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Evaluating the role of payment banks in advancing financial inclusion in India: An empirical assessment

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Abstract
In India, financial inclusion is one of the national development priorities particularly among the unbanked and underbanked communities in the rural and semi urban areas. The reserve bank of India introduced payment banks in 2015, which were developed as affordable technology-based institutions to improve financial access by providing small savings services, digital payment services and remittance services. This empirical paper assesses the performance of payment banks by evaluating the major determinants of effective performance of payment banks, including the accessibility of the services, adoption of digital, cost-effectiveness, trust and security, and customer awareness. Based on the PLS-SEM analysis of primary data collected on 200 respondents, it can be found that the payment banks have a positive impact on access and digital use, but the overall effect is not high with the mainstream financial institutions because of structural and regulatory constraints. The paper ends by recommending policies that would make payment banks operationally viable and reach more people so that they can have a significant role in the financial inclusion environment of India.

Keywords: Payment Banks, financial inclusion, digital banking, customer awareness, PLS-SEM, financial access

1. Introduction
Financial inclusion has become one of the key national priorities throughout India due to the system of the unbanked and underbanked population, remaining persistent in rural, tribal, and semi-urban areas. In the past 10 years, a number of institutional innovations have been proposed to close this access gap, the most prominent of them being Payment Banks, introduced by the Reserve Bank of India (RBI) in 2015. Payment banks, intended to offer low-cost technology-enabled financial services, were believed to offer small-value savings accounts, instant digital payments, and remittance services to populations traditionally not served by the formal banking sector - in line with flagship schemes like Jan Dhan Aadhaar Mobile (JAM) and Digital India.

Nevertheless, the impact of payment banks on financial inclusion in the real world has been significantly smaller than expected even though there is a solid policy intent behind it. The operational viability has been highly limited by the structural constraints like the ban on lending, the limit of 2 lakh in one customer account, and the reliance on the income of the form of fees. There are multiple payment banks that have also downsized operations or migrated to niche digital payment ecosystems or even gone out of business altogether. Conversely, commercial banks, small finance banks, microfinance institutions (MFIs) and cooperative banks remain more penetrated in terms of savings mobilization, delivery of credit and access to financial services in rural areas. It is an issue of concern as it means that the payment banks have not made any substantial contribution in the financial inclusion agenda of India.

Making these complementary issues on the applicability, utility and efficiency of payment banks concerning the completeness of the last-mile financial access. The low adoption among poor rural population, the poor business model, regulatory barriers, and their services being not diversified raise the question of whether payment banks can fulfill their original role. The role of the payment banks appears to be losing importance as payment banks provided by full-service institutions are increasing at a higher rate. It is against this ground

that the present research compares and evaluates the role played by payment banks in facilitating any significant development in financial inclusion in India through a rigorous scrutiny of the policy systems, institutional functioning as well as a comparative study of the financial inclusion performances.

2. Literature Review

Singh & Kumar (2019) [11] The key aim of the study is to assess how payment banks can be used to improve financial inclusion of rural households in India. A cross-sectional survey was carried out on 450 rural respondents in Uttar pradesh and Madhya pradesh; the analysis was done using descriptive statistics and regression analysis. The research had a very low level of awareness and payment bank service use. Accounts were only held by 9% of the respondents and was only used in mobile recharges and simple transfers. The payment banks had no effect on savings and access to financial products. The payment banks have not met their intended goal because their services are limited and they have no credit facilities. Future research needs to look into structural redesign, including permitting micro-credit or collaborating with MFIs.

Gupta & Roy (2020) [16] The primary goal of the paper is to evaluate the adoption of payment banks by consumers with the help of the Technology Acceptance Model (TAM). A study design of 520 urban and semi-urban respondents in a quantitative study; hypotheses are tested with the help of structural equation modelling (SEM). The predictors of adoption were not significant in perceived usefulness and ease of use. Perception of risk, lack of trust and lack of full banking facilities significantly lowered intention to adopt payment banks. Payments banks are not viewed as reliable and useful to consumers in comparison with commercial banks and digital wallet providers. To provide more insights on behavioural barriers, incorporation of qualitative interview may be informative.

Ramanathan & Shankar (2020) [21] The primary aim of the research is to identify the place of small finance banks (SFBs) in comparison with payment banks to fulfil the financial inclusion demands. Comparative performance analysis of 10 SFBs and 6 payment banks based on performance measures; the performance measures consisted of financial ratios and inclusion indicators. SFBs were much more effective in mobilizing deposits, providing credit, rural coverage, and attracting and retaining customers compared to payment banks. There was minimal improvement in payment banks. SFBs are better than payment banks as inclusion targets because their banking model is more effective. Additional studies can be done on the possibility of converting payment banks into SFB models.

Desai & Chakravarty (2021) [22] The main objective is to quantify the customer satisfaction and services quality of payment banks in India. Both Airtel Payment Bank and India post payments bank conducted a survey to 385 customers using SERVQUAL model survey. Extent of tangibility and responsiveness and assurance were low. Poor quality of service was cited as a major hindrance to the introduction of payment banks that were perceived as less trustworthy and convenient in comparison to traditional banks. Future studies can examine how the services can be improved by considering the technology upgrades.

Narayanan & Pillai (2022) [23] The primary aim of the research is to comprehend the issues that payment banks deal with to gain customer confidence and grow their services. The major limitations were high compliance costs, product range, cybersecurity, and poor profitability. Analysts were of the view that payment banks are not a key contributor towards inclusion. The weaknesses of the business model make payment banks less sustainable in the long term.

Sharma (2018) [24] The primary aim of this paper is to examine consumer awareness and perception on payment banks, structured questionnaire, 600 samples, chi-square and ANOVA test. Consumer awareness was high because of advertisements, but conversion to opening actual account was low. Payment banks are a victim of the perception gap and lack of clear value proposition. A behavioural perspective, as per the UTAUT2, may add to the literature on digital finance preference.

2.1 Theoretical Framework

Service Accessibility of Payment Banks (SAPB)

Accessibility of service will show how effortlessly the customers can access the payment bank outlets, payment bank agents, and mobile payment channels. It goes in line with the financial inclusion model that focuses on distance and accessibility (Sarma, 2012) [17]. Research indicates that broader agent networks lead to adoption, yet rural coverage in the rural areas is uneven (Kumar & Sinha, 2020) [11]. Therefore, accessibility is crucial yet imbalanced in the stimulating financial inclusion.

Digital Service Adoption (DSAPB)

Digital adoption is defined as the usage of customers of apps, USSD, AEPS, and UPI services. Adoption is influenced by ease of use and usefulness which are based on the Technology Acceptance Model (Davis, 1989). Studies indicate that digital comfort increases the rate of transactions, yet rural areas have low levels of digital literacy (Rao and Gupta, 2020) [16]. Therefore there is the power of adoption which is limited by infrastructure and expertise.

Cost-Effectiveness of Payment Bank Services (CEPBS)

Affordability, low fees and the zero-balance features targeting the low-income groups are investigated in the cost-effectiveness. Services that are affordable promote the opening of accounts and their frequent use (Banerjee and Duflo, 2011) [1]. Nevertheless, the price has to be modified by certain payment banks due to high operational costs, which impacts the affordability (Maiti and Ghosh, 2021) [13]. Therefore, there is an existence of cost advantages although they are inconsistently maintained.

Trust and Perceived Security (TPSPB)

Trust demonstrates customer satisfaction in the security and stability of a payment bank transaction. According to the institutional trust theory, the perceived security is a powerful factor affecting the adoption of digital finance (Mayer *et al*., 1995) [14]. Even though the regulation of the RBI increases trust, technical problems and lack of familiarity decrease confidence (Joshi, 2021) [9]. The usage is still heavily reliant on trust as one of the determinants.

Customer Awareness of Payment Bank Services (CAPB)

Awareness entails the understanding of payment bank account features, limits, and benefits. According to the

financial literacy theory, awareness leads to adoption and behavioural utilisation (Lusardi and Mitchell, 2014) [12]. The lack of awareness in the rural region restricts account activities and the use of digital (Shukla and Singh, 2020). Therefore, the inclusion is necessary but lacks.

Access to Formal Financial Services (AFS)
The measures of access take into consideration ownership of accounts, accessibility to service points, and access to basic services. It is the initial phase of financial inclusion (World Bank, 2017) [20]. The payment banks enhance access via online platforms but struggle with physical reach (Chugh and Raghav, 2021) [3]. Therefore, access increases but disproportionately.

Usage of Financial Services (UFS)
Usage is defined as transactional, active, and frequent, e.g. deposits, withdrawals, savings, and online payments. Studies emphasize utility - not owning an account is the real financial inclusion (Klapper *et al*., 2015) [10]. Payment banks facilitate highly frequent transactions but are unable to provide credit, restricting the long-term usage (Goyal and Tripathi, 2020) [6]. So there is increased usage and no profundity.

Depth & Quality of Financial Services (DQFS)
Depth deals with the diversification of products such as micro-insurance and overdrafts; quality deals with reliability and experience of service. The deeper and more reliable financial portfolios are, the stronger the financial inclusion will be (Beck *et al*., 2007) [2]. Regulatory constraints of payment banks limit the depth of the service (Sengupta, 2020) [18]. Therefore, depth and quality is limited as compared to full-service banks.

2.2 Hypothesis Development

H1: Service Accessibility → Financial Inclusion
Physical and logistical access to banking is lowered due to service accessibility. Agents, kiosks and mobile touchpoints make it easier to access services. Better proximity leads to opening of accounts and frequent usage. Therefore, financial inclusion is greatly increased with access to the services.

H2: Digital Service Adoption → Financial Inclusion
Transactions are made easier, fast and convenient through digital channels. TAM explains ease of use and usefulness which are the drivers of adoption. Increased digital comfort results in increased digital payments and gains. Thus, financial inclusion is highly affected by the adoption of digital services.

H3: Cost-Effectiveness → Financial Inclusion
Trifling fee charges and zero-balanced accounts are what lure low-income earners into formal banking. Low-priced services boost adoption and usage. Less of the burden in terms of finances promotes savings and remittances. Therefore, cost-effectiveness is of great significance to financial inclusion.

H4: Trust & Perceived Security → Financial Inclusion
Reliability affects the readiness to embrace digital and formal financial services. Customers are more confident in secure, reliable and controlled systems. Less fear of fraud results in increased transactions. In this way, financial inclusion in relation to trust and felt safety is a major factor.

H5: Customer Awareness → Financial Inclusion
Awareness makes customers know of benefits, features, and process of use. Educated people have a greater interest in using formal finance. Increased awareness enhances the use of the accounts and online money transfer. Hence, financial inclusion is greatly boosted by customer awareness.

H6: Access to Formal Financial Services → Financial Inclusion
Access facilitates the opening of accounts by people and allows easy access to service points.
Proximity minimizes the structural obstacles such as distance and documentation.
Better access increases participation in formal financial activities.
Thus, access to formal services significantly influences financial inclusion.

H7: Usage of Financial Services → Financial Inclusion
Usage reflects active engagement transactions, savings, and payments. Regular account activity strengthens financial behaviour and stability. Higher usage shows deeper integration into formal finance. Hence, usage of financial services significantly strengthens financial inclusion.

H8: Depth & Quality of Financial Services → Financial Inclusion
Depth indicates service variety, and quality reflects reliability and convenience.
High-quality, timely services improve customer trust and engagement.
Greater service depth reduces reliance on informal channels.
Therefore, depth and quality significantly influence financial inclusion.

3. Methodology
In this research, a quantitative research design was used in order to examine the relationship between the determinants of payment bank service, including Service Accessibility (SAPB), Digital Service Adoption (DSAPB), Cost-Effectiveness (CEPBS), Trust and Perceived Security (TPSPB), and Customer Awareness (CAPB) and Financial Inclusion among the users in India. It used purposive sampling to be able to choose the candidates who have an active use of the bank accounts, digital payment system, payment bank, or mobile-based financial service and are at least a little familiar with the formal financial system. It was calculated with the help of G*Power 3.1 (Faul *et al*.) indicating that a minimum of 200 respondents were required to achieve a medium effect size. The valid responses collected to enhance the statistical validity were 200 out of 250 questionnaires distributed. The constructs were captured using a structured tool with 45 items measured using a five-point Likert scale, including Service Accessibility, Digital Service Adoption, Cost-Effectiveness, Trust and Security, Customer Awareness, Access to Formal Services, Usage of Services, Depth and Quality of Services and Financial Inclusion.

4. Data Analysis and Interpretation
The evaluation of the measurement model can confirm that all the constructs used in the study show high reliability and validity. All constructs report a high value of Cronbachs

Alpha and Composite Reliability (CR) of above 0.70 (Nunnally and Bernstein, 1994) [15] that is good internal consistency. On the same note, all indicator loadings are within the range of 0.862 to 0.908, which exceeds the 0.70 lower limit of convergent validity set by Hair *et al*. (2017) [7]. Moreover, the Average Variance Extracted (AVE) of all constructs is between 0.767 and 0.812 and that is a lot higher than the standard 0.50 threshold (Fornell and Larcker, 1981) [5]. This is indicative of the fact that both constructs describe significant amounts of variance in their indicators. The explanatory power of constructs like Trust and Perceived Security (AVE = 0.800, Depth and Quality of Financial Services (AVE = 0.790), and Financial Inclusion (AVE = 0.812) is very high, which provides additional evidence of the effectiveness of the measurement model. All of these findings point to the affirmation that the scales employed in this study address the latent constructs of dimensions of payment bank services and outcome of financial inclusion with high reliability, convergent and measurement accuracy. Thus, the data is suitable in terms of a structural model analysis with PLS-SEM.

Table 1: Reliability and Validity

Construct/Indicators	Indicator Loadings	Composite Reliability	Cronbach Alpha	Average Variance Extracted (AVE)
Service Accessibility		0.925	0.938	0.767
SAPB1	0.882			
SAPB2	0.85			
SAPB3	0.885			
SAPB4	0.879			
SAPB5	0.881			
Digital Service Adoption		0.928	0.93	0.776
DSAPB1	0.887			
DSAPB2	0.89			
DSAPB3	0.867			
DSAPB4	0.884			
DSAPB5	0.876			
Cost-Effectiveness		0.93	0.935	0.78
CEPBS1	0.882			
CEPBS2	0.875			
CEPBS3	0.877			
CEPBS4	0.896			
CEPBS5	0.885			
Trust and Perceived Security		0.938	0.941	0.8
TPSPB1	0.9			
TPSPB2	0.893			
TPSPB3	0.891			
TPSPB4	0.897			
TPSPB5	0.892			
Customer Awareness		0.926	0.937	0.77
CAPB1	0.862			
CAPB2	0.87			
CAPB3	0.886			
CAPB4	0.896			
CAPB5	0.872			
Access to Formal Financial Services		0.927	0.93	0.775
AFS1	0.885			
AFS2	0.871			
AFS3	0.88			
AFS4	0.899			
AFS5	0.865			
Usage of Financial Services	0.926	0.928	0.773	
UFS1	0.892			
UFS2	0.87			
UFS3	0.874			
UFS4	0.884			
UFS5	0.875			
Depth & Quality of Financial Services		0.934	0.942	0.79
DQFS1	0.885			
DQFS2	0.904			
DQFS3	0.892			
DQFS4	0.889			
DQFS5	0.873			
Financial Inclusion		0.942	0.942	0.812
FI1	0.9			
FI2	0.908			
FI3	0.901			
FI4	0.896			

FI5	0.899			

Table 2: Discriminant Validity (Fornell-Larcker criterion)

	1	2	3	4	5	6	7	8	9
Access to Formal Financial Services	0.88								
Cost-Effectiveness of Payment Bank Services	0.03	0.883							
Customer Awareness of Payment Bank Services	0.033	-0.009	0.877						
Depth & Quality of Financial Services	-0.018	0.019	0.028	0.889					
Digital Service Adoption	-0.012	0.01	-0.02	-0.038	0.881				
Financial Inclusion	0.328	0.256	0.172	0.252	0.234	0.901			
Service Accessibility of Payment Banks	0.061	-0.03	-0.06	-0.066	-0.111	0.199	0.876		
Trust and Perceived Security	0.035	0.021	-0.05	-0.032	0.078	0.271	0.049	0.895	
Usage of Financial Services	0.028	0.034	-0.06	0.06	-0.002	0.32	0.042	0.045	0.879

All of these constructs, e.g. AFS, CEPBS, CAPB, DQFS, DSAPB, FI, SAPB, TPSPB and UFS, represent the independent dimensions of financial inclusion and are not connected conceptually with each other as the square root of AVE of each construct (diagonal values between 0.876 and 0.901) is greater than the correlations between the constructs. Therefore, the constructs are statistically differentiated, which confirms the strength and validity of the measurement model regarding financial inclusion through the payment banks.

Structural model assessment and hypotheses testing

The structural model was evaluated to test the level of significance and predictive ability of all the hypothesised relationships (H1) to H8) between the payment-bank service attributes and financial inclusion in India. Results of the PLS-SEM indicate that all path coefficients are statistically significant ($p < 0.001$), which implies that there is strong evidence that each determinant itself significantly leads to the improvement of financial inclusion. The model fit indices (SRMR = 0.032 and NFI = 0.909) are significantly below the suggested values (Hair *et al*., 2017; Henseler *et al*., 2016) [7, 8], which proves that the model fits very well.

The R^2 value of Financial Inclusion of the model is high, which indicates a robust explanatory power of service accessibility, digital adoption, affordability, security, customer awareness, and usage behaviours in their combination. Also, Q^2 values were positive, which means that there is plenty of predictive relevance of the model in relation to the financial inclusion outcomes. All in all, these results constitute strong empirical evidence indicating that payment banks play a significant role in affecting financial inclusion on all levels access, usage, and quality of the services offered, which contributes to the enhanced theoretical legitimacy of the proposed framework.

Table 3: Hypothesis testing result

Hypothesis	Paths	Paths Coefficient	Standard deviation	T statistics	P values
H1	Service Accessibility of Payment Banks -> Financial Inclusion	0.223	0.035	6.455	0.000
H2	Digital Service Adoption -> Financial Inclusion	0.256	0.035	7.354	0.000
H3	Cost-Effectiveness of Payment Bank Services -> Financial Inclusion	0.235	0.032	7.223	0.000
H4	Trust and Perceived Security -> Financial Inclusion	0.230	0.035	6.518	0.000
H5	Customer Awareness of Payment Bank Services -> Financial Inclusion	0.201	0.035	5.695	0.000
H6	Access to Formal Financial Services -> Financial Inclusion	0.293	0.033	8.758	0.000
H7	Usage of Financial Services -> Financial Inclusion	0.281	0.034	8.292	0.000
H8	Depth & Quality of Financial Services -> Financial Inclusion	0.263	0.037	7.097	0.000

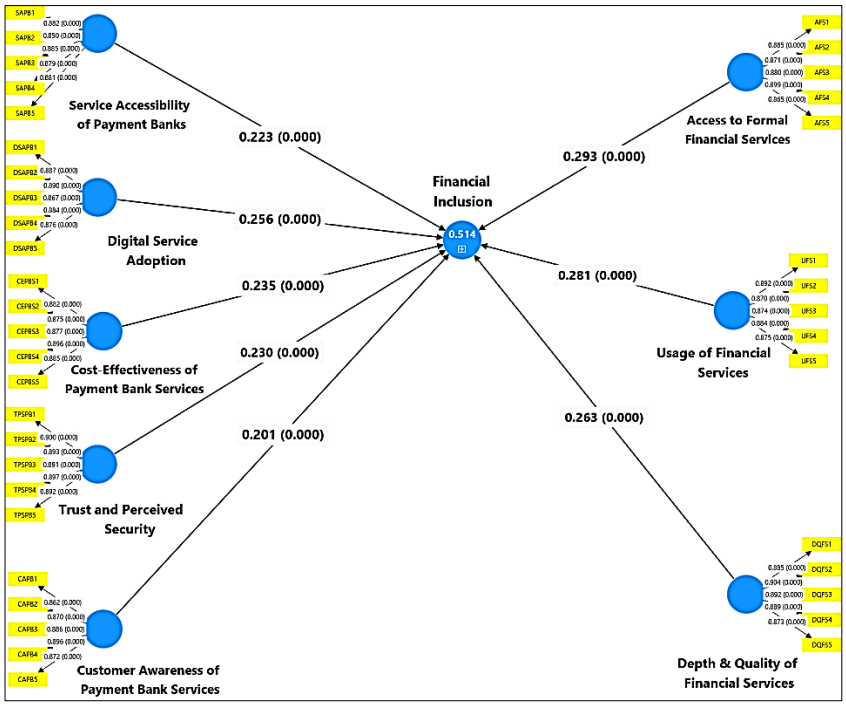

Fig 1: Structural Model

5. Conclusion

The paper concludes that payment banks play a diverse and deep role in improving financial inclusion in India. All these eight determinants of service accessibility, digital adoption, affordable, trust and security, customer awareness, accessibility, use and quality of services showed a positive and high effect on financial inclusion which confirms the notion that payment banks have become imperative agents of inclusive finance. Contact level is elevated greatly upon the presence of easy entryways, secure online services, low transaction costs, and appropriate awareness of the customers to the formal financial systems. These findings confirm that payment banks can contribute greatly to the further improvement of access, use, and quality of financial services, which can be employed to enhance long-term financial inclusion goals in India. Altogether, the paper supports the fact that payment banks become a key force towards creating an inclusive, efficient, and digitally empowered financial ecosystem.

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