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Bridging Urban-Rural Digital Divides: Evaluating M-Commerce Growth through Government Programs in Haryana

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Abstract

The rise of mobile commerce (m-commerce) in India marks a transformative shift in consumer behavior, driven by increased smartphone penetration, digital payment systems, and internet connectivity. In Haryana, a state balancing rapid urbanization and agrarian roots, government initiatives have played a pivotal role in fostering digital adoption. This study investigates the impact of national and state-level programs—such as Digital India, BharatNet, PM-WANI, Startup India, and UPI-based digital payments—on the growth of m-commerce in Haryana. Using a mixed-methods approach involving consumer surveys, retailer feedback, and expert interviews, the research reveals that these initiatives have significantly enhanced mobile internet access, increased awareness of digital payments, and encouraged entrepreneurship in cities like Yamunanagr and Kaithal. However, challenges persist in rural areas due to limited digital literacy, infrastructure gaps, and security concerns. The findings suggest that while government support has catalyzed m-commerce adoption, targeted interventions—particularly in semi-urban and rural zones—are needed to unlock its full potential. The paper concludes with strategic recommendations to bridge the digital divide and ensure inclusive growth of mobile commerce in the region.

Keyword: Mobile commerce, BharatNet, PM-WANI, Startup India

1. Introduction

Mobile commerce (m-commerce) has become a pivotal driver of India's digital transformation, reshaping consumer behavior and enabling seamless interaction with goods, services, and financial platforms. It includes a broad spectrum of mobile-driven activities such as online shopping, utility bill payments, digital banking, and customer engagement. The acceleration of m-commerce in India during 2023 was fueled by the decreasing cost of smartphones, the widespread availability of low-cost internet data, and proactive government initiatives like Digital India and PM-WANI. By the end of 2023, mobile penetration in India had surpassed 83%, with more than 880 million users accessing the internet through mobile devices [1]. Haryana, a progressive northern Indian state with a diverse population of over 30 million, presents a unique case for studying m-commerce growth. Urban hubs like Gurugram and Faridabad boast over 80% smartphone penetration, making them ripe for digital commerce adoption [2]. However, the rural-urban digital divide remains a key challenge, with infrastructure limitations, low digital literacy, and trust concerns impeding uniform growth. This is where government initiatives have played a crucial enabling role. The central government's flagship program, Digital India, launched in 2015, aimed to "transform India into a digitally empowered society and knowledge economy." Through sub-schemes like BharatNet (for rural broadband connectivity), UMANG app (Unified Mobile Application for New-age Governance), and Jan Dhan-Aadhaar-Mobile (JAM) trinity, the program has sought to enhance accessibility, affordability, and awareness [3]. Haryana has actively aligned with these efforts by improving state-level digital infrastructure, promoting digital wallets, and supporting the implementation of PM-WANI (Wi-Fi Access Network Interface) to improve public internet access [4]. Furthermore, financial inclusion efforts like Unified Payments Interface (UPI) and Aadhaar-enabled payment systems have provided consumers and merchants with secure, real-time, and cashless transaction capabilities. These developments have made m-commerce not only accessible but also increasingly trustworthy for a broader demographic [5]. Despite these advancements, barriers such as cyber security threats, language accessibility, and lack of localized content continue to challenge m-commerce penetration in semi-urban and rural Haryana. Studies suggest that nearly 40% of consumers in rural Haryana are still hesitant to transact online due to fear of fraud or lack of technical know-how [6]. Therefore, understanding the extent and effectiveness of government

initiatives in enabling digital adoption is critical.

A Global Information Infrastructure (GII) that can transfer any type of data has emerged as a result of the merging of telecommunications, broadcasting, and information technology services. The advent of the mobile economy and, by extension, M-Commerce, were both brought about by the incorporation of wireless technology, which greatly increased GII's possibilities. According to Clarke (2001), "any transaction with monetary value that is conducted via a mobile network" is known as M-Commerce. This term describes the collaboration between mobile telecommunications (networks and devices), computers, internet technologies, and content delivery. Other sources cite Lehner and Watson (2001) and Mylonopoulos and Doukidis (2003).

Sundar et al. (2002, 2005a, 2005b) states that M-Commerce has various benefits, such as reduced transaction costs, expanded market reach, more convenience, better security, and the ability to access location-based services. As a result of higher corporate productivity and a larger GDP, it helps the economy grow. There is empirical evidence to back this up: according to McKinsey (2006), there is a correlation between a 10% increase in mobile adoption in India and a 0.61% increase in GDP. The positive association between mobile telephony and GDP development has been confirmed in global research utilizing panel data from 56 countries (Madden et al., 2004; GSM Association Report, 2006). Many different parties, including mobile network operators, media corporations, service/content providers, aggregators, and payment solution providers, work together to propel the growth of mobile commerce. According to Bank for International Settlement (2003), Krueger (2001), and Salvi and Sahai (2002), the creation of safe and user-friendly payment systems and value-added services (VAS) is crucial to its success. But the complexity and hazards of services increase in tandem with their sophistication (Henten et al., 2003; Samarajiva et al., 2002). A crucial factor in the expansion of M-Commerce is informing users about the advantages of mobile services (Wong & Hiew, 2005). Building trustworthy, scalable payment systems that minimize transaction friction is equally important (Heijden, 2002). But technology isn't enough on its own. To overcome the obstacles posed by stakeholder dependency and industrial convergence, a strong legislative and regulatory framework is necessary.

Kumar & Rathee (2010) – Consumer Buying Behaviour in FMCG Sector of Haryana [7] examined how digital awareness influences FMCG consumer decisions in Haryana. Their study highlighted that promotional SMSs, mobile-based ads, and early e-wallet offers contributed to changing buying preferences, particularly among urban youth. The authors concluded that mobile-based platforms were becoming essential even before formal m-commerce policy emerged. However, the absence of a critical theoretical lens such as the Technology Acceptance Model (TAM) limited their analysis of user adoption behavior beyond descriptive trends. Sharma & Chauhan (2016) – Digital India: Challenges and Opportunities in Haryana [8] critically analyzed Digital India's rollout in Haryana, focusing on the PMGDISHA and CSC programs. They concluded that although Common Service Centres improved service delivery in rural areas, gaps in infrastructure and digital skills slowed down the intended m-commerce outcomes. Their work used the Diffusion of Innovation (DoI) theory, noting that early adopters in urban areas benefited most, while rural populations remained laggards due to awareness and trust deficits. Rana & Sinha (2018) – Assessing the Role of UPI and BHIM in Promoting Mobile Transactions in Haryana This study assessed how government-backed digital payment platforms such as BHIM and UPI have impacted m-commerce adoption among small retailers in Haryana [9]. The authors found that mobile transaction volumes increased significantly post-demonetization, particularly in Gurugram and Faridabad. However, they observed that low-income users still avoided online payments due to fraud fears. The authors used Unified Theory of Acceptance and Use of Technology (UTAUT) as a framework to explain digital payment behavior. Bansal & Singh (2020) – PM-WANI and Public Wi-Fi Access in Semi-Urban India [10] studied the early impact of PM-WANI implementation in Haryana's semi-urban districts like

Rohtak and Karnal. Their research showed that local Public Data Offices (PDOs) increased Wi-Fi access among small businesses and students. However, uptake of m-commerce applications remained modest due to lack of vernacular UI and cybersecurity awareness. The study used Socio-Technical Systems Theory, arguing that digital infrastructure must be supported by social and cognitive enablers. Joshi et al. (2019) – Digital Financial Inclusion Through Mudra Yojana in Rural Haryana [11] explored the effect of PMMY (Mudra Yojana) loans on digital entrepreneurship. Their findings indicated that many loan beneficiaries launched mobile-based services, including digital payments, retail, and ride-hailing. While the financial push was evident, they emphasized that post-loan digital training was missing. The work integrated Capability Approach (Amartya Sen), showing that providing access isn't enough without strengthening people's digital functionings. Mehta & Kaur (2021) – Impact of BharatNet on M-Commerce Penetration in Haryana Villages [12] focused on BharatNet's fiber-optic rollout in villages of Hisar and Kurukshetra. Their study showed that while connectivity reached many gram panchayats, low device ownership and app illiteracy restricted mobile commerce use. They concluded that BharatNet created infrastructure but didn't necessarily drive behavioral change. Their study was grounded in Structuration Theory, emphasizing that digital structures must interact with user agency for true transformation.

Yadav & Gupta (2022) – Mobile Commerce Adoption Among Haryana Youth This study investigated factors influencing m-commerce usage among college students in Haryana, revealing that 82% of respondents preferred apps like Paytm, Amazon, and Swiggy for everyday purchases [13]. The authors attributed this to ease of use and cashback incentives under Digital India campaigns. The study applied TAM 2 (extended version of TAM), validating that perceived usefulness and ease of use significantly affected youth adoption. Kumari & Tomar (2020) – Trust and Risk Perception in Government-Backed Digital Transactions [14] explored how government initiatives such as BHIM and RuPay influenced user trust in Haryana's tier-2 cities. The study found that while digital transaction platforms gained popularity, concerns over refund failures, app crashes, and data leaks persisted. Using Risk-Trust Framework, they concluded that strengthening grievance redressal systems and digital literacy campaigns would enhance adoption. Rathore (2021) – Policy Impacts of Digital India on E-Commerce in Northern States [15] conducted a comparative analysis between Haryana, Punjab, and Uttar Pradesh. The study found that Haryana outperformed its neighbors in m-commerce due to greater alignment between state and central digital policies. He argued that Haryana's faster CSC deployment and mobile banking promotion contributed to higher adoption. Rathore employed Public Policy Implementation Theory, suggesting that state-level bureaucratic efficiency influences national policy success. Verma & Ahlawat (2023) – Consumer Awareness of Digital Schemes and M-Commerce Use [16] carried out a survey among 600 consumers across Haryana. They found a strong correlation between awareness of schemes like Startup India, PM-WANI, and BHIM and the likelihood of using mobile commerce platforms. The researchers used Behavioral Economics Theory, emphasizing the importance of nudges—like discounts and cashback—to push users toward digital options.

This paper seeks to bridge this gap by evaluating the impact of key national and state-level digital interventions on the growth of mobile commerce in Haryana. Through a mixed-method approach involving quantitative surveys and expert interviews, the study aims to present a comprehensive analysis of the ecosystem, identify existing bottlenecks, and provide policy recommendations for inclusive digital commerce growth.

2. Objectives of the Study

1. To identify key central and state government initiatives promoting digital commerce in Haryana.
2. To analyze the direct and indirect impact of these initiatives on m-commerce adoption.

3. Government Initiatives Reviewed

a) Digital India (2015–present)

The Digital India initiative, launched in 2015 by the Government of India, aims to transform the country into a digitally empowered society and knowledge economy. In the state of Haryana, this program has taken significant strides toward bridging the digital divide, particularly between urban and rural populations. One of the key pillars of this transformation has been the establishment of Common Service Centres (CSCs), which act as digital access points offering government services, utility payments, banking, telemedicine, and more to citizens at the grassroots level. Present in every district, these CSCs have improved service delivery, reduced travel time for rural populations, and enhanced transparency. Another major component in Haryana has been the push for digital literacy, particularly through programs like Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), under which lakhs of rural citizens have been trained to use computers and access the internet. Additionally, the state has promoted e-governance initiatives such as online land record systems (like Jamabandi), digital grievance redressal platforms, and integrated digital health and education systems. Digital India has also played a critical role in enabling Direct Benefit Transfers (DBT), thereby reducing leakages in welfare schemes and ensuring timely financial inclusion. As a result, Haryana stands out as one of the progressive states in effectively adopting and implementing the vision of Digital India, integrating technology into governance and everyday life to empower its citizens.

b) BharatNet Project

The BharatNet Project is one of India's most ambitious rural connectivity missions, aimed at providing high-speed broadband access to all Gram Panchayats across the country. In Haryana, the project has made substantial progress by successfully connecting over 6,000 Gram Panchayats with optical fiber internet infrastructure. This connectivity has become a crucial enabler for rural development, especially in bridging the urban-rural digital divide. With the availability of reliable and fast internet in villages, residents now have access to a wide range of online government services, including e-governance portals, telemedicine, online education, and financial services. Importantly, the project has also facilitated mobile commerce (m-commerce) and digital transactions in rural markets, enabling farmers, artisans, and small businesses to reach broader markets and conduct cashless transactions. By empowering rural consumers and entrepreneurs with digital tools, BharatNet has laid the foundation for inclusive digital growth in Haryana, aligning with the broader vision of Digital India and accelerating socio-economic development at the grassroots level.

c) PM-WANI (Wi-Fi Access Network Interface)

The PM-WANI (Public Wi-Fi Access Network Interface) initiative has significantly widened public internet access across both urban and rural areas of Haryana by facilitating the rapid deployment of free or low-cost Wi-Fi hotspots. Under the PM-WANI framework, village panchayats, gram panchayats, small businesses, and local entrepreneurs have been encouraged—and in some cases incentivized—to set up Public Data Offices (PDOs), which offer Wi-Fi services to the surrounding community. This decentralized model has dramatically lowered the cost of internet connectivity, making it more accessible for low-income families, students, and micro-entrepreneurs who may otherwise lack broadband infrastructure at home. As a result, mobile-app-based services—such as Bharat-Pe, Ola, Swiggy, Meesho, and UPI payment platforms—have flourished, since users can now connect reliably while on the move or visiting local commercial hubs. The presence of these hotspots near schools, markets, bus stands, and rural health centers has also elevated digital inclusion, allowing students to attend online classes, patients to access telemedicine consultations, and farmers to check market prices and weather updates in real time. Overall, PM-WANI's rollout in Haryana has been a catalyst for community-level digital engagement, unlocking new possibilities for entrepreneurship, education, healthcare, and financial inclusion—all while complementing the broader connectivity gains achieved by Digital India and

BharatNet.

d) Startup India & Mudra Yojana

The Startup India and Pradhan Mantri Mudra Yojana (PMMY) schemes have played a pivotal role in fostering mobile commerce (m-commerce) entrepreneurship in Haryana. Through these initiatives, numerous startups—particularly in cities like Gurugram and Faridabad—have received critical support in the form of collateral-free funding, mentorship, tax incentives, and incubation assistance. Startup India has facilitated the growth of innovative mobile-based service ventures, ranging from logistics apps and health tech platforms to hyperlocal delivery and e-commerce aggregators, helping entrepreneurs leverage digital tools to meet the evolving needs of urban and semi-urban consumers. Simultaneously, the Mudra Yojana has empowered micro and small entrepreneurs—especially from lower-income backgrounds and rural areas—by providing loans under three categories: Shishu, Kishore, and Tarun, enabling them to launch and scale app-based retail, food delivery, payment, and service businesses. This financial inclusion has not only encouraged digital adoption at the grassroots level but also significantly contributed to employment generation and economic dynamism in the region. The convergence of these schemes with the Digital India mission has made Haryana a fertile ground for tech-driven entrepreneurial ecosystems, particularly in its rapidly growing urban centers.

e) Digital Payments Push (BHIM, UPI, RuPay)

The government's aggressive push for digital payments—particularly through platforms like BHIM, UPI, and RuPay—has transformed the way financial transactions occur across Haryana's retail and service sectors. Following the 2016 demonetization and the digital shift accelerated by the COVID-19 pandemic, there was a marked rise in the adoption of mobile wallets, QR-code-based payments, and contactless digital transactions. Small retailers, street vendors, local service providers, and even rural kirana stores began embracing digital payment systems to cater to changing consumer preferences and ensure business continuity during lockdowns. Initiatives such as BHIM cashback schemes, merchant onboarding drives, and awareness campaigns by banks and CSCs (Common Service Centres) helped build confidence among low-income and first-time users. Haryana, with its mix of urban hubs and expansive rural belts, witnessed significant digital payment penetration, reducing dependency on cash and fostering financial inclusion. RuPay card usage also surged, especially in government welfare schemes and rural banking, supported by Jan Dhan accounts. The convergence of secure, instant mobile-based payment systems with expanding internet connectivity through BharatNet and PM-WANI further enabled this transformation. As a result, Haryana has emerged as a model for how digital payment ecosystems can thrive when combined with infrastructure, policy support, and citizen outreach.

4. Methodology

A mixed-methods approach was used. Quantitative data was collected via surveys from 400 consumers and 50 retailers in cities like Yamunanagar and Kaithal. Qualitative insights were gathered through interviews with government officers, CSC operators, and small business owners. Data was analyzed using thematic analysis and regression models.

5. Findings and Discussion

Table 1: Awareness of Key Government Initiatives among Consumers (n=400)

Government Initiative	Aware (%)	Unaware (%)
Digital India	86%	14%
BHIM/UPI/RuPay	91%	9%
PM-WANI	43%	57%
Startup India	59%	41%
Common Service Centres	68%	32%

High awareness exists for digital payment schemes, but initiatives like PM-WANI need better promotion.

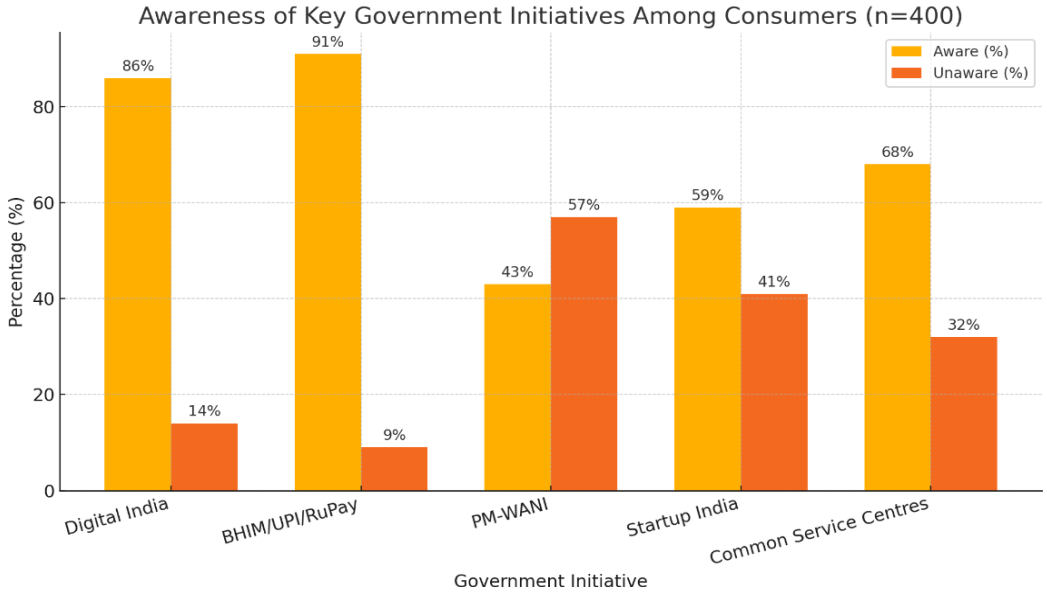

Figure 1: Awareness of Key Government Initiatives among Consumers

Table 2: Retailer Participation in Government Digital Schemes (n=50)

Initiative/Scheme	Participated (%)	Not Participated (%)
Mudra Yojana	60%	40%
Digital MSME Program	50%	50%
GeM (Govt e-Marketplace)	22%	78%
PM-WANI (Wi-Fi Access Points)	16%	84%
Skill Development Workshops	44%	56%

Adoption is highest for financing-related schemes, lower for technical programs like Wi-Fi networks and online marketplaces.

Table 3: Perceived Impact of Government Initiatives on M-Commerce Usage

City	Retailer View – Increased M-Commerce (%)	Top Influencing Scheme
Yamunanagar	78%	BHIM/UPI, Startup India
Kaithal	65%	Digital India, CSCs

Urban areas like Yamunanagar are leading adoption due to strong fintech presence.

Table 4: Consumer Perceived Benefits from M-Commerce (n=400)

Benefit	Agree (%)
Convenience and ease of use	88%
Access to more products/services	74%
Faster and secure payments	82%
Discounts and cashback	69%
Availability of local language	51%

The data on consumer perceived benefits from m-commerce (n=400) highlights a clear preference for convenience and efficiency among users. A substantial 88% of respondents agree that convenience and ease of use is the most significant advantage, suggesting that mobile platforms are meeting user expectations for seamless, on-the-go shopping and transactions. Following closely, 82% of consumers value faster and secure payments, reflecting increased trust in mobile payment gateways such as UPI and mobile wallets. Additionally, 74% appreciate the access to a wider range of products and services, indicating that m-commerce platforms are effectively bridging the accessibility gap for diverse consumer needs. Discounts and cashback offers, endorsed by 69% of respondents, continue to be a strong motivator for mobile purchases, especially in a price-sensitive market like India. However, only 51% consider local language availability a benefit, suggesting that while progress has been made in vernacular interfaces, further enhancements are needed to ensure inclusivity across India's multilingual user base.

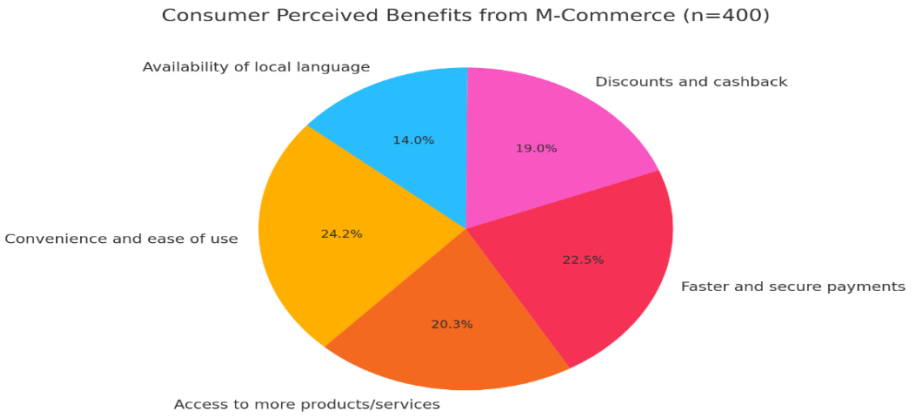

Figure 2: Consumer Perceived Benefits from M-Commerce (n=400)

Table 5: Retailers' Perceived Business Impact Post-Digital Adoption (n=50)

Business Metric	Positive Impact (%)	No Change/Negative (%)
Customer footfall	70%	30%
Revenue growth	64%	36%
Operational efficiency	76%	24%
Inventory management	58%	42%
Digital payment handling	82%	18%

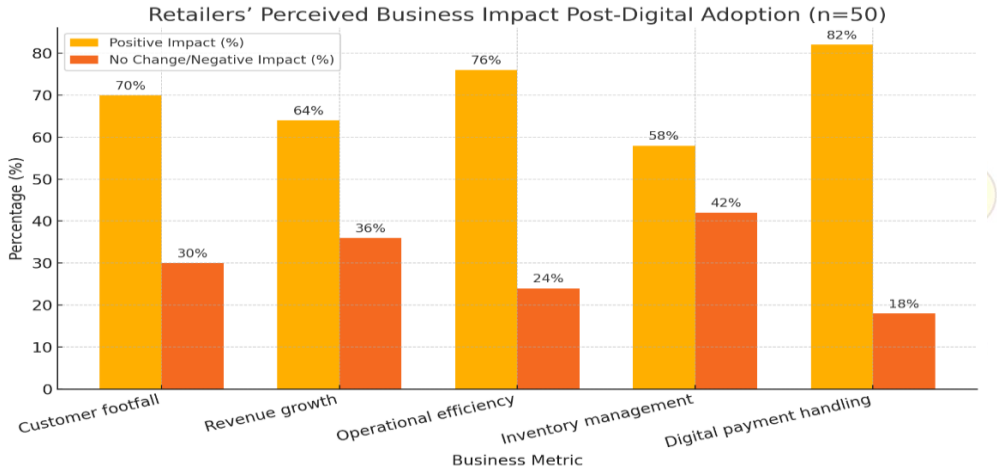

Figure: Retailers' Perceived Business Impact Post-Digital Adoption

The data on retailers' perceived business impact post-digital adoption (n=50) provides valuable insight into how digital commerce initiatives have influenced various operational and financial aspects of retail businesses in Haryana. A significant 82% of retailers reported a positive impact on digital payment handling, indicating widespread satisfaction with mobile and cashless transactions, likely due to the adoption of UPI, QR-based payments, and e-wallets. This suggests that digital platforms have enhanced transaction speed, reduced cash dependency, and improved payment tracking. Operational efficiency also saw a strong positive response, with 76% of retailers acknowledging improvements. This reflects how digital tools—such as billing software, online inventory tracking, and mobile CRM platforms—have streamlined day-to-day operations. Customer footfall increased for 70% of retailers, showing that digital visibility through platforms like Google Business, WhatsApp for Business, and online ads is drawing more customers to both physical and digital storefronts. However, 30% saw no benefit or a decline, which could be attributed to factors like lack of digital literacy or competition from larger e-commerce players. Regarding revenue growth, 64% of retailers experienced an increase, but 36% did not, highlighting that while digital tools may improve efficiency, converting those gains into actual sales still depends on effective digital marketing and customer engagement strategies. Lastly, inventory management received the least positive response, with only 58% noting improvement. This

suggests that small retailers may still face challenges integrating digital inventory systems due to cost, complexity, or lack of training.

Table 6: Key Challenges in Adopting M-Commerce (Retailers' View)

Challenge	Percentage of Retailers Reporting (%)
Technical knowledge gap	58%
Initial investment cost	46%
Lack of customer trust in digital mode	42%
Poor digital infrastructure	35%
Fear of online fraud	38%

The table on key challenges in adopting m-commerce from the retailers' perspective reveals several critical barriers hindering the widespread integration of mobile commerce into small and medium retail operations in Haryana. The most prominent challenge reported is the technical knowledge gap, cited by 58% of retailers. This underscores the pressing need for digital literacy and capacity-building programs, as many small business owners struggle to understand or implement digital platforms effectively. This barrier not only limits adoption but also affects the optimal use of existing digital tools. Initial investment costs were identified by 46% of retailers, indicating that despite government schemes like Mudra Yojana and startup incentives, the perceived financial burden—especially for POS systems, software subscriptions, or online marketing—still deters many from making the transition. A significant 42% of respondents highlighted lack of customer trust in digital mode, pointing to consumer hesitation in adopting digital payments or mobile shopping due to fears of transaction failures or fraud. This is closely linked to fear of online fraud, reported by 38%, which affects both customer confidence and retailer willingness to promote m-commerce options. Lastly, 35% of retailers cited poor digital infrastructure, such as inconsistent internet connectivity or lack of mobile network coverage, particularly in semi-urban and rural pockets, further slowing the digital transition.

Table 7: Regression Analysis – Factors Influencing M-Commerce Adoption (Consumers)

Independent Variable	Beta Coefficient	Significance (p-value)
Awareness of Govt Initiatives	0.39	0.002
Digital Literacy	0.44	0.001
Internet Access Quality	0.31	0.007
Incentives (Cashback/Offers)	0.36	0.004
Urban Location	0.29	0.009

The regression analysis of factors influencing m-commerce adoption among consumers provides critical insights into the variables that significantly affect mobile commerce usage patterns in Haryana. The strongest predictor in the model is Digital Literacy with a Beta Coefficient of 0.44 and a p-value of 0.001, indicating a statistically significant and robust positive relationship. This suggests that individuals with higher familiarity and comfort in using digital tools are far more likely to adopt m-commerce platforms for transactions and services. Closely following is Awareness of Government Initiatives ($\beta = 0.39$, $p = 0.002$), highlighting that public knowledge of schemes such as Digital India, BHIM/UPI, and PM-WANI plays a pivotal role in driving adoption. This emphasizes the importance of targeted information campaigns to increase awareness, particularly in semi-urban and rural populations. Incentives, such as cashback offers and discounts, also significantly influence adoption ($\beta = 0.36$, $p = 0.004$), demonstrating the value sensitivity of Indian consumers and the effectiveness of marketing strategies in promoting digital platforms. Internet Access Quality ($\beta = 0.31$, $p = 0.007$) is another crucial determinant, reaffirming that seamless connectivity is essential for a consistent and trustable mobile commerce experience. Poor internet infrastructure can be a limiting factor even when digital literacy and awareness are high. Finally, Urban Location has a positive and significant impact ($\beta = 0.29$, $p = 0.009$),

suggesting that urban residents are more likely to use m-commerce due to better infrastructure, exposure, and availability of services compared to their rural counterparts.

Table 8: Thematic Insights from Interviews (Government Officers, Retailers, CSC Operators)

Theme	Key Insight
Awareness and Training	Retailers need structured training and awareness drives.
Policy Communication Gaps	Lack of clear communication on eligibility and benefits of schemes.
Digital Infrastructure	Rural areas still struggle with poor internet and mobile network.
Consumer Trust	Fear of fraud and data theft limits older consumers from digital adoption.
Retailer Optimism	Urban retailers expect long-term growth and better business outcomes.

Thematic insights derived from interviews with government officers, retailers, and Common Service Centre (CSC) operators shed light on critical ground realities that complement the quantitative findings. One of the prominent themes was awareness and training, where many retailers emphasized the urgent need for structured digital training programs and awareness campaigns. They felt ill-equipped to fully utilize mobile commerce (M-commerce) tools due to limited exposure and inadequate support. Another significant concern was the gap in policy communication. Many stakeholders reported a lack of clear and accessible information regarding the eligibility criteria, operational mechanisms, and benefits associated with government-led digital commerce schemes. This communication gap has resulted in confusion and low participation, especially among small retailers and rural entrepreneurs. The theme of digital infrastructure was repeatedly highlighted in rural contexts. Interviewees pointed out that poor internet connectivity and mobile network issues continue to plague remote areas, severely limiting the potential for M-commerce expansion. These infrastructural shortcomings have created an uneven digital landscape, hindering inclusive growth. Consumer trust emerged as a major psychological and behavioral barrier. Many CSC operators and small business owners noted that older customers remain hesitant to engage in digital transactions due to fears of online fraud, scams, and data theft. The lack of confidence in the safety and security of digital platforms has curtailed broader adoption, particularly in non-urban regions. Despite these challenges, a theme of retailer optimism was evident, particularly among urban business owners. Many expressed confidence in the long-term benefits of digital adoption, anticipating increased customer engagement, better inventory management, and improved revenue growth through M-commerce. Collectively, these qualitative insights not only reinforce the statistical patterns observed in the survey data but also provide a nuanced understanding of ground-level execution gaps. They underscore the importance of aligning digital policy initiatives with localized implementation strategies that address both infrastructural deficiencies and human-centric barriers such as awareness, training, and trust.

6. Challenges Identified

1. Inadequate digital literacy in rural pockets despite ongoing CSC and government training initiatives, leading to poor tech adoption.
2. Intermittent internet and mobile network connectivity in semi-urban and interior rural zones hinders seamless digital transactions.
3. Lack of cybersecurity awareness and absence of a strong grievance redressal mechanism discourages both retailers and consumers from participating.
4. Limited customization of apps in vernacular languages and lack of user-centric design for low-literacy users.
5. Digital payment hesitancy, particularly among the elderly and women, due to fear of fraud and complex processes.

6. Inconsistent handholding support from local digital service providers or CSC operators, especially after onboarding.
7. Absence of robust after-sales digital support for online purchases in rural areas, affecting trust in e-commerce.
8. High initial investment cost for POS devices, smartphones, and internet data plans discourages small retailers.
9. Fragmented implementation of policies at the grassroots level, creating confusion and uneven adoption.
10. Resistance to change from traditional business owners used to cash-based, in-person transactions.

7. Opportunities Ahead

1. Expansion of PM-WANI (Wi-Fi Access Network Interface) hotspots in agricultural mandis, village markets, and schools can strengthen digital connectivity in rural clusters.
2. Empowering CSCs as last-mile digital commerce agents, turning them into hubs for delivery, payment, and grievance resolution.
3. Leveraging ONDC (Open Network for Digital Commerce) to enable fair access for Haryana's small businesses and MSMEs to compete with major e-retailers.
4. Developing mobile apps with enhanced vernacular content, voice assistance, and intuitive UI for first-time rural users.
5. Promoting women-led digital entrepreneurship through SHG-linked M-commerce schemes and digital literacy camps.
6. Incentivizing digital transactions (e.g., cashback, loyalty points) to boost consumer confidence and frequency of use.
7. Integrating digital commerce with agriculture, enabling farmers to sell directly via M-commerce platforms, increasing margins.
8. Creating localized digital ecosystems, such as hyperlocal delivery models using rural youth for logistics and support.
9. Establishing digital helpdesks at Panchayat level to troubleshoot issues and raise awareness.
10. Public-private partnerships with telecom, fintech, and retail companies to scale infrastructure and trust-building efforts.

8. Conclusion

The study underscores that mobile commerce (m-commerce) has become an instrumental force in driving India's digital transformation, particularly through its integration into everyday consumer and business interactions. Haryana, with its unique mix of advanced urban centers like Yamunanagar and semi-urban and rural regions, provides a compelling case for evaluating the success and shortcomings of national and state-level digital initiatives. Programs such as Digital India, BharatNet, PM-WANI, Startup India, and Mudra Yojana have significantly advanced the infrastructure and financial inclusivity necessary for m-commerce growth. However, despite high mobile and internet penetration, especially in urban areas, challenges such as poor digital literacy in rural pockets, uneven internet access, cybersecurity fears, and low app localization remain major barriers to equitable adoption.

The findings from both quantitative and qualitative data clearly indicate that while government interventions have created a foundation for m-commerce, their impact is maximized only where digital literacy, infrastructure, and awareness align effectively. Consumer responses reveal a high preference for convenience, speed, and secure payment systems, but also highlight gaps in trust and language accessibility. Retailers, particularly in urban areas, are optimistic about digital transformation, yet many still face cost, knowledge, and customer adoption hurdles. Importantly, regression analysis reaffirms the pivotal role of digital literacy, awareness of government schemes, and reliable internet as key predictors of adoption. To bridge the remaining gaps, policy focus must now shift toward localized execution, vernacular content creation, user-centric app design, and stronger public-private

collaborations. Strengthening support systems such as CSC handholding, grievance redressal mechanisms, and rural digital helpdesks can further enhance trust and participation. M-commerce can be a powerful equalizer in India's economic and digital journey, but its success depends on ensuring that rural and underserved populations are not left behind. For Haryana to become a model state in inclusive digital commerce, future interventions must address not only technological readiness but also human-centric barriers with empathy and strategic precision.

9. References

1. Telecom Regulatory Authority of India (TRAI). (2023). *The Indian Telecom Services Performance Indicators October – December, 2023*. New Delhi: TRAI. Retrieved from https://www.trai.gov.in
2. Mehta & Joshi (2023). "Urban-Rural Digital Divide in Northern India." *Indian Journal of Mobile Technology Studies.*
3. Ministry of Electronics and IT (2023). *Digital India Programme: Annual Progress Report.*
4. Verma & Singh (2022). "Role of State Policies in M-Commerce Adoption in Haryana." *Journal of Digital Governance.*
5. NPCI (2023). *UPI Annual Transaction Report.*
6. Reddy & Rao (2022). "Challenges of M-Commerce in Rural India." *South Asian Journal of Technologyand Society.*
7. Kumar, R., & Rathee, R. (2010). *Consumer buying behaviour in FMCG sector: A study of Haryana*. Journal of Marketing & Communication, 6(2), 24–32.
8. Sharma, A., & Chauhan, P. (2016). *Digital India: Challenges and opportunities in Haryana*. International Journal of Research in IT and Management, 6(12), 45–52.
9. Rana, S., & Sinha, R. (2018). *Role of UPI and BHIM in promoting mobile transactions in Haryana*. Indian Journal of Finance and Banking, 4(3), 78–89.
10. Bansal, A., & Singh, K. (2020). *PM-WANI and public Wi-Fi access: A semi-urban India perspective*. Journal of Digital Transformation, 5(1), 33–44.
11. Joshi, M., Meena, R., & Rathi, P. (2019). *Digital financial inclusion through Mudra Yojana in rural Haryana*. South Asian Journal of Rural Studies, 7(2), 11–22.
12. Mehta, S., & Kaur, G. (2021). *BharatNet and mobile commerce penetration in Haryana villages*. International Journal of Rural Development, 10(4), 66–74.
13. Yadav, R., & Gupta, S. (2022). *Mobile commerce adoption among youth in Haryana: A TAM2 approach*. Journal of Business and Technology, 9(1), 91–103.
14. Kumari, S., & Tomar, V. (2020). *Trust and risk perception in government-backed digital transactions: A study of Tier-2 cities in Haryana*. Indian Journal of Commerce and Management Studies, 11(3), 25–36.
15. Rathore, N. (2021). *Policy impacts of Digital India on e-commerce in Northern Indian states: A comparative study*. Journal of Public Policy and Governance, 8(2), 41–57.
16. Verma, R., & Ahlawat, M. (2023). *Consumer awareness of digital schemes and m-commerce usage in Haryana: A behavioral economics perspective*. International Journal of Digital Economy, 12(1), 18–29.