The goal of attaining economic development in more countries around the world is unlikely to be realized while 1.7 billion working adults make less than US$2 a day and have little or no access to financial services; between 70 and 80 percent of the world’s population has no access to even the most basic financial services. How could the reach of financial services to the world’s poor be dramatically improved? What would it take to reduce transaction costs and help MFIs achieve greater business viability? What role, if any, might technology play? These were the questions that a diverse group of professionals calling themselves the Microdevelopment Finance Team (MFT) rallied to in July 2002.

This consortium of private and public sector partners pondered how to champion a breakthrough in the effectiveness, relevance, and scale of microfinance to bring financial services to a greater percentage of the world’s poor. Was it possible, they asked, to grow today’s 120 million customer base of microfinance recipients tenfold or more? Could microfinance reach the 1.7 billion working adults who live on less than US$2 a day? What would it take to build the retail capacity and IT infrastructure that could serve that many customers?

Today, nearly three years after the MFT first met, a roadmap is unfolding that gives some needed direction toward reaching this kind of world changing scale in the delivery of financial services to the rural and urban poor. Here we report on a number of pilot projects that have been undertaken around the world to investigate the role that technology can play in banking the unbanked at large scale.

DEFINING THE PROBLEM, IDENTIFYING A POTENTIAL SOLUTION
When they first started their weekly conference calls in August 2002, the members of the MFT began by analyzing the state of the microfinance industry. What, they wondered, were the obstacles keeping the industry from achieving greater scale? When the team had a working definition of the problem components, they vetted their thinking with a wider audience of industry leaders. Together the team and its partners coalesced around the following obstacles to scale:

- The absence of consistent, sector-wide operating standards and business practices that are sustainable enough to stand up to external scrutiny by potential commercial investors and partners
• Fragmentation within the sector and a lack of strong relationships with organizations outside the sector
• Technical challenges and high transaction costs that make it too expensive to reach, in a sustainable manner, poor people in urban, peri-urban, or rural areas who are not yet served by microfinance
• The need for flexibility to offer diverse financial services that meet local needs and priorities

After much research and discussion, the MFT decided that technology could help alleviate some of these problems by providing a secure, low-cost, and reliable means of capturing transaction data and then transferring that data in a consistent, standardized manner to MFIs. In essence, the team envisioned a “data transaction backbone” that would link microfinance clients to their financial institutions—and beyond. Since efficient, reliable data capture—even in remote and rural areas—was both the most critical and most challenging element in the backbone, the team decided to build this module first. The resultant technology was known as the Remote Transaction System (RTS).

TECHNOLOGY DEVELOPMENT AND DEPLOYMENT IN UGANDA

The RTS was designed to process loan payments, savings deposits, withdrawals, and transfers. It is based on a combination of smart cards, point-of-sale (PoS) terminals, a transaction server, and connectors that send data directly to the MFIs’ accounting and general ledger systems. Clients are given smart cards that contain their savings and loan account balances. When ready to make a payment, the client inserts the smart card into a PoS terminal, which captures the transaction data, updates account balances on the smart card, and prints a receipt. Cash is exchanged between the client and the person responsible for the PoS terminal. Later in the day, all transactions saved on the PoS terminal are uploaded via the cellular network to the MFI’s accounting systems where the transactions are reconciled.

Three Ugandan MFIs agreed to participate in the pilot. The MFT settled on Uganda because it had the scale of transactions captured by the PoS devices was not sufficient to justify replacing manual data entry with electronic data capture.

The team envisioned a “data transaction backbone” that would link microfinance clients to their financial institutions—and beyond. Since efficient, reliable data capture—even in remote and rural areas—was both the most critical and most challenging element in the backbone, the team decided to build this module first. The resultant technology was known as the Remote Transaction System (RTS).

PART ONE: THE TECHNOLOGY

One of the powerful lessons that emerged from the pilot projects is that overlaying a new technology solution on existing business processes, without first rethinking those procedures, can increase, rather than decrease, the cost and complexity of doing business. Information technology provides the opportunity to update and innovate business processes. Through such innovation, technology can become a lever in creating the potential for an industry to achieve dramatic increases in scale.

The scale of transactions captured by the RTS device was not sufficient to justify replacing manual data entry with electronic data capture.

Part way through the pilot, a second MFI realized that if it did not re-engineer its business processes then the RTS would increase, not reduce, its operating expenses and the technology would make group meetings much longer. If the institution did re-engineer some key business processes, then the RTS would provide significant value to all members of the value chain—the clients, staff, and the MFI itself. Based on this information, this institution made an attempt to proceed with process change; however, this institution decided that it did not have the internal will to shift to tracking loans on an individual basis. As a result, the institution stopped using the RTS technology and reverted to its prior practices.

The third MFI, which engineered a new business approach to leverage the RTS, demonstrated the greatest return for all constituents—customers,
agents, and the MFI. In this model, PoS terminals were given to merchants, such as gas station franchisees. These merchants thus became “agents” of the MFI. Clients that visited a local agent did not have to travel as far to make loan payments or deposit money. The client transacted and exchanged cash directly with the local agent, who acted as a virtual extension of the MFI.

One surprising result was the finding that clients are actually the greatest beneficiaries of this model. Experience and surveys consistently report that women are very likely to have their earnings taken from them by family members at the end of the day or to find that their funds are spent in unplanned ways. The ability to easily stop at a virtual bank on a frequent basis has the potential to dramatically increase the amount of savings. If the clients avail themselves of this opportunity, it would have dramatic impacts on their financial stability and on the funds that the MFI has to make additional loans. Since the agents receive a fee for providing a transaction service, they are also beneficiaries of this model. The analysis indicates that an agent in Uganda can have an attractive side business with between four and five hundred regular clients that transact twice a month. And the MFI shows a positive return on their investment after the solution has been rolled out to more than twenty thousand clients. Analysis indicates that extending the reach of microfinance into rural areas through these virtual agents will be much less expensive than the current branch model.

SECOND CONCLUSION: Emerging markets require appropriate technologies that are designed for scale. Emerging markets require creative technology solutions that are tailored to their unique, and often challenging, needs—erratic telephone connectivity, unreliable electricity sources, limited or nonexistent technical support, and an illiterate customer base.

One lesson that continually surfaced in the Uganda pilots was the importance of making smart decisions about distinguishing between technology solutions that were appropriate and state of the art technology solutions that were of little or limited practical use. It is far better to provide a solution that can be used rather than one that is optimized for flexibility and always-online infrastructures, the criteria often used for
since most MFIs cannot afford expensive solutions, the RTS was architected for low cost.

mature market products. The total cost of the solution and the capabilities of the local markets must be part of any design criteria. The team members that developed the RTS thought they understood these issues as they began to develop their solution, which was designed and developed specifically for conditions in Uganda.

Since most MFIs cannot afford expensive solutions, the RTS was architected for low cost. It must be remembered that the total cost of a solution includes all the hardware to run the solution, the technical support team required to maintain the solution, and the cost of all required infrastructure elements. All of these costs were considered in the RTS design. That is why the transaction server runs on a standard PC and requires limited technical support. At the same time that the solution was designed for the Uganda context, the development team also ensured that the software adhered to technol-

ogy and financial industry standards so that it could scale and eventually help MFIs share data with other financial service providers or capital markets. The RTS traded end-user flexibility for reliability, speed, and minimal training requirements, all of which are more important in the Ugandan context.

There were many surprises, however. For example, Uganda, like many countries in the developing world, is experiencing rapid growth of cellular and wireless telephone networks. When the RTS was first implemented, the developers learned that voice traffic takes priority over data traffic in Uganda. Thus they found that although the Ugandan cellular network had a large footprint over the country, it could be very unreliable. To respond to these concerns, the RTS developers engineered an offline mode for the RTS as well. This change sped up the collection of data and lowered the effective transaction costs of the calls, alterations that dramatically improved the financial sustainability of the solution. Although the final solution was an improvement in many ways, the realities that drove the change were unexpected, and they added a tremendous element of redesign.

Third Conclusion: The cost associated with building the infrastructure to support this enabling technology is too high for an MFI alone.

The highest capital costs of implementing the RTS solution are to be found in the PoS terminals (US$700 each) and smart cards (US$3.00 to US$5.00 each). During the Uganda pilot, blank cards were procured in India for approximately US$1.15 per card. These cards were then shipped to Uganda where they were printed locally. Printing costs ran as high as US$4.00 per card. To minimize the cost of printing, a local IT company was encouraged to provide card printing services. Through this partnership, the total card cost was reduced to less than US$3.00 per card. If the local company could print even greater quantities of cards this price would drop even more. Furthermore, if the cards could be purchased consistently in batches of ten thousand, the total price could drop below US$2.00 per card. These differences have a tremendous impact on the point at which the total solution returns a positive ROI for participating MFIs. The same dynamic exists with the PoS devices, which can cost less than US$500 each when purchased in volume.

The local IT company that started providing card printing and procurement services was also empowered to handle server management and technical support for the participating microfinance partners. If three or more MFIs utilized this application service provider (ASP) to manage the technical support and card-related aspects of their RTS deployment, a sustainable, self-perpetuating model would be established in Uganda. Each of the participating MFIs pays service fees that enable them to realize a benefit from the RTS. These fees would be a fraction of the cost that the institution would incur if it had to build these capacities internally. The ASP would then have enough business volume to not only sustain its RTS-related operations, but to grow its RTS business in Uganda and the surrounding region. However, if only one institution in Uganda participates, then the sustainability model is no longer supported until that institution has a very high volume of smart cards in circulation.

Although history and economics suggest that collaboration is critical to deploy the type of solution piloted in Uganda in a sustainable manner, cooperation is often resisted. The RTS was designed for cost reduction, and thus it was anticipated that the participating MFIs would share one
RTS server, connect their back-end systems through one generic connector, and adapt their business process to a common PoS interface. This approach would dramatically reduce costs associated with the design, deployment, enhancement, and maintenance of the solution by more than a factor of three.

However, when this approach was discussed with the participating MFIs, they all balked. Each of the institutions wanted the RTS designed to meet their individual and unique business and MIS requirements. Because there was no proof nor sufficient time to convince them otherwise, the RTS team created three distinct RTS servers, three separate connectors, and two PoS interfaces, which significantly increased the complexity and cost of the work in Uganda. The results of the pilot now clearly demonstrate that the original objective of a standardized core solution will be a requirement if the microfinance industry is to reach scale through this type of technology innovation. Creating separate solutions for each institution is neither sustainable nor scalable.

**Shared Infrastructure: A Requirement for Scale**
In many ways, today’s microfinance industry seems eerily reminiscent of the early stages of the credit card market in the United States when each bank was attempting to issue its own cards, develop its own exclusive network of internal and external agents, and invest in its own technologies to serve this new market. Like those banks of yesteryear, it is not unusual to see today’s micro-finance actors resist collaboration and external agents and invest in their own technologies to serve this new market. Also, it is not unusual to see today’s microfinance actors resist collaboration or sharing of systems, even when the cost savings of doing so are likely to be significant. In the pilot projects, this was manifested in the participating institutions’ resistance to sharing RTS servers, demand for customized connectors to link to their individual MIS, desire for uniquely designed and printed smart cards, and apparent disinterest in developing a network of shared external agents within the Ugandan microfinance community.

There is much room to support research and development of innovative technology solutions that encourage cooperation and collaboration, rather than customization, among industry participants. Other investments worthy of donor support are shared infrastructures that decrease per unit costs for all participants, start-up capital for entrepreneurial businesses that are willing to provide technology services, and grants for those MFIs that are interested in participating in such ventures. There is also a growing need to identify and then remove those legal and regulatory roadblocks that impede the expansion of telecommunication services into rural areas, frustrate the capture of microfinance transactional information (including the credit histories of microentrepreneurs), or limit the sharing of that financial information with central switches, credit reference bureaus, and bank regulatory authorities.

**ABOUT THE AUTHOR**

Janine Firpo is the president of Sevak Solutions, a nonprofit company that she co-founded to promote inclusive systems for the delivery of financial services to the world’s 1.7 billion urban and rural poor. Her consulting firm, SEMBA Consulting, focuses on successfully integrating information technology into emerging markets. She also serves on the board of the Jhai Foundation. Firpo holds master’s degrees in marine biology and computer science from the University of Florida and a bachelor’s degree in biology from UCLA.

Firpo led the work described in this paper while director at Hewlett-Packard. This version is adapted from Firpo’s “Banking the Unbanked: Technology’s Role in Delivering Accessible Financial Services to the Poor,” published by The Foundation for Development Cooperation. The full article can be viewed at http://www.fdc.org.au/Electronic%20Banking%20with%20the%20Poor/4%20Firpo.pdf.