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# FIT IN Initiative

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Research synthesis brief

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## How do instant interoperable payment systems transform modern economies?

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Innovations for Poverty Action



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Economics for the Common Good

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# How do instant interoperable payment systems transform modern economies?

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**The digital transformation of economies presents a powerful opportunity to tackle some of the most persistent challenges facing households and businesses today. Despite significant advances, nearly one in three individuals globally still lack access to basic financial accounts as of 2021 (Demirgüç-Kunt et al., 2022). Additionally, 34% of the global population has never made or received a digital payment – partly reflecting the traditional financial system’s limitations in reaching underserved communities (Demirgüç-Kunt et al., 2022). Small businesses, meanwhile, continue to grapple with credit constraints, hindering their ability to engage in entrepreneurial activities and contribute to economic growth.**

As a response to these challenges, the development of a robust digital public infrastructure stands out as a critical priority for forward-thinking governments. By laying the groundwork for digital financial markets to operate on, instant interoperable payment systems (IIPs) hold significant potential to leapfrog economies, foster financial inclusion, create innovative and competitive financial markets, and drive sustainable economic growth while including marginalized populations. In particular, IIPs can offer an appealing alternative to cash by reducing the frictions associated with digital transactions and enabling consumers to use their accounts for a variety of financial activities (Razi et al., 2022). Closed-loop mobile money systems have achieved significant success in driving peer-to-peer (P2P) transfers in emerging markets, but they often struggle to promote other use cases such as merchant or bill payments, especially in fragmented markets with multiple providers (Suri, 2017). Synthesizing recent evidence on IIPs as digital public infrastructure, this research brief takes a closer look at their potential to address the limitations of existing digital payment systems and enhance economic outcomes for consumers and businesses.

## *What makes IIPs a vital part of digital public infrastructure?*

Digital public infrastructure (DPI) can be broadly defined as “a set of shared digital systems that are secure and interoperable, built on open standards and specifications to deliver and provide equitable access to public and/or private services at a societal scale” (UNDP, 2022). While essential components of DPI include digital identity and open data sharing, much of the current discourse centers on IIPs. These systems facilitate the seamless and instantaneous transfer of digital money between individuals, businesses, and governments. The focus on IIPs also likely stems from the success stories of countries like India and Brazil, where their introduction has driven significant growth in account ownership and usage.



## *Background on digital payment systems and interoperability*

Early forms of digital payment systems, particularly mobile money, have been instrumental in driving financial inclusion. For instance, Sub-Saharan Africa is home to all 11 of the world’s economies in which adults with only a mobile money account outnumber those with a traditional financial institution account (Demirgüç-Kunt et

al., 2022). Researchers have sought to understand the reasons for mobile money's success, especially in Sub-Saharan Africa. Evidence shows that mobile money enhances financial resilience and risk-sharing among families in response to negative income or health shocks, primarily through remittances (Jack and Suri, 2014); and has been linked to poverty reduction (Suri and Jack, 2016). The growing literature on mobile money also underscores the role of remittances and payments in promoting financial resilience and higher savings in formal financial accounts (Blumenstock, Eagle and Fafchamps, 2016; Riley, 2018; Breza, Kanz and Klapper, 2020).



Despite these successes, not all countries have seen similar increases in remittances or transaction volumes through mobile money. A key factor identified in this divergence is the lack of interoperability. Many mobile money systems were initially developed as closed-loop platforms, meaning that users were unable to exchange transfers with other users from different mobile money providers. This lack of interoperability diminished the value proposition for users, limiting the overall utility and uptake of digital payment platforms. It may also have reduced incentives for mobile money platforms to compete (Bianchi et al., 2023).

Brunnermeier, Limodio and Spadavecchia (2023) examine the impact of interoperability between mobile money platforms in Africa from 2010 to 2020, with a focus on its effects on competition among providers and on the fees charged to consumers. Mobile money fees typically exhibit tiered prices that depend on whether the transfer is within the same network (on-network) or across networks (off-network), with smaller transactions incurring higher fees. The study highlights how the introduction of interoperability corresponds to reduced mobile money fees. On-network transaction fees decreased by 20%, while cross-network fees fell by 35%. This reduction was most pronounced for small transactions, where on-network fees dropped by 20% and cross-network fees by more than 45%. These results indicate that interoperability can enhance competition among providers, reduce costs for consumers, and ultimately increase consumer welfare. However, more research is needed to reach a definitive conclusion on the effect of interoperability on consumer welfare, market competition, and the broader financial ecosystem.

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**On-network  
transaction fees  
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### *What advantages do IIPs promise over existing digital payment systems?*

IIPs offer several advantages over existing digital payment systems. With instant, inclusive, and interoperable payments, policymakers can enhance financial inclusion, stimulate economic growth, and foster competition among financial service providers.<sup>1</sup> While digital payments help reduce explicit and implicit transaction costs, they still face significant challenges, particularly in emerging markets. Complicated onboarding and authentication processes, as well as unintuitive user interfaces, hinder widespread adoption (SWIFT, 2015). Additionally, payment clearing between different financial service providers remains slow, costly, and often inaccessible for users of mobile money and digital wallets due to a lack of interoperability (Razi et al., 2022). This lack of digital payment interoperability has encouraged consumers to stick to cash, which, despite its drawbacks, is universally accepted. In developing IIPs, a key architectural priority was to accommodate a wide range of financial service providers,



1. A complementary research brief by Bianchi and Garz (2024) discusses empirical and theoretical academic research in economics to highlight key insights for practitioners as they seek to build IIPs.

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including both banks and non-banks, ensuring interoperability between users. Policymakers implementing IIPs can achieve several objectives. First, they can deepen financial inclusion by lowering explicit (e.g., fees) and implicit (e.g., time and inconvenience) costs, while building trust and expanding access to other financial services such as credit and insurance (Greenlend and Toth, 2023; Sampaio and Ornelas, 2024). Second, IIPs can drive economic growth by reducing transaction costs and mitigating information asymmetries through the creation of verifiable digital transaction records, especially in underserved communities where access to formal banking services is limited (Dubey and Purnanandam, 2023). Lastly, IIPs may promote greater competition and innovation in the banking sector, allowing smaller banks and non-bank financial service providers to offer more convenient payment options, closing the convenience gap with larger institutions (Sarkisyan, 2023; Roessler, Toth and Tsai, 2024). Integrating open banking into IIP frameworks further enhances these benefits by reducing information asymmetries and promoting competition between traditional banks and Fintech companies (Alok et al., 2024).

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### *Do IIPs deliver on their promise?*

#### IIPs can deepen financial inclusion

Despite the expansion of financial accounts in many emerging markets, their overall usage remains limited. Although these accounts are frequently used for peer-to-peer payments, many individuals still rely on cash for other key transactions such as receiving wages and merchant payments. This lack of engagement raises concerns about how “deep” financial inclusion is among banked individuals. It is also reflected in the lack of use of other financial instruments, such as insurance, investment and credit products. A crucial question is then if users of IIPs are more likely to have a deeper engagement with their financial accounts. One would expect that lower implicit transaction costs associated with IIPs would incentivize users to conduct a wider range of financial transactions. Greenlend and Toth (2023) and Sampaio and Ornelas (2024) highlight that IIPs can indeed deepen financial inclusion.

Studying the impact of India’s Unified Payment Interface (UPI), Greenlend and Toth (2023) show that UPI users are nearly three times more likely to save in formal accounts without a reduction in their informal savings. The study also finds that UPI users are more likely to switch from cash to digital for bill payments and receiving wages. Moreover, financial inclusion deepens through the use of other financial products: The authors show that UPI users are more likely to purchase insurance and investment products through digital channels. These findings underscore the ability of IIPs to drive broader adoption of digital financial services and further integrate individuals into the wider financial ecosystem.

Sampaio and Ornelas (2024) add support to the argument that IIPs can deepen financial inclusion. Focusing on Brazil’s fast payment system, Pix, the authors show that as the number of Pix users increases, so does the use of other traditional banking services, such as wire transfers and card transactions. Importantly, the adoption of Pix significantly boosts financial inclusion by facilitating the establishment of new banking relationships. The study finds that a 1% increase in the number of active Pix users results in a 0.45% rise in individuals establishing a credit relationship within the same municipality, a 0.25% increase in people creating a relationship with a new bank, and a notable 0.8% increase in the number of first-time bank account holders. These findings underscore Pix’s role in expanding access to banking services and supporting deeper financial inclusion, where individuals increase their engagement with the formal financial system.

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## IIPs can spur economic growth

In standard economic textbooks, payment systems are often seen as mere tools to settle claims. So how can an efficient payment method influence real economic outcomes? Dubey and Purnanandam (2023) examine how economic outcomes in India differ between districts with varying levels of UPI adoption. They argue that, in the presence of transaction costs and information asymmetries, certain payment methods can be more effective at minimizing these frictions. Consequently, the medium of payment can have a direct impact on real outcomes and economic growth.



By analyzing two sets of similar districts that differ only in their level of UPI-participating banks, the authors present some striking findings. Households in districts with higher UPI participation saw around 8% more income growth between 2018 and 2022 compared to those in districts with lower UPI participation during the same period. Furthermore, these households experienced a 2% greater increase in business ownership and significantly higher business income. The results are notably heterogeneous. The period studied allowed the authors to examine the joint impact of IIPs and the COVID-19 pandemic. They find that these effects were evident both before and after the pandemic, with COVID-19 amplifying the positive effects on income and entrepreneurship. The findings support the idea that digital payments can reduce frictions, especially in areas with fewer brick-and-mortar bank branches. The increases in household income and entrepreneurial activity are primarily driven by higher borrowing in districts with a higher share of UPI-participating banks.

**8%**  
**Households in districts with higher UPI participation saw around 8% more income growth between 2018 and 2022**

Interestingly, the increase in borrowing appeared with a time lag of a few years. This suggests that digital payments can help households build transaction histories, which later serve as a form of collateral for obtaining loans. These findings align with the broader economic channels discussed earlier, where IIPs reduce transaction costs and relax credit constraints, ultimately fostering economic growth.

## Open banking initiatives embedded in IIPs can amplify financial inclusion and credit access

Open banking empowers bank customers by allowing them to share their financial transaction data with other financial service providers, facilitating competition and innovation in the financial sector (Babina et al., 2024). By placing customers at the center, these initiatives reduce information asymmetries between consumers and providers, which holds promise for expanding access to credit. However, while the theoretical potential of open banking to enhance competition is widely acknowledged, there is limited empirical evidence of its impact on credit expansion.

Alok et al. (2024) investigate how open banking, enabled through India's Unified Payment Interface (UPI), affects credit access and examines the role of different intermediaries, such as traditional banks and Fintech lenders, in facilitating credit for various borrowers. The study yields important insights: credit markets expanded by 17% due to the introduction of open banking within UPI, with a significant portion of this expansion directed toward underbanked and marginal borrowers. As intermediaries, Fintech firms were responsible for this growth, although traditional banks also experienced an increase in the value and volume of loans issued. The regions with a higher proportion of previously unbanked populations saw the greatest credit growth, driven largely by Fintech firms, and credit growth was more pronounced in areas with better internet connectivity.

**17%**  
**Credit markets expanded by 17% due to the introduction of open banking within UPI**



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UPI infrastructure played a crucial role in this credit expansion. Prior to UPI, 99% of Indian households already had at least one member with a bank account, thanks to the Jan Dhan Yojana (JDY) Initiative that promoted universal bank account ownership. Regions that had recently achieved higher financial inclusion through the JDY Initiative showed nearly double the increase in the value of credit extended, suggesting that the foundation laid by JDY was instrumental in accelerating credit growth. Furthermore, the widespread availability of affordable internet connection and the expansion of digital networks addressed the digital divide, with areas offering cheaper and better internet access seeing particularly strong growth in credit. These results indicate that UPI allowed consumers to build verifiable digital transaction histories, which subsequently enhanced their access to credit after the introduction of open banking.

IIPs can enhance banking competition and innovation

**IIPs hold the potential to reshape the market structure by lowering entry barriers for a broader range of financial service providers, challenging the traditional dominance of large banks as the primary payment facilitators**

The banking industry is often characterized by high concentration, where a few large banks dominate the market, leading to limited competition and innovation (Drechsler, Savov and Schnabl, 2017; Wang et al., 2022). One key consequence of this lack of competition is the low deposit rates offered to consumers, which can hinder aggregate formal savings and consequently reduce the overall credit supply. IIPs hold the potential to reshape the market structure by lowering entry barriers for a broader range of financial service providers, challenging the traditional dominance of large banks as the primary payment facilitators.

A recent working paper by Sarkisyan (2023) explores the impact of IIPs on banking competition by studying Pix, introduced by the Central Bank of Brazil in November 2020. Brazil's experience is particularly informative since the government mandated large and medium-sized banks to participate in

Pix, resulting in more than 90% of banks joining within two months. Sarkisyan shows that in regions with higher Pix usage following the easing of COVID-19 restrictions, deposits at small banks grew more relative to the deposits at larger banks, leading to a significant reduction in deposit market concentration and deposit rate spread. This shift is largely attributed to Pix reducing the convenience gap between large and small banks. Prior to Pix, larger banks had an advantage in offering more convenient payment and transfer services, but Pix leveled the playing field, making consumers more sensitive to deposit rates. As a result, small banks experienced an increase in demand for deposits. Consequently, while small banks initially offered higher deposit rates to attract customers, they began lowering these rates in response to rising demand. However, their rates remained higher than those of larger banks, likely due to larger banks providing superior non-payment services, such as more extensive credit card options or more advanced online banking applications. Overall, the evidence suggests that IIPs like Pix can enhance competition in the banking sector, allowing smaller banks to compete more effectively by offering competitive deposit rates. However, the non-payment services provided by larger banks may continue to play a role in maintaining their customer base, even as payment service competition increases.

Another consequence of limited competition in the traditional banking sector is the lack of innovation. Roessler, Toth and Tsai (2024) focuses on the impact of India's UPI on the frequency of updates to mobile banking apps that introduce new financial products, technologies related to UPI, user-friendly features, and improved payment functionalities. Before UPI was introduced, financial service providers showed similar trends in terms of innovation. However, after UPI's implementation, banks and other financial institutions that participated in the UPI system exhibited significantly higher levels of innovation compared to non-UPI members. This increase was reflected not only in new app features but also in the higher volume of mobile banking transactions. These results suggest that UPI stimulates both innovation within financial service providers and greater demand for digital financial services. By fostering a competitive environment, IIPs like UPI incentivize banks to innovate, ultimately benefiting consumers with more advanced and accessible financial products.



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## IIPs can improve monetary policy transmission

Monetary policy is an essential tool for steering economic growth. When central banks raise interest rates, the expectation is that banks will pass on these rate changes to both deposits and loans. However, banks with significant market power often keep their deposit rates unchanged, avoiding large outflows of deposits due to their dominant positions (Drechsler, Savov and Schnabl, 2017). A recent working paper by Liang, Sampaio and Sarkisyan (2024) argues that banks with higher market power tend to raise deposit rates less during interest rate hikes, insulating themselves from competition. However, they find that IIPs, such as Brazil's Pix, can diminish banks' market power, making them more responsive to monetary policy changes. This shift is explained by two key factors: IIPs lower the switching costs for depositors and narrow the convenience gap between small and large banks. As a result, consumers can move or withdraw their deposits more easily, increasing competition for deposits and compelling banks to adjust rates in line with changes in monetary policy. To explore potential reasons why Pix enhances monetary policy transmission, the authors develop a dynamic general equilibrium model. They find that the reduced switching costs make depositors more sensitive to interest rates. This "deposit channel" is identified as the primary driver of increased monetary policy effectiveness, rather than firms' borrowing behavior or banks' capital management decisions.

**IIPs reduces banks' market power, pushing them to become more reactive to policy changes. This shift is explained by two key factors: IIPs lower the switching costs for depositors and narrow the convenience gap between small and large banks**

Which environments help to realize these benefits?

**The introduction of UPI in 2016 was the culmination of a period of Indian investment in digital public infrastructure**

While IIPs offer significant potential to transform economies, these benefits are not realized in a vacuum. Their success may depend on market conditions, pricing structures, and the regulatory environment. India and Brazil provide essential role models, but they also raise the question of whether these systems can yield similar benefits in environments where financial inclusion is lower and regulatory commitment is weaker. Although this remains an open empirical question, examining the financial ecosystems into which UPI and Pix were introduced may offer valuable insights.

The introduction of UPI in 2016 was the culmination of a period of Indian investment in digital public infrastructure (Dubey and Purnanandam, 2023). The Indian government laid the groundwork by introducing a nationwide digital ID system in 2010, which significantly reduced onboarding and verification costs for both users and financial institutions to open financial accounts. The Pradhan Mantri Jan Dhan Yojana (JDY) program, launched in 2014, ensured universal access to bank accounts, which was the required entry-point for new users of UPI.<sup>2</sup> Additionally, the government invested heavily in building the digital infrastructure required to support secure, cross-platform payment systems (Acharya, 2023). UPI's introduction in 2016 was bolstered by government-backed incentive programs and promotional campaigns, while the demonetization of high-denomination currency notes and the COVID-19 pandemic further accelerated adoption by pushing more people toward digital transactions.<sup>3</sup>

In Brazil, Pix was introduced in 2020 within an environment where financial inclusion was already relatively high, with over 70% of Brazilians holding a bank account, largely



2. Greenlend and Toth (2023) show, however, that after onboarding through a traditional bank account, UPI users overwhelmingly switch to utilizing one of the three dominant fintech payment apps—PhonePe, GooglePay, or PayTM—which process 95% of UPI transactions.

3. See Chodorow-Reich et al. (2020) and Cruzet, Gupta and Mezzanotti (2023) for the effects of demonetization.



due to employers requiring salary accounts (Sarkisyan, 2023). A key driver of Pix's rapid adoption was the Central Bank of Brazil's mandate requiring banks and payment institutions with over 500,000 accounts to participate in the system (Duarte et al., 2022). The mandate created a critical mass of users and triggered significant network effects, encouraging smaller banks and non-bank payment service providers to join voluntarily. The timing of Pix's launch during the COVID-19 pandemic also played a crucial role, as the Central Bank of Brazil implemented measures to limit cash withdrawals from Pix transactions for at least a month, compelling new users to engage with digital payments more regularly (Aurazo and Gasmi, 2024).

Given that India and Brazil's success in implementing IIPs occurred in an environment with relatively high financial inclusion, a crucial question arises: Are the benefits of IIPs reaped only in environments with high financial account

ownership? Theoretically, it is unclear how interoperability could influence financial inclusion and consumer welfare in an environment where the financial inclusion rate is relatively low. This is because interoperability reduces financial service providers' incentives to invest in crucial digital payment infrastructure such as telecom towers and mobile money agents. The economics behind this argument is simple: the lack of competition without the presence of interoperability increases the scope for rent extraction and induces platforms to increase their size and drive financial inclusion. While the empirical research on IIPs has not addressed this question, the results of Brunnermeier, Limodio and Spadavecchia (2023) provide some guidance on how interoperability influences competition among service providers and financial inclusion. The authors argue that while interoperability is associated with increased competition and lower fees for consumers, it also corresponds to lower infrastructure investment by mobile money providers. Mobile money companies operating in countries that adopted interoperability saw an 18% decline in population coverage, a 22% drop in market penetration, a 29% reduction in revenue, and a 12% decrease in the number of towers. These findings suggest that while interoperability offers clear benefits in terms of cost reductions and consumer welfare among existing users, it also raises concerns about network coverage and financial inclusion in rural and underserved areas.



**While interoperability offers clear benefits in terms of cost reductions and consumer welfare among existing users, it also raises concerns about network coverage and financial inclusion in rural and underserved areas**

## Conclusion

The evidence presented in this brief highlights the transformative potential of IIPs as a core component of digital public infrastructure. For policymakers, the implementation of IIPs offers a pathway to deepening financial inclusion, stimulating economic growth, fostering competition, and enhancing innovation within the financial system. By lowering transaction costs and expanding access to financial products, IIPs can play a pivotal role in supporting underserved populations and encouraging greater engagement with formal financial systems.



The evidence presented in this brief highlights the transformative potential of IIPs as a core component of digital public infrastructure. For policymakers, the implementation of IIPs offers a pathway to deepening financial inclusion, stimulating economic growth, fostering competition, and enhancing innovation within the financial system. By lowering transaction costs and expanding access to financial products, IIPs can play a pivotal role in supporting underserved populations and encouraging greater engagement with formal financial systems.



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Policymakers must recognize, however, that the benefits of IIPs are not automatically realized in all contexts. As demonstrated by case studies from India and Brazil, success in implementing IIPs often depends on pre-existing levels of financial inclusion and robust digital infrastructure. In environments where financial account ownership is low, policymakers should focus on complementary policies that address these foundational barriers, such as expanding digital identity systems and improving telecommunications infrastructure. Moreover, attention must be given to the potential trade-offs of interoperability, as the reduction in provider competition could dampen incentives for further investment in digital infrastructure, particularly in rural and underserved regions.



To maximize the impact of IIPs, policymakers should ensure that implementation efforts are inclusive and adaptive to local conditions. This includes mandating participation from both banks and non-bank financial institutions to drive network effects and making targeted investments in regions with low financial inclusion. Additionally, embedding open banking frameworks within IIPs can amplify the benefits of competition and enhance access to credit for underbanked populations.

In conclusion, IIPs hold transformative potential for financial markets, but their successful deployment requires a nuanced approach that addresses both the opportunities and the challenges posed by existing market dynamics. Through thoughtful design and implementation, IIPs can support equitable and sustainable economic growth.

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## KEY POLICY INSIGHTS

IIPs hold transformative potential for modern economies, acting as a catalyst for financial inclusion, economic growth, competition, and financial innovation. By lowering transaction costs and expanding access to financial products, they can play a pivotal role for underserved populations and encourage engagement with formal financial systems.

### IIPS benefits are not guaranteed

- The effectiveness of IIPs is contingent on existing levels of financial inclusion and robust digital infrastructure.

### Use complementary policies

- Where financial inclusion is low, policymakers should consider additional solutions such as digital identity systems and improving infrastructure

### Consider the trade-offs

- Interoperability could dampen incentives for investment in digital infrastructure, particularly in rural and underserved regions.

### Maximize impact

- Mandating participation from financial institutions can drive network effects, while open banking initiatives can amplify the benefits of competition and enhance credit access.

### Final thoughts

- Successful deployment of IIPs requires a nuanced approach that addresses both the opportunities and the challenges posed by existing market dynamics.
- Thoughtful design and implementation can support equitable and sustainable economic growth.

## About the author



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Hakan is currently a postdoctoral scholar at Stanford Graduate School of Business. He was previously affiliated with the Financial Inclusion through Interoperability Initiative at Toulouse School of Economics.

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## About the FIT IN Initiative

In November 2020, the Toulouse School of Economics launched the Financial Inclusion Through Interoperability Initiative to catalyze new research to constructively influence the design and regulation of interoperable digital financial services systems in low- and middle-income countries.

The main objective of this four-year research initiative is to better understand the implications of alternative competition and regulatory policies and ultimately inform policies to expand the scope, improve the quality and reduce the cost of digital payment systems for impoverished users.

The FIT IN Initiative receives support from the Bill & Melinda Gates Foundation's Financial Services for the Poor program.

For more information: [www.tse-fr.eu/groups/FIT-IN-Initiative](http://www.tse-fr.eu/groups/FIT-IN-Initiative) / [ftininitiative@tse-fr.eu](mailto:ftininitiative@tse-fr.eu)





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