Financial Inclusion through Digitalisation: Economic Viability for the Bottom of the Pyramid (BOP) Segment

Abstract

The bottom of the pyramid (BOP) in every developing and frontier economy represents a largely untapped segment of the market that is excluded from formal financial markets because it cannot be served using the traditional financial market channels. We use a mixed-method approach to examine the challenges and intricacies of financial inclusion for the BOP segment in developing and frontier economies. To build a foundation for this debate, we conduct a review of the financial services and intermediaries serving the BOP, using case studies, experts' insights, and quantitative analysis. Perspectives drawn from case studies of microfinancing firms and experts' insights are used to explain the collaborations between businesses and formal institutions that can create a viable economic channel useful for serving the BOP segment. Further quantitative analysis demonstrates that a higher degree of financial inclusion for the BOP segment is likely to be achieved through the digitalisation of formal financial intermediaries, like banks.

Keywords: BOP, Unserved Population, Disruptive Innovation, Economic Viability, Financial Inclusion

Paper type: Original research paper

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1. Introduction

A report by the World Bank Global Findex (2018) highlights that the BOP segment suffers from financial exclusion because of its inability to access benefits offered by a formal financial services sector. Poverty, debt, lack of financial literacy, lack of supply or demand for products and goods, and inordinate cost of healthcare are many caveats surrounding financial exclusion (Marron, 2013; Neaime & Gaysset, 2018; Kanungo & Gupta, 2021). The UN's target to achieve universal financial access by 2025 recognises financial inclusion as a fundamental component of socioeconomic growth (UN, 2018). The findings in the World Bank Global Findex (2018) report were based on the non-consumption of financial products and services by 65% of the population in India, 76% in sub-Saharan Africa, and 63% in the Philippines. Particularly, these figures reflect the number of individuals who do not have an account at a formal financial institution. Therefore, first, reaching out to the underserved BOP customers and second, converting the non-customers into customers in an economically viable formal manner, are key challenges for formal financial institutions and intermediaries like banks, which require BOP customers to prove their identity (Bang & Joshi, 2012; Agnihotri, 2013; Bhattacharyya, 2019). Currently, the financial-services-related needs of BOP customers, such as making money remittances, are being served by informal financial systems that exist in several developing and frontier economies (David-West et al., 2018; Lashitew et al., 2019; Iheanachor et al., 2021). In South Asia, 65% of people use informal channels for transferring money, as do 35% in African countries (Godoy et al., 2012; Kendall et al., 2012; Kendall et al., 2013; Makholwa et al., 2020). These figures suggest that while there is still a largely untapped market for remittance-related services at the BOP, the lack of a formal financial channel to offer low-cost products and accessible services remains an issue for this segment. Particularly for the BOP, financial intermediaries and unserved customers are anchored on the concept of financial inclusion (Schuster & Holtbrügge, 2012; Bremermann et al., 2019; Makholwa et al., 2020; Ababio et al., 2021). Financial inclusion carries practical implications for the BOP segment, where

financial intermediaries like banks play a significant role by offering and promoting lending, credit, savings and deposits (Chawla & Goyal, 2021; Tanda & Schena, 2019, p. 97). Meanwhile, framing theoretical aspects of financial inclusion helps managerial perspectives and contributes to the financial inclusion initiatives that are concerned with the unserved and marginal customers at the BOP. Although there are no commonly acknowledged theories of financial inclusion, our study is broadly situated within the theories of community-systems-dissatisfaction (Ozili, 2020). Particularly, we reframe and examine financial inclusion at the BOP through the community and customer perspectives, personal experience narratives, and channels of financial intermediaries like banks. Banks, through digitalisation, play a prominent role in financial inclusion as the principal depository by offering ease of access and prompt financial services (Kanungo & Gupta, 2021; Lashitew et al., 2019; Kochar, 2018).

Managers can create a space, as proposed by the Blue Ocean strategy, for their product or service in an uncontested market. They can disrupt the space, both physical and digital, in which competitors operate by making them irrelevant (Kim & Mauborgne, 2014; Carton, 2020). Firms aiming to enter BOP markets should collaborate with firms that have the capability to innovatively operate in a resource-constrained environment based on their micro-level knowledge of the diversity that exists in the market and the products sought after by the segment (Reficco and Marquez, 2009; Fan et al., 2019; Dembek et al., 2020). A collaborative entry, through various provisions such as marketing integration, platform digitalisation, and efficient management of locale and external knowledge, provides easy access into the market. This is based on a better understanding of the customers, a sense of the feasibility of including a distribution system in the business plan, and an appropriate marketing communications plan suited to the new environment (London & Hart, 2004; Gomber et al., 2018; Kalaignanam et al., 2021). Several financial institutions are making an effort to bridge these differentials. This can be viewed from the perspective of disruptive innovation theory, which attempts to explain how practitioners have been able to create products and services that meet the basic needs of BOP customers in a resource-constrained market (Hart & Christensen, 2002; De Silva et al., 2018; Sengupta et al., 2021). Disruptive Innovation theory, introduced by Christensen (1997), explains how disruptive innovations create good-enough products that support consumption and initially appear inferior to

products for mainstream customers, but which perform better on alternative dimensions. Continuing discourse on disruptive innovation has failed to recognise the naïve customers who are not being served; in particular, such customers are unaware of the services available to them (Hart & Christensen, 2002; Markides, 2006; Simanis & Hart, 2009; Govindarajan et al., 2011; Sengupta et al., 2021). Furthermore, extant studies do not adequately address two very significant market-related issues: 1) how to bring an un-serviced and unwilling customer into the market (this, in a sense, refers to the BOP segment); and 2) how to use both traditional and non-traditional business models and involve financial intermediaries to create economically viable products and services for the BOP segment.

To fill this gap in the literature, we primarily build on the work of London & Hart (2010), with broader reference to the studies of Agarwal et al. (2018), De Silva et al. (2020) and Dembek et al. (2020), who argued that it is not possible to drive BOP markets without collaborating with entities that engage themselves with the local community. Our study classifies collaborations identified by London & Hart (2010) into traditional and non-traditional partners to reflect on their contributions to promoting financial inclusion. As such, collaboration based on resources and infrastructure can help entrance into the market, resulting in the identification of customers who do not have access to services (Roatynskj, 2011; Ho et al., 2020). Particularly, we reframe collaboration as provisions that offer marketing integration, platform digitalisation and efficient management of locale and external knowledge to access the market (London & Hart, 2004; Gomber et al., 2018; Kalaignanam et al., 2021; Sengupta et al., 2021). So far, studies have paid marginal attention to the extent to which collaboration has influenced the recent market structure and digital platforms, or exploited external knowledge to gain access to the unserved, marginalised BOP segment. Unlike several recent studies (Ababio et al., 2021; Kanungo & Gupta, 2021; Lawson-Lartego & Mathiassen, 2021; Srivastava et al., 2020; Makholwa et al., 2020; Surana et al., 2020), ours addresses an urgent gap in the theory and practice of financial inclusion that is focused on the BOP segment, the role of financial intermediaries, and the process of financial inclusion. We establish the causal inferences between them, drawing on the inconsistencies – the disparity in resource allocation, differentials in market provisions, and levels of inequity in practice – that have extensively affected the process of financial inclusion for the BOP.

Therefore, we attempt to answer several questions to explore the financial inclusion of the BOP segment and the effects of digitalisation that has been channelled through financial intermediaries like banks. We do so first by using 4 case studies surrounding issues and related challenges that the BOP segment faces in India. Second, we use the expert insights of 12 managers, through their personal experience, working in India and Africa for 2 financial services companies serving the BOP segment. Third, we undertake a quantitative analysis to explore the extent to which Indian public sector banks are outreaching to the BOP segment through digitalisation. Both the case studies and experts' insights ask the following questions: How can we bring an unserved and unwilling customer into the market? How to disrupt regular business models for creating the economic viability of products and services to the customers of the BOP segment? And how can managers weave a social agenda such as the financial inclusion of BOP into their business models? To supplement, we use a quantitative analysis examining Indian public sector banks and their financial inclusion initiatives that have been undertaken for the BOP segment through digital platforms. We explore if there were any discernible differences in their services prior to undertaking digitalisation, and the extent to which digitalisation has significantly improved banking access and extended financial inclusivity to the BOP segment of India.

Our study offers substantive contributions to the BOP and financial inclusion discourse, which refers to the entry modes of firms through collaboration with formal financial services into the BOP segment, by disrupting existing market channels and achieving the purpose of financial inclusion. We find that mobile remittance through digitalised platforms is disrupting the traditional means of financial transactions and offering formal financial access to the BOP segment, through the Mobile Money Channel (MMC) and the Alternative Banking Channel (ABC). We further illustrate how the digitalisation of formal financial intermediaries like banks is expediting the process of financial access and extending wider financial inclusivity to the BOP segment. Our study also shows the extent to which the potential of the BOP segment can be harnessed through non-traditional business models, and how the impact of business models through collaboration can help firms to achieve socioeconomic equity without compromising profit allocation.

The remainder of the paper is organised as follows. Section 2 draws upon literature to present the complexity and richness of the underlying phenomenon. Section 3 outlines and discusses the research methods. Sections 4 and 5 explore the case studies and experts' insights, respectively, to detect patterns and regularities across different cases and present a synthesis of experts' insights. Section 6 presents the quantitative analysis and documents the results. Section 7 underscores various policy implications followed by conclusions.

2. Literature review

Innovation is fundamental to economic progress and creates material value for the market (Fan et al., 2019). Disruptive innovation theory explains how existing markets can be disrupted by products that can create value for those non-consumers who are happy to use a simpler, modest and affordable version of high-end goods (Hart & Christensen, 2002; Christensen et al., 2015; Teece, 2018; Benzidia et al., 2021). Particularly, disruptive innovation, as argued by Chawla and Goyal (2021), implicitly relates to the digital transformation of business models. As such, digitalisation as an enabling part of disruptive innovation is increasingly and consistently altering the traditional market structure (Majumdar et al., 2018) and leading to an alternative business model, where unserved customers are benefited through immediate access to formal markets (Gelashvili, 2021). We, referring to the Blue Ocean strategy, identify an appropriate business model that disrupts the consumption of informal services and encourages BOP consumers to use formal services as central to value creation (Kim & Mauborgne, 2014). As extant literature on formal consumption of services by BOP consumers is limited (Schuster & Holtbrügge, 2012; Alibhai et al., 2018; Srivastava, Mukherjee, & Jebarajakirthy, 2020), we review previous studies on business models used by firms to serve the BOP segment through the lens of disruptive innovation theory. Although our research does not cover an exhaustive list of previous studies surrounding disruptive innovation referring to the BOP segments of developing nations, it highlights the most relevant studies to find answers to our research enquiries.

The modes adopted by multinational companies (MNCs) to enter into the BOP segment are largely based on efficient collaboration and resource complementarity. The BOP offers tremendous

opportunities but comes with unique challenges to penetrate (London & Hart, 2004; Agarwal et al., 2018; De Silva et al., 2020; Dembek et al., 2020). Collaboration comes through several main channels: sharing resources (Yamin & Sinkovics, 2009; Agarwal et al., 2018), integrating IT-enabled supply chain information (Khuntia et al., 2021), aligning consumption channels (Srivastava et al., 2020) and combining proprietary digital platforms (Makholwa et al., 2020; Agarwal et al., 2018). Companies trying to enter an unknown BOP market have had to make high investments and integrate various marketing initiatives into their business models to ensure that the profits generated were able to justify the investment (Seelos & Mair, 2007; Yamin & Sinkovics, 2009; Sinkovics et al., 2014; Agarwal et al., 2018). The higher investments to reorient business models often relate to digitalising of the service channels and product portfolios (Tanda & Schena, 2019, p. 87). In particular, disruptive technology through digital platforms opens up traditional market boundaries to digital market participants offering new and alternative business models (Romānova et al., 2016). Seelos and Mair (2007) and more recently Lashitew et al. (2021) show how entering a BOP market to serve the unmet needs of the segment whose purchasing power is very low requires managers to focus on recognising, accessing and configuring the resources that exist in the market and identifying opportunities for penetration through the existing channels of local entrepreneurs serving the segment. Particularly, collaboration, such as sharing proprietary business models and digital technology with local entrepreneurs, is important for finding resources, developing capabilities and creating a value delivery chain in a BOP setup that does not receive either political or economic support from any established institution (Khurshid & Snell, 2021; Lawson-Lartego &, Mathiassen, 2021). Collaborations between two firms with different aims but similar objectives can facilitate the market offering of the products and services that are new for the customer but conventional for the firm (Seelos & Mair, 2007; Yamin & Sinkovics, 2009). Based on a review of four cases from India, supplemented with expert insights and quantitative analysis, this study attempts to identify business models that can enable companies to create and occupy new market space in the context of the BOP. However, studies that explain how firms can strategically use collaborations to enter the BOP market are less vocal and inconsistent regarding how to disrupt the established informal channels and generate demand for offerings made by the formal financial sector to customers

who are familiar and comfortable with using informal channels for financial transactions. In contrast, such customers are unable to access formal financial channels due to regulatory and administrative limitations.

The transnational model of national responsiveness, global efficiency and worldwide learning through global capabilities and subsidiary strategy will not be sufficient for firms aiming to serve BOP customers (London & Hart, 2004; Srivastava et al., 2020). Particularly, social embeddedness is crucial for success in the BOP segment. This is highly likely to be achieved through the evolution of technology and the digitalisation of market provisions (Tiwari & Herstatt, 2020; Nair et al., 2017). As such, social performance drives the dominance of social contracts and social institutions in the BOP segment (Srivastava et al., 2020). In addition, the traditional partners of MNCs lack the experience required to serve BOP customers. Therefore, the western style of economic development for firms is not suited to tapping the potential that exists at the BOP in emerging economies. Instead, strategies for this segment should rely upon leveraging the strengths of the existing market environment and including market relationships and technological processes that are affordable and resource efficient in the business plan to capture the mindshare of non-traditional partners to co-invent customised solutions that can facilitate building of local capacity for MNCs. The importance of collaboration with non-traditional partners for co-inventing customised solutions and building the necessary local capacity for entering the BOP segment using a bottom-up approach for resources and infrastructure-related capabilities is well recognised in the literature (London & Hart, 2004; Agarwal et al., 2018; De Silva et al., 2020; Dembek et al., 2020). However, this fails to highlight the role played by external entities in building the capacity of firms through sharing resources (Yamin & Sinkovics, 2009; Agarwal et al., 2018), integrating IT-enabled supply chain information (Khuntia et al., 2021), aligning consumption channels (Srivastava et al., 2020) and combining proprietary digital platforms (Makholwa et al., 2020; Agarwal et al., 2018) to make products and services accessible to the customers that are not being served. Nor does it show how non-traditional partners can enable a firm to create economic viability by offering their products and services to low-income marginalised customers.

Firms, while earning profits, can contribute to poverty alleviation in emerging markets by helping the unserved and disadvantaged groups of people that belong to the BOP (Pitta et al., 2008; Bremermann et al., 2019). However, how firms can translate the wealth at the BOP into profits remains a challenge. Keeping the business purpose in line with profit generation and promoting inclusion through various channels (digital platforms, resource complementarity and business model reorientation) can improve firms' market positions. For example, common goods or community-based items like televisions, telephones or medical services have a better chance to harness profits from the potential of the BOP (Pitta et al., 2008). Serving the poor with a social welfare mindset is the role of charities; therefore, profit is a clear incentive to move into the BOP. However, it is hard for firms to make this shift without firm-level wealth creation. Particularly, consumers in emerging economies like India face pronounced distribution-based economic problems. The lack of access to services for poor people in remote areas affects the rural population's income and quality of life. Below, we attempt to explain how a distribution network can innovatively disrupt the existing setup and help firms to penetrate this segment by encouraging groups of disadvantaged individuals to take advantage of the products and services being offered to them.

Firms, in a broader sense, can identify consumption patterns in the BOP market using Maslow's framework to understand the priorities of low-income consumers about their basic needs, essential services, social interaction, discretionary purchases in terms of survival, safety and security, self-esteem and self-actualisation (Subrahmanyan & Gomez-Arias, 2008). Although the incomes and resources of BOP consumers are very limited, such consumers are highly creative and innovative. Their purchases are driven by social capital, family systems, cultural differences and compensatory as well as aspirational consumption, and more recently technological innovation (Srivastava et al., 2020; Bremermann et al., 2019; Rosca & Bendul, 2019). Although there is a big market for infrastructure-based services in the BOP, firms aiming to enter this sector should understand the diversity in the segment and learn how individual markets function. This is because community-based higher-order needs such as self-esteem and self-fulfilment can improve productivity and create opportunities for making profits through traditional and digital channels. Even if community efforts can be a very

effective means of mobilising entry of firms into the BOP market, this does not explain how community-based transactional efforts engage the local community and innovatively ensure the availability of these services in rural areas where the informal sector is well established, and unserved consumers are not willing to switch to services being offered formally.

MNCs that enter low-income marginal markets operate within the BOP segment and gain knowledge about the market using the internationalisation and technology-enhanced processes of market knowledge and market commitment (Schuster & Holtbrugge, 2012; Rosca et al., 2019). Successful entry of an MNC into a market largely depends upon the knowledge possessed by its managers, either through traditional or digital means. MNCs require different products, business models and strategies to enter into the BOP segment because this segment differs significantly from the markets that have so far been served by MNCs in developing nations. While entering into emerging markets, firms ensure the availability of their products and services for the BOP segment, which has a high concentration of low-income, rural and fragmented markets. Particularly, locals identify the needs in the market and offer services to consumers in remote areas, with the help of firms operating in these markets (Sinha & Seth, 2018). Although local firms can help a firm to enter into a BOP market, there have so far been few attempts to explain how collaborations such as digital platforms, resource complementarity and business model reorientation enable managers to innovatively identify unserved and unwilling customers and encourage them to disrupt their consumption patterns, motivating them to switch to formal from informal channels and ensuring the economic viability of delivery of formal services to these low-income groups.

3. Research approach

Using a mixed-method approach through case studies, experts' insights and quantitative analysis, we attempt to answer the fundamental enquires central to financial inclusion initiatives affecting the BOP segment (Reinhardt et al., 2018). A mixed-method design offers pragmatic advantages when exploring complex research phenomena (McCusker & Gunaydin, 2015). Usually, a mixed-method approach improves the confidence of findings and validates the rich context of the

research enquiry (Kleemann et al., 2017; Guetterman et al., 2017). In a mixed-method approach, the combination of the qualitative perspective and quantitative analysis brings out rigorous meta-inferences beyond what either approach could achieve alone (Plano & Ivankova, 2016; Guetterman et al., 2017). In particular, the mixed-method approach extends the breadth and range of the enquiry, informs quantitative analysis through qualitative exploration to develop testable research questions, identifies causality between constructs, compensates for the limitations (e.g., sampling and selection bias) of one approach by incorporating another approach, and supports and complements results *inter alia* (Kohli et al., 2021).

Various studies surrounding financial inclusion, for example dealing with mobile money (Lashitew et al., 2019), financial inclusion determinants (Kumar, 2013), competition of digital platforms (Kazan et al., 2018), branchless banking (Kochar, 2018) and FinTech (Gozman, et al., 2018) have broadly used mixed-method designs. Thus, a combination of three approaches leads us to both material and pragmatic evidence-based conclusions. Our case study approach offers a generalisation on how unserved BOP customers have benefited from financial inclusion initiatives, experts' insights strengthen our case study findings by elaborating on how managerial engagement has served the BOP segment, and quantitative analysis shows the extent to which the financially excluded marginal segment has been included in mainstream formal financial channels through the digitalisation of financial intermediaries like banks. We therefore anticipate that the granularity of financial inclusion within the BOP segment will be better captured through a mixed-method approach than by any standalone method, given the expansive and relatively emerging nature of the financial inclusion literature.

4. Case study

We draw upon the case study method (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Siggelkow, 2007; Yin, 2014; Rashid et al., 2019) to perform a detailed examination of the factors that drive entry of a firm into the BOP by identifying unserved customers in the low-income socioeconomic BOP segment and disrupting their consumption patterns by introducing products and services that generate higher value for them. A formative approach was adopted to explore the best possible answers

to our research questions. Hence, an in-depth case analysis was considered to be appropriate for this study. We reviewed four cases that helped us to retain a meaningful holistic view, reduced researcher bias and provided valuable insights into the given area of interest (Hancock & Algozzine, 2016; Rashid et al., 2019). We identified four firms offering mobile financial services to the BOP segment in India. We choose to do so because India offers a rich context to explore the complexities of digitised business model innovation at the BOP (Sengupta et al., 2021). In addition, several incentives to include the BOP segment in mainstream financial services have been initiated in India through an access-based business model and digitalisation (Sengupta et al., 2021; Schaefers et al., 2018). Our chosen firms characterised the context of this study with reference to the unserved customers of India's BOP segment.

The four firms chosen for case analysis were A Little World (ALW), EKO Financial Services (EKO), Financial Inclusion Network and Operations Ltd (FINO), and Green Money Transfer. They were selected on three criteria. First, the financial services firm was started with a mission to facilitate inclusion of disadvantaged groups whose needs were not recognized by the organized formal financial services sector. Second, the service provider considered the affordability of the BOP segment to develop specific products and strategies that allowed their firm to deal with the challenges of serving BOP customers who would not otherwise qualify to use their services. Third, access for BOP customers to financial services was planned using small facilities in multiple locations rather than a few large units. The data analysis for the case studies was conducted via a step-by-step procedure to ensure rigour (Gioia et al., 2013). We started by textually reading, identifying recurring themes referring to financial inclusion at the BOP and developing propositions to discuss the aggregate effect. First, we outlined a concise overview of each case; second, we explored the economic viability of disruptive business model collaborations through traditional and non-traditional partners in successfully serving the BOP; third, we developed propositions, providing discussions on each case study.

ALW: ALW (A Little World), an initiative of Zero Mass Foundation (ZMF), was set up with a vision to enter the BOP market with its financial-services-related products and serve the unmet needs of the segment through collaboration with formal financial institutions and innovative use of digitalised technology. In 2006, ZMF collaborated with one of the largest formal financial institutions, the State

Bank of India (SBI), with a purpose to disburse government funds through ALW. To achieve its goal, ZMF reviewed the latest technology to create products and services that facilitated basic financial transactions for the target segment, like receiving remittances and transferring funds in a resource-constrained environment. It developed a digital mobile-network-based platform called ZERO, which combined near-field communications technology with smart cards that used contactless radio-frequency identification (RFID). It integrated the two with a biometrics system through a transaction server to facilitate financial transactions and authenticate the identities of customers through mobile phones. Local individuals were appointed by ZMF under ALW to serve as Customer Service Provider (CSP) centres of ALW; they were equipped with biometric devices, mobile phones and a receipt printing machine. CSPs were trained on the use of these technological devices to instantly connect customers who wanted to open basic bank accounts with formal financial institutions, to facilitate the exchange of money. The technology platform allowed a formal connection between these two groups, through a secure electronic identity code that could be used via phone or smartcard to verify the identity of the customer, while CSPs as agents of the financial institutions took deposits and dispensed cash. Biometric devices, photo ID badges and voice recognition software were used through mobile phones to authenticate the identity of about 5,000 customers before enrolling them with a formal financial institution. By 2010, ALW was able to serve about 4 million rural customers through a network of CSPs spread across 22 states, creating 8,314 points of presence across the country. The primary function of these CSPs was to create a channel of communication between the unserved market and formal financial institutions. During personal visits to customers' doorsteps, these CSPs promoted financial inclusion through digitalised means amongst those who were unable to use banking services; they explained the benefits of using formal rather than informal methods of transactions and the risks of informal ways of spending or saving their money. With the help of technology and local resources, ALW has been able to successfully identify the unserved and engage the unwilling customer. By implementing such a responsible business model for informing, engaging and delivering services, ALW has been able to create customised value for customers, who can save despite their low incomes, and for the provider, who can instantly use previous data to make verification, thereby reducing their infrastructure costs.

FINO: FINO (Financial Inclusion Network and Operations) was set up in 2006 in Mumbai to provide financial services to low-income socioeconomic groups as an alternate banking channel through a platform-based technology-assisted process. The purpose of this channel was to facilitate the delivery of banking services in rural areas through a branchless banking model. The objective was to offer a wide range of financial services to the BOP segment and pioneer the financial services sector in remote rural areas by facilitating remittances and transactions through the use of technology and collaboration with a formal financial institution. FINO innovatively developed its capability to provide information about BOP customers through the use of mobile-based GPRS and biometric technology to a nationalised bank, the Union Bank of India, to facilitate formal transactions. FINO used local individuals as agents to provide easy service access to customers at their doorsteps and kept a record and track of transactions through *insta-card*, a smart card that holds the account information of each customer in a digital format and proves the identity of the customer when connected to a mobile biometric device. Easy access to financial services at a cost as low as $0.50 for remitting up to $165.00 in a single transaction made formal financial services affordable for the BOP customers, and the saving of time and effort through easy access to the service via local agents encouraged the BOP customers to prefer formal services to informal services. The agents appointed by FINO are commonly known in the BOP community as *Bandhu*, which in the local language means a friend. These individuals are trained by FINO to provide end-to-end customer identification, acquisition and servicing skills to serve customers looking for savings, deposits, insurance and remittance-related banking solutions through a GPRS-enabled hand-held biometric device. Bandhus of FINO work primarily from home or a very small office located within the community so that they can move door to door in their vicinity to inform customers about their service and engage them by demonstrating the value it can create for the individual customer. Today, national and private banking partners such as Allahabad Bank, the Bank of Baroda, PNB, ICICI and Axis Bank promote the services offered by FINO. FINO also receives support from insurance sector companies like Reliance and HDFC. Other mainstream financial institutions like the International Finance Corporation in India, and state governments, have come forward to collaborate with FINO to mutually create a strategic and sustainable partnership. FINO's official website states that, with a BOP

customer base of over 43.66 million, it is now able to handle around 5 million micro-transactions per month.

EKO: EKO India Financial Services Pvt Ltd was established in 2007 to serve low-wage migrant workers who did not have access to formal banking facilities and wanted to send their earnings to their family members who were left behind. These migrants work as labourers, and they are not recognised officially as residents of the country. The objective of this initiative was to innovatively penetrate the informal financial market managed by the indigenous banking sector, which offered various types of financial services to this segment. Hence, EKO's prime objective was to offer services like fund deposits, cash withdrawals with insurance, and credit-related products via low-end mobile phones. A money transfer service, through digital platforms, called *Tatkal* was launched by EKO in August 2010; this enabled instant remittance and transfer of funds through basic infrastructure at a very low cost, paid by the sender as the service charge. The aim was to provide an economically viable mode of remittance at a geographically convenient location at suitable times. EKO integrated retailers, telecom technology and mainstream banking facilities in its business model to conduct formal transactions. Therefore, EKO collaborated with Centurion Bank of Punjab to serve this segment through retailers who acted as its Customer Service Points (CSPs). On completion of a transaction, the sender and recipient receive a confirmation SMS on the registered mobile number(s). The initial efforts enabled EKO to successfully disrupt three prime BOP markets in India: Delhi, Bihar and Jharkhand. Success in these markets encouraged EKO to consider expansion through collaboration with other financial institutions in the country. Today, as a business correspondent of the likes of State Bank of India (SBI), ICICI and Yes Bank, EKO has been able to make its services available in seven states of India through CSPs. These are individuals who manage small retail shops in high-traffic areas. In the next stage, EKO is planning to enter the rural market using the same business model for penetration; that is, to offer services to customers in areas that do not have any infrastructure, through local retailers such as grocers, stationery shops, IT shops and telephone booths. In the financial year 2011, EKO was able to send remittances worth US$19.333 million via the State Bank of India (SBI) Tatkal product.

Green Money: Green Money Transfer (GMT), a person-to-person mobile money transfer service, was launched in November 2009 jointly by the established Indian financial institution Corporation Bank, the leading cellular technology provider Tata Teleservices Limited, and the international wireless transaction platform provider Paymate. Paymate offered a strong technology-based digital transaction platform for the collaboration. At that time, Paymate was serving the financial services sector with its Payment Card Industry Data Security Standard (PCI-DSS) and Payment Application Data Security Standard (PA-DSS) certified security processes, systems and infrastructure, which had been introduced successfully in the USA, UAE, Sri Lanka, Nepal, Africa and Eastern Europe. Corporation Bank contributed with its 8,617 service outlets in India, and Tata Indicom, a subsidiary of Tata Teleservices Limited, offered its digital network in 450,000 Indian towns and villages, based on 60,000 telecom towers. The collaboration aimed to promote the financial inclusion of people from lower-income socioeconomic groups in the formal financial system through services offered by GMT. The objective of GMT was to perform secure M-commerce using one-time transaction codes to ensure the identities of the sender and the receiver. Initially, Tata's PCO and True Value Shop Network were used to provide money transfer services. Later, GMT group appointed several local retailers known as “Green outlets” to facilitate easy registration for use of its services through mobile phones by potential customers. GMT allowed a maximum of $82 for one transaction between two individuals within India. The service was launched in Kerala to serve that state’s large migrant population; however, it was instantly accepted by Mumbai’s famous Dabbawala supplier Nutan Mumbai Tiffin Box Suppliers Trust, which employs around 5,000 Tiffin delivery men (Vibhute, 2010). Over 90% of the families of Tiffin delivery men live in different villages in Maharashtra that are far away from their workplace. Dabawallas regularly send their savings and money for expenses to their villages through people they know will soon be visiting their hometown. GMT outlets have enabled a large segment of this population to open a basic bank account and conveniently use mobile-based banking services in a cost-efficient and secure manner. This innovative integration of retail, digitalised technology and the personal touch between the provider and the customer has innovatively disrupted the US$12.75 billion market and opened new revenue streams for both large and small firms who can associate with GMT as its “Green outlets” (CGAP, 2010).

4.1 Case study analysis

Disruptive innovations offer organisations the opportunity for growth by expanding their industry through identifying unserved market segments, positioning the innovation against non-consumption and presenting it as a smart and effective choice in comparison to alternatives available in the marketplace (Christensen, 1997; Gilbert, 2003; Markides, 2010; Govindarajan et al., 2011; Christensen et al., 2015; Benzidia et al., 2021). The success of a disruptive innovation depends upon the identification of the fit of the innovation in the marketplace through a disruptive business model that garners new customers (Petrick & Martinelli, 2012; Lehikoinen et al., 2018; Sengupta et al., 2021). Firms offering disruptive and innovative products recognise that they need different types of capabilities to bring an unserved and unwilling customer at the BOP into the market. Hence, they seek collaborations and partnerships to successfully implement a strategy that will disrupt the market and position their product appropriately in the marketplace (Petrick & Martinelli, 2012; Sengupta et al., 2021). As reviewed in our four cases, the economic viability of a disruptive business model depends upon two types of collaborations: 1) with traditional collaborators such as supply chain or distribution partners that offer local infrastructures such as retail outlets, and 2) with non-traditional partner organisations like the Dabbawala association (GMT), a village council (ALW) and individual entrepreneurs (EKO). To acknowledge the role of collaborations in successfully serving the BOP by classifying them into traditional and non-traditional partners needs further understanding. We develop the following propositions to offer insights:

> *P1a: The greater the collaboration with retailers as traditional partners for delivery of the disruptive innovation, the higher the potential to create economic viability in serving unserved customers in the low-income BOP segment.*

> *P1b: The greater the collaboration with non-traditional partners for delivery of the disruptive innovation, the higher the potential to create economic viability in serving the unserved customers in the low-income BOP segment.*

To enter the BOP segment with a distinctive value proposition, firms tend to collaborate with different kinds of partner firms (Johnson & Tellis, 2008; Gomber et al., 2018; Ho et al., 2020). Market knowledge received from non-traditional local partners allows appropriate positioning in the BOP marketplace (Dahan et al., 2010) and resources made available by traditional partners provide access to capabilities

required to present the products and services at the right time in the marketplace (London & Hart, 2004; De Silva et al., 2020; Dembek et al., 2020). Non-traditional distribution partners like rural microfinance companies such as Kshetriya Gramin Financial Services (GMT) or village councils (ALW) provide deeper penetration in difficult-to-reach rural areas. Similarly, collaboration with slum dwellers (FINO) or local entrepreneurs (EKO) allow penetration in areas that are difficult for traditional banking channels to reach. Furthermore, collaborations enable the firm to offer disruptive products or identify further gaps or missing services in the current market as potential business opportunities (Anderson & Markides, 2007). While these arguments explain the role of collaborations in ensuring successful penetration through disruptive innovations, a further investigation of the argument is proposed from the perspective of the unserved BOP:

> *P2: The greater the value created by the disruptive innovation for the partners, the higher the potential of the firm to identify future opportunities for businesses to serve unserved customers in the BOP segment.*

The reasons for non-consumption by the unserved BOP can be the low paying capacities of consumers or the inability of providers to serve the market with affordable products and services (Bang & Joshi, 2012; Rivera-Santos & Rufin, 2010; Kim & Mauborgne, 2014). As the basic premise of disruptive innovation is to offer relevant products at an affordable cost, business models for disruptive products should be based on the low cost of delivery (Johnson, et al., 2008; Johnson & Tellis, 2008; Iheanachor et al., 2021). Meeting these criteria is a challenge for managers as BOP consumers are difficult to reach through traditional channels, and collaborating with non-traditional partners can be expensive because their success is based on resources that are state of the art and contemporary (Pitta et al., 2008). However, serving the BOP segment in an economically viable manner at a low margin is the first prerequisite for the acceptability of products and services by BOP customers (Habib & Zurawicki, 2010). In a disruptive business model for the BOP, it is important for managers to consider a significant drop in gross margins and a radical reduction in many elements of the cost structure, while identifying the profits they wish to make (Markides & Oyon, 2010). In the cases of ALW and FINO, although customers are charged by the provider for use of services, the revenue of the providers is driven by the set-up and rental fee paid by financial institutions for space on their back-end system, for point-of-

transaction terminals and card issuances. The case of EKO is different, because transactions are mobile phone based, and the provider does not require additional infrastructural support for the identification of the customer's identity. Therefore, 70%–80% of EKO's revenue comes from remittances. In the case of GMT, about 5%–6% of commission is shared between various traditional partners engaged in the delivery of the product and the creation of a value chain. In such cases, firms will benefit from the BOP segment if they are able to increase the volume of their sales (Markides & Oyon, 2010; Iheanachor et al., 2021). Hence, it can be inferred that the capability of a provider to successfully disrupt a market and establish a product in a BOP segment depends upon its ability to lower the cost of the product by reducing the margin per sale and increasing the volume of sales. Therefore, we propose that:

> *P3: The greater the capability of the provider to lower the cost of the disruptive product, the higher the potential to successfully establish the product for unserved customers in the BOP segment.*

Various companies across the world are trying to adhere to the Millennium Development Goals (MDGs) of the United Nations by using innovative methods for devising business models that aim to focus on poverty reduction and financial inclusion (Saith, 2006; McArthur & Rasmussen, 2018). The MDGs primarily aim to address wider socioeconomic differentials by bringing equitable and sustainable provision for all (Fuller & Dwivedi, 2019). Thanks to the MDGs, the pace of acceleration of socioeconomic inclusion has significantly improved for developing economies compared to developed countries; the impact of such changes in developed countries is more nuanced and remains progressively consistent (McArthur & Rasmussen, 2018). Adopting MDGs has considerably improved income inequality and disparity in access to financial services, while several financial intermediaries like banks, as MDG signatories, have better served the unserved marginalised people at the BOP through lending, remittance, credit and savings, particularly via digital platforms (McArthur & Rasmussen, 2018; Fuller & Dwivedi, 2019). The specific role of banks in inclusive development is well acknowledged through adopting MDGs (Asongu & Odhiambo, 2019; Asongu & Nwachukwu, 2018). For example, companies and banks in countries like Brazil and India have used business correspondents, South Africa and India have adopted bank-led mobile payments, Kenya has used non-bank-led models, while bank-led and non-bank-led mobile payment models co-exist in the Philippines. In India, the deep penetration of the

formal financial sector and mobile technology companies has resulted in a moderate penetration of business correspondents and agent-based banking (Surana et al., 2020; Comviva, 2013; Srinivas, 2012). Furthermore, the inclusion of the local community in encouraging customers to use digital platforms and technology-based financial services is helping to promote financial inclusion and serve all communities without considering the socioeconomic backgrounds of the customers. A study conducted by Sivapragasam et al. (2011) on acceptance and penetration of mobile financial services among BOP customers in Asia found that 50%–80% of unbanked customers were willing to use mobile financial services if made available at an affordable price. Therefore, we propose that:

> *P4: The greater the involvement of the local community in the promotion of financial services, the greater the ability of a provider to promote financial inclusion of unserved customers in the BOP segment.*

5. Experts' insights

To strengthen the insights of the existing literature and published case studies, we used the personal experiences of 12 managers working in India and Africa for two large Indian financial services companies serving the BOP segment. Both companies were providing technology-based financial services in multiple countries across South Asia, Africa, Latin America, the Middle East and Channel Islands, and employing large numbers of people. Expert insights gained through personal interviews with managers enabled us to evaluate the understanding developed from the case studies, and to make recommendations. We conducted in-depth interviews with managers in each organisation to get expert views about the propositions presented in the previous section. All the interviews were conducted either in person or on Skype. Based on the recommendation of Glaser and Strauss (2009), we made a purposive attempt to ensure that our sample consisted of managers with both marketing and non-marketing roles so that we could get a deeper understanding of the issues. In our sample, two of the managers selected held senior management positions, six held marketing positions, and four were in operations departments. The gender distribution was equal. We followed a standard format of questions for all the interviews. To initiate a discussion with respondents, we initially provided a brief description of the research we were carrying out, following our key research questions: How can we bring an unserved

and unwilling customer into the market? How to disrupt regular business models for creating the economic viability of products and services to the customers of the BOP segment? And how can managers weave a social agenda such as the financial inclusion of BOP into their business models? To maintain ethical standards, all the respondents were informed about the basic and extended purpose of the research agenda and research questions. They were informed that it was not mandatory for them to participate. If they did not wish to participate, they could leave or ask the interviewer to stop the interview immediately. We also created a list of topics and subtopics, for our reference, to probe the respondents during the interviews, each of which lasted for about 45 minutes. We used a recording device to audiotape the interviews, with the respondents giving permission to record. We engaged three people to conduct the interviews with the experts, although all the coding was conducted by one interviewer. Therefore, the issues of inter-rater reliability and selection biases were avoided.

The respondents provided novel, deep and valuable explanations about the challenges of entering and serving a BOP segment. They narrated successful incidents that had allowed them to move swiftly into the market. In the next section, we explore how these expert views can push the periphery of our current knowledge regarding financial inclusion at the BOP.

5.1 Experts' insights analysis

5.1.1 Economic viability of serving the BOP segment

The issue of economic viability in serving customers whose paying capacity is very low was discussed with the respondents. One of the senior managers explained that initiatives to serve the BOP segment focused on volume generation rather than profit maximisation. These arguments were in line with Gautam (2001) and Sinha et al. (2017). The respondents revealed how an increase in the volume of services consumed by the BOP can make the offering economically viable for the provider. They explained the economic viability of two routes adopted by companies to offer financial services:

> *Economic viability of running an Alternate Banking Channel (ABC) is based upon making banking services accessible for customers living in remote areas and allowing them to safely transfer money through a formal financial institution. ABC model works efficiently on the concept of the creation of a large customer base that generates large volumes of transactions through a branchless model of operations. The success of ABC*

depends upon the collaborative efforts of microfinance institutions, technology providers and multiple individuals who provide a local presence to the bank in remote locations through their micro-level small entrepreneurial businesses like internet kiosks or grocery shops or barbershops.

5.1.2 Financial inclusion as social agenda for the BOP segment

The discussion in the current literature about the provision of banking services to the unserved BOP segment as an effort to promote financial inclusion was explained to the respondents (Kanungo & Gupta, 2021; Lashitew et al., 2019; Tovar et al., 2014; Maurer, 2012). We particularly briefed the respondents on banking provisions that would offer a better experience to mainstream customers and how such provisions are likely to incentivise marginalised customers through prompt access to credit, savings and transactions. Also, we elaborated on the extent to which increased use of and access to financial services for the wider segment of unserved customers can facilitate financial inclusion, as argued by Lashitew et al. (2019) and Tovar et al. (2014). Many of the respondents agreed with this, but some of them had conflicting and dispersed views about the topic. The difference as explained by one of the respondents was in line with literature such as Diniz et al. (2012), that the ability of each of the two channels to ensure financial inclusion differs from country to country and depends upon various factors like existing banking or postal infrastructure:

Mobile Money Channel (MMC) has been able to successfully enter the BOP segment in countries that lack a network of postal or banking services. So, coverage by a mobile network tower encourages existing mobile customers in these countries to use MMC as a safe and convenient method to transfer money or make transactions. In the case of a country like India, MMC has not been a success story with the BOP segment because even migrant labourers in India can send out money at no commission charges to their families using postal or banking or alternate banking channels without having a formal account with them. Therefore, telecom providers in India are no more offering MMC to the unbanked or underbanked BOP segment because the need has not arisen. Instead, they are now offering this service to the customers above the poverty line, i.e. with high paying capacity, and encouraging them to use MMC as a risk-free payment platform for making e-transactions for everyday consumables through a deposit parked with the provider by the customers. Telecom service providers use reduction of risk in using online banking services as a USP to sell their MMC services to the customers who use credit or debit cards for everyday shopping needs. So, it is hard to say that companies offering either MMC have a social agenda. Instead, ABC is a model that uses mobile technology for a social impact and not for financial gains.

It is important to recognise that firms which are equipped to cater to the product- and services-related needs of the BOP will be successful when they develop an ability to weave the solutions to the problems faced by their stakeholders into their business strategy. The objective will become achievable when the value created by their business strategies focuses on the challenges faced by their BOP stakeholders. This will happen when top management attempts to link the core purpose of the organisation with the core business and societal problems. Our five research propositions highlight the successful entry of a service provider into the BOP segment in developing nations; however, our analysis of qualitative data collected from discussions with managers provides some differing views, thereby creating a possibility of future research on the topic, particularly within the context of the "social agenda".

Both the case studies and the experts' insights confirm that greater collaboration through disruptive innovation, such as using digitalised business models, has the potential to create a higher level of economic viability for serving unserved BOP customers. Collaboration with non-traditional partners is especially likely to enhance the prospect of a higher degree of economic viability for the BOP segment. Similarly, the higher value created by the disruptive innovation for the partners can facilitate identifying future opportunities for businesses at the BOP, while lowering the cost of products and services will incentivise the unserved segment of the BOP. We also find evidence that the involvement of the local community sizeably influences the ability of a provider to promote financial inclusion of unserved BOP customers. The experts contended that the economic viability of running an Alternate Banking Channel (ABC) offers safer financial transactions in the absence of formal financial intermediaries. Particularly, ABC is made successful via collaboration with microfinance institutions, technology providers and multiple individuals (business correspondents and banking agents) who provide a local presence to the bank in remote locations through their micro-level small entrepreneurial initiatives. However, experts expressed concerns that although Mobile Money Channel (MMC) has been largely successful due to its availability and affordability for the BOP segment, it is hard to say if the business providers have an obvious social agenda. In contrast, ABC has a distinct and purposive social agenda for financial inclusion and is less positioned for financial reward. From these findings, we infer that the BOP segment can be well served through alternative banking channels that can

potentially lead to a higher level of financial inclusion. As such, banks, financial inclusion and the BOP are implicitly related as banks carry out the role of intermediation for advancing financial inclusion, particularly for the socially marginalised unserved customers at the BOP (Kanungo & Gupta, 2021; Kochar et al., 2018). Lately, the Central Bank of India – that is, the Reserve Bank of India (RBI) – has implemented several measures to mandate banks to upscale their financial inclusion initiatives, in particular through digital platforms (RBI, 2021). Therefore, ABC and MMC used at the micro-entrepreneurial level are highly likely to benefit the wider customer base at the BOP in partnering with formal financial intermediaries like banks.

Based on narratives from the case studies and experts' insights, we have undertaken a quantitative analysis, consistent with Kleemann et al. (2017) and Guetterman et al. (2017), to supplement our findings to further validate the extent to which financial inclusion is achieved at the BOP through the intermediation of digitalised banks. Combining the qualitative perspective and quantitative analysis reinforces and identifies causality between constructs, counterbalances the selection bias limitations of one approach, and supports the results (Kohli et al., 2021). Although our findings from the case studies and experts' insights offer a valuable understanding of financial inclusion at the BOP segment, endorsement via quantitative analysis is likely to better characterise the role of financial intermediaries like banks in the process of financial inclusion. Therefore, we have adopted a systematic combination of methods that can adequately address our research enquiries.

6. Quantitative analysis

6.1 Background

The conceptualisation of BOP was initiated to understand how the market can meet the socioeconomic needs of the marginalised, disenfranchised and financially excluded people by interlinking formal agencies and informal agencies (Prahalad & Lieberthal, 1998; Prahalad & Hart,1999; Agarwal et al., 2018; Iheanachor et al., 2021). Gradually but visibly, the concept of the BOP started evolving and was both supported (London et al., 2011) and challenged for its value proposition within a well-functioning traditional economic view (Karnani, 2007, 2011). The Indian BOP segment

is largely concentrated in rural sectors and has been affected by the underlying causes of poverty, gender discrimination, insufficient funds and resource provisioning, financial exclusion, economic deprivation and sociocultural barriers (Kanungo & Gupta, 2021). Regardless of several limitations, India has shown remarkable resilience to renew and reform itself at the infrastructure, content and policy levels. For example, it has undertaken several initiatives to address the issues concerning the BOP, including the Digital India initiative (Kochar, 2018; Sharma, 2016), the Information Technology Act 2000 (Kharbanda et al., 2019; Bhasin & Rajesh, 2018), the Universal Service Obligation (USO) and funding scheme (Pansera & Owen, 2018; Malar et al., 2019), digital wallet and mobile banking (Sharma, 2016; Malar et al., 2019), optic fibre network and E-connectivity for public services (Gomber et al., 2018; Sharma, 2016), community information centres, the digital library scheme and the telemedicine programme (Gomber et al., 2018; Sharma, 2016; Sudhakar & Singh, 2018; Pansera & Owen, 2018). These initiatives and the Information Technology Act 2000 have made particularly substantial changes to the way financial transactions are undertaken by the marginalised and unserved customers of the BOP (Kharbanda et al., 2019; Bhasin & Rajesh, 2018; Sharma, 2016; Malar et al., 2019; Gomber et al., 2018). In addition, the Universal Service Obligation (USO) and funding scheme have provided access to funding using both traditional and non-traditional financial market channels (Pansera & Owen, 2018; Malar et al., 2019), while community information centres and digital library schemes have created financial awareness among unserved customers (Kochar, 2018; Sudhakar & Singh, 2018).

Digitisation in India started as early as 2006 in a scattered and localised way. In July 2015, a Digital India initiative was launched, offering access to wider digital connectivity across the country (Digital India–Power to Empower, 2015). The prime drive was to achieve wider financial inclusion through universal digital literacy, delivering financial services through digital means, and developing secure and stable digital infrastructure. The IMF in its April Fiscal Monitor report (2017) highlights that “The experiences of India and South Africa show how digitalisation can help improve social protection and the delivery of public services”. Under renewed governmental and institutional efforts, the scale of India’s digital engagement has substantially improved. However, several recurring socioeconomic-cultural issues continue to affect the desired growth in India.

The RBI mandates enhancing financial inclusion through digitalisation by bringing financial reform and legacy platforms together (RBI, 2021). In particular, it attempts to bring equitable welfare to the unserved BOP by combining traditional financial services with digital financial channels to achieve wider financial inclusivity. The RBI has asked financial intermediaries like banks to put in place Financial Inclusion Plans (FIPs) to address the marginalised and unserved segment of the population, with a focus on consumer protection and capacity building for the customers (RBI, 2021). This interplay could potentially lead India towards a knowledge economy by reducing societal inconsistencies through broader financial inclusion. Significant digital improvements have been made since 2015: 35% of the Indian population now own 1.23 billion digital biometric identity cards, 1.21 billion mobile phones, and 446 million smartphones (Midha, 2015; Rani, 2016). Almost 560 million people were using the internet by December 2017, while 51% growth was registered in e-commerce (Prasad, 2019). Further, the industry has pledged $3.2 trillion to support the Digital India initiative (Digital India, 2015). However, critics see the digital India initiative more as technological determinism than the redressal of societal essentials (Thomas, 2012; Ananth, 2012). Although technology amplifies the underpinning institutional context, digitalisation must be accompanied by significant changes in policy and institutions, in order to have a meaningful impact (Nagarajan, 2015; Kentaro, 2015). To promote equitable financial access and address the socioeconomic differentials experienced by the BOP segment, the RBI stipulates digitalisation as a means to financial inclusion (RBI, 2021; Sengupta et al., 2021). However, the inclusion of people at the bottom of the social pyramid remains an elusive goal and addressing the unmet demands of the largely excluded population are still unfulfilled, despite the government of India's various measures (Satpathy et al., 2015).

Digital initiatives require some transformational processes and refinements to achieve the desired service level objectives for the BOP segment, although digitalisation provides a wider opportunity to use the latest technology to redefine the Indian service industry (Rani, 2016). Digital India for knowledge future may fail if improper implementation, inaccessibility and inflexibility over essential societal necessities at the bottom level are not addressed (Midha, 2016). Arguably, digitalisation through banks has made a sizable impact on rural segments of India, showing an increasing trend

towards financial inclusivity (Gupta & Singh, 2015). The rural BOP market in India is defined as households in the bottom four expenditure quintiles that spend less than Rs3,453 (US$75) on goods and services per month, and represents a market of 114 million households or 76% of the total rural population (National Sample Survey Organisation, India).[1] Given the sheer size of the BOP market in India, the recent digitalisation initiative aims to offer wider access to the BOP segment through formal financial channels, complementing the RBI mandate on financial inclusion. The process of financial inclusion for the BOP segment through technology-assisted digitalisation offers an understanding of how consumption- and access-based business models work for the marginalised segment of the socioeconomic hierarchy.

6.2 Research enquiry

The Global Financial Development report of the World Bank (2018) emphasises the relevance of financial inclusion, offering an extended view of financial inclusion status and reiterating the problems of financial sector policy.[2] The Maya Declaration bringing together 90 countries suggests wider financial inclusion for the less benefited segments of society.[3] The participating countries of the Maya Declaration represent more than 75% of the unbanked global population. Also, the G20 and non-G20 countries have set up the Global Partnership for Financial Inclusion (GPFI) platform.[4] The GPFI recognises financial inclusion as one of the overreaching commitments of the global development agenda that is endorsed in its Financial Inclusion Action Plan.

The emerging literature on financial inclusion has two prime features: explaining user adoption at the micro level (Murendo et al., 2017; Aker et al., 2016; Blauw & Franses, 2016) and evaluating the socioeconomic impact of such measures (Munyegera & Matsumoto, 2016; Aker et al., 2016; Suri & Jack, 2016). To provide access to the BOP segment, banks and other informal financial intermediaries in India have implemented financial inclusion policies following the RBI mandate. To accomplish the

[1] CDF-IFMR analysis, National Sample Survey Organization (NSSO) 2004/2005, round 61. http://web.mit.edu/idi/idi/India-%20The%20Base%20of%20Pyramid%20distribution%20Challenge-IFMR.pdf.
[2] https://www.worldbank.org/en/publication/gfdr
[3] https://www.afi-global.org/maya-declaration
[4] https://www.gpfi.org/

objectives, banks have adopted three strategies for financial inclusion: 1) Financial inclusion in villages allotted by SLBC (State Level Bankers Committee) adopted by rural branches of the bank; 2) 100% financial inclusion in lead districts; and 3) Technology-based financial inclusion (Bihari and Pradhan, 2011; Arnold, 2018). To incorporate the RBI's financial inclusion mandate, Indian banks often adopt FinTech platforms, and coordinate and liaise with the microfinance and Self-Help Group (SHG) financing agencies. The banks have developed relationships with 91,536 SHGs and have extended credit facilities of Rs636.00 crores through SHGs, whereby millions of bottom-line households have become beneficiaries of financial inclusion (Bihari & Pradhan, 2011). Public sector banks in India have adopted digital banking facilities and are using digitalisation for broader financial inclusion under the RBI's directives (Table 1), to address wider socioeconomic differentials mostly seen in the BOP. However, how to measure financial inclusion remains uncertain and one of the unresolved concerns. Financial inclusion indicators typically consider usage and access to formal financial services by using supply-side aggregate data (Sarma, 2008, 2012; Chakravarty & Pal, 2010; Amidžic et al., 2014). Several financial inclusion measures with demand-side data also provide comprehensive outlooks (Demirgüç-Kunt & Klapper, 2015; Prime et al., 2012). However, financial inclusion indices are sensitive to their assigned value, and this can lead to spurious conclusions (Lockwood, 2004; Clinton & Whisnant, 2019). Therefore, we collate seven common financial inclusion indicators to examine the extent to which Indian banks have made a significant contribution in servicing the marginalised Indian population since they have adopted alternative business models through digital platforms. We consider financial inclusion as usage and access to financial services and provisions which minimise involuntary financial exclusion. Involuntary financial exclusion represents several socioeconomic barriers that have prevented people from using and accessing formal financial services and offerings. This leads us to develop and examine a relevant research question: How are banks extending their financial services to the BOP segment of society for greater financial inclusion using digitalised platforms?

[Insert Table 1 here]

6.3 Data and methods

To test our research question, the initial data were collected from 21 nationalised public sector Indian banks and 6 of their associate banks. The 21 banks included 20 nationalised banks and 1 other public sector bank, i.e., IDBI bank. The State Bank of India includes its 6 associates. All the banks are listed on the RBI site.[5] However, due to missing data, 6 banks were eliminated from the initial sample, resulting in 21 banks remaining in the final sample. To extract the variables used in this study, two other databases were employed, FitchConnect and Thompson One. Some variables were also directly collected from individual banks' annual reports. The year a bank completed digitalisation was taken as the year 0. Data were collected ±3 years from the year of digitalisation; that is, the year the digital platform of the bank was fully operationalised on the banking transaction and service gateway.

The quantitative analysis was conducted under binary logistic specification since we aimed to examine both the pre-and post-digitalisation periods of banks. In particular, we examined the extent to which the digitalisation of Indian public sector banks is offering financial access to the BOP segment. Despite an increasing number of studies on financial inclusion (Demirgüç-Kunt et al., 2018; Neaime & Gaysset, 2018; Zins & Weill, 2016), what are the financial inclusion indicators remain inconclusive (Kim et al., 2018; Sarma, 2016). Therefore, we included several indicators as proxies of financial inclusion, specifically those relevant to the BOP segment (Table 2): number of customers (i.e., total annual number of customers from the rural sector actively banking with the bank) (Kim et al., 2018; Sarma, 2016); number of basic accounts (i.e., total annual number of basic new accounts opened for the rural segment – basic accounts require no minimum deposit and levy no charges) (Sarma, 2016); current account deposits (i.e., total annual value of the current account deposits for the rural sector) (Ababio et al., 2021; Li & Meyer-Cirkel, 2019); savings account deposits (i.e., total annual value of the savings account deposits for the rural sector); banking concentration (i.e., number of bank branches per 100,000 rural population) (Demirgüç-Kunt et al., 2018); micro-credit offered (i.e., total annual value of micro-credit offered to the BOP/low-income sector by banks in collaboration with NGOs, SHGs and micro-financing agencies) (Kumar, 2013; Amidžic et al., 2014); and number of banking agents (i.e., number

[5] https://rbi.org.in/commonman/english/scripts/banksinindia.aspx accessed on 17th August 2018.

of banking agents per 10,000 rural population) (Kochar, 2018). Our choice of financial inclusion proxies was driven by two key reasons. First, the RBI is significantly emphasising to increase the number of bank customers, the number of basic account holders, and the current account deposits for the unserved segment to promote its financial inclusion initiatives (RBI, 2021). Thus, banks can offer prompt and timely access to lending, financing, credit and savings for the unserved BOP segment. Second, savings account deposits, number of bank branches, the value of micro-credit offered to the low-income sector, and the number of banking agents are well recognised as key drivers of financial inclusion that carry substantive relevance for the BOP segment (Ababio et al., 2021; Li & Meyer-Cirkel, 2019; Demirgüç-Kunt et al., 2018; Neaime & Gaysset, 2018; Kim et al., 2018; Kumar, 2013; Amidžic et al., 2014). Particularly, savings accounts and lending to the BOP sector, in combination, promote the financial stability required to sustain financial inclusion initiatives.

[Insert Table 2 here]

We define the financial access offered by banks as a dependent dummy variable with a binary latent value, 0 for no and 1 for yes. The financial access period covers a window of ±3 years for the pre- and post-digitalisation years. The number of customers, number of basic accounts, current account deposits, savings account deposits, banking concentration, micro-credit offered, and number of banking agents are considered as independent variables. The dependent variable is denoted as $Y_{i,t}$ with binary latent value 0, 1 for bank *i* at time *t*, such that the log transformation of $Y_{i,t} = \begin{cases} 1 \; if \; Y_{i,t} \geq 0 \\ 0 \; if \; Y_{i,t} \leq 0 \end{cases}$ gives the log-Odds $Ln\left(\frac{\pi}{1-\pi}\right)$. The years are denoted by t = 1, 2, and 3. The estimation model is specified as:

$$Y_{i,t} = \alpha_0 + \alpha_1 Number\ of\ Customers + \alpha_2 Number\ of\ Basic\ Accounts + \alpha_3 Current\ Account\ Deposits + \alpha_4 Savings\ Account\ Deposits + \alpha_5 Banking\ Concentration + \alpha_6 Micro\text{-}credit\ Offered + \alpha_7 Number\ of\ Banking\ Agents + \varepsilon_{i,t}$$

6.4 Results

Table 3 reports the summary statistics of the data sample. The z-statistics are estimated by testing the difference between the mean and observed values of the sample variables. The z-scores for all the variables are statistically significant at least at a 0.10% level. Thus, the probability of a significant

difference between the mean and observed value of variables is less than 0.10%. This indicates a random normal distribution of all the variables. The estimation results are presented in Table 4, suggesting our model to test the research questions is significant and parsimonious. The model is not outperforming a naïve proportional chance model (Joy & Tollefson, 1975); therefore, it justifies the goodness-of-fit criteria. The difference between the pre- and post-digitalisation periods leads to the rejection of the proposition that digitalisation has not improved financial inclusion. The reported "percentage correctly classified" is 84.1%, which is statistically significant at a 1% level. The Cox and Snell R^2 and Nagelkerke R^2 statistics explain 49.5% and 65.9% of the variability of independent variables respectively. The Hosmer and Lemeshow test is not statistically significant, with a p-value greater than 0.10%. The Omnibus statistic is significant at a p-value less than 0.01%, indicating that the coefficients of the logistic regression along with the intercept are significant. This indicates that the parameter estimates are unbiased and robust. The model coefficient is 2.104, significant at a 1% level, with a reported Odds ratio of 8.201. Largely consistent with Kanungo & Gupta (2021), our overall results suggest that there is a significant difference between the pre- and post-digitalisation periods; at least, the post-digitalisation period has witnessed substantial changes in terms of financial inclusion compared to the pre-digitalisation period.

[Insert Table 3 here]

[Insert Table 4 here]

All the financial inclusion indicators included in the model are statistically significant at least at a 10% level, except for micro-credit offered. Although banks have pursued their financial outreach through microfinance and Self-Help Groups (SHG), digitalisation has made no sizable difference in improving financial inclusion for the less benefited BOP segment of society. This finding to some extent resonates with the views gathered from the experts' insights about MMC, that non-traditional partnerships that offer MMC may not have a social agenda like financial inclusion. Particularly, micro-credit services through banks have not penetrated the BOP segment (Lawson-Lartego & Mathiassen, 2021; Pansera & Owen, 2018; Rani, 2016). Since financial inclusion primarily addresses how to create a single financial system that serves the marginalised BOP segment and provides opportunities for firms

to create businesses by serving them, it is clear that the current banking model and financing ecosystem need to be changed to reach out and appeal to financially excluded populations (Kosta, 2015), particularly at the microfinancing level. Although the variable savings account deposits is statistically significant at a 1% level but denotes a negative coefficient value of -0.245; this suggests that digitalisation has reduced savings account deposits among the marginalised BOP population. This is not completely in line with Amidžic et al. (2014), Kim et al. (2018), or Neaime and Gaysset (2018). However, it implies that a higher number of current account facilities has impacted savings account deposits, since ease of access to funding through current accounts has lowered the need for savings account deposits.

Other financial inclusion indicators have shown significant improvement as a result of the digitalisation of banking provisions. As key indicators of financial inclusion, similar to Kanungo and Gupta (2021), the number of customers, current account holdings and basic account holders indicate that the marginalised BOP segment now has better access to banking services. This also complements the findings from the case study analysis that banking agents are making a significant contribution by bringing the less-served BOP segment of society into mainstream financial provisions. Particularly by collaborating with microfinance institutions, technology providers and individual agents in remote areas, the banks are assisting alternative banking channels in promoting inclusion. By and large, our results find similar evidence to Kochar (2018). The banking agent model was introduced in 2006 by the RBI to allow banks to have third-party, non-bank agents extending their services right to people's doorsteps. Agents are a very important resource for India's transition to digital-based financial inclusion. They act as a bridge between financial service providers and last-mile customers, not only in a practical sense as transaction facilitators but through their human touch and personal interface.[6] Consistent with Kochar (2018), Agrawal (2018) and Gupta and Singh (2015), we find that banking concentration suggests that an increase in the number of bank branches has significantly improved financial inclusion and successfully served the unserved BOP segment. This implicitly refers to our case studies and experts' views that affordability and accessibility of products and services for a broader

[6] https://www.dailypioneer.com/2019/columnists/facilitating-financial-inclusion.html Accessed 6th June 2019

population can be achieved through the physical presence of financial institutions, and that the unserved marginal population at the BOP can be served through the channel of digitalisation.

7. Research implications

7.1 Policy implications

We, in view of our findings, outline several policy implications that have socioeconomic relevance. We recommend that economic viability for the BOP segment can be achieved through greater collaboration with disruptive innovations like digitalisation, particularly with non-traditional partners. Thus, governments of emerging economies, where deprivation and exclusion are common (Malar et al., 2019; Bansal, 2014), should formulate policies through mutual dialogue with non-traditional partners. The policies should also be developed considering the market-led purpose of cost reduction of products and services to incentivise the unserved BOP segment. Banks, at the same time, should prioritise their financial inclusion mandates, adopting digital platforms and implementing policy guidelines that protect the BOP segment for safer and secure transactions. In addition, banks, in consultation with central and local governments, development agencies and financial regulators, should ensure that stipulated policies are effectively implemented and offer financial stability for them. Beyond financial transactions, government policies should ensure that financial inclusion aimed at extending borrowing and investing to the BOP segment should be at parity with the demand and supply sides of the market, and prudential banking supervision should be in place to monitor the regulatory compliances of financial intermediaries.

7.2 Theoretical implications

Referring to our dominant theoretical framework based on disruptive innovation and digitalisation, first, we add to the body of knowledge that non-traditional partners and banking agents both play a crucial role in serving the BOP segment by creating viable economic channels. Thus, financial inclusion initiatives through personal engagement are highly likely to be successful in penetrating the BOP segment. In line with the theoretical view of disruptive innovation, we find that

the personal engagement of banking agents at the BOP, accompanied by affordability and accessibility of products and services for the broader population, can make financial inclusion effective (Benzidia et al., 2021; Govindarajan et al., 2011). In addition, personal engagement offers the BOP segment the choice of finding alternatives; thus, it can create greater scope for market expansion and economic viability. Second, we contribute to the BOP literature by showing that personal engagement, through non-traditional and banking agents, has the potential to create uncontested market space, fulfil new demand corresponding to supply, and break the value-cost trade-off. This also clearly endorses the principles of the Blue Ocean strategy (Carton, 2020; Kim & Mauborgne, 2014). Particularly, we show that relational engagement can create avenues for expanding the market boundaries, leading to inclusive societal change. This further illustrates that disruptive innovation through digitalisation can support the social agenda of financial inclusion by bringing various viable economic benefits to the BOP segment. Third, with reference to digital innovation literature (Tanda & Schena, 2019, p. 87; De Silva et al., 2020; Dembek et al., 2020; Makholwa et al., 2020; Agarwal et al., 2018), we demonstrate that digitalisation has made substantial changes to the banking practices of the BOP population, reaching out to unserved customers, offering them better banking engagement through bank agents, opening up new accounts and current accounts and benefiting them through higher banking concentration. Thus, digitalisation as a channel of disruptive innovation has transformed the way financial products and services are served to the marginalised low-income population at the BOP. This theoretically justifies the critical role of technological materiality in organisational change (Mesgari & Okoli, 2019), which, in a sense, affirms the view that technology-in-use has significant affordance value that comes from relational engagement.

7.3 Practical implications

Our study suggests that collaboration is central to a higher level of economic viability for serving the unserved customers in the BOP segment. The engagement of the local community, through microfinance institutions, technology providers and multiple individuals who provide a local presence to the banks in remote locations through their micro-level small entrepreneurial businesses, makes financial inclusion possible for the BOP. Particularly, financial transactions through the Alternate

Banking Channel (ABC) are highly likely to be successful for the unserved customers of the BOP segment. Particularly, ABC has a purposive social agenda and carries relevance for financial inclusion. Banks, in advancing financial inclusion, are successfully carrying out their role of intermediation through digitalisation and incentivising the BOP segment with better facilities through new accounts, in-person counselling with bank agents and increasing their banking presence in remote areas. This offers both accessibility and affordability of credit, saving and financing to the BOP segment. We find that banks are increasing their number of new low-income accounts and deposits from the low-income accounts to maintain an enhanced revenue stream. This, in effect, will make the financial system stable, and, in turn, will improve inclusive financial provisions.

7.4 Limitations

Despite our study extending the current understanding of disruptive innovation and digitalisation that lead to financial inclusion at the BOP, it has certain limitations. First, our case studies cover a sample of emerging economies, whereas this study could be generalised in a similar setting in different emerging economies to capture the extent to which financial inclusion is promoted through disruptive innovation and digitalisation. Second, the experts' insights on economic viability and the social agenda were somewhat mixed; this could have been exploited further by including additional experts in the sample. Third, our choice variables of financial inclusion are widely used in financial inclusion literature (Ababio et al., 2021; Li & Meyer-Cirkel, 2019; Demirgüç-Kunt et al., 2018; Neaime & Gaysset, 2018; Kim et al., 2018; Kumar, 2013; Amidžic et al., 2014); however, employing other financial inclusion indicators could have provided a more nuanced understanding of the market dynamics of the BOP segment.

7.5 Future lines of research.

Our study, while offering several novel insights, has further scope for future research. While we recognise and address the challenges of penetrating the BOP and the critical role of digitalisation, the central concept of the BOP can be further explored by developing new measures, including country-

level institutional frameworks and capturing the ethnographic understanding of BOP participants. Given that the BOP segment is not homogeneous across the country and community levels, our findings offer unique opportunities for future research to exploit these differences, and to develop a broader understanding of the intricacies of the BOP segment and the promises of financial inclusion that aims to deliver parity and inclusivity to the marginalised population. Our study also informs future lines of research to undertake a closer examination of the microfinancing and social enterprises working in the area of social inclusion.

8. Conclusions

We studied the extent to which disruptive innovation and digitalisation affect the marginalised BOP segment. Our research focused on the BOP segment, i.e., 53% of global population that as per the International Finance Corporation (IFC) has no access to formal banking services but can be reached through technologically assisted means (IFC, 2016). As indicated by the IFC, 75% of these underserved individuals are based either in East or South Asia or in Africa. Where, mobile money services have direct access to about 1 billion of these people, and their reach is expected to increase to 2.3 billion by 2025. Using the theory of disruptive innovation as our baseline perspective, we viewed disruptive innovation as an opportunity for growth since it harnesses new growth based on lessons learned about value from the legacy systems (FT, 2014; Forbes, 2014). Further, formalising digitalisation as a channel of disruptive innovations, we weaved into it a progressive social agenda, i.e., financial inclusion as a socioeconomic initiative that can benefit the BOP segment. To gain explicit understanding about the pledges of disruptive innovation and articulate the critical engagement of digitalisation, we investigated, based on case studies and experts' views, the most suitable mode of entry of firms offering financial services to the unserved BOP segment with disruptive innovative products and services. We found that this can be achieved through two routes: the Mobile Money Channel (MMC) and the Alternative Banking Channel (ABC). In both cases, we found evidence that strategic engagement of the service provider, mainly with non-traditional partners and alternate channels, is important for successful entry into a BOP market. Although traditional channels do not possess the technological expertise required

to disrupt a market, we found that collaborations between service providers, despite their lack of market knowledge and their traditional distribution channels for delivery, can penetrate the BOP segment. We further revealed a clear difference between ABC and MMC and delineated the prerequisite factors to fostering a non-traditional channel for success in high-potential but non-consuming markets. Particularly in the case of alternative banking, respondents recommended that the reputation of the primary promoting authority can facilitate strategic penetration into areas where the financial service provider does not have infrastructure. Our study has shown that firms offering a disruptive innovation product or service to the BOP segment can benefit from their entry into the market, based on their reputation in other segments and the profit they earn from volume-based transactions and effective cost reduction approaches.

Our attempt to investigate the appropriate market entry modes for formal financial services into the BOP segment with products and services that can disrupt the existing market, largely captured by the informal financial services sector, has offered a better understanding of the market dynamics. Four case studies have unveiled how penetration through technology-assisted means – that is, mobile phones – into remote locations is disrupting the established informal market channels that have been operating for many years. This is making it possible for providers of financial services to serve the under- and unserved customers through different digital channels. In addition, we have provided further insights into banking services that offer financial access and extend financial inclusivity to the BOP segment through digitalisation. In particular, banks have significantly reached out to the unserved population of the BOP segment through digitalisation, offering ease of access to new accounts, current accounts and services of banking agents, and increasing banking concentration. However, banking digitalisation has not improved microcredits. We understand that this is because ease of access and affordability of funds for transactions may have impacted the microcredit offering. Our view of entering a BOP segment collaboratively with other traditional and non-traditional partners establishes how business-model-related factors such as collaboration, penetration through an efficient business model and cost structure with social impact are likely to help an organisation aiming to enter the BOP segment and earn profits from it.

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Table 1: Digitalisation of Indian Banking

Name and Address of Nationalised Public Sector banks	Year digitalisation introduced	Year full digitalisation operationalised
1. State Bank of India, Central Office, Chairman's Secretariat, P.B.No.12, Nariman Point, Mumbai-400 021.	2006	2010
2. Allahabad Bank, Head Office, 2, Netaji Subhas Road, Kolkata-700 001.	2009	2014
3. Andhra Bank, Andhra Bank Building, Sultan Bazar, P.B.No.161, Hyderabad-500 001.	2009	2014
4. Bank of Baroda, Head Office, Baroda House, Mandvi, Vadodara- 390006, Gujarat.	2008	2012
5. Bank of India, Head Office, Express Towers, Nariman Point, Mumbai-400 021.	2008	2015
6. Bank of Maharashtra, Lok Mangal, 1501, Shivaji Nagar, Post Box No.919, Pune-411 005.	2009	2015
7. Canara Bank, 112, Jayachamarajendra Road, Post Box No.6648, Bangalore-560 002.	2008	2014
8. Central Bank of India, Central Office, Chander Mukhi, Nariman Point, Mumbai-400 021.	2009	2014
9. Corporation Bank, Bharath Building, G.H.S. Road, Post Box No.88, Mangalore-575 001.	2009	2014
10. Dena Bank, Dena Corporate Centre,C-10 G Block Bandra Kurla Complex, Bandra East Mumbai 400 051.	2009	2015
11. Indian Bank Building, P.B.No.1384, 31, Rajaji Road, Chennai-600 001.	2009	2014
12. Indian Overseas Bank, Central Office, 762, Anna Salai, P.B.No.3765, Chennai-600 002.	2009	2014
13. Oriental Bank of Commerce, E-Block, Connaught Place, P.B.No.329, New Delhi-110 001.	2008	2015
14. Punjab National Bank, 7, Bhikaji Cama Place, Africa Avenue, New Delhi-110 066.	2009	2014
15. Syndicate Bank, Post Box No.1, Manipal-576 119.	2008	2015
16. Union Bank of India, Central Office, 239, Backbay Recla, P. B. No.93A, Nariman Point, Mumbai-400 021.	2008	2015
17. United Bank of India, 16, Old Court House Street, Kolkata-700 001.	2009	2014
18. Punjab & Sind Bank, Bank House, 4th floor , 21, Rajendra Place, New Delhi-110 008.	2009	2015
19. UCO Bank, Head Office, 10, Biplabi Trailokya Maharaj , Sarani, Kolkata-700 001.	2008	2015
20. Vijaya Bank, Administrative Office, Janardhan Towers No.2, Residency Road, Bangalore-560 025.	2009	2014
Other Public Sector-Indian Banks	**Year digitalisation introduced**	**Year digitalisation completed**
21. IDBI Bank Limited, IDBI Tower, WTC Complex, Cuffe Parade, Mumbai-400 005.	2009	2014

Note: This table presents 21 nationalised public sector Indian banks. The 21 banks include 20 nationalised banks and 1 other public-sector Indian bank, i.e., IDBI bank. The State Bank of India includes its 6 associates-Reserve Bank of India.

Source: Collected from different newspapers, agency portals and reports; the year of digitalisation was cross-validated by using WayBack Machine https://web.archive.org Accessed on 9th November 2020

Table 2: Measurement index of variables

No. Customers[a]	Total annual number of customers from the rural sector actively banking with the bank.
No. Basic Accounts[a]	Total annual number of basic new accounts opened for the rural segment. Basic accounts require no minimum deposit and levy no charges.
Current Acct Deposits[b]	Total annual value of the current account deposits for the rural sector.
Savings Acct Deposits[b]	Total annual value of the savings account deposits for the rural sector.
Banking Sector Concentration[c,d]	Number of physical bank branches per 100,000 rural population. Bank concentration, which is likely to be associated with reduced competitive pressure in the sector, is expected to increase financial inclusion.
Micro-Credit Offered[d]	Total annual value of micro-credit offered to BOP/low-income rural sector by banks in collaboration with NGO, SHG and Micro-financing agencies.
Banking Agents[d]	Number of banking agents per 100,000 rural population. *The model was introduced in 2006 by the Reserve Bank of India (RBI) to allow banks to have third-party, non-bank agents to extend their services right to people's doorsteps. Agents are a very important resource for India's transition to digital-based financial inclusion. They act as a bridge between financial service providers and last-mile customers, not only in a practical sense as transaction facilitators, but through their human touch and personal interface*. https://www.dailypioneer.com/2019/columnists/facilitating-financial-inclusion.html

[a] Collected from each bank's annual report
[b] Collected from banks' annual reports, FitchConnect, Thompson One and BvD on payment basis
[c] Collected from banks' annual reports and FitchConnect
[d] Collected from banks' annual reports and news reports

Table 3: Summary Statistics

Variables	Mean	Std. Dev.	Z-statistics[e] for tests of mean differences
No. Customers	50933534	241335	-3.886**
No. Basic Accounts	17336743	90227	-8.765**
Current Acct Deposits	137123612[a]	192546	4.897**
Savings Acct Deposits	12973321[a]	171260	-10.318*
Banking Sector Concentration	234	154	9.214**
Micro-Credit Offered	12579239[a]	54040	9.876**
Banking Agents	14	16	8.776**

[a]Accounting figures are in Indian Rupees (Rs)

Table 4: Logistic Regression Results

Predictors	β	***Wald's*** χ^2	e^{β} **(Odds ratio)**
Constant	2.104***	7.036	8.201
	(0.011)		
No. Customers	0.230*	2.945	1.000
	(0.002)		
No. Basic Accounts	0.121**	5.673	1.000
	(0.021)		
Current Acct Deposits	0.322***	7.815	1.000
	(0.033)		
Savings Acct Deposits	-0.245***	11.737	1.000
	(0.002)		
Banking Sector Concentration	0.041**	6.632	1.006
	(0.201)		
Micro-Credit Offered	-0.220	0.776	1.000
	(0.028)		
Banking Agents	0.868***	9.287	0.917
	(0.793)		

Goodness-of-fit test	χ^2
Omnibus Model Test	86.961***
Hosmer & Lemeshow Test	79.295
Diagnostic tests	
Percentage correctly classified	84.1
Cox and Snell R^2	0.495
Nagelkerke R^2 (Max rescaled R^2)	0.659

Note: *, * * and * * * Statistically significant at 10, 5 and 1 per cent, respectively. The statistical significance is estimated using the standard t-statistics. The standard errors of the coefficients are reported in parentheses. The Joy & Tollefson (1975) proportional chance test is used to determine the significance of the percentage correctly classified. Studentised residuals that are larger than ±3 are deleted.