a decade), a secondary trend analysis (rather than a cross-sectional analysis) was employed. Furthermore, this study opted for a secondary data source over a primary survey, as the latter would allow capturing only the current state of affairs (i.e., a snapshot), whereas the research question implied the need to identify trends. This study's design is similar to the published trend-analysis literature on the development of India's digital payment ecosystem, which also relied on secondary data provided by the RBI and NPCI respectively.

5.1 Sources of Data

The data used in the study is secondary in nature and has been sourced from the official and industry publications such as, but not limited to, the Reserve Bank of India's (RBI) Annual Reports and Digital Payments Index bulletins, National Payments Corporation of India (NPCI)'s monthly and annual reports pertaining to UPI, Government of India replies placed before the Parliament and disseminated through the Press Information Bureau, PwC Indian Payments Handbook 2025-2030, Worldline India Digital Payments Report, and International Monetary Fund's 2025 report on retail digital payments. The figures related to the prior part of the study period (FY 2016-17 to FY 2019-20) have been extrapolated from the RBI and NPCI's historical releases as cited in the subsequent official publications.

5.2 Period of Study

The study period runs from FY 2016–17, the year of demonetisation and launch of UPI, to FY 2025–26, the most recent financial year for which provisional NPCI data is available as of the date of this research.

5.3 Method of Analysis

The information has been classified on the basis of timelines and analyzed using trend and percentage-growth analysis. The analysis covers the compound annual growth of the transaction volume and value, index growth (RBI-DPI and FI-Index), and the shift in the market share on a mode and platform-wise basis to understand the dynamics and challenges. The year-on-year (YoY) growth rates as reported by RBI, NPCI and the Ministry of Finance have been utilized, wherever applicable, to provide a comparable view of trends.

5.4 Limitations

Since the study uses secondary aggregate data, it cannot explain individual behavior, for instance, why one would choose to pay or not pay by a particular method, as a primary survey would have been able to do. National aggregates may mask variation that may exist at the state level and across different socio-economic groups. A follow-up study that would expand on the current trend analysis using secondary data by actually surveying urban, semi-urban and rural residents as proposed in this study's introduction would be helpful in actually determining the factors influencing the choice of payment method at an individual level.

6. RESULTS AND FINDINGS

6.1 Growth in UPI Transaction Volume and Value

The table illustrates the rapid increase in UPI transaction volume within India during the present year. In 2016-17 the UPI transaction volume was only 2 crore. It increased to 4595.61 crore in 2021-22 illustrating the growth of the level of UPI transactions began. Level of UPI transactions increased yet again in FY 2022-23 exceeding 8,371.44 crore and rising by 82.2% as compared to the previous year. The level proceeded to increase reaching 13,112.95 crore in FY 2023-24 rising by 56.6% relative to the previous year and 18,586.60 crore in FY 2024-25 rising by 41.7% relative to the previous year. The data for FY 2025-2026 illustrate further growth of the level of UPI transactions up to 24,162.00 crore implying a 30% growth.

The increase in the worth of transactions has corresponded well with the UPI trends. The value of UPI transactions rose from Rs. 0.07 lakh crore in FY 2016-17 to Rs. 84.16 lakh crore in FY 2021-22 and would further increase to Rs. 139.15 lakh crore in FY 2022-23, Rs. 199.95 lakh crore in FY 2023-24, and Rs. 260.56 lakh crore in FY 2024-25. With this momentum, it should touch a figure of Rs. 314 lakh crore by FY 2025-26. However, inspite decrease in YoY growth from 82.2% to 30.0%, increase in the volume and value of transactions suggests that UPI has become an important participant in the digital payments system of the Indian economy. Hence, we can conclude that findings point towards positive digital payment scenario in the country.

Table-1: UPI Transaction Volume and Value, FY 2016–17 to FY 2025–26

Financial Year	Volume (crore transactions)	Value (₹ lakh crore)	YoY Volume Growth
2016–17	2.0	0.07	—
2021–22	4,595.61	84.16	—
2022–23	8,371.44	139.15	82.2%
2023–24	13,112.95	199.95	56.6%
2024–25	18,586.60	260.56	41.7%
2025–26 (provisional)	24,162.00	314.00	30.0%

Source: Compiled from NPCI data, Ministry of Finance replies in the Lok Sabha, and Press Information Bureau (2026)

Two aspects of this trend are worth noting. First, while growth remains robust, it has tempered to more manageable levels compared to triple-digit and high-double-digit levels in the early years: still healthy, but lower at 30 per cent in FY 2025–26, and consistent with a maturing if not yet saturated market. Second, average ticket size has been dropping steadily—starting from over ₹1,600 in early 2023 to the current level of close to ₹1,293. So while overall transaction

value growth has been strong, it is being driven less by the large-value transactions and more by the increase in the number of small-value transactions.

6.2 UPI's Share of Retail Payments and Merchant-Led Growth

The contribution of UPI to the overall retail payments ecosystem of India increased from 79.4 percent in FY 2023-24 to 83.4-84 percent in FY 2024-25 (Reserve Bank of India, 2025a). The P2M transactions have overtaken P2P growth on the UPI platform. The former saw a rise of fifty percent compared to the latter, representing approximately thirty percent growth between the second half of 2023 and the second half of 2024 (Worldline, 2025). This implies that UPI users are increasingly using the digital payment system to make payments to merchants as against persons-to-person. The observation aligns with the rapid proliferation of QR codes that jumped ninety-one and a half percent to reach sixty-five crore eight crores in FY 2024-25.

6.3 Movement of the RBI Digital Payments Index

The RBI Digital Payments Index presented in the table below is a measure of the digital payment ecosystem in India. The base year for the index is March 2018 and its value is 100. Evidence points to the index value going from 100 during March 2018-March 2019 to 153.47 by the end of this period. The index further rose to the value of 349.30 by March 2022 which indicates that digital payments, digital transactions and infrastructure development in India went up rapidly. The value of the index will be equal to 445.5 by March 2024 indicating that its value has increased more than four times. Thus, it can be concluded that significant progress has been achieved by India in the field of digital payments.

Table-2: RBI Digital Payments Index Trend

Reference Date	RBI-DPI Value
March 2018 (base)	100.00
March 2019	153.47
March 2022	349.30
March 2024	445.50

Source: Reserve Bank of India, compiled via Medianama (2025) and PWOlyIAS (2025)

6.4 Financial Inclusion: Progress and the Emerging Gap

Table-3 demonstrates the evolution of the Financial Inclusion Index (FI) as prepared by the Reserve Bank of India (RBI) over the period from March 2021 to March 2025. As per the information stated in the table it can be concluded that financial inclusion in the country has progressed step by step. FI has increased from 53.9 in March 2021 to 56.4 in March 2022, with 2.5 points of rise. However, there was a leap in FI index figure known from March 2024 when it achieved the level of 64.2 which proves that there was a great expansion of the granted access to and usage of financial services. Ultimately, by March 2025 this index reached the level of 67.0 thus growing by 13.1 points compared to the

level of March 2021. It means that financial inclusion is continuously on the rise in India according to the Financial Inclusion Index of the RBI. Thus, it can be indicated that there are significant improvement results achieved while working on making financial services accessible to the population in India.

Table-3: RBI Financial Inclusion Index Trend

Reference Date	FI-Index Value
March 2021	53.9
March 2022	56.4
March 2024	64.2
March 2025	67.0

Source: Reserve Bank of India / Press Information Bureau (2025)

6.5 Security and Fraud Trends

The rise in the volume of transactions does not mean there is no increase in the number of fraudulent activities. The Ministry of Finance has released data that shows losses related to UP-related fraud to be ₹1,087 crore in FY 2023-24, which fell to ₹485 crore in 2024-25, while at the same time the volume of transactions increased significantly. This indicates that several fraud prevention measures including device binding, 2FA and AI/ML-based fraud monitoring have been successful (Press Information Bureau, 2025). However, a large number of fraud cases (over 6.32 lakh) were recorded in the first few months of FY 2024-25, indicating that fraud is still a major problem, the number of lost money is reducing but fraud still occurs at high rates. This indicates that independent research conducted on the issue of digital frauds in India provides similar results.

6.6 Market Concentration Among UPI Applications

The table-5 below shows the change in the competitive landscape of India's UPI ecosystem as of May 2026. Although PhonePe and Google Pay continue to lead by volume, their combined market share has dropped to about 79 per cent - the lowest since the NPCI started publishing application-wise data. This indicates increased competitiveness in the UPI fray as users are open to adopting alternate UPI apps like BHIM, Navi, and super.money. The 30 per cent market-share cap proposed by the government for any single UPI application is a step towards healthy competition and reduces the risks inherent in the current skewed market-volatility. The UPI adoption issue now has dimensions beyond the demand-side barriers (digital literacy, awareness, and infrastructure). Thus, the current concentrated market needs a push towards diversity and competition to build system-level resilience.

Table-4: Competitive Structure of the UPI Market in India (May 2026)

Particulars	Status / Value	Interpretation
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Leading UPI Applications	PhonePe and Google Pay	The two applications continue to dominate the Indian UPI ecosystem.
Combined Market Share	Approximately 79%	Their combined market share fell below 80% for the first time since NPCI began publishing app-wise data.
Emerging Competitors	BHIM, Navi and super.money	These applications have gained market share, indicating increasing competition and gradual diversification of the UPI market.
NPCI Market-Share Cap	Maximum 30% for a single UPI application	The policy aims to prevent excessive concentration and promote a more competitive digital payments ecosystem.
Implementation Timeline	Expected approximately six months after May 2026	The implementation follows a two-year deferral of the market-share cap.
Major Structural Concern	High concentration among a few private applications	Excessive dependence on a small number of applications may create systemic risks for India's digital payment infrastructure.
Overall Market Trend	Gradual reduction in market concentration	The growth of smaller competitors suggests an emerging shift towards greater competition and diversification.

Source: CoinLaw (2026); NPCI market-share regulations.

7. Discussion

The results of the study both confirm and expand upon the drivers and challenges identified in the literature. In line with Ghosh (2020) and Kumar and Singh (2021), the results confirm that increased connectivity and government transactions inclusion initiatives have contributed to increased transaction volumes and values in absolute terms. In line with Gupta, Choudhury and Sharma (2019), while demonetisation appears as a peak in the series, it is subsequently followed by a consistent increase in both indicators. In line with Bansal and Sharma (2022) and Iyer and Kumar (2020), the results further suggest that improved security features contribute to the continued growth of the UPI.

However, the results also highlight nuances that go beyond the qualitative review. The different dynamics between the DPI and FI-Index suggest that beyond the sheer volume of transactions and connectivity, the government and the private sector should focus more on the quality of financial inclusion, as suggested by RBI's NSFI 2025–30 strategy. In particular, the results suggest that a significant body of accounts remains largely inactive and that there are disparities in the “last mile” of financial inclusion that require resolution.

While Sharma and Singh (2021) and the World Bank (2020) note the limitations of rural infrastructure, the results suggest that a similar issue is emerging at the level of the platform itself. With the UPI set to become the central element of the country's economic infrastructure, the entry of new players is being actively restricted by NPCI, which has imposed a 30 per cent market-share limit (NPCI, 2021). This appears to be a reaction to the concentration of risk

discussed by Sharma and Singh (2021) and the World Bank (2020), which was not explicitly acknowledged in the literature. Specifically, the results suggest that while large-scale fraudulent transactions are rare (and effectively counteracted by UPI security measures), many consumers are still negatively impacted by smaller-scale fraudulent activities, potentially undermining trust in the system.

8. Summary of Findings

The data reflects that India's digital payment system has registered unprecedented exponential growth over the period of study, UPI being the major driver. UPI's share in India's digital payment system has grown manifold over time leading to a steep increase in the value of transaction, which rose from around 2 crore transactions in FY 2016-17 to over 24,162 crore transactions in FY 2025-26. This phenomenal growth is indeed a testimony to India's mobile-led digital payment ecosystem, which has emerged as one of the key pillars of India's retail payment ecosystem. India's UPI accounts for 84 per cent retail payment volume. It is therefore evident that UPI has emerged as the preferred mode of payment in India.

India's digital payment system, as captured by RBI-DPI has also registered an extraordinary growth trajectory recording over four times growth in the past five years (March 2019-March 2024), rising from 38.5 to 160.8 during the period. This clearly reflects that besides technological innovations, India's payment infrastructure, payment adoption, performance, and enabling environment has also witnessed a significant improvement.

The analysis also reflects the need to take a holistic view of the findings, as revealed by the low growth rate of FI-Index as compared to that of DPI. In contrast to the spectacular growth of DPI, the growth rate of FI-Index has been rather low highlighting the fact that while the digital payment system in India is burgeoning by the day, its ability to contribute towards financial inclusion has been rather limited. In other words, as India races towards building a P2P digital economy, its ability to foster financial inclusion has been constrained. In absolute terms, India still has a long way to go before it can claim to have achieved a certain level of financial inclusion as far as the vulnerable and the rural population are concerned. There is a huge digital gender gap that needs to be addressed. Not everyone has access to smartphones and digital literacy is still confined to a small section of society. Connectivity and digital literacy are prerequisites for interacting with India's digital-first economy. Therefore it is quite evident that India's financial inclusion needs alternate interventions besides plugging into the digital payment ecosystem.

As far as India's digital payment security is concerned, the data reveal that India's digital payment security has not registered appreciable improvement. While fraud losses may have decreased, the number of fraud cases still remains a matter of concern. As per the findings, India's digital payment security landscape is a mixed bag registering differential levels of security across different payment modes and instruments. However, India's digital payment security framework has registered phenomenal success in terms of reducing fraud losses mainly on account of timely response to frauds, consumer awareness about frauds and appropriate consumer behaviour, use of advanced technology-enabled fraud detection, layered authentication and regulatory interventions like real-time monitoring etc. Given that UPI transactions have crossed over 10,000 crore per month, the menace of fraud and misuse is bound to

happen and therefore it is essential that consumer confidence is maintained through measures such as consumer awareness, grievance redressal mechanisms and monitoring of transactions in real-time through the use of technology for consumer protection. This requires a sustained approach on the part of the Reserve Bank and other regulator bodies, besides the industry and consumers.

UPI's growth has been largely on account of Person to Merchant (P2M) transactions with QR codes playing a significant role, with the contribution of QR code-based transactions rising exponentially over the years. Even as Person to Person (P2P) transactions continue to dominate UPI payments, it is for the first time that P2M transactions are witnessing a parallel growth trajectory which is bound to have spill over effects on M2P (Merchant to Person) transactions. QR code has democratised payments and ushered in a new era of digital transactions wherein even small-time merchants could embrace digital payments and be a part of India's digital-first economy. QR code-based payment instruments have made it possible for even minimally smartphone-literate individuals to make digital payments. The findings suggest that UPI is poised to emerge as the preferred mode of making business payments.

While UPI has witnessed spectacular growth, it has also attracted a set of challenges, one of which pertains to the traffic concentration on UPI. A large proportion of UPI traffic is routed through two private UPI Apps. At a time when the Government has been advocating for a level-playing field for promoting competition in the digital payments space, the traffic concentrations on two UPI Apps raise questions about such large concentrations and whether this is in the best public interest. NPCI has taken a corrective step by capping traffic on these two UPI Apps so as to promote competition. The findings suggest that India's digital payments landscape has witnessed unprecedented growth facilitated through cutting-edge technology-enabled UPI platforms. It is therefore essential that competition is fostered in the digital payments space through such measures besides addressing the issues of financial inclusion and consumer protection that India's digital payments ecosystem faces.

9. Conclusion

India's digital payments ecosystem, underpinned by UPI, has achieved levels of adoption comparable to some of the world's most advanced real-time payment systems. The number of transactions processed has grown by nearly 12,000x since UPI launched and the RBI-DPI finds that this reflects genuine improvement in underlying digital payments infrastructure, as opposed to just growth in transaction numbers. However, the study also finds that financial inclusion has not kept up with the breadth of transaction growth, fraud remains a prevalent concern and concentration risk among a small number of applications poses a key issue for regulators to address.

Based on these findings, the report recommends a few key steps. First, financial inclusion programmes need to move from a focus on simply opening accounts and enabling access to an emphasis on active usage, including through addressing dormant accounts and improving Business Correspondent services in rural and remote areas. Second, fraud-prevention efforts should move beyond aggregate losses to focus on the large number of smaller fraud incidents occurring, through continued investment in AI/ML-based monitoring, increased consumer awareness and faster grievance-resolution using the National Cybercrime Reporting Portal. Third, NPCI's market-share cap should be utilised and closely monitored to enable a richer and more diverse UPI application landscape without undermining the

convenience driving adoption levels. Fourth, investment in rural digital infrastructure and digital literacy is vital to achieve the RBI's goal of a billion unique UPI users by 2029. While headline figures for UPI transactions will remain impressive, the focus for driving wider economic growth should be on addressing the inclusion, security and concentration issues identified by this study.

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