Digital Payment Gateways Creates Digital Economies

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Abstract

Digital payment gateways have emerged as critical infrastructure in the transformation of traditional economies into digital economies. By enabling secure, efficient, and scalable transactions, payment gateways facilitate e-commerce growth, financial inclusion, and innovation in financial ecosystems. This paper examines the role of digital payment gateways in shaping digital economies, assesses their socio-economic impacts, analyses related challenges, and offers policy recommendations to support sustainable digital economic growth. Digital payment gateways are core infrastructure that enable seamless electronic transactions in online and offline marketplaces. As economies rapidly digitize, the ability to conduct secure, efficient, and scalable payments has become central to economic growth, financial inclusion, and digital innovation. This paper examines how digital payment gateways contribute to the creation and expansion of digital economies using a mixed-methods approach, synthesizing theoretical foundations and empirical insights with "special refence to retail sector growth in accepting digital payment gateways after the demonetization in India". Findings reveal that payment gateways enhance economic participation, reduce transaction costs, promote entrepreneurship, and support digital ecosystems for retail sector. Policy implications and challenges are also discussed.

Keywords: Digital payment gateways, Digital economy, financial inclusion, E-commerce, Economic growth

Introduction

The rapid digitalization of financial systems has shifted economic interactions from physical cash to electronic transactions. Central to this shift are **digital payment gateways**—software interfaces that connect merchants, buyers, and financial networks to authorize and process online payments. As economies digitize, payment gateways represent more than transactional tools; they are transformative enablers of economic participation, inclusion, and innovation. The advent of digital payment gateways has transformed economic interactions by enabling electronic monetary transactions across platforms, borders, and services. Payment gateways serve as intermediaries

that transmit sensitive payment information securely between consumers, merchants, and financial institutions. *In a conversation one of the prominent academicians **Prof. Deepak Babu**, Head and Dean, Faculty of Commerce, Siddharth University Kapilvastu, Siddharth Nagar, U.P. said that "now after a long-time new revolution is evolved and that revolution he named as **D-Revolution** which is first time introduced in economy".* In digital economies—where economic activity is primarily driven by digital technologies and online systems—these gateways are indispensable (Zhao et al., 2020).

Digital economies depend on infrastructures that support trust, interoperability, and instantaneous value exchange (Mougayar, 2016). Payment gateways are more than transactional tools; they enable new business models, facilitate financial inclusion, and enhance the efficiency of market mechanisms. This study investigates the mechanisms through which payment gateways facilitate digital economic growth and identifies associated and also explores the mechanisms through which digital payment gateways contribute to building digital economies, focusing on retail sector only.

Digital Payment Gateways:

A **digital payment gateway** is an online service that securely transmits payment data from a consumer to a merchant's bank and back, facilitating the authorization, settlement, and confirmation of digital payments. Examples include **Stripe**, **PayPal**, **Razorpay**, and **Square**. Digital payment gateways allow merchants and service providers to accept online payments through card networks, mobile wallets, bank transfers, and other electronic modes. These systems use encryption and secure protocols to authorize and settle transactions with minimal friction (Kshetri, 2017).

Major Global Players

- **PayPal:** A household name for ease of use, security, and vast international reach (200+ countries).
- **Stripe:** Known for developer-friendly APIs, strong customization, and subscription management.
- **Square:** Popular for integrating online and in-person (POS) payments, especially for small businesses.
- **Adyen:** Offers a unified global platform with advanced fraud prevention for large businesses.
- **Amazon Pay:** Leverages Amazon's user base for quick checkouts with saved details.

Key Payment Methods and Technologies Used

- **Credit/Debit Cards:** Still foundational, processed via gateways like Visa, Mastercard, Amex.

- **Digital Wallets:** Apple Pay, Google Pay, Alipay, Paytm, WeChat Pay – dominant in Asia and growing globally.
- **Bank Transfers (Real-Time Payments):** UPI (India), SEPA (Europe), ACH (US), PIX (Brazil) offer low-cost, instant settlement.
- **Mobile Money:** M-PESA (Kenya), GCash (Philippines), EcoCash (Zimbabwe) are crucial in emerging markets.
- **Buy Now, Pay Later (BNPL):** Klarna, Afterpay, ZestMoney provide installment options.
- **QR Codes:** Widely used for quick payments via mobile apps.

Regional Favourites

- **Asia:** Alipay, WeChat Pay, UnionPay.
- **Europe:** Bancontact (Belgium), BLIK (Poland), Trustly (Sweden).
- **Latin America:** Mercado Pago.
- **Africa:** M-PESA, EcoCash.

The Digital Economy Defined

The **digital economy** encompasses economic activities driven by digital technologies, platforms, and data flows—including e-commerce, online services, digital finance, and ICT-enabled commerce. It also refers to an economy that leverages digital information, communication technologies (ICT), and online platforms to enable economic processes. Digital economies are marked by increased automation, data flows, and networked interactions among consumers and enterprises (Bukht & Heeks, 2018). "The digital era demands continuous agility, not one-time projects."

*"At least 40% of all businesses will die in the next ten years… if they don't figure out how to change their entire company to accommodate new technologies." — **John Chambers**, Former CEO, Cisco*

Literature Review

Recent studies confirm that digital payment adoption boosts economic growth by enhancing transaction efficiency, expanding market access, and encouraging entrepreneurship (World Bank, 2021). Financial inclusion research highlights that digital payments extend access to financial services for previously underserved populations, especially in emerging markets (Demirgüç-Kunt et al., 2018).

However, literature also points to risks such as cybersecurity threats and regulatory challenges that can impede digital payment adoption (Arner, Barberis & Buckley, 2020).

It has been observed that countries as developed as Japan, Korea, and Sweden to the developing ones like China, Nigeria and the Bahamas are experimenting with their own digital currencies famously known as Sand Dollar, eNaira and e-CYN. Most of the countries are moving towards CBDC because of its convenience, cost-efficiency and a promising characteristic of financial inclusivity and sovereignty. Most recently, India has also become a part of this transformation, as it formally announced its own CBDC.

Pavoor, A. S., & Ajithkumar, N. (2022) "in the paper titled, Digital rupee-A rival for cryptos? Has mentioned, 'Central Bank Digital Currencies' are virtual money that are being considered for legal tender status and are issued by national central banks. Since the Reserve Bank of India has publicly stated similar targets, it should soon be possible to access a CBDC in India. It is hard to accurately measure the impact unless the advantages and disadvantages of adopting CBDC are considered. The financial system that is in place now is monitoring CBDC. The global use of digital currencies and blockchain technology is accelerating due in part to the expansion of CBDC, which has the backing of national central banks. This study combined the international literature. There have been several private cryptocurrency comparisons made with the Indian digital rupee."

Kumar, A. (2021) "The steady transition from paper money to electronic money has had a tremendous impact on the advancement of contemporary payment systems and is essential to the world economy. The government backs CBDC, a digital currency that is issued by central banks. Weaknesses in the current monetary system have come to light as a result of surge in digital transactions and overall banking innovation. Since the introduction of cryptocurrencies like Bitcoin in 2008, the legitimacy of central banks has been called into doubt. Furthermore, central bank supervision is credited by global monetary authorities by instilling public's faith in the banking sector. As per the BIS study, the percentage of central banks aiming to establish a CBDC climbed from 60% in 2017 to 80% in 2019. This paper has focused on the possible effects of CBDC on the economy of India."

Jani, S. (2018) "The rapid advancement of information and communication technology has led to increased versatility and efficiency in many aspects of our daily lives. The growth of internet users has given rise to new economic phenomena, such as cryptocurrencies, which are used for various monetary transactions like buying, selling, and trading. Intangible yet valuable assets, cryptocurrencies are employed in peer-to-peer networks, virtual worlds, online social networks, and social games. Virtual currencies are now commonly accepted on a large number of websites. This study looks at what consumers anticipate from digital money in the future, given the current state of unregulated cryptocurrency use. It investigates the level of systemic trust held by Bitcoin 10 users. The objective of the article is to objectively evaluate the rate of bitcoin acceptance. The research looks into how 21 other countries' legislative and regulatory agencies have responded to cryptocurrencies after studying its impact on the Indian Law."

Farooqui, S. A. (2022) "Since cryptocurrencies emerged in 2009, the market for different forms of digital currency has significantly grown. This article examines and assesses the key factors

influencing this growth. Claims of a speculative bubble have been raised in response to the skyrocketing prices of digital currencies, mostly due to inadequate regulatory monitoring, the possibility of illicit activity in an underdeveloped and opaque trading conditions, and the damage to the infrastructure brought about by the rise in digital malfeasance. All of these things work against the possibility that currencies based on technology will be accepted as trustworthy financial instruments. New digital currencies have advanced more quickly thanks to central banks, notwithstanding their limited capacity for concentration. More and more economic research is dedicated to studying the impact of CBDCs' 'saves for all' feature on consumer spending. Understanding the effects of CBDCs on competitiveness, payment system integrity, and security necessitates considering them within the broader information economy and information dominance. In our analysis of the increasing CBDC literature, we concentrate on the impact of CBDCs on the broader economy, including the monetary stability and financial infrastructure. Additionally, we examine the impact on microeconomic factors such as operational framework, ideation and security."

Kshetri, N. (2023) "The feasibility of utilizing the digital yuan to expand access to banking and other financial services was studied. The digital yuan was compared with some of its strongest competitors. Researchers also investigated how the digital yuan could be leveraged by the "Chinese Communist Party" for economic and population surveillance. The study delves deeply into the potential for international use of the digital yuan. This study provides a fresh outlook on the digital yuan as it assists in setting up global standards for digital currencies issued by nations."

Chen, S., Goel, T., Qiu, H., & Shim, I. (2022) "According to this paper, central banks have been involved in projects related to central bank digital currencies (CBDCs), or digital money denominated in the national unit of account and a central bank liability, more and more in developed and developing economies in recent years (BIS, 2021). Though each nation's level of participation varies, all 26 central banks that are present at this meeting (refer to Annex Table A1) are actively involved in CBDC research, with a number of them having stepped to the pilot (e.g.: Hong Kong Special Administrative Region (SAR), Saudi Arabia, Thailand, and The United Arab Emirates (UAE)). Some countries (like China's e-CNY) are almost ready to go live, while others (like Poland and Singapore) don't think a CBDC is immediately necessary. The first part of this paper discusses the primary drivers of CBDC participation for EME central banks, with a particular emphasis on the justification for retail CBDCs. The primary concerns of central banks with relation to retail CBDCs are covered in a second part, along with data privacy and data governance. The 11 final section talks about retail CBDC design options that balance potential issues with promoting central bank goals. The consequences of using CBDCs across borders and associated design issues are covered in the fourth part. High-level conclusions are drawn from the paper's conclusion. The entire document is based on background information and survey results from the central banks that are attending the conference."

Sapovadia, V. (2018) "Even with our world becoming more connected, over a third of the population still lacks access to formal financial services. Research increasingly indicates that

providing easy access to dependable financial services benefits everyone, including consumers and businesses. Many factors contribute to economic and social marginalization. Shortcomings in the traditional banking system often result in people being unable to afford essentials such as food, housing, and medical care. Growing adoption of digital money and mobile banking provide an opportunity for greater financial inclusion in marginalized populations. Studies indicate that utilizing a conventional financial system for small-value transactions is prohibitively expensive. Utilizing mobile apps and digital currency can simplify and make small transactions more affordable and accessible. The use of mobile technology can lead to quicker, easier, and more precise processing of large financial transactions. Some developing countries are employing mobile phone networks to address financial exclusion. This section delves into how mobile technology is leveraged to offer financial services to the unbanked, exploring its benefits, drawbacks, challenges, solutions, and global implementation."

Objectives of the study

After rigorous literature review we conclude that all the researchers were talked about the CBDC and the impact of digital payment gateways into the growth of the nation's GDP, E-Commerce, banking sector but not specific in retail sector. Therefore, the research gap we find is that to study the impact of digitalization of Indian currency especially in retail sector. The major objective of the study is:

- Are digital payment gateways having any impact on sales of retail sector?
- To study the behavior of retailors regarding receipts and payments of business transactions?
- Is digital payment gateways create transparency in transactions or not?

Research hypothesis

To obtain the answers of the research objectives we have to create respective hypothesis. The research hypothesizes are:

$H0_1$: Digital payment gateway has no impact on sales of retail sector.

$H0_2$: Retailors having negative behavior towards digital payment gateways for business transactions

$H0_3$: Digital payment gateways do not create transparency in business transactions.

Research methodology

The research paper is based on the exploratory research design for both primary and secondary data. Primary data is collected from small retailors of 16 states of India total 145 responses are

collected. Secondary data is collected from the RBI, world bank and different websites from the year 2012 to 2022. MS Excel and SPSS software are used for testing the hypothesizes.

Finally, this paper employs a **mixed-methods approach**, combining qualitative synthesis of existing literature with secondary data analysis from international reports and case studies.

- **Qualitative Analysis**: Systematic review of peer-reviewed literature from Scopus and Web of Science on digital payments and economic indicators.
- **Secondary Data**: Use of datasets and figures from global financial inclusion reports, central bank statistics, and payment market analyses.

This approach enables triangulation between theoretical frameworks and measurable socio-economic outcomes.

Testing of Hypothesis

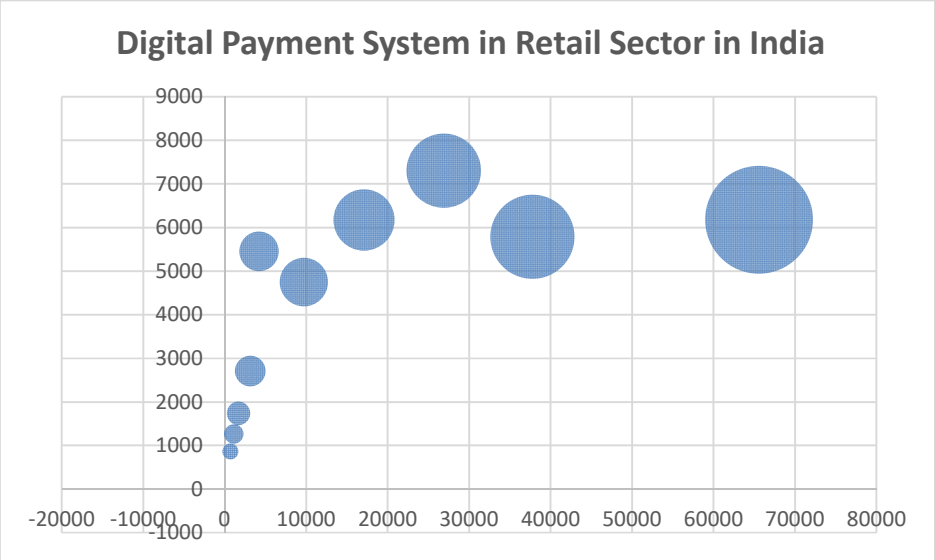
For testing the first hypothesis **HO_1** we use secondary data of mode of payment in retail sector only from the year 2012 to 2022. For testing aforesaid hypothesis, we use decadal data from 2012 to 2022 related to platforms used by retailors in their business transactions.

Digital Payment System in Retail Sector in India
(In Volume)

Digits in 10 Lakhs

Year	Electronic Payments	Cards Payments	Total
2012-13	692.8	865.7	1558.5
2013-14	1108.3	1261.8	2370.1
2014-15	1687.4	1737.7	3425.1
2015-16	3141.6	2707.2	5848.8
2016-17	4205	5450.1	9655.1
2017-18	9717.2	4748.6	14465.8
2018-19	17120.4	6176.9	23297.3
2019-20	26893.6	7301.2	34194.8
2020-21	37770	5784.1	43554.1
2021-22	65566.6	6178.6	71745.2
Total	**167902.9**	**42211.9**	**210114.8**

Source: Reserve Bank of India

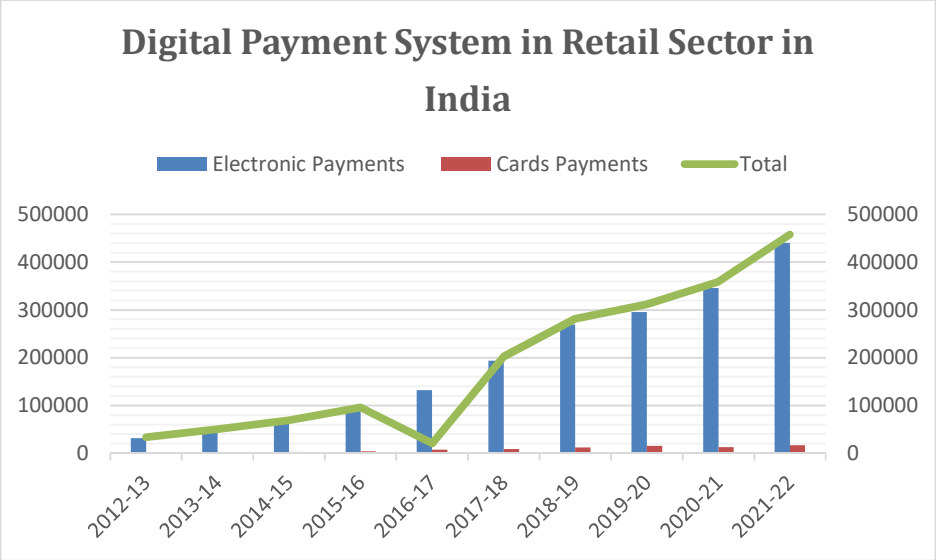


From the above table and graphic presentation, it is clear that from 2012 to 2022 the growth of electronic transactions in retail sector in volume is increased more than 93.64 percent and this shift of payment gateways is more prominent since 2017 onwards. Therefore, it is believed that there is a direct relation between digital payment gateways and sales of retail sector.

Digital Payment System in Retail Sector in India (In Value)

		Amount in 100 Crores	
Year	**Electronic Payments**	**Cards Payments**	**Total**
2012-13	31876.8	1972.9	33849.7
2013-14	47856	2575	50431
2014-15	65366	3325	68691
2015-16	91408	4484	95892
2016-17	132255	7421	20646.5
2017-18	193552.21	9190	202745.21
2018-19	269672.1	11968.88	281641.1
2019-20	296136.94	15357.65	311494.94
2020-21	345923.97	12938.2	358862.19
2021-22	440550	17020	457570
Total	**1914597.02**	**86252.63**	**1881823.64**

Source: Reserve Bank of India



If we observe the aforesaid table and graphical presentation of digital payment system in retail sector in India in value, it also clearly showed that number of electronic transactions as compared to card payments is increased drastically and retailors believed more in digital payment gateways than to card payments. Resultant we can conclude that digital payment gateways create smooth and feasible ecosystem for retailors to do business seamlessly. Therefore, we reject the null hypothesis ($H0_1$).

With the help of SPSS remaining two hypotheses were tested with correlation and chi square test and the results showing below:

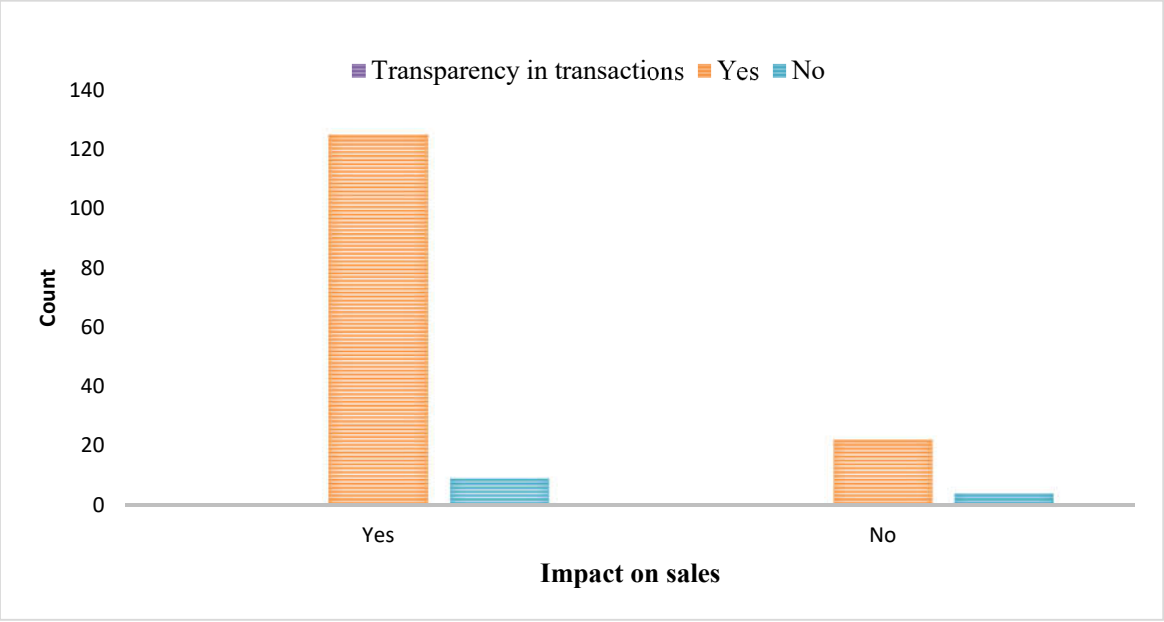
Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Impact on sales * Transparency in transactions	160	100.0%	0	0.0%	160	100.0%
Impact on sales * Visitors increased after demonetization	160	100.0%	0	0.0%	160	100.0%
Share of digitalized payment in sales * Transparency in transactions	160	100.0%	0	0.0%	160	100.0%

Share of digitalized payment in sales * Visitors increased after demonetization	160	100.0%	0	0.0%	160	100.0%

Impact on sales * Transparency in transactions Crosstabulation				
Count				
		Transparency in transactions		Total
		Yes	No	
Impact on sales	Yes	125	9	134
	No	22	4	26
Total		147	13	160

From the above tables we can easily conclude that retailors also believed that digital payment platforms have positive impact on sales and create greater transparency in sales transactions. 147 retailors said yes out of 160.

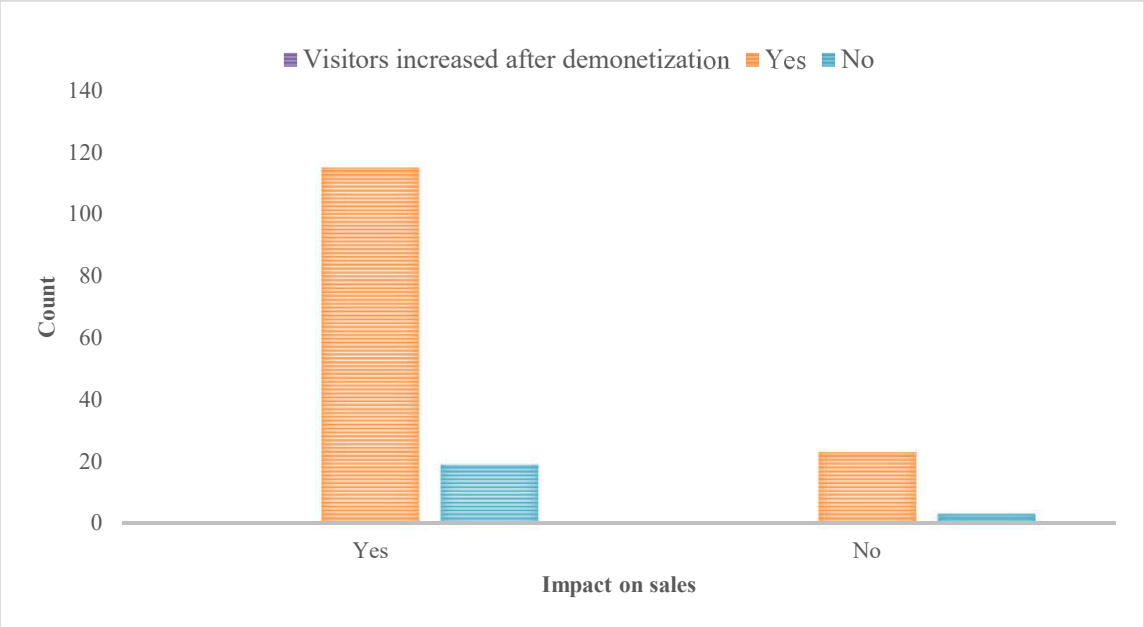


Above mentioned bar graph is representation of aforesaid table in which retailors believed that with the help of transparency in sales transaction increased.

And we reject our null hypothesis $H0_2$ and accept that **"Retailors having positive behavior towards digital payment gateways for business transactions."**

Impact on sales * Visitors increased after demonetization Crosstabulation				
Count				
		Visitors increased after demonetization		
		Yes	No	Total
Impact on sales	Yes	115	19	134
	No	23	3	26
Total		138	22	160

Aforesaid table or cross tab is a relationship between impact on sales and visitors or customers increased after demonetization. 138, 134 retailors out of 160 strongly believed that all the digital platforms are beneficial for increased sales.



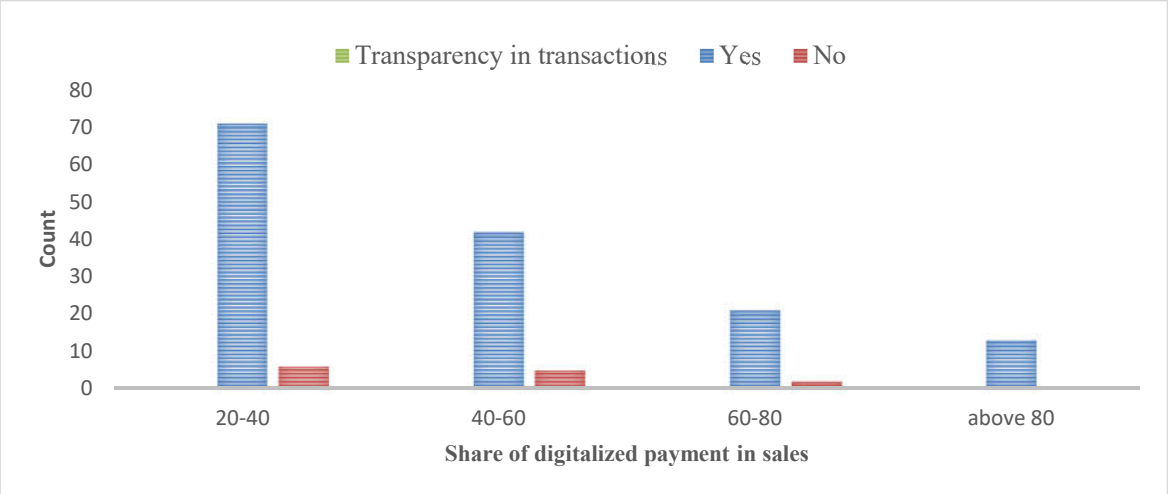
Graphical presentation showed above is a presentation of table which has impact on sales vs visitors increased after demonetization. this presentation showed a positive relation between impact on sales and visitors increased in stores.

On the basis above table and graphical presentation we can conclude that there is positive relation between sales and customers visit in the stores due to digital payment gateways. Therefore, our

prime alternative hypothesis is also accepted with the help of primary data. **"Our primary hypothesis Digital payment gateway has positive impact on sales of retail sector".**

Share of digitalized payment in sales * Transparency in transactions Crosstabulation				
Count				
		Transparency in transactions		Total
		Yes	No	
Share of digitalized payment in sales (percent)	20-40	71	6	77
	40-60	42	5	47
	60-80	21	2	23
	above 80	13	0	13
Total		147	13	160

Table showed above is depicts the relationship between share of digital payments in sales and transparency in transactions crosstab. In above table it is conclude that 147 retailors believed that transparency in transactions is increased out of 160.



Aforesaid graphical presentation is drawn from crosstabs table of relationship between share of digital payments in sales and transparency in transactions. It is very clear from the presentation that retail transactions are sharply increased by 20 to 80 percent due to availability of digital payment gateways. Therefore, **we reject our null hypothesis ($H0_3$) and accept that "Digital payment gateways create transparency in business transactions".**

System through Which Payment Gateways Support Digital Economies: Here some mechanism discussed below through which payment gateways support to enhance the efficiency of the economies are as follows:

Facilitating E-Commerce Growth

Digital payment gateways enable online businesses to accept card payments, mobile wallets, bank transfers, and UPI-based transactions. This expands consumer reach beyond geographic constraints, increasing sales potential and market depth.

Enhancing Financial Inclusion

By lowering barriers to entry, payment gateways allow small vendors, gig workers, and micro-entrepreneurs to receive digital payments—often through mobile apps. This fosters participation in the formal financial system and supports income generation.

Improving Transaction Efficiency and Trust

Payment gateways use encryption, tokenization, and fraud detection to secure transactions. High security and reliability build **consumer trust**, which is essential for digital economic interactions.

Supporting Innovation and New Business Models

APIs and integrations offered by gateways allow developers to create **FinTech solutions**, subscription services, and digital platforms that are critical to modern digital economies. Here we discuss some of, global popular digital payment gateways include *Stripe, PayPal, Square, Adyen, and Amazon Pay, serving as platforms for credit/debit cards and wallets like Apple Pay/Google Pay; alongside strong regional players like Alipay/WeChat Pay (Asia), M-PESA (Africa), Mercad Pago (LatAm), and UPI (India),* facilitating diverse methods like bank transfers, mobile money, and QR codes for seamless online/offline transactions.

Socio-Economic Impacts

Contribution to GDP Growth

Digital payments reduce transaction costs and time, effectively increasing economic efficiency. Economies with high digital payment penetration often exhibit higher rates of economic productivity and GDP growth.

Job Creation and Entrepreneurship

Payment gateways support startups and digital enterprises by enabling seamless monetization of goods and services. This has led to growth in the gig economy, digital services, and platform-based businesses.

Financial Inclusion and Poverty Reduction

Mobile payment adoption has been linked to increased savings, easier access to credit, and financial records, enabling better access to financial products such as insurance and loans.

Challenges and Risks

Digital Divide and Accessibility

Despite rapid growth, digital payments are less accessible in regions with poor internet infrastructure or low digital literacy.

Cybersecurity Risks

Digital payment systems attract cyber threats—data breaches, phishing, and fraud—which can undermine trust in digital finance.

Regulatory and Policy Barriers

Regulations vary across jurisdictions, leading to compliance complexity for cross-border digital payments and innovation.

Case Studies

India's UPI Ecosystem

India's Unified Payments Interface (UPI) dramatically increased digital payment adoption. Integrations with payment gateways allowed millions of merchants to accept real-time digital payments at low cost—contributing significantly to digital economic activity.

Mobile Money in Kenya (M-Pesa)

M-Pesa enabled digital commerce and savings in regions with limited banking infrastructure, illustrating how payment gateways and mobile wallets drive economic participation.

Policy Implications and Recommendations

To accelerate digital economies, policymakers should:

- **Enhance infrastructure**: Expand broadband and mobile connectivity.
- **Promote digital literacy**: Educate users about digital payments and cybersecurity.
- **Harmonize regulations**: Foster interoperable standards for cross-border payments.
- **Encourage innovation**: Support FinTech startups through regulatory sandboxes.

Conclusion

Digital payment gateways are foundational to building and scaling digital economies. By facilitating secure, inclusive, and efficient transactions, they contribute to economic growth, entrepreneurship, and financial inclusion. However, addressing infrastructure, security, and regulatory challenges is essential to realize their full potential. Digital payment gateways are instrumental in building and sustaining digital economies. By enhancing transaction efficiency, expanding financial inclusion, and fostering innovation, they contribute to economic growth and digital transformation. Policymakers should prioritize digital infrastructure, support secure frameworks, and encourage inclusive regulations to maximize the economic potential of digital payment ecosystems.

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