Attainers and Sluggards in Digitisation of Payments: Findings from Grassroots in Assam

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Abstract

With pervasiveness of ICT, payment modes in India and elsewhere have progressively turned digital. While digitisation of payment brings many advantages to adopters of this mode, for those who may be constrained from moving into these new ways of transactions, the changers may mean a new dimension of disparity to confront. With this concern in mind, a field study was carried out in the Northeast Indian state of Assam for identifying the determinants of the extent of cashless transactions by individuals from different socioeconomic and spatial background. Tobit regression of a customised index of digital payment showed that young urban males with relatively better education and higher economic status are ahead of others in adopting cashless transactions. Superior basic infrastructure, comprised of bank branches, internet connectivity and power supply, enables people in urban areas to change over to cashless modes of transactions to a greater extent than their rural counterpart.

Introduction

With penetration of IT into banking operations, transaction modes have been progressively turning digital. Digital instruments such as debit card, credit card, net banking, UPI (Unified Payments Interface) have been crowding out traditional instruments of paper currency and cheques for monetary transaction (Tee & Ong, 2016). Monetary authorities across the globe have been increasingly switching over to various electronic payment modes due to its micro as well as macro level advantages. While, at the macro level, it saves hefty amounts spent on printing and circulating physical cash, it offers benefits like convenient ways to carry, easy records of transactions, contactless exchanges, etc. at the micro level (Singhraul & Garwal, 2018). Among countries, Sweden has attained the highest level of cashlessness

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with cash-GDP ratio plummeting to 4% (Khiaonarong & Humphrey, 2019). In the emerging economies of India, Russia and China, the ratio has come down to 11.2%, 10.4% and 9.5% respectively (Herwadkar, 2019).

Adoption of cashless payment modes has been found to depend on age, education, income, gender and geographical location (Arvidsson, 2019). Elderly people, due to their lesser exposure to digital ways, mostly find it difficult to move over to digital modes of payment. Antonio and Tuffley (2014) ascribe gender gap in adoption of digital payment modes to sociocultural barriers that women usually face. Rural areas are generally handicapped in going cashless due to deficiencies in digital infrastructure in villages (Keer et al., 2019; Thomas &Krishnamurthi, 2017). Even in developed Japan, generational gap breeds reluctance towards going cashless (Fujiki, 2020).

India has seen a significant transformation in its payment systems over the past few years, with cashless transactions gaining momentum at an unprecedented rate. This shift towards digital payments has been catalysed by several factors, including governmental initiatives, the proliferation of smartphone usage, and the advent of innovative financial technologies. The Indian government's push for digitalization, marked by the launch of the Unified Payments Interface (UPI) system in 2016, has been a critical driver in this shift. UPI facilitates instant, real-time payments between banks using mobile devices, making digital transactions accessible to a broader segment of the population. The demonetization move in November 2016, which saw the withdrawal of high-denomination currency notes from circulation, further accelerated the adoption of cashless payment methods as citizens looked for alternative means to carry out their transactions. This period witnessed a surge in the use of mobile wallets, online banking, and card payments, with a notable increase in the setup of Point of Sale (POS) terminals across the country. Financial inclusion initiatives have also played a significant role in this transition. Moreover, the COVID-19 pandemic has acted as a catalyst for the adoption of contactless payments, with individuals and businesses alike recognizing the convenience and safety of cashless transactions amidst health concerns.

Despite these advances, India's journey towards becoming a cashless economy faces challenges, including gaps in digital literacy, cyber security concerns, and the need for furtherinfrastructure development in rural and semi-urban areas.A large numbers of Indians are still held-up at the digital fault-line from changing over to cashless payment modes. With the poor overcrowding the lower end of the GDP distribution, it is conceivable that those excluded from digital mode of transactions will be well in excess of 10%, despite the cash-GDP ratio coming down to about 10%. As exclusion from cashless transactions can add another dimension to such people's inherent socioeconomic disadvantage, it was felt necessary to examine the role of different socioeconomic factors restricting inclusiveness of digitisation of payment methods. Accordingly, a field study was carried out in August-September 2020 in a few selected urban and rural pockets of the state of Assam in Northeast India, a region known for its large infrastructure deficit and relatively slower economic progress.

This introduction is followed by an outline of materials and methods used. The sample profile and usage patterns of digital payment methods are delineated in section three. In the fourth section, factors influencing the extent of use of digital payment methods are analysed. Findings of the study and implications thereof are summed up in the concluding section.

Review of Literature

The evolution of the cashless economy is closely tied to the advancements in digital payment methods, evolving alongside the growth of information and communication technology (ICT). The inception of cashless transactions in Europe during the 1980s with the introduction of first-generation plastic cards equipped with smart chips for pre-paid, low-value exchanges marked a significant milestone (Hartmann, 2006). The advent of the internet in the 1990s further propelled the adoption and development of various digital payment instruments, including debit and credit cards, net banking, UPI (Unified Payments Interface), IMPS (Immediate Payment Service), and mobile wallets, among others. The widespread availability of internet access and smartphones has significantly enhanced the convenience and appeal of these payment systems to a broad audience, bolstering their popularity. Nonetheless, digital transactions necessitate specific digital platforms for execution, unlike cash, which is universally accepted and does not require any technical infrastructure. The digital payment ecosystem operates on a dual-market model, necessitating that both transaction participants have access to banking services and digital infrastructure (Mukhopadhyay, 2016). Until now, electronic payments have served as an alternative to traditional payment methods. Recent trends in the volume of digital transactions have sparked predictions that such payments could eventually replace physical cash (Council, 2016). This shift would mean a steady decrease in physical cash circulating within the economy while transactions made through non-cash methods increase. Despite the entrenched nature of cash transactions in India, the period following demonetisation has highlighted a clear move towards adopting digital or non-cash payments (Herwadkar et al., 2019; Chodorow-Reich et al., 2020).

Numerous socio-economic elements influence cashless payment behaviours. Research indicates that factors such as age, education, income, gender, and geographical location significantly shape attitudes towards digital payments (Niehaves et al., 2012; Kruger & Seitz, 2017). Digital literacy, encompassing basic ICT knowledge like internet usage and smartphone functionalities, is crucial for engaging in digital transactions. The term "digital divide," coined in the early 1990s, describes the disparity between individuals with access to ICT and those without (Gunkel, 2003), evolving to also reflect differences in ICT usage levels (Hargittai, 2003). Older generations often encounter difficulties in adopting ICT for digital payments, with studies suggesting that socio-economic factors interplay in complex ways to influence digital payment adoption differently than when considered in isolation. Education, for instance, can mitigate generational divides, enabling older individuals to adapt

to digital payments. Additionally, there's a positive correlation between age, income, and the propensity towards cashless transactions, with males generally perceiving digital payments as more convenient, a perception shaped by societal norms assigning ICT familiarity to males from a young age (Cullen, 2001). Education can also overcome gender-based psychological barriers, increasing women's likelihood to adopt cashless methods.

Rural and underserved areas, hampered by inadequate digital infrastructure, often resist digital payments due to challenges such as insufficient electricity and poor telecom networks (Keer et al., 2019; Thomas and Krishnamurthi, 2017). Even with adequate infrastructure, preferences for cash transactions persist in nations like Japan, where a significant elderly population and a digital divide slow the transition to cashlessness (Omiya et al., 2021; Fujiki,2020). Similarly, countries such as Nigeria, the Philippines, and initially Denmark, grapple with both infrastructural issues and digital divides. In Denmark, efforts to bridge this gap have been partially successful, with a high internet usage rate indicating readiness for cashless payments (Council, 2016). Indonesia's young demographic shows potential for a cashless transition, yet challenges like poor telecom services and a substantial unbanked population hinder progress (Azali, 2016). In India, the push towards financial inclusion through the Jan-DhanYojana which connected a substantial segment of rural households to the banking system, prepared the ground for big push towards cashlessness (Ravi, 2019). Demonetisation of 2016 compelled many to switch to cashless payment methods (Herwadkar et al., 2019). The transition towards a less cash economy gathered further momentum from the requirement of conducting transactions without physical contacts following outbreak of COVID19 pandemic. This complex interplay of factors highlights the multifaceted challenges and opportunities in the global shift towards cashless economies.

The examination of non-cash payment instruments reveals their adoption challenges and economic implications. Despite the advantages of digital payments, including security and convenience, barriers like high transaction costs and the necessity for digital infrastructure limit widespread acceptance. The critical roles of education in facilitating digital payment adoption and cyber security in building trust are also noted (Widjaja, 2016; Oluchukwu, 2014).This review synthesizes insights into the transition towards a cashless economy, emphasizing digital infrastructure, awareness, and socio-cultural factors as key determinants. The potential benefits of cashless payments for economic growth and transaction efficiency are acknowledged, alongside persistent barriers such as digital divides and infrastructural limitations. Future research is directed towards exploring these gaps, with a particular focus on the socio-economic and cultural barriers to cashless adoption in specific regions to guide targeted policy interventions (Nair, 2016; Kathuria, 2018). The present study probes some of these issues in the context of Assam.

Materials and Methods

Data for the study were collected from a sample of 789 individuals selected through a process of multistage sapling from two districts of Assam. Kamrup Metro and Barpeta districts were selected to represent the urban and rural areas respectively. Expectedly, and as confirmed by RBI Database of Indian Economy (2020), Kamrup Metro had greater density of bank branches and ATMs than Barpeta. The Zoo Road area of Kamrup Metro has many commercial establishments, which attracts lot of people making it a suitable location for conducting a survey using accidental sampling in an urban setting. Two villages were selected in Barpeta district to include both connected and interior locations. One of these villages, SatraBaradi is only about two kilometres away from the district head quarter. The other village Sonapur is almost 12 kilometres away from the head quarter. While the sample size for each village was calculated by applying Yamane formula for 5% error, individuals interviewed were selected using convenient sampling to include people from different socioeconomic backgrounds. While 385 respondents were from Kamrup Metro, 203 and 201 were respectively from Satra Baradi, and Sonpur villages of Barpeta.

Inputs gathered from field survey have been first processed by metrics of ratios and percentages. An Index of Digital Payment has then been constructed to capture the extent of use of digital payment by sample individuals. Finally, a multiple regression analysis has been carried out to identify factors significantly influencing the extent of use of digital payment methods by individuals.

A Broad Profile of the Sample and Extent Adoption of Cashless Transaction

Table 1 provides information on the percentage of respondents falling under different categories of gender, age groups, and years of schooling. The data indicates that urban areas have a greater proportion of individuals with higher education as compared to the villages of Sonapur and Satra Baradi.

Figure 1 highlights the differences in the possession of amenities between the three areas, with urban having the highest percentage of people with a smartphone, access to the internet, and a bank account, while Sonapur has the lowest percentage. Notably, disparities are less with respect to having bank accounts in the three locations. SatraBaradi stands somewhere in the middle, with a higher percentage of people having smartphones and access to the internet and bank account than Sonapur.

Table 1: Gender, Age Group and Educational Level-wise Distributions of Sample Respondents in Percentages

Row Labels		Urban	Satra Baradi	Sonapur	Total
Gender	Female	47.53	42.36	33.33	42.59
	Male	52.47	57.64	66.67	57.41
	Total	100	100	100	100
Age Groups	15-39	44.94	40.39	60.70	47.78
	40-59	25.45	52.71	33.83	34.60
	60 & above	29.61	6.90	5.47	17.62
	Total	**100**	**100**	**100**	**100**
Years of Schooling	0-5	-	8.87	37.31	11.79
	6 to 10	4.42	45.32	49.75	26.49
	11 to 12	22.60	19.70	7.46	18.00
	>12	72.99	26.11	5.47	43.73
	Total	**100**	**100**	**100**	**100**

Source: Authors' calculation using Sample data

Figure 1: Percentage of Respondents having Bank Account, Smart Phone and Internet
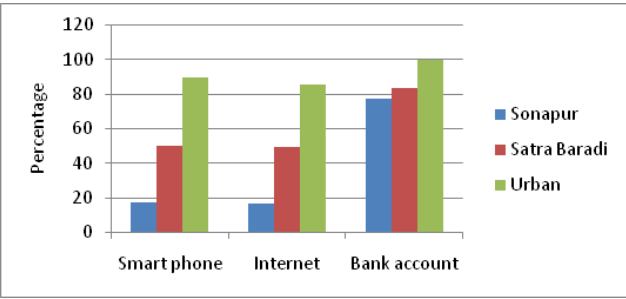
Source: Authors' calculation using Sample data

Cashless Payment: Extent of cashless transaction has been sought to be captured in an index. Respondents were asked whether digital modes were use in paying grocery bill, medical bill, electricity bill, remittances to someone, purchases of clothes and train/bus tickets, mobile and TV recharges, home delivery food bill and online purchases. The index is then defined as the ratio of the number of purposes for which payments were made digitally to the total number of transaction types considered

$$Index\ of\ cashless\ payment\ (ICP) = \frac{Number\ of\ items\ digitally\ transacted}{Number\ of\ items\ transacted}\ (Eq1)$$

Table 2: Distribution of Sample Respondents by Extent of Cashless Payment

ICP Range	Urban	Satra Baradi	Sonapur	Total
Low (Below 0.35)	26.45%	36.02%	37.52%	100%
Moderate (0.35 to 0.7)	92.16%	6.86%	0.98%	100%
High (Above 0.7)	97.40%	2.60%	-	100%
Mean ICP	0.48	0.048	0.0032	0.24

Source: Authors' calculation using Sample data

This average index value is 0.48 for urban area whereas it is only 0.048 and 0.0032 for Satra Baradi and Sonapur respectively. The table 2 shows that cashless payment modes are more often used in urban areas than in rural areas. As we move away from the urban area, index values of cashless payment become smaller and smaller.

Factor Influencing Extent of Use of Digital Payment Methods

For explaining variations in the extent of use of cashless payment methods among sample individuals, the following have been listed as the possible explanatory factors. The existing literature is used as guiding lenses while considering the independent variables (Vehovar et al., 2006; Martin, 2003).

i) Age: Age can be an important determinant of adoption of cashless modes of transaction. After certain age, extent of cashless transaction may increase with age. However, among elderly population, we can expect less use of cashless transaction. Accordingly, the respondents have been grouped into three categories: adult, middle-age and the elderly. To capture the three categories, two dummies are used taking elderly age group (60 and above) as base category.

A1: 1 for people's age between 15-39; 0 otherwise

A2: 1 for people's age between 40- 59; 0 otherwise

ii) Gender: To examine the differences of perception regarding digital payments between genders, a dummy variable has been taken.

G = 1 for male and 0 for female

iii) Education: Use of digital payment methods requires the use of various technological devices, including smartphones and computers, which may be more familiar to individuals with higher levels of education. Hence, we may expect a better educated person to use cashless methods for transaction more extensively. The extent of education of a respondent has been captured in her/his years of schooling **(E).**

iv) Economic status: Higher the economic status of the household greater can be its access to facilities for digital transactions. Per capita household income should have been ideally the indicator of economic status of the household. However,

income data is prone to errors. Accordingly, living standard of a household and the respondent belonging to it has been captured counting the possession of selected consumer durables. The items are bicycle, radio, mobile phone, two-wheeler, television, refrigerator, washing machine, computer, and four-wheeler with respective weights from one to nine (The Market Research Society of India, 2011). The index of economic status is calculated with the help of the following formula:

$$Index\ of\ economics\ status\ (IES) = \frac{Consumer\ durable\ possessed\ valued\ by\ respective\ weights}{Sum\ of\ weights\ of\ all\ consumer\ durables\ consideded}\ (Eq\ 2)$$

v) Location: Geographical location is important since the supply of digital infrastructure (telecom network, internet and bank branches) is not equally developed at all places. In order to capture the extent of cashless payment in the rural and urban areas, two dummy variables are constructed based on the three categories of different locations.

R1= 1 for Satra Baradi; 0 otherwise
R2 = 1 for Sonapur; 0 otherwise

The urban area is considered as a benchmark category.

Table 3:Explanatory Variables with their Expected Direction of Impact

Explanatory Variables	Expected Sign
A1	+
A2	+
G	+ / -
E	+
IES	+
R1	-
R2	-

Thus, the basic model has been formulated as-

ICP = F (A1, A2, G, E, IES, R1, R2)   Eq (3)

The dependent variable is not only bounded between 0 and 1 but there are clusters of observations at both the ends. Hence the appropriate econometric specification for equation 3 is Tobit regression. The Tobit regression is defined using the latent variable Y^* where

$$Y_i^* = \alpha + \beta_1 A1_i + \beta_2 A2_i + \gamma G_i + \delta_1 E_i + \lambda IES_i + \mu_1 R1_i + \mu_2 R2_i + \varepsilon_i\quad Eq\ (4)$$

ε_i is the error term.

Y* is linked to the values of the dependent variable ICP in the following way:

ICP = Y* if 1>Y*>0

ICP = 0 if Y*≤0 and

ICP = 1 if Y*>1

Maximum Likelihood estimates of the parameter in equation 4 along with the model diagnostics are presented in Table 4.

Table 4: Results of Tobit Regression of Index of Cashless Payment

Variables	Estimated Coefficients/ Values	't' values
Constant	-1.911	-13.12***
A1	0.965	20.49***
A2	0.646	13.12***
G	0.163	5.37***
E	0.093	10.02***
IES	0.393	4.21***
R1	-0.603	-5.88***
R2	-0.679	-14.39***

*Log likelihood: -170.27, LR Chi2 (12): 1012.80***, Pseudo R2: 0.748*

*Note: **, *** indicate significance at 5% and 1% level respectively.*

Source: Authors' calculation using Sample data

The Tobit regression results of the Index of Cashless Payment (ICP) provide insightful observations into the factors influencing the extent of cashless transaction usage among individuals. The coefficients represent the expected change in the latent propensity to use digital payments per unit change in the predictor variables, holding all other variables constant.

To examine the pattern of cashless transactions among people of different age groups two dummy variables (A1 and A2) are taken in the regression model. The positive and significant coefficient A1 indicates that adults (aged 15-39) are more likely to engage in cashless transactions compared to the elderly (aged 60 and above), suggesting that younger individuals are more inclined towards digital payments. Similarly, the positive and significant coefficient A2 shows that middle-age group individuals (aged 40-59) also have a higher propensity for cashless payments than the elderly, though less so than younger adults. This trend might be attributed to younger and middle-aged adults being more familiar and comfortable with digital technology, having grown up during its rapid evolution. They are likely more adept at navigating digital platforms and thus more inclined to utilize digital payment methods over traditional cash transactions. This reflects a broader shift in societal behaviours towards digitalisation, where younger generations lead in the adoption of new technologies.

The positive and significant coefficient Gender dummy (G), suggests that males are more likely to use digital payment methods compared to females, reflecting possible gender disparities in access to or comfort with digital payment technologies. Cultural and societal norms may also play a role, where men might have more exposure to technological gadgets and platforms, thus feeling more confident in using digital payment systems. This insight underlines the need for targeted educational and outreach programs to bridge the gender gap in digital payment usage, ensuring women have equal access to and confidence in using these technologies. The results confirm the findings of the study by Cooper (2006) on "Digital Divide".

Cashless payments are also found to be positively influenced by the level of education (E) of the users of various digital platforms. Thus higher educational attainment seems to facilitate the adoption of digital payment methods backed by higher digital literacy making individuals more comfortable with and capable of using digital technologies. Education not only provides the necessary skills to navigate digital platforms but also fosters a mindset open to adopting new technologies. This finding emphasizes the importance of incorporating digital literacy into educational curriculums to prepare individuals for an increasingly digital economy.

The Index of Economic Status (IES) also has a positive and statistically significant coefficient, suggesting that higher economic statusis associated with a greater likelihood of using cashless payments. This relationship can be understood through the lens of access and propensity. Higher economic status often correlates with greater access to necessary technologies, such as smartphones and internet services, which are fundamental for engaging in digital transactions. Additionally, individuals with higher economic status may have a larger volume of transactions or more complex financial needs, making the convenience and efficiency of digital payments more appealing. This insight suggests that economic empowerment and access to consumer technology are critical drivers in the transition to a cashless economy.

To examine the extent of cashless payments in rural areas two rural dummies R1 and R2 are considered. While R1 represents a rural area relatively nearer to an urban centre, R2 refers to a relatively distant rural area from the reference urban centre. As the results indicate the coefficient for both the two dummies are statistically significant & negative, indicating that people from both the rural areas are less likely to make cashless payments compared to those from the urban benchmark category.

This disparity likely stems from variations in the availability of digital infrastructure and banking services, which are crucial for supporting digital payments. The considered rural areas, (SatraBaradi and Sonapur), may suffer from inadequate internet connectivity, fewer banking facilities, or limited access to financial education, all of which can hinder the adoption of cashless methods. This finding highlights the importance of addressing infrastructural and service-related gaps to ensure equitable access to digital payment systems across different geographical regions.

Overall, the results highlight the significance of age, gender, education, economic status, and geographical location in determining the extent of cashless payment usage, underlining the multifaceted nature of digital payment adoption across different segments of the population.

Conclusion

Despite spread of digital transactions in India, a significant portion of population still mostly uses physical cash payments in the relatively less developed state of Assam. Digital infrastructure in rural areas being deficient compared to the same in urban areas, proportion of digital transaction is significantly lower in villages than in cities. Given the state of digital infrastructure, economically and educationally more advantaged individuals have been able to take greater advances in shifting to cashless digital modes of transactions. Women and older people have lagged behind their male and younger counterparts respectively in moving over to cashless payment modes. The study thus confirms that the process of change-over to a less-cash economy is beset with disparity along the conventional distributional fault-lines based on gender, location (urban-rural), age, economic status and level of schooling. The changeover, beneficial as it may be in the aggregate, does add a further dimension to inequality in our society. It is however worth noting in this context that even Denmark, which today is practically cashless, experienced age and location specific exclusions in its early stages of drive towards cashlessness. But such exclusions have been overcome by strengthening necessary infrastructure and broadening digital literacy (Eriksen, 2011). This inspires us to think that the observed exclusions in India need not be insurmountable and can be addressed through suitable interventions.

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