MICROFINTECH: OUTREACHING FINANCIAL INCLUSION WITH COST-CUTTING INNOVATION

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ABSTRACT

Microfinance is a renowned albeit controversial solution for giving financial access to the unbanked, even if micro-transactions increase costs, limiting outreach potential. Economic and financial sustainability of Microfinance Institutions (MFIs) is a prerequisite for widening a potentially unlimited clients’ base. Automation decreases costs, expanding the outreach potential and improving transparency and efficiency. Technological solutions range from branchless mobile banking to geo-localization of customers, digital/social networking for group lending, blockchain validation, big data, and artificial intelligence, up to “MicroFinTech” – FinTech applications adapted to microfinance. Financial inclusion has been identified as an enabler for 7 of the 17 Sustainable Development Goals (SDGs).

Cross pollination of financial intermediaries is catalysed by digital platforms that act as a bridging node among multilayer networks where traditional banks, FinTechs, and MFIs interact.

This study examines these trendy solutions comprehensively, going beyond the existing literature and showing potential applications to the traditional sustainability versus outreach trade-off.

Keywords: financial inclusion, sustainability, SocialTech, scalability, Mobile banking, social networking, digital platforms, big data; blockchains.

1. INTRODUCTION

Going beyond traditional banking, microfinance is by now a consolidated and successful mean to provide credit to the neediest, helping the poor to sort out bank exclusion, which is one of the main misery traps (Collier, 2007; Moro Visconti, 2014) that prevents billions of underserved, especially women, from escaping atavistic poverty.

While the success of microfinance, since the pioneering intuition of Yunus, has gone beyond any expectation, its implementation is still typically subsidized and raises growing concerns. Self-sufficiency and economic sustainability represent in most cases a mighty goal, whose attainment would allow MFI to broaden their clientele (potentially unlimited, being represented by billions of unbanked poor).

Consistently with this view, Ghosh, 2013 claims that microfinance cannot be a silver bullet for development and profit-oriented MFIs are problematic (“better unbanked that unable to repay loans”). The business industry remains opaque, and mission drift is a constant temptation, especially in India (Saxena and Deb, 2014). Microfinance must be regulated and subsidized, and other strategies for viable financial inclusion of the poor and small producers must be more actively pursued.

Financial inclusion is generally considered as a pro-growth strategy and improved access to (micro)finance reduces income inequality and poverty (Agyemang-Badu, 2018), fostering Sustainable Development Goals (SDGs). Mader (2017) however claims that high expectations
of financial inclusion serving as a core pro-poor, private sector led development lack justification. Bateman and Chang (2012) are even more skeptical, arguing that microfinance constitutes a powerful institutional and political barrier to sustainable economic and social development, and so also to poverty reduction. Mission drift often prevents MFIs for achieving their outreach potential (Shu & Oney, 2012).

Technology, starting from electronic payments, may foster financial inclusion and availability/affordability of financial services in developing economies, softening the perverse effects of microcredit (Dos Santos and Kvangraven, 2017). Digital finance companies work a mile further, in the name of digital financial inclusion, by serving excluded, marginalized, neglected individuals and Small and Medium Enterprises through their innovative, affordable, quality, and speedy digital financial services and products (Ravikumar, 2019).

While there is an impressive literature on microfinance (for a comprehensive introduction, Armendariz De Aghion and Morduch, 2010; for recent surveys, Garcia-Perez et al., 2017; Moro Visconti, 2016), and m-banking (Shaikh and Karjaluoto, 2015), little attention has been dedicated to other more innovative strands, as FinTech (Gai et al., 2018) or social networking applied to microfinance group-lending (Ali et al., 2016) and peer-to-peer (P2P) lending (Bruton et al., 2015).

Financial technology (FinTech) is a new technology that uses software and digital platforms to deliver financial services to consumers (Schüffel, 2017). These digital tools often disrupt well-established business models by creating new and efficient means of providing services. The use of smartphones for mobile banking, investing services and cryptocurrency are examples of technologies aiming to make financial services more accessible. FinTech is related to complementary businesses as InsurTech or RegTech that may both interact with microfinance, due to its contiguity with microinsurance or with regulatory issues (especially for deposit-taking MFIs, supervised by Central Bank authorities).

There is a growing amount of studies concerning the financial inclusion perspectives of FinTechs (Agyemang-Badu, 2018; Arner et al., 2018). Fintech innovations are enabling access to financial services through mobile devices for many unbanked in the world. Though fintech innovations are touted as game changers in deepening financial inclusion, their wide acceptance and use remain limited (Senyo, Osabutey, 2020).

There are two main reasons for the emergence of fintech companies (Saksonova and Kuzmina-Merlino, 2017). First, the global financial crisis of 2008, has vividly demonstrated to consumers the shortcomings of the traditional banking system that led to the crisis. Second, the emergence of new technologies that helped provide mobility, ease of use (visualization of information), speed and lower cost of financial services (Anikina et al., 2016).

Whereas some studies examine the impact of technology on microfinance (Ashta, 2011; Moro Visconti and Quirici, 2014; Moro Visconti, 2015), there are no papers dedicated to “MicroFinTech”, a neologism that combines financial technology (FinTech) with microfinance, reshaping the delivery of financial services to make them more accessible and affordable. In emerging markets where financial inclusion is a challenge, FinTechs are helping bridge the exclusion gap, and may be financed for instance by social impact funds (described in Chiappini, 2017). Rapid urbanization, mobile and internet penetration, and ease of use are driving individual demand for FinTech services. Leapfrog innovation can provide cutting edge solutions for the unbanked (Ernst & Young, 2019). Ashta (2018) illustrates some best practices in the use of digital technologies by highly innovative fintech firms in areas that could be of use to MFIs in diverse sectors such as mobile payments, credit scoring, card readers, ATMs and management information systems. According to Liu et al., 2020, the latest fintech business model research hotspots are mobile payment, micro-finance, P2P lending, and crowdfunding.
Mobile money facilitated by mobile technology stands out as the most successful innovation in extending financial inclusion in Africa. The second most promising innovation that has the potential to alleviate SME funding constraints is crowdfunding (Makina, 2019).
This study represents an advance in the debate about the trendy opportunities of microfinance. Consistently with this framework, the research question is focused on the impact of technology-driven innovation (FinTech applications, digitalization, etc.) on microfinance sustainability. If MFIs are more sustainable, they may then be enabled to expand their activities, increasing outreach.
As a corollary, the interrelations between MFIs, FinTechs and traditional banks will be investigated.

2. SUSTAINABILITY VERSUS OUTREACH

The success of microfinance does not imply that it can solve all the existing socio-economic problems which affect the poor. Such a false and simplified conviction is both dangerous and deceiving, as it generates exaggerated expectations that are going to remain mostly unsatisfied.
MFIs, according to their current tide, are limited in their ability to serve the poorest (this being a practical but also theoretical obstacle to optimal outreach), for many complementary reasons such as the poorest natural unwillingness to borrow - life is already risky enough without taking on debt - or exclusion (often self-exclusion) from group lending membership. The poorest also desperately need primary goods and services such as food, grants, or guaranteed employment before they can make good use of financial products.
Highly subsidized safety net programs are what the destitute at the bottom of the economic ladder primarily need.
Microfinance business is often unprofitable or - in the luckiest cases - it offers only decent returns and consequently it does not readily attract ambitious and profit-maximizing managers unless they have a charitable background and are looking for “values” beyond money and success.
MFIs have a high-interest rate burden due to the small monetary amount and high operating cost per transaction. To ensure financial viability and to expand the depth and breadth of their operations, MFIs must adopt cost recovery interest rates. Hence MFIs must charge interest rate high enough, substantially higher than the bank loan risk-free interest rate. The main factors in determining the interest rate on microcredit are the cost of funds, operating costs, loan loss cost and capital for business expansion (Song et al., 2014).
Trendy strategies suggest privileging technological investments instead of opening new physical branches.
The key for a feasible and progressive solution of the main microfinance target - maximizing outreach and impact while preserving long term, possibly unsubsidized, sustainability - is to insist on the search for financial innovation, to find smart and unconventional solutions to unorthodox problems. Among the interchanging examples of financial flexibility and innovation, there are changing sizes in target groups, different loan maturities, individual rather than group lending, feasible ad hoc forms of guarantee (forcing deposits from retained earnings; pledging notional assets psychologically worthy for the borrower …). Other characteristics are represented by the frequency of repayment installments, synergies between financial products (e.g., loans linked with deposits and insurances), specific methods of monitoring (from primary rural supervision to technology-driven devices).
Outreach and sustainability are much concerned with the risk that may affect already tiny margins, especially for MFIs who are also enabled to collect deposits that can conveniently reduce their risk profile. This may happen both on an aggregate basis, matching assets (credits towards borrowers) with liabilities towards depositors, and on a single base, since many
depositors are also borrowers, partially counterbalancing their overall exposure towards the MFI.

Accounting and financial indicators such as the “financial self-sufficiency ratio”, which calculates the ability to generate enough revenues to cover running and fixed costs, can measure the threshold to profitability. Institutions serving poor customers charge higher interest rates and have fewer default rates than those addressing better-off clients.

The classical trade-off between outreach and sustainability stands as a real key point in microfinance issues. Maximum outreach and potential involvement of as many as possible between the poorest is a primary goal, and sustainability is a crucial element for its persistence over time.

Technical or social innovation, also concerning the creation and commercialization of new products, strategies, and management, has a deep impact on MFIs, contributing to reshaping their business model, with an impact on their overall risk profile.

Innovation ignites a Schumpeterian “creative destruction” that reengines the business model, making it sounder and more resilient to external shocks, albeit requiring initial investments on both sides, concerning not only MFIs but also increasingly sophisticated clients. Innovation is accelerated by globalization and the deregulation of banking systems, and it promotes economic growth through improved allocation, efficiency, and a reduction of financial service costs (Satya, 2013).

Technology stands out as a big disrupting factor, which segments haves from haves-not, so creating a market barrier among different MFI, where only the strongest are fit for upgrading. Technology is reshaping the banking industry mainly since the advent of IT applications as home banking. Spill-over effects on microfinance are reengineering old-fashioned business models and, in some cases, MFIs are pioneering change, as it happens for M-banking. Whereas technology typically originates in Western countries and then trickles down in poorer areas, with microfinance, emerging markets represent a pioneering lab for financial innovation (Sharma and Al-Muharrami, 2018).

Even if technology has many different applications, some strands are predominating the actual landscape. IT applications through the digital web are the bridging platform where technologies converge. This is the case for M-banking, social networks, FinTech applications, etc.

Technology is possibly the most potent transmittable tool within a globalized world, subject to unprecedented movements of capitals, goods, people and their know-how, a common denominator which represents the “software” behind any “hardware” transfer, with a demiurgic impact that makes it a cornerstone of internationalized economic value.

Technology is also introducing new stakeholders as TLC operators or social networks, who respectively carry and intermediate data. Digital information is exchanged through web platforms and data carriers are becoming the dominant player, with possible abuses (threatening privacy, overcharging their services with the extraction of monopolistic rents, etc.).

Table 1 shows the main financial access indicators, evidencing a progressive worldwide improvement in most parameters, which however still far from reaching a comfort zone. Mobile money indicators on average grow more than commercial bank parameters.

Table 1. Financial Access Survey

<table>
<thead>
<tr>
<th>Key Indicators</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automated Teller Machines (ATMs) per 100,000 adults</td>
<td>0.71</td>
<td>0.76</td>
<td>0.93</td>
<td>1.07</td>
<td>1.27</td>
</tr>
<tr>
<td>Branches of commercial banks per 100,000 adults</td>
<td>2.28</td>
<td>2.33</td>
<td>2.19</td>
<td>2.14</td>
<td>2.14</td>
</tr>
</tbody>
</table>

1 Source: International Monetary Fund - http://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C&sId=1460043522778
### Demand Side Drivers (Microborrowers at the bottom of the social pyramid)

- Depositors with commercial banks per 1,000 adults: 157.39, 174.90, 183.57, 184.60, 174.58
- Borrowers at commercial banks per 1,000 adults: 3.77, 3.03, 2.96, 3.05, 3.30
- Outstanding deposits with commercial banks (% of GDP): 18.34, 19.02, 19.30, 19.29, 20.44
- Outstanding loans with commercial banks (% of GDP): 4.14, 3.76, 3.70, 3.12, 3.23
- Outstanding loans with comm. banks: of which SMEs (% of GDP): 0.26, 0.16, 0.17, 0.20, 0.18
- Mobile money agent outlets: registered per 1,000 km²: 1.17, 1.65, 2.35, 2.19, 2.98
- Mobile money accounts: registered per 1,000 adults: 81.49, 79.28, 12.02, 21.35, 27.42
- Mobile money transactions: value (% of GDP): 0.31, 0.33, 0.34, 0.69, 1.09

Other data can be found in the MIX Global Outreach & Financial Performance Benchmark Report 2017-2018 ([link](https://static1.squarespace.com/static/5db8891e058ab7204b4e9088/t/5dea83f380f97670d487de8e/1575650294671/MIX+Market_Global+Outreach+%26+Financial+Benchmark+Report_2017-2018.pdf)). See also Quayes (2015).

### 3. THE CAUSES OF FINANCIAL EXCLUSION

Financially excluded households are unbanked since they are not commercially viable for mainstream retail financial providers. Underprovided are consumers who could afford to provide for their core financial needs but are not doing so due to demand and supply side factors and barriers to access.

The issue may be better understood considering the bridging impact of technology in matching demand and supply of financial services, exemplified in Figure 1.

**Figure 1 – Technology-Driven Financial Inclusion Upgrade**

### 4. FINTECH-DRIVEN SCALABILITY AND ECONOMIC SUSTAINABILITY

The causes of financial exclusion, synthetically recalled in paragraph 3 and in Figure 1, are too many to be extensively examined here. Consistently with the research question of the study, specific attention will be dedicated to the economic sustainability that brings to affordability and outreach.
Economic sustainability of the financial intermediary (in particular, the MFI) is first concerned with its capacity to show positive economic margins within its income statement. The profitability of a typical MFI can be investigated considering *pro capite* customer data (see MIX, 2020) and the cumulated revenues and costs reflected in the income statement. MIX (2020), p. 18 shows that for FinTechs:

- **Costs per customer** drop between the 1-2 years and 3-4 years age bracket, a good indication that firms are able to decrease operating costs after initial start-up activities, such as onboarding talent, developing and testing the product, and integrating with partner institutions, are behind them.
- **Revenue per customer**, however, does not start to increase until firms are more than 4 years old: thus, firms may need to wait longer to be able to cover on-going costs through revenue without relying on outside funds.
- while **cost per customer** drops by years 3-4—suggesting lower operational costs—**cost per acquisition** does not, suggesting that firms are still spending money to get new customers.
- It also takes longer for **referral rates** to increase: these do not jump until after the four-year mark. This suggests that firms, even once they are gaining some traction, may take four or more years to hit product/market fit, at which point they can fully take advantage of excitement and word-of-mouth to gain new customers.

Figure 2 – *Microfinance Average Costs and Revenues per Client*

Economic sustainability can be detected considering the income statement of a typical MFI and the impact of technology that can disrupt and re-engineer existing business models, as shown in table 2. According to Adeyeye and Oyetayo, 2016, sustainability can be measured with financial and operational self-sufficiency, with capital adequacy and with the subsidy dependence ratio. The main parameters are recalled in Table 2.
Statistics of financial inclusion may be found in:
- [https://fitsmallbusiness.com/microfinance-statistics/](https://fitsmallbusiness.com/microfinance-statistics/)

The key parameter to assess the business sustainability is represented by the Earning Before Interests and Taxes (EBITDA).

### Table 3. - MFI Income Statement and Impact of Technology

<table>
<thead>
<tr>
<th>MFI - Income Statement</th>
<th>Impact of Technology / FinTech</th>
</tr>
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<tbody>
<tr>
<td>1. Interest income</td>
<td>Increase in Outreach boosts loan volumes and interest revenues</td>
</tr>
<tr>
<td>2. Interest expenses</td>
<td>Higher competition may partially decrease funding costs</td>
</tr>
<tr>
<td>3. Net Interest Margin</td>
<td></td>
</tr>
<tr>
<td>4. Net Operating (non-interest) income</td>
<td></td>
</tr>
<tr>
<td>4.a. Fees and commissions receivable</td>
<td>Increase in Outreach boosts revenues</td>
</tr>
<tr>
<td>4.b. Fees and commissions payable</td>
<td>Shorter and digitalized supply chains may reduce negative commissions</td>
</tr>
<tr>
<td>4.c. Net profit or loss on financial operations</td>
<td></td>
</tr>
<tr>
<td>4.d. Other operating income</td>
<td></td>
</tr>
<tr>
<td>5. Contribution margin</td>
<td></td>
</tr>
<tr>
<td>6. Operating expenses</td>
<td></td>
</tr>
<tr>
<td>6.a. Staff costs</td>
<td>Product and process innovation (reduction of physical branches, automatization, etc.) cuts costs</td>
</tr>
<tr>
<td>6.b. Property costs</td>
<td>Delocalization, virtual branching, clouding and dematerialization cut costs</td>
</tr>
<tr>
<td>6.c. Other operating expenses</td>
<td>IT automation reduces sundry expenses</td>
</tr>
<tr>
<td>7. Net income before provisions = EBITDA</td>
<td>a higher EBITDA improves sustainability and fosters outreach</td>
</tr>
<tr>
<td>8. Net provisions</td>
<td></td>
</tr>
<tr>
<td>8.a. Provisions on loans</td>
<td>Artificial intelligence fueled by big data improves credit scoring reducing delinquency; blockchains validate transactions</td>
</tr>
<tr>
<td>8.b. Other net provisions</td>
<td></td>
</tr>
<tr>
<td>9. Income before tax</td>
<td></td>
</tr>
<tr>
<td>10. Income tax</td>
<td></td>
</tr>
<tr>
<td>11. Net income after tax</td>
<td>a higher net income improves sustainability and outreach, increasing the dividend potential</td>
</tr>
</tbody>
</table>
The dynamic interpretation of Table 3 represents the canvas for the answer to the research question.

MFIs traditionally face high staff costs (6.a) and related operating expenses (6.c.) for their core credit scoring and lending activities. Delinquency from untrustworthy borrowers represents another significant cost that contributes to the economic and financial absorption of resources. To the extent that technology contributes to decrease costs, economic marginality automatically improves. This surplus can be allocated, at least partially, to decreasing unitary interest rate margins, converging towards fair loan rates (Jarrow and Protter, 2018). MFIs may be tempted to cash in these extra margins, with a consequent mission drift from their original vocation; competition and the will of philanthropic shareholders may, however, minimize this risk, pushing towards a decrease in the level of interest rates. This reduction improves outreach, and so higher volumes of loans may partially compensate lower marginality, preventing sustainability concerns.

Technology can improve the supply and value chain on different layers, reducing the costs but also improving the revenues, not only with outreach-driven higher volumes but even with extra gains from innovative business models. For instance, digitalization of information from profiling customers produces big data that represent a worthy asset, whose revenues can be shared with the clients, following a value co-creation pattern.

Business models extensions can also derive from the interaction with complementary activities and stakeholders. For instance, digital group lending through social networks eases the convergence with peer to peer lending, as shown later.

A core component of sustainability is represented by the business’ scalability that expresses the capability to handle growing revenues, dramatically improving economic marginality, so contributing to making the business profitable.

MFIs can incorporate in their business models many FinTech features. This may lead to cost savings and to revenue increases. Even if what matters for sustainability is positive economic and financial marginality, there is a trade-off that derives from the intrinsic riskiness of lending (banking) activity.

5. EXPANDING OUTREACH WITH MULTILAYER DIGITAL PLATFORMS

The evolution of MFIs – from rural moneylenders to licensed banks – eases the social lift of development and goes along with the increase of their outreach potential. Each network layer can be represented by a financial intermediary, linked among them through a Darwinian chain by bridging nodes. Catalyst nodes may be represented by digital platforms or other technological devices that upgrade the outreach potential. Multilayer networks are so connected and represent a segmented ecosystem where different actors coexist.
Outreach may be divided into loans and savings outreach (Adeyeye and Oyetayo, 2016).

6. CROSS POLLINATION OF FINANCIAL INTERMEDIARIES THROUGH DIGITAL PLATFORMS IN A MULTILAYER NETWORK ECOSYSTEM

The financial intermediation ecosystem is populated by several players that synergistically interact among them. They are mainly represented by (traditional) banks, FinTechs and MFIs. Each intermediary operates in a network layer that is linked to the other layers by bridging nodes, mainly represented by digital platforms.

Multilayer networks – i.e., networks represented by interacting layers – are consistent with platforms that operate in relation to other platforms (e.g., Internet platforms serving social media apps). Networks are weighted if the intensity (traffic of data; transactions, etc.) of each interaction among nodes is measured. Bridging digital platforms are typically weight-intensive, improving the overall value and functionality of the network’s ecosystem (consistently with the Metcalfe’s law).

This relationship is exemplified in Figure 4.
This interaction may produce several positive results, ranging from the widening of the product offering to cost savings driven by economies of scale and experience.

7. DISCUSSION

As FinTech technology expands with new products and services, financial inclusion can dramatically improve. Micro-services can be provided ubiquitously, with higher speed and efficiency, especially for consumers that live in backward environments, where physical bank branches are not present.

FinTech advancements may impact on microfinance (creating the neologism “MicroFinTech”) with electronic loan applications and banking services that allow for fast credit decisions and loan disbursal. They can also foster remittances, disintermediating the money transfer market that is expensive for the customers and physically anchored to local branches.

FinTech can also fuel big data, helping to build up personalized credit histories (of m-phone payments, for instance) that help avoiding opportunistic temptations as multiple borrowing and represent a useful track record of each customer trustworthiness.

FinTech can also ease cashless digital payments that are traceable in real time. Security gains in poor environments where thefts routinely occur are significant, together with transparency improvements in the fight against money-laundering or tax evasion.

Adaptation of advanced FinTech applications to microfinance must be carefully fine-tuned, considering the peculiarities and necessities of microfinance. Technology is the most critical catalyster of cost-cutting strategies in microfinance, with positive impacts on the business model of MFI. Implications for their overall sustainability and the consequent ability to extend outreach to underserved customers are meaningful and promising.

There are however some caveats and pitfalls that need to be carefully considered:

- a) Technology is not neutral, and its governance implications may favour stronger stakeholders, as TLC operators (who run and control digital platforms and networks) or social network companies, always looking for cheap data to acquire and use, often bypassing privacy concerns;
- b) Technology is a big disrupting factor, which segments haves from haves-not, so creating a market barrier among different MFI, where only the strongest are fit for upgrading. Sponsoring equity-holders increasingly acknowledge the importance of IT contributions and technical/managerial training but there is still an enormous effort to make, involving...
thousands of small and unskilled MFI, too unsophisticated and fragile for scaling up unless properly assisted;
c) The selection of the right technology is often uneasy, especially for small MFI with limited economies of scale and experience. And technology might be unaffordable or too sophisticated for poor customers that lack skills and experience;
d) Threats to the security of the system, represented by phishing or cyber-attacks, are likely to grow exponentially with the market. Information security poses a growing challenge;
e) Digital divide issues represent a further discriminatory factor for the bottom of the pyramid households if they are too poor to have access to the web (and TLC operators may be unwilling to invest in godforsaken areas, especially if scatterly populated);
f) Innovation typically follows a top-down approach that is mastered by providers, not clients, so developing the prevailing interest of the former;
g) Geographical scalability and the worldwide introduction of innovation can be hindered by local adaptation to unconventional environments;
h) Technical integration of microfinance service providers (increasingly mastered by TLC operators) is uneasy and may create opportunistic rents where MFIs represent the weakest component of the supply chain;
i) Big data concerning personal habits of underserved customers are collected, processed and sold often without any explicit consent of the client, who is unaware of the value of these data and is not given the opportunity to share this value. Privacy issues are likely to grow exponentially, reproducing in a grey zone where information asymmetries may create unprecedented abuses;
j) Technology-driven savings could cause a mission drift in the MFI if these extra resources are used to address wealthier clients, rather than extending outreach to the unbanked;
k) Technology and the financialization of microcredit (Aitken, 2013) reduce the geographical segmentation between local MFIs and global financial markets that has prevented many underserved micro-borrowers to be hit by the global financial crisis. Risk of contagion consequently grows.

Some peculiar drawbacks concern m-banking. According to the Economist (2018) “Mobile money, which offers the equivalent of a basic bank account to almost anyone with any sort of phone, has long been a boon for financial inclusion. So recent evidence that it is leaving problems in its wake is causing dismay. Digital credit through mobile phones is leading in some places to overborrowing, hardship and - horror of horrors - even more, financial exclusion”.
It should also be noted that “diffusion of technology is easier in crowded towns, where there is critical mass for infrastructures and networks but maybe somehow even more useful in underpopulated rural areas, in the middle of nowhere. “To increase the outreach of MFIs, institutions will have to go a step further and start their operation in the rural areas. Implementing sustainable IT infrastructure in such areas is a challenge with numerous obstacles” (Asth, 2011: Ch. 3). Rural environments so face further challenges that exacerbate their vulnerabilities.

The potential for outreach is enormous, but it must be properly supported, especially if tackling the poorest, who suffer for an increasingly harmful digital divide, and consequent lack of opportunities.

Technology is possibly the biggest catalyzer of scalability that improves both economic marginality (up to self-sustainability and profitability) and outreach potential. 

Figure 5 recaps the main concepts.
8. CONCLUSION

This study starts from the consideration that outreach is severely impaired in most MFIs by negative economic marginality. Since costs mostly concern staff and provisions for delinquent loans, technology can be useful in improving sustainability if it tackles these core bottlenecks. More sustainable MFIs can expand their clientele, boosting outreach with a reduction in interest rate charges. Traditional patterns of firms that compensate lower marginality with higher volumes may, however, be unfit for MFIs whose main “product” is represented by risky microloans.

Preliminary evidence (concerning already established M-banking) shows that innovation can actively contribute to cut costs. Confirmation of the combined synergies of technological devices and processes is still wanted, especially for what concerns the latest innovations. Among these, the re-engineering process of traditional group lending through digitalized social networks stands out as a promising pattern for outreach optimization through interest rate discounts.

Digitalization is a powerful catalyst of efficiency, especially in backward environments passing from oral culture to straightforward conversion in digital form. Big data represent a valuable by-product of this process, contributing to making microfinance a business of scale.

Technology needs being conceived, designed, and implemented with a mixed approach, both top-down and bottom-up and with horizontal integration of the MFI with external IT/ICT providers, with synergistic and scalable outsourcing.

Out-of-the-pocket technology (smartphones with germinating apps are like mobile phones some years ago, originally unaffordable but then rapidly and cheaply spreading) is an entry barrier for both providers (MFI, backed by their technological partners) and clients (users).

Any technological device that can soften information asymmetries, increasing consciousness, is likely to bring strategic added value, even with cost reduction. Examples may include real-time information on the MFI's conditions (interest rates; the size of loans and repayment schedule, etc.), benchmarking comparisons regarding both credit institutions (alternative MFI, branch locations, etc.) and market trends in the specific industry sponsored by MF loans. Even if MF apps are still to be proposed, as soon as smartphones and tablets will reach enough critical mass, the pattern will rapidly change and scale up.

M-banking diffusion in developing countries witnesses that there is a greater stimulus for innovation in harder environments with more compelling survival needs. The economic and social impact of branchless M-banking still needs further investigation, also considering
innovative aspects such as information asymmetries reduction, which may have a positive impact even on final clients, strengthening their business models and so enabling micro-borrowers to establish better links with their sponsoring MFI. We may think, for instance, about a real-time device (linked to mobile phones, new generation smartphones, etc.) to communicate in real time wholesale and retail prices of tradable commodities, key information for farmers, small shop owners, etc., which may shorten the whole intermediation chain, to the advantage of producers and consumers. Even peer to peer (P2P) microlending (Ashta and Assadi, 2009; Powers et al., 2008; Stetenfeld, 2008; Freeman and Zopa, 2006) increasingly depends on technological platforms.

The role of big ICT players needs to be further investigated, considering the potential positive impact of their partnering for development in Telco-led M-banking but also the possible – likely – abuses that naturally characterize stronger players.

Booming social networks are likely to reshape group lending composition – a core characteristic of traditional microfinance, following the scalability potential obtainable by leveraging social technology.

Technology is spread through a cross-pollination, from developed to catching up economies and back (as witnessed by M-Pesa mobile solutions in Kenya). Top-down application of innovative devices (smartphones, etc.) and processes merge with bottom-up empirical evidence, grass-rooted in the emerging countryside. Start-ups are ubiquitous, and lever exponential technological applications.

Among the technological advances, fintegration stands out as the trendy innovation behind MicroFinTech, due to the simultaneous interaction of usability, the velocity of innovation, accessibility, and security.

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