

FINTECH: REVOLUTIONS

Part One: Phone Bank

Fifty years ago, IBM announced the availability of the first true mainframe computer, the System/360 integrating computing power, card readers, printers, and tape drives into a system with unprecedented power. System/360 - with up to a megabyte of RAM, and powering through a million instructions a second - meant that entirely new classes of applications opened to digitization, mostly in the banking and finance sectors.

This marks the start of the transition away from manual ledgers to electronic bookkeeping. Within two decades, every bank in the developed world would migrate to a computerized infrastructure.

System/360 is the very [first piece of fintech](#), one device that changed the whole universe of finance.

Come forward two generations, and the smartphone I hold in my hand, a [Google Nexus 4](#) (already twenty-two months old, and thus a bit obsolete), has two thousand times as much memory, processing its instructions four thousand times faster.

This smartphone has as much grunt as *all* of the System/360s manufactured by IBM in its first year of production. With the right software, this smartphone could handle all of the electronic banking transactions from 1966.

This would be remarkable enough if I were the only person on the planet bearing one of these devices. But I'm one of billions. [China's largest handset manufacturer](#), Xiaomi, will sell over *sixty million* smartphones this year. [Over three hundred million were sold in the 2nd quarter of 2014.](#)

By the end of this year around a billion and a half people will be using smartphones. At the end of this decade that number will be much closer to five billion - nearly equal to the number of people expected to have mobile subscriptions.

The mobile has already transformed markets throughout the world. Let me illustrate with a story from India.

Marico is a large Indian manufacturer of health and beauty products. To produce their potions, they require a vast number of coconuts. Historically, they've contracted with middlemen, who purchase coconuts from the pickers, reselling them to Marico.

In 2011, Marico asked these tens of thousands of pickers to text the firm, placing them onto a list which daily alerted pickers of the price Marico would pay for their coconuts.

Marico used SMS to establish direct relationships with the pickers, going around the coconut middlemen, employing small fluctuations in the daily price to modulate the supply of coconuts. Marico has created an exchange mechanism for coconuts - *coconuts-as-currency* - with little more than text messaging.

Smartphones makes it very easy to create on-the-fly exchanges for almost any type of goods or services. Uber and Lyft create markets for transportation, TaskRabbit does this for labour, Freelancer for skills, and so on. Although nearly all of these services interface with the money economy through the banking system, that isn't necessary.

In the 'unbanked' quarters of the world, the mobile has become the essential, revolutionary piece of fintech. Earlier this month, [Zambia's Central Bank reported](#) the number of 'mobile money' accounts had dramatically overtaken the number of formal bank accounts - 3.4 million versus 2 million (out of a population of 14 million).

Mobile money platforms like Vodafone's M-PESA allow millions of the unbanked to enjoy the benefits of banking without its costly infrastructure. Mobile money provides the necessary exchange mechanism to connect the unbanked to the money economy.

All of that happened before the smartphone.

At the end of August 2014, a powerful but cheap (Rp 1,999, or \$33) Mozilla smartphone [launched in India](#). As this device and its competitors make their way across Africa, India and China, mobile money will be married to the vast computing resources available on a smartphone. Cryptocurrencies like Bitcoin will flourish alongside mobile money. The exchanges between them will not exist in banks, but within the smartphones themselves.

Every one of these billions of smartphones is becoming its own trading desk, offering up its own store of commodities, exchanging them for other commodities. Much of the time, these will be money exchanges, but we'll also see a true globalization of the barter economy as smartphones seamlessly negotiate exchanges of value that entirely ignore money.

Fifty years after System/360, the fintech revolution has reached everyone, as cheap smartphones, connected to mobile broadband networks more pervasive than running water or mains electricity, run sophisticated apps designed to facilitate exchanges of value.

The ground is now fully prepared for economic revolution to dwarf anything that has come before. Every individual, everywhere, now has the same raw capacity for trade and exchange as any bank. Millions of entrepreneurial individuals and businesses - small and medium enterprises - will convert those capabilities into new products and services.

Institutions have an window to anticipate and plan for the forces being unleashed as smartphone-based exchanges empower everyone, everywhere. Increased capacity brings with it increased risk. This new, distributed banking system has none of the regulatory frameworks that protect the formal banking system, presenting both unexpected challenges and unprecedented opportunities.

Part Two: Branchless in Jakarta

Let's examine how these advances will transform lives among the unbanked.

Andrew Davis of HSBC told me about a recent trip to Jakarta, where he's working with several of the larger telcos to implement a mobile money solution for Indonesia's small businesses. These ventures - of which there are countless numbers - often consist of a single individual with a small shop.

One of these shops might be a simple lean-to shack on the side of another building, containing little more than a selection of cold drinks and cigarettes. The proprietor - we'll name him 'Yandi' - runs a family business that's been handed down through three generations. A business that has always run on a strictly cash basis.

This means that Yandi never has any debts to worry about. But cash constrains Yandi's business. When the local Coca-Cola distributor comes by on their weekly visit to refresh Yandi's supply of beverages, Yandi can only purchase as much as he can afford in that moment.

If Yandi has enough cash on hand to purchase a two-day supply of Coca-Cola, at the end of the second day he'll have to go up the street to a larger shop and purchase cans at retail to resell in his shop, cutting into his ability to turn a profit.

Yandi has never had a bank account. He's never had enough money to be interesting to a bank.

Offering small businesses like Yandi's the opportunity to exchange mobile money - 'branchless banking' - gives these businesses a chance to build a cash reserve that could be invested in the business, perhaps used to place larger orders with the Coca-Cola distributor, lowering costs, and increasing profits. Businesses that save money using branchless banking become more successful. Savings produces investment that generate more business.

This improvement in business won't go unnoticed among all the people Yandi's trades with. When people see something that's worked for someone else, they

imitate the activity. Yandi's success story becomes the example that nudges other local businesses into branchless banking.

Branchless banking will transform Indonesia's economy because the basic technology - text messaging on the mobile - is already pervasively deployed, not just its major cities, but pervasively throughout the nation. Still largely rural and unbanked, Indonesia will adopt branchless banking because the need is pressing and a solution already at hand. In fact, few countries in the world so ready for branchless banking.

As Yandi and millions like him adopt branchless banking, new possibilities open up. It's a straightforward affair to run basic analytics on a mobile money account, and model the cash flow needs of a business. An analysis of Yandi's account would clearly indicate dips when the Coca-Cola distributor delivered that week's beverages.

Should the branchless banking system offer Yandi a line of credit to even out his cash position? Would Yandi understand a line of credit? Or is that something that might be offered through the Coca-Cola distributor, who requires Yandi to make daily payments on a weekly order?

As Indonesia opens into an inclusive banking system, business-to-business relationships can be amplified with the judicious addition of financial services.

Who provides these services?

One of the companies exhibiting at this expo - Advanced Merchant Payments - specializes in offering financial services to unbanked small businesses. They might be able to offer a line of credit.

Coca-Cola could offer this financial service to its customers. It would be in their own interest to do so, as it would increase customer capacity sell products. Every dollar Coca-Cola invests in financial services for Yandi would be returned and multiplied.

(Branchless banking also means a Coca-Cola distributor isn't cruising the dangerous streets of Jakarta with large amounts of cash, reducing losses for the distributor, who would be able to pass those savings along to customers.)

Branchless banking accelerates the movement of money through an economy, and as a result, creates a demand for more sophisticated financial services. But that's just the beginning. We're now adding the nearly infinite compute resources of the smartphone.

Branchless banking is designed to work over SMS. Yandi's ten-dollar handset works as well as a thousand-dollar iPhone. But within a few years, Yandi's ten-dollar handset *is* a sophisticated smartphone.

Branchless banking is now an app. The Coca-Cola distributor has given Yandi another app. Yandi uses the Coca-Cola app to precisely tune his beverage order each week, before the driver leaves the bottling plant. These two apps talk to one another within the smartphone, via a common interface, so the Coca-Cola app automatically receives payments from the branchless banking app. The branchless banking app can receive payments from Yandi's customers, who transmit them from their smartphones.

All of Yandi's suppliers and many of his customers move toward app-based commerce. His smartphone becomes an extension of his store, and Yandi begins to trade in items that never pass through his hands. Smartphone markets, liquid and fast-moving, continually offer Yandi new ways to trade.

Just by installing an app, thousands of small businesses like Yandi's band together, forming an app-based credit union offering lines of credit, loans and mortgages based on cash-flow analysis. Risk, shared equally by all the participants, and backstopped by an NGO, allows them to grow their businesses without needing to rely on a banking system that still considers them too small and too risky.

All of this is inevitable now that the unbanked are being drawn into branchless banking. First the bank comes to Yandi's palm, then, with the smartphone, Yandi gains access to all of the products and services common to 21st century markets.

In Indonesia alone, Yandi's journey from cash economy to broad participation in a range of financial services will be repeated over a million times.

Part Three: Inevitabilities and Approaches

Connectivity transforms markets.

A connected individual has immediate access to resources of capital, labour and knowledge that far surpass their own. Although this capacity is present from day one, empowerment doesn't happen overnight. It takes years for people - and institutions - to learn how to put these new capacities to work.

The surprise is not in that branchless banking is coming to Indonesia, but that something so obviously worthwhile took so long. It's arriving just as a wave of cheap smartphones roll in, wiping out any advantages branchless banking hold over app-based banking.

Connected individuals amplify their market power.

When a million individuals run the same app, they become a market force. Connectivity provides the capacity to quickly scale any market into new efficiencies. In Indonesia, Coca-Cola might soon confront an app that creates a unified market of hundreds, thousands, even tens of thousands of small buyers banded together to make their beverage purchases.

Every sufficiently large market will see its own 'appification'. Connected individuals will amplify their new capabilities with the computing power of the smartphone to increase their market power.

Connected markets are nearly frictionless.

All of this application is driven by self-interested individuals seeking to maximize their profits. Apps will be written because smartphones provides a universal platform for connected commerce, available to everyone, everywhere. These apps will be taken up by users because each presents an easy way to save money or make money. The coupling of the money economy with the app economy is fundamentally transforming the operation of the market.

Connected markets favour direct relationships.

Just as Marico went direct to the coconut pickers, eliminating the middlemen, connected markets tend to ignore the points of contact that once held them together, but now simply add friction and cost.

Success comes from making markets more efficient.

The success of any app will be measured in increased market efficiency. Uber and Airbnb both allow individuals to buy and sell services (transportation and accommodation) in a smartphone-based marketplace that's much more efficient than similar services offered by taxis companies and hoteliers.

Connected markets learn from all points.

Any advantage gained anywhere within a connected market is observed and quickly reproduced everywhere throughout that market. The moments for advantage and arbitrage become ever-more fleeting. Connected markets are a learning markets, constantly improving their own performance.

Connected markets are capability amplifiers.

Every individual and institution participating in a connected market learns from the vastly multiplied experience of others. *A connected market never stops learning,*

which is another way of saying that it never stops amplifying the capacity of those participating within it.

Over the next decade the vast majority of the seven billion of us will participate in connected markets. That participation will initially be driven by our native capacities - as a farmer, a fisherman, or shop-owner - but once those capacities have been amplified by the resources present within a connected market, individuals and organizations will have unprecedented scope for their activities.

Farmers will set up their own value chains, moving produce from farm to high-value market. Fishermen will form sales cooperatives, and self-insure against losses at sea. Shop-owners will collectively purchase goods from suppliers unable to resist their market power.

All of this is entirely straightforward, just an unimaginative projection of the present into the future. We'll get there within a few years. None of it accounts for the growth of capacities much beyond where they exist in the present day.

What happens when someone launches an app that allows farmers to hedge against the expected value of their crops with a bit of sophisticated futures trading? Or when connected fishermen corner the market in Bluefin tuna? Or when a shop-owner uses their connected market power to prevent a competitor from opening next door?

Connected markets provide raw power. That power can increase market efficiencies, or create barriers to entry. Connected markets can develop new ways to finance their operations, or new ways to fleece their participants. Connected markets will be everywhere, on every device. At every point, on every device, it will be possible to promote or wreck any market.

We are used to markets being concentrated and mostly visible. They're about to become distributed, floating between smartphones, and largely invisible. Much of their trading will occur in currencies that are not formally recognized - some created

on-the-fly, to meet a sudden demand. They will exist outside the easy inspection of regulators, and will be flexible enough to vanish beneath the concentrated gaze of institutional powers.

This is the world of financial inclusion in the 21st century. We are creating a vast and chaotic environment for business, one heavy with opportunity and fraught with dangers. It's not possible to simultaneously preserve the opportunity and eliminate the dangers.

The pivotal question - and the one I want to leave you with, this morning, because it's one that we all need to wrestle with over the next few years - is **how do we mitigate these dangers?** Where is the balance point that provides some degree of safety without short-circuiting these enormous opportunities?

If we do find such a balance point, will it even be possible for institutional capacities to infiltrate these new markets to protect their participants from either the folly or the maleficence of others?

No technology can provide an answer these questions. Once we have the answers, we can look to technology to backstop policy. But technology can also undermines policy. A balance point, once found, may not long remain in one place. Markets tend to defy attempts to keep them stable and contained. The future is a moving target.

These new opportunities for financial inclusion will transform the lives of billions. Each of the companies presenting at the expo today represent one key element in this transformation. But it's early days. We don't know what we don't know. We have to connect to these new markets, learn from them, and use what we know to guide opportunity into capacity.

Good luck.