UNIVERSITY *of* NICOSIA

MSc in Digital Currency

Introduction to Digital Currencies

Session 12

Digital Currencies and the Developing World

Introduction to Digital Currencies

UNIVERSITY of NICOSIA

Session Objectives

- Understanding digital currencies' potential impact on infrastructure development and non-traditional payment systems (M-Pesa)

We will look at:

- What *"financial inclusion"* and *"financial communication",* on a global scale, could mean for underdeveloped countries
- An existing example where development leapfrogged the conventional financial services infrastructure through the use of digital transactions
- The potential that may exist on alternative avenues of infrastructure development, what transaction disintermediation may mean for developing regions, and how conventional infrastructure could potentially be leapfrogged

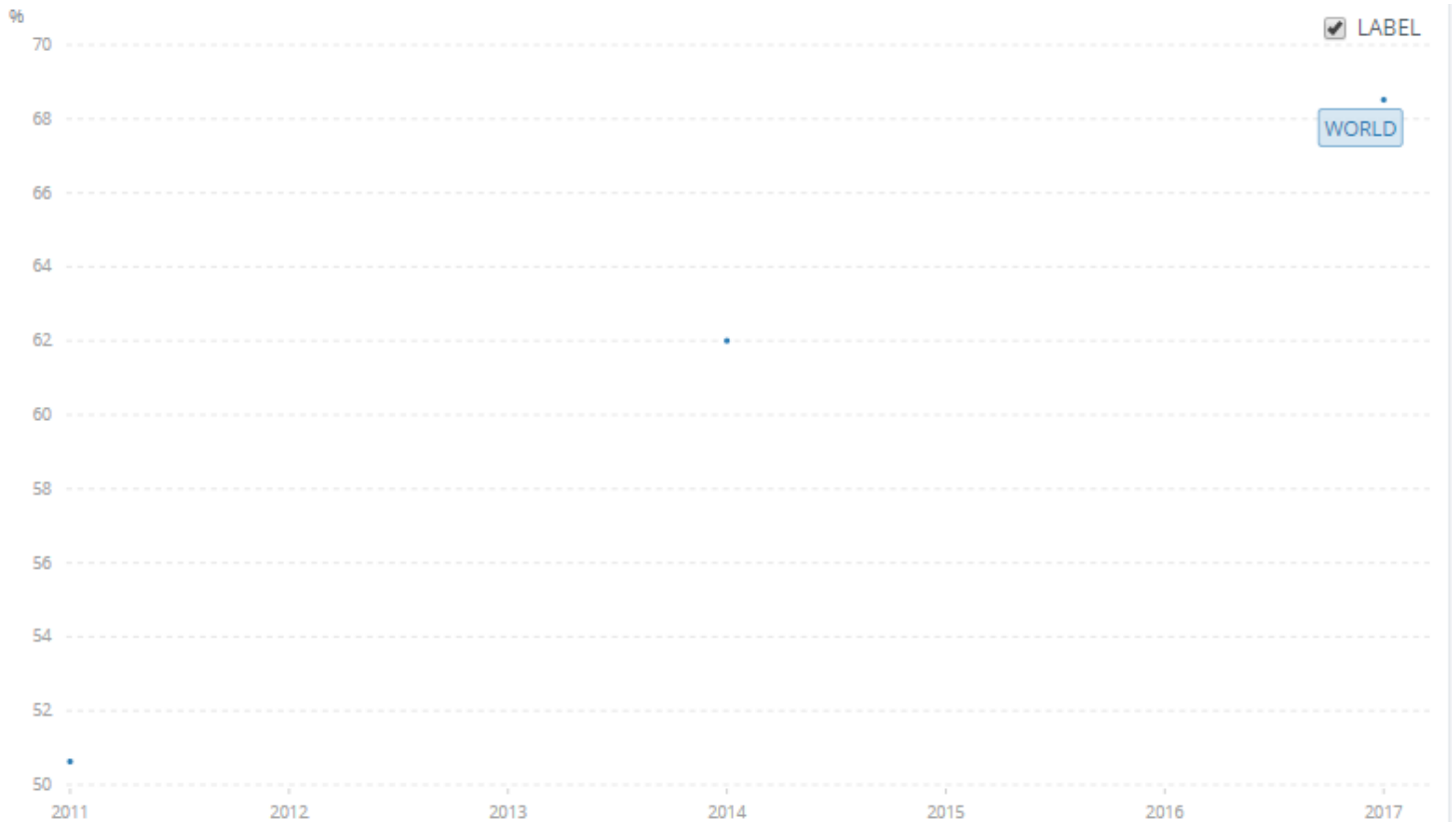
Agenda

1. Financial Inclusion and Financial Communication
2. The case of M-Pesa
3. Infrastructure by Leapfrogging
4. Kiva & Zidisha
5. Conclusions
6. Further Reading

Financial Inclusion and Financial Communication

The “unbanked”

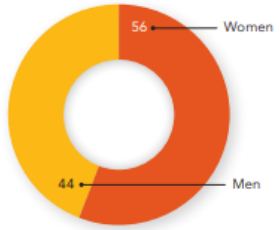
- Ongoing studies from the World Bank, indicate a significant growth in financial inclusion regarding the global populace of adults in the world which have access to conventional financial services
- Look at the table for improvements on account ownership at a financial institution or with a mobile-money-service provider from 2011 to 2017
- 2011: 50.63%
- 2014: 62%
- 2017: 68.5%



Source: The World Bank

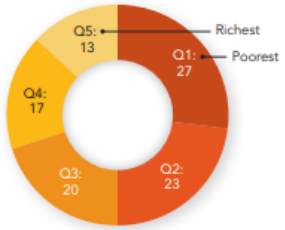
Who are the “unbanked”?

FIGURE 2.2
Worldwide, most unbanked adults are women
Adults without an account by gender (%), 2017



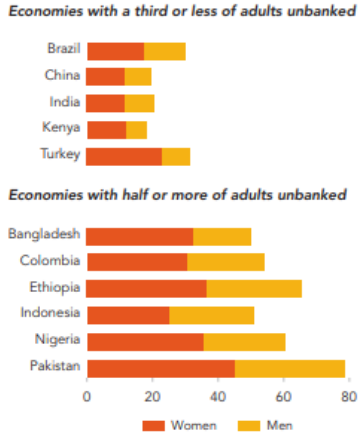
Source: Global Findex database.

FIGURE 2.4
Twice as many unbanked adults live in the poorest households in their economy as in the richest ones
Adults without an account by within-economy income quintile (%), 2017



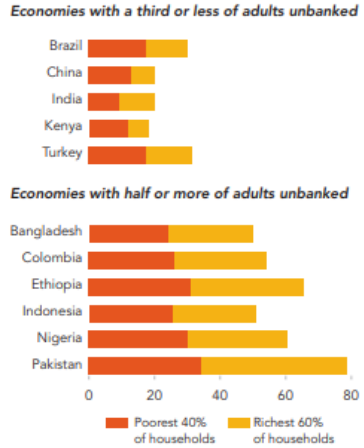
Source: Global Findex database.

FIGURE 2.3
Women are overrepresented among the unbanked in most economies
Adults without an account (%), 2017



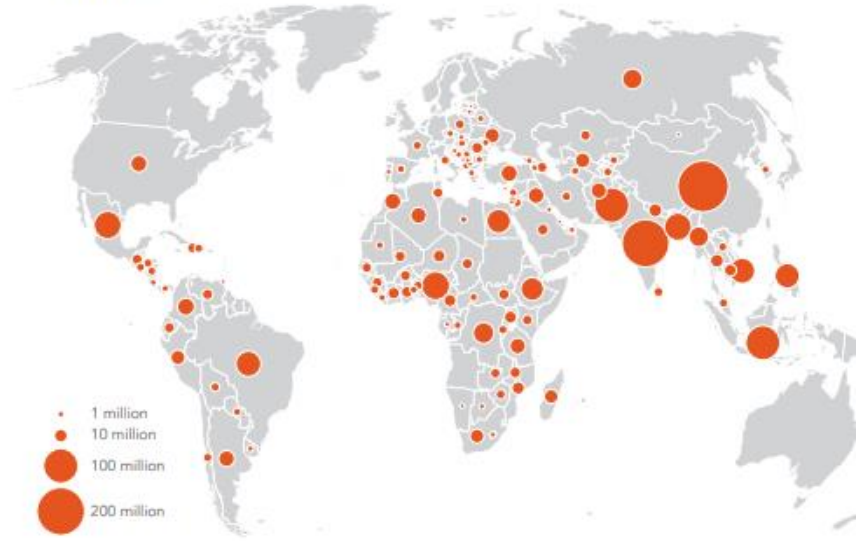
Source: Global Findex database.

FIGURE 2.5
In economies where a small share of adults remain unbanked, most of the unbanked are poor
Adults without an account (%), 2017



Source: Global Findex database.

Globally, 1.7 billion adults lack an account
Adults without an account, 2017



Source: Global Findex database.
Note: Data are not displayed for economies where the share of adults without an account is 5 percent or less.

- The World Bank created the “Global Findex”, a global financial inclusion database to measure the use of financial services and identify the population with the greatest barriers to access.
- Not only poverty - but costs, travel distance and paper work involved are also factors which keep many people unbanked.
- Note that the World Bank has shown interest towards blockchain technology so there might be a room of innovation and global adoption

The poorest and the excluded

- At the same time, and as would probably be expected, the poorest regions enjoy less financial inclusion
- This impacts access to all types of conventional financial services, including remittances, depository accounts and lending, for people in rural or undeveloped regions
- According to the Universal Financial Access 2020 Initiative 73% of all financially excluded people live in: Bangladesh, Brazil, China, Colombia, Cote d'Ivoire, DRC, Egypt, Ethiopia, India, Indonesia, Kenya, Mexico, Morocco, Mozambique, Myanmar, Nigeria, Pakistan, Peru, Philippines, Rwanda, South Africa, Vietnam, Tanzania, Turkey, and Zambia
- Clearly, increased GDP correlates with increased financial inclusion

Source: The World Bank – Country Progress

The poorest and the excluded

- According to the The World Bank – Country Progress:

- *"Countries worldwide have the opportunity to enable access to a transaction account and other financial services to:*
  - *1.3 billion adults by opening up the regulatory environment and market to reach financially active, unbanked adults who currently save, remit or pay bills in cash.*
  - *167 million adults by digitizing government (G2P) payments provided to unbanked adults and depositing them directly into transaction accounts.*
  - *802 million adults by developing and implementing national financial inclusion strategies (NFIS) to coordinate financial inclusion efforts and increase the number of banked adults over time."*

Regional differences: High-Income Economies vs Developing Countries by the Global Findex Database

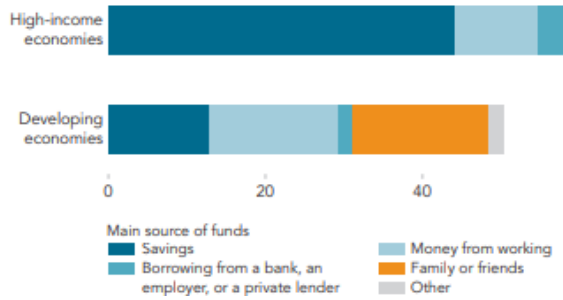
MAP O.5

About 235 million unbanked adults receive agricultural payments in cash

Adults without an account receiving payments for agricultural products in the past year in cash only, 2017

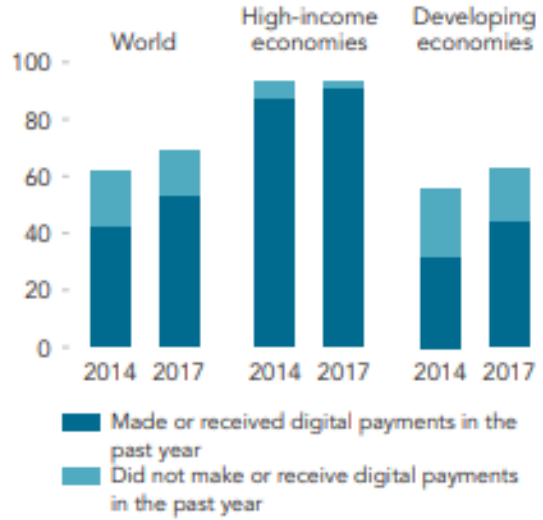
People in high-income economies are more likely to be able to raise emergency funds—and to do so through savings

Adults able to raise emergency funds (%), 2017



More people who have an account are using it for digital payments

Adults with an account (%)



Globally, more than half of adults who save choose to do so at a financial institution

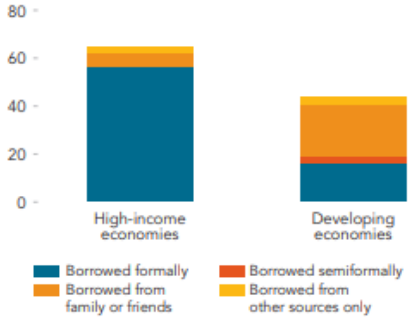
Adults saving any money in the past year (%), 2017

Source: Global Findex database.
Note: People may save in multiple ways, but categories are constructed to be mutually exclusive. *Saved formally* includes all adults who saved any money formally. *Saved semiformally* includes all adults who saved any money semiformally but not formally. Data on semiformal saving are not collected in most high-income economies.

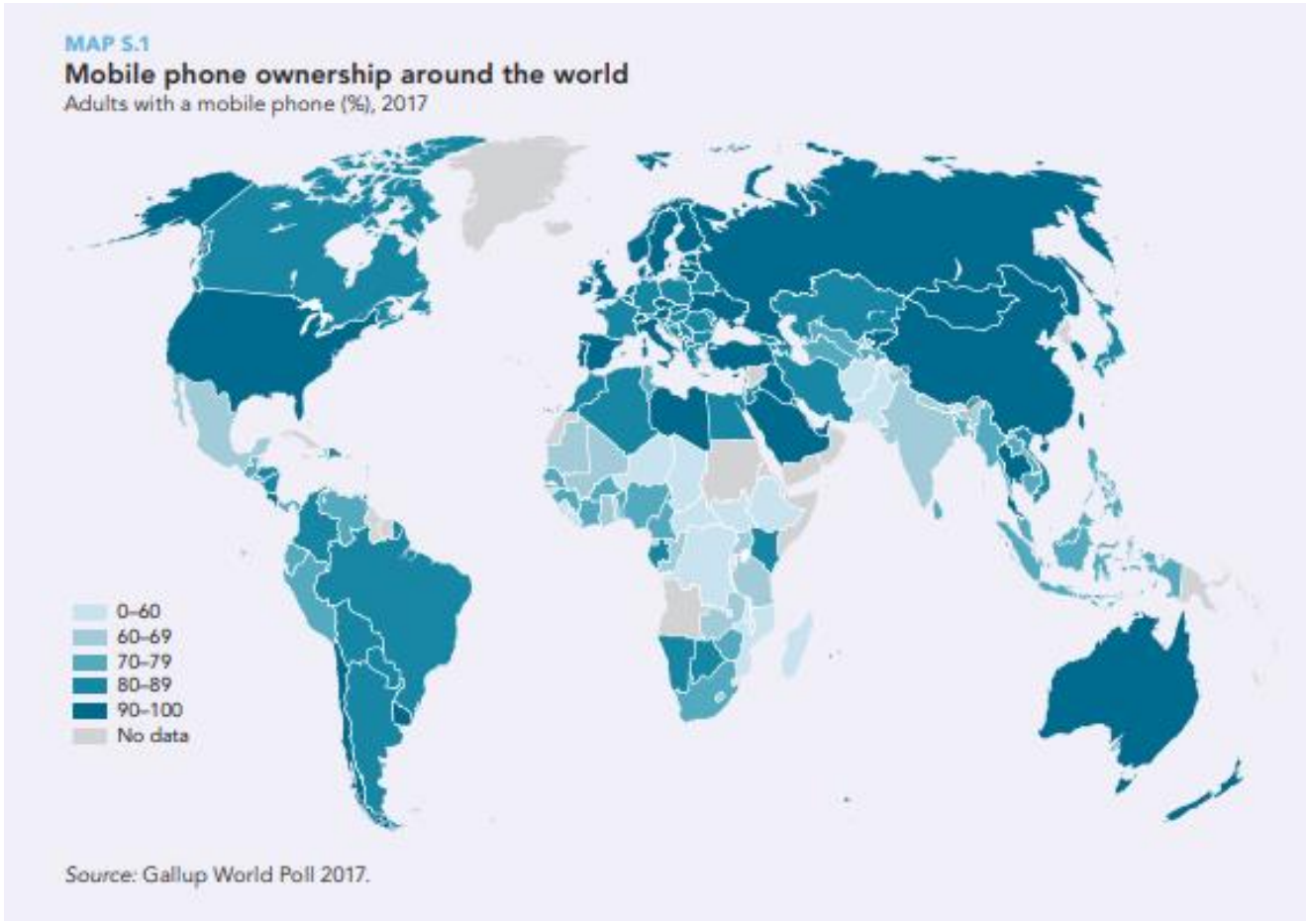
FIGURE O.4

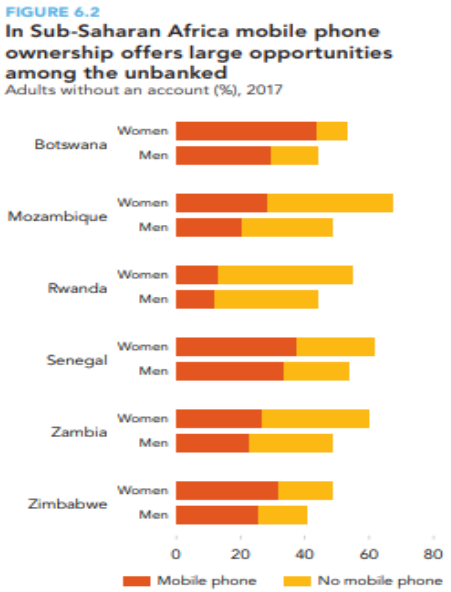
Borrowers are more likely to rely on formal credit in high-income economies than in developing ones

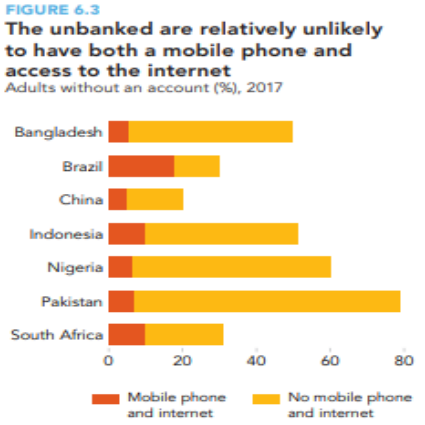
Adults borrowing any money in the past year (%), 2017



The unbanked can gain financial access







Source: The Global Findex Database 2017

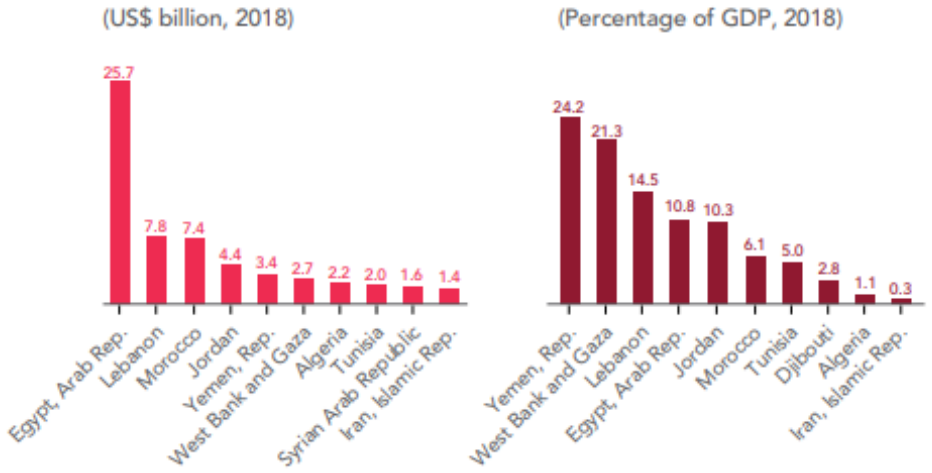
Remittances

According to the latest Migration and Development Brief (December 2018) :

TABLE 1.1. Estimates and Projections of Remittance Flows to Low- and Middle-Income Regions

	2010	2015	2016	2017	2018e	2019f	2020f
	($ billions)						
Low and Middle Income	**343**	**449**	**442**	**477**	**528**	**549**	**573**
East Asia and Pacific	96	127	127	133	142	148	155
Europe and Central Asia	38	43	43	52	63	65	68
Latin America and Caribbean	57	68	74	79	87	90	93
Middle-East and North Africa	39	51	51	54	59	61	63
South Asia	82	118	110	117	132	138	144
Sub-Saharan Africa	32	41	37	41	45	47	50
World	**469**	**592**	**586**	**625**	**689**	**715**	**747**
Memo Item:							
Developing countries (FY 2016 income classification) *	337	441	435	468	518	538	561
	(Growth rate, percent)						
Low and Middle Income	**11.4**	**0.2**	**-1.5**	**7.8**	**10.8**	**4.0**	**4.3**
East Asia and Pacific	19.4	3.7	-0.5	5.1	6.6	4.2	4.7
Europe and Central Asia	4.9	-16.6	-0.6	20.9	20.0	4.0	4.6
Latin America and Caribbean	2.6	6.1	7.4	7.9	9.3	3.8	3.9
Middle-East and North Africa	18.2	-5.3	-0.4	6.0	9.1	2.7	3.5
South Asia	9.5	1.5	-6.1	5.7	13.5	4.3	4.1
Sub-Saharan Africa	11.1	5.8	-8.8	10.3	9.8	4.2	5.6
World	**8.5**	**-1.5**	**-1.0**	**6.6**	**10.3**	**3.7**	**4.5**

FIGURE 4.7. Remittance Inflows to the Middle East and North Africa Grew Rapidly in 2018



Sources: IMF; World Development Indicators; World Bank staff estimates. Estimates for Syria and Yemen based on latest available data.
Note: GDP = gross domestic product.

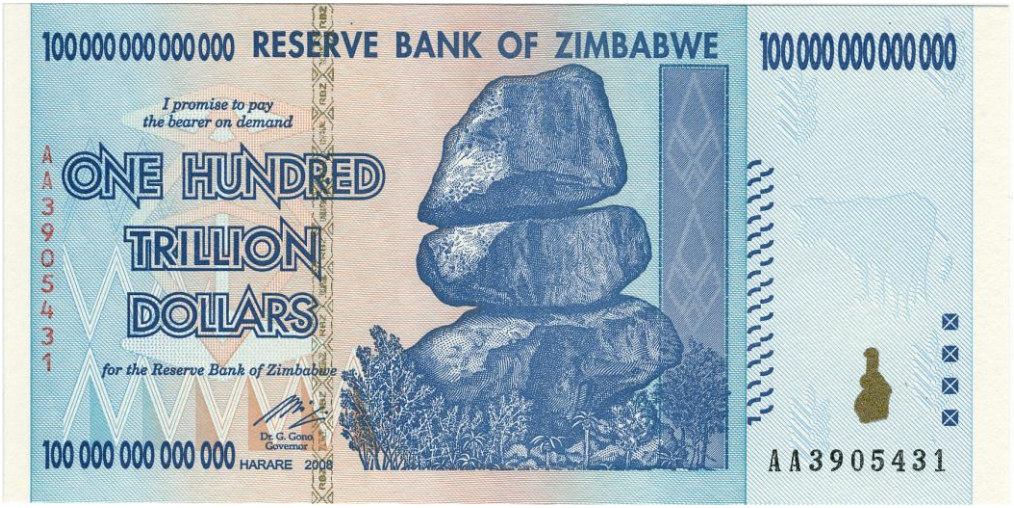
But fees in many countries remain high

- Service facilitators and intermediaries, whether in remittances or other conventional financial services, usually draw a heavy burden on the local rural populace, chipping away at limited income sources
- According to the Migration and Development Btief, the global average cost of sending remittances has remained high, at 7.2 percent in 2018 Q3, significantly higher than the Sustainable Development Goal target of 3 percent by 2030.

- To send money in to sub-Saharan Africa regions, costs often exceed 9% on average and users are limited to an oligopoly or a duopoly or choices
- The reasons for this may vary but generally include the lack of competition and the lack of transparency in how these services draft their fee structures

Hyperinflation

- Hyperinflation (whether due to war or bad government policies) is also much more commonly found in developing nations
- Zimbabwe's hyperinflation ended up destroying their currency, and suspending all trades with it indefinitely.
- Several Latin American countries (Argentina, Venezuela) have also experienced extreme financial and currency disruption, with extremely high inflation
- https://en.wikipedia.org/wiki/Economy_of_Venezuela



Source: Wikimedia Commons

Africa has a lower penetration than India

- Indian enterprises and households are more likely to use financial services than their peers in African
- In India, private initiative appears to have made more progress to attract the rural communities, opening hundreds of stores in rural locations to facilitate and service those without financial inclusion

Source: egov.eletsonline.com

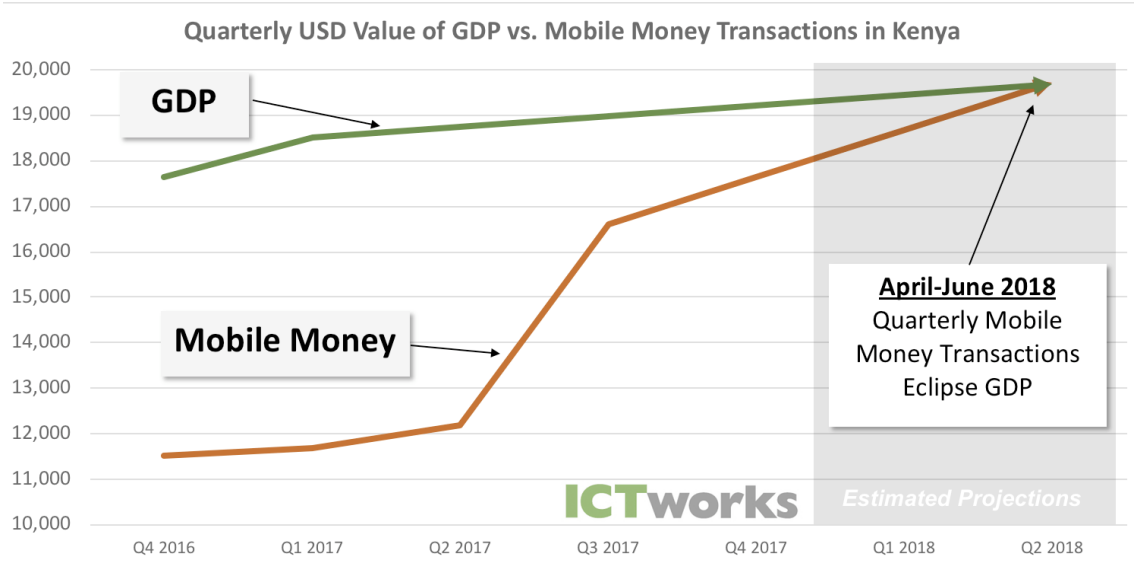
The case of M-Pesa

M-Pesa

- In 2007, there were only 2.5 million bank accounts in a population of 39 million in Kenya. Given the lack of traditional banking infrastructure, mobile phone users began bartering prepaid airtime for other products and services (a commodity currency)
- In 2007 Safaricom, the leading mobile phone company in Kenya, launched M- Pesa, allowing its subscribers to send and receive funds with SMS
  - M-Pesa charges allow for transactions at relatively low costs compared to existing financial infrastructures
  - There are no monthly fees and fees are only incurred once performing an action such as sending funds
  - When sending funds to an unregistered user, the sender pays a fee, providing an incentive to convince unregistered users to register
  - Users may use the services as peer-to-peer services or to pay bills
  - Several online jobs are now paying via M-Pesa

A resounding success

- M-Pesa usage is relatively easy and has recently launched a loyalty program
- Currently, there are more than 28.6 million registered customers with approximately 18 million active customers, 100,000 merchants and 156,000 M-PESA agents
- By some metrics, due to M-Pesa, Kenya, a developing economy, has the most advanced per-capita mobile money market in the world
- M-Pesa serviced what was originally considered a niche market, where traditional financial institutions have been previously unwilling to serve, mainly due to low profit margins



https://www.ictworks.org/mobile-money-larger-kenya-gdp/

M-SHWARI

- M-SHWARI was introduced in 2011 in partnership with CBA Bank and provides short-term loans (instant decisions, 30 day terms) and savings accounts
- Other corporate M-Pesa products allow for:
  - Bulk payments
  - Payments of promotional fees
  - Payment of dividends

A broad mobile money ecosystem

M-Pesa effects in Kenya

FIGURE 1. Total accounts of Kenyan banks and mobile network operators, 2006–2015

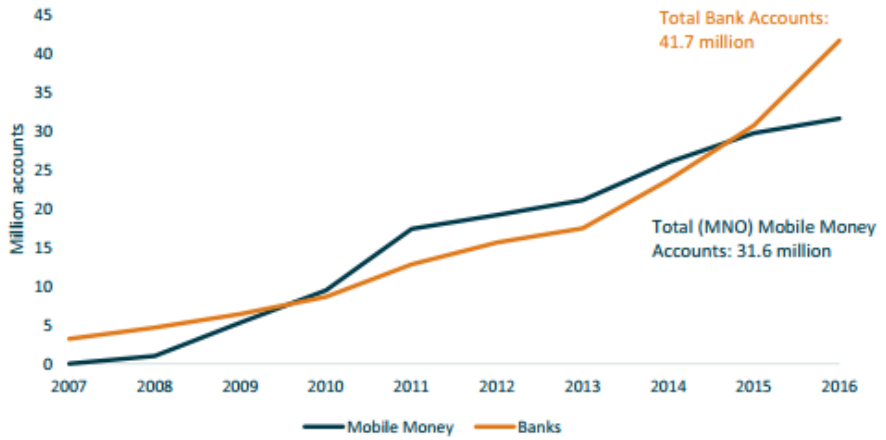


FIGURE 4. Total accounts, by institution, Kenyan banks and MNOs; 2006–2015

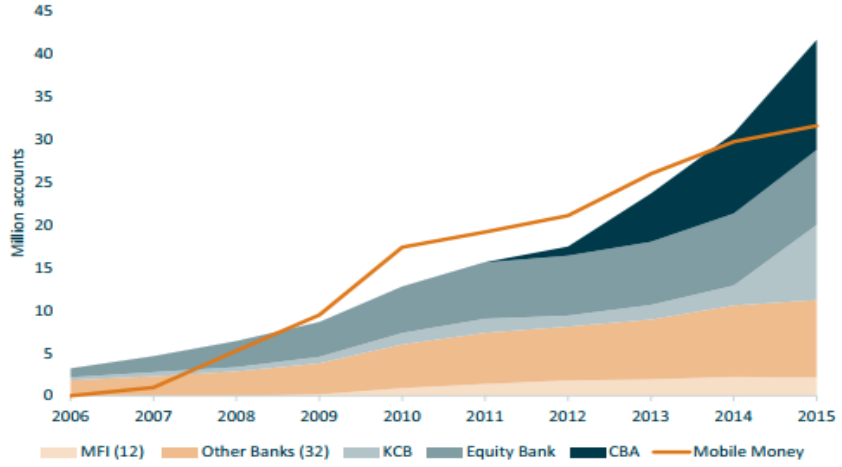
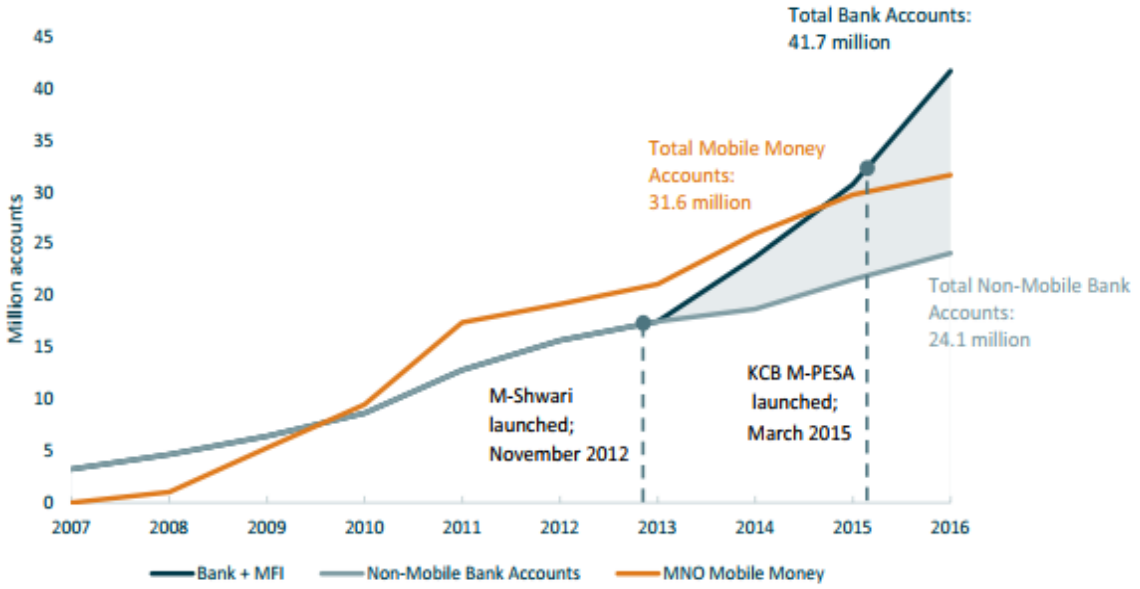


FIGURE 3. Total Accounts by Channel, Kenyan Banks and MNOs, 2009–2015



By July 2017, M-Shwari had expanded to 19.5 million accounts—more than the accounts of the next two largest bank competitors combined.

Sources: http://www.cgap.org/blog/kenya-bank-accounts-again-more-popular-m-pesa-why
https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/09/P2G_Report_Final.pdf

Less friction and more incentives

- As Trace Mayer said in an interview: *"Some may even skip entire generations of currency, going directly from only using cash to using Bitcoin, missing out credit and debit cards altogether. In doing so they will also avoid the problems associated with card payments. Credit and debit cards are outdated; they were created before the internet whereas bitcoins have been designed with ecommerce in mind so they are much easier to use."*

- As we've seen with M-Pesa, dozens of thousands of agents sprung out due to the existence of a profitability margin in exchanging M-Pesa into local currencies. Conventional shopkeepers were incented to add M-Pesa payments to attract a small profit (revenue sharing)

- Since it only takes a cell phone with very limited capabilities to manifest the service, there is little friction in starting a service as an agent after receiving the "go" from Safaricom or other providers

Bitcoin=M-pesa on a planetary scale ?

- Until the infrastructure is there for global connectivity, mobile operators in developing countries could leverage the Bitcoin ecosystem and the inherent low transaction fees to provide a much needed service to those in their region. By creating a simple interface controlled by them, people from all over the world could send remittance funds via Bitcoin to their service, which they then handle with local agents to exchange in the local currencies.

- This would mean an additional profitability avenue for any mobile operator, with significantly lower costs, since the Bitcoin network is very lean and cost effective, while remaining safe and immediate.

- The same avenue could easily propagate decentralized digital currencies as internet coverage develops further, with “self-appointed” agents profiting from converting BTC to local currencies in the same ways as ABRA or “local bitcoins” function.

Infrastructure By Leapfrogging

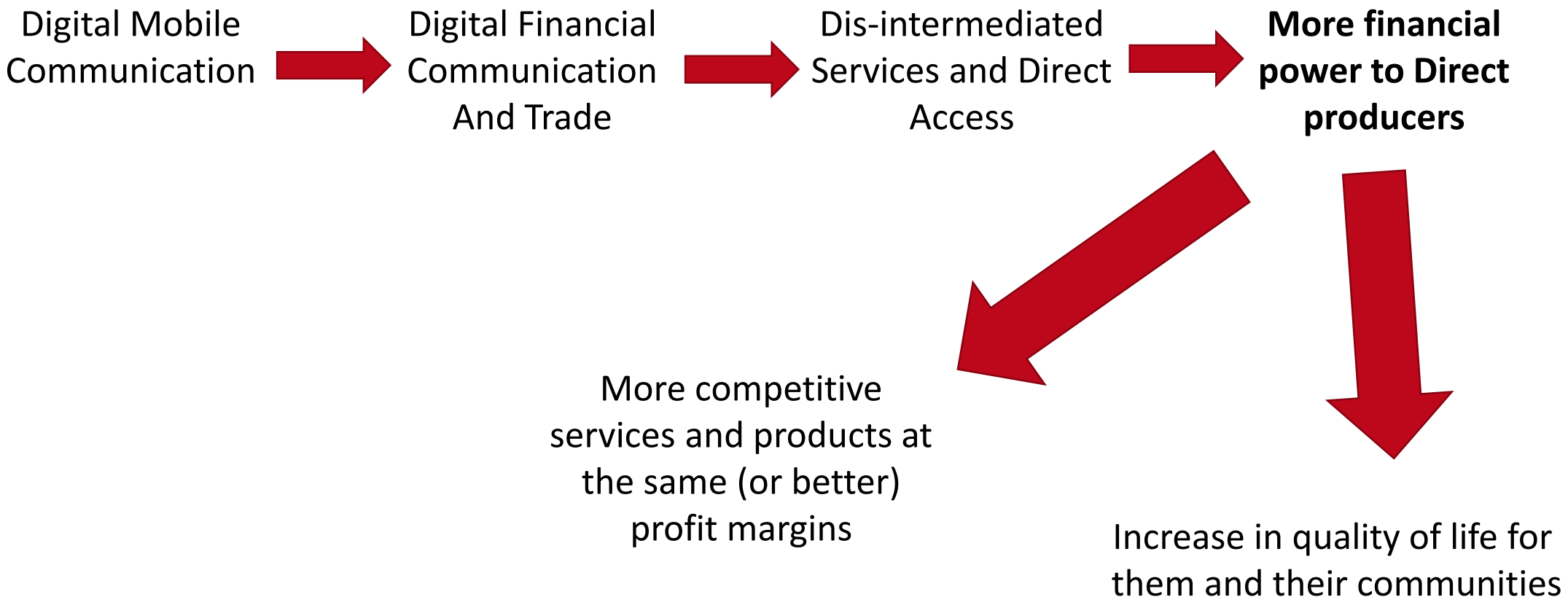
New tools + no infrastructure= ?

- The interconnectivity produced by the internet and digitized communication, has presented a large number of new avenues for information acquisition, commerce and new avenues for trade, with fewer intermediaries

- We'll try to take a deeper look at the potential that the technology behind digital currencies and specifically the technologies around distributed consensus may hold, as tools for building infrastructure where non exists

- If people and companies in developing countries are replacing conventional financial services with digital services that provide faster access, cost less and demand less physical presence, while bringing convenience, security and solve practical problems, who is to say that the same can't happen in other areas?

A virtuous development for further development

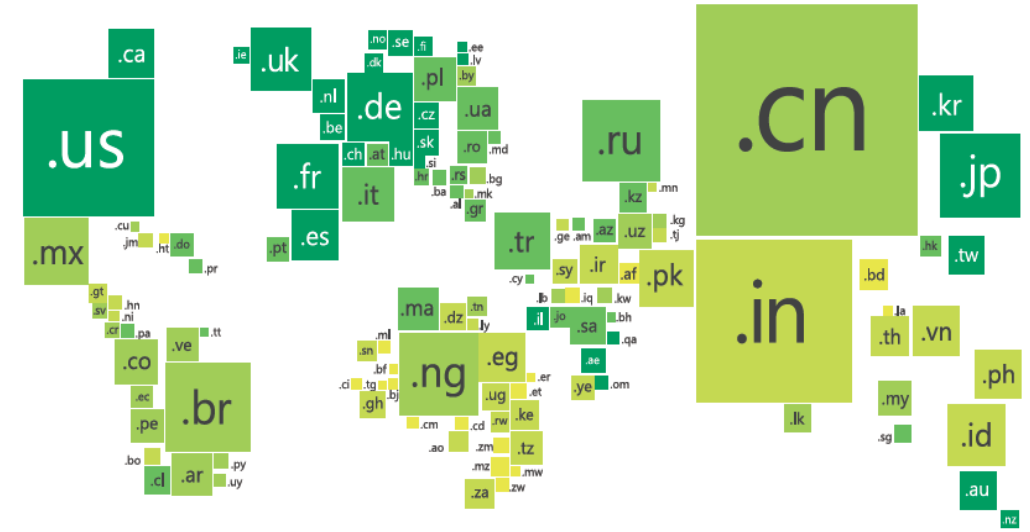


Billions about to be connected?

"For every person online, there are two who are not", wrote Eric Schmidt of Google, and continued, "By the end of the decade, everyone on Earth will be connected."

- Current research projections indicate that internet users will double by 2020 to about 4.1 billion worldwide, with large populations of users located in China, India and Africa

- Very cheap smartphones now exist (prices below $25)



Source: Microsoft

- The next big barrier for companies like Google, Microsoft and Facebook appears to be bringing the internet to every developing country and citizen on the planet

A “new” Internet for the “newcomers”

- The internet of this new generation of users will be quite different from the one we learned to use.
  - In Thailand, more than 10,000 informal businesses are powered by Facebook with next to no physical presence
  - Opening physical stores for the 700 million urban citizens of China can have prohibitive costs, so 90% of online retail is sold through online marketplaces. Alibaba’s Tmall has more than 180M customers, more than 200,000 brands and more than 150,000 merchants transacting digitally, providing a high profile “digital storefront” for major brands
  - Social platforms in developing countries and China are about much more than chat-boxes, they are stores for products and services, with integrated payment solutions

Source: The Emerging Global Web

Bitcoin & Crypto for the Developing World

- While in the developed world, innovation and development usually follow certain known paths mentioned in the previous lectures, digital innovation has allowed developing countries to essentially “leapfrog” some of these stages
- Cryptocurrencies may have the potential to revolutionize processes even more and allow further financial access for the poor
- https://blockonomi.com/cryptocurrencies-developing-countries/
- One of the most notable initiatives is Bitpesa
- Bitpesa is an older initiative which run through some regulatory pressures. Even though the potential is huge the service is not limited to a lot of nations
- No matter how innovative such projects are, the first and last mile problem is still unsolved

Thought Exercise: Attestation

- Attestation, the fact of providing proof of identity can be wholly digitized with systems akin to what Bitcoin is using, asymmetric cryptography. Imagine a village that has no street addresses, no significant central authority to issue certificates, no notaries to verify the legality of contracts or agreements, or even ownership titles of real estate. Could they be using Uport, Tykn or any other key based identity solution ?

- Instead of performing the conventional KYC policies that financial services need to operate, systems of digital crowd-sourced identity management could exist for rural communities to attest that a certain member of the community is who he claims he is, and the more villagers attest to this fact, the more credible his own online identity is when digitally signing documents

- The documents or contracts, could exist online via extended protocols like Ethereum or Rootstock, and could be transparent and easily verifiable by the authorities

Currency is only the first ‘app’

The invention of the Blockchain might allow some or all of these systems to be digitally decentralized over time to some degree:

I. Financial Instruments, Records and Models

- Currency
- Private equities
- Public equities
- Bonds
- Derivatives (futures, forwards, swaps, options and more complex variations)
- Voting rights associated with any of the above
- Commodities
- Spending records
- Trading records
- Mortgage / loan records
- Servicing records
- Crowd-funding
- Micro-finance
- Micro-charity

II. Public Records

- Land titles
- Vehicle registries
- Business license
- Business incorporation / dissolution records
- Business ownership records
- Regulatory records
- Criminal records
- Passports
- Birth certificates
- Death certificates
- Voter IDs
- Voting
- Health / Safety Inspections
- Building permits
- Gun permits
- Forensic evidence
- Court records
- Voting records
- Non-profit records
- Government / non-profit accounting / transparency

Currency is only the first ‘app’

III. Private Records

- Contracts
- Signatures
- Wills
- Trusts
- Escrows
- GPS trails (personal)

IV. Other Semi-Public Records

- Degree
- Certifications
- Learning Outcomes
- Grades
- HR records (salary, performance reviews, accomplishment)
- Medical records
- Accounting records
- Business transaction records
- Genome data
- GPS trails (institutional)
- Delivery records
- Arbitration

V. Physical Asset Keys

- Home / apartment keys
- Vacation home / timeshare keys
- Hotel room keys
- Car keys
- Rental car keys
- Leased cars keys
- Locker keys
- Safety deposit box keys
- Package delivery (split key between delivery firm and receiver)
- Betting records
- Fantasy sports records

Currency is only the first ‘app’

VI. Intangibles

- Coupons
- Vouchers
- Reservations (restaurants, hotels, queues, etc)
- Movie tickets
- Patents
- Copyrights
- Trademarks
- Software licenses
- Videogame licenses
- Music/movie/book licenses (DRM)
- Domain names
- Online identities
- Proof of authorship / Proof of prior art

Source: Ledra Capital crowd-sourced list. Some ideas are more exotic than others, but certainly some of these will come to fruition.

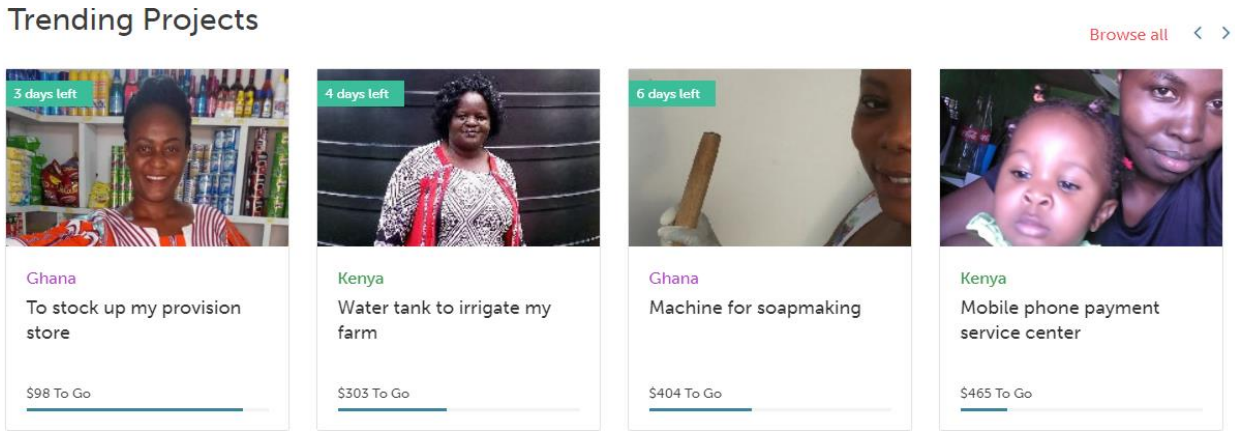
Kiva & Zidisha

Kiva

- Kiva - A crowdfunding Monetary Financial Institution founded in 2005. Areas of loans are found mainly in rural communities, underbanked areas, towards young entrepreneurs and sustainable energy projects
- The founder's initial interest in microfinance was inspired by a 2003 lecture given by Grameen Bank's Muhammad Yunus at Stanford Business School.
- "Kiva" means "unity" in Swahili
- In April 2005, Kiva's first seven loans were funded, totaling $3,500
- By September 2005, those first entrepreneurs repaid the entirety of their original loans
- Kiva reached $1.3 billion in facilitated loans
- The average loan size is $411.26, and the average Kiva user has made 10.17 loans.
- Kiva's repayment rate for all its partners is 96.9%
- Kiva Zip launched in 2011 is a 0% interest P2P lending pilot for entrepreneurs in U.S. & Kenya
- https://www.forbes.com/sites/devinthorpe/2018/09/24/kiva-is-really-a-crowdfunded-bank-for-refugees-and-other-unbankables/#1b28c02d220a
- https://www.prnewswire.com/news-releases/kiva-sierra-leone-and-united-nations-agencies-partner-to-implement-credit-bureau-of-the-future-300720556.html

Zidisha

- Zidisha - A non-profit organization founded in 2009. Areas of loans mainly towards young entrepreneurs
- Entrepreneurs use a Zidisha platform to share their stories and roadmap. Lenders and entrepreneurs can directly discuss and maximize transparency on the project
- Repayments from entrepreneurs are usually on a weekly basis on a peer-to-peer manner
- Borrowers pay a fee of 5% of the loan amount



Digital Currencies and the Developing World - A preview of DFIN-535 (MSc)

A preview of DFIN-535 (MSc)

- There's much more to cover with regards to digital currency and the developing world – for instance, how the under-development of financial systems hinders growth, and much more:
  - **The Developing World** – How under-development hinders growth, world patterns of poverty/growth, weak institutional system hypothesis, demographic trends
  - **Pathway to Development** – Consumer products and key differences in marketing and distribution, pathway from developing to developed country
  - **Alternative Payment Mechanisms** – Financial infrastructure analysis, alternative payment mechanisms (e.g. M-Pesa), implications for digital currencies, role of decentralized systems
  - **Microfinance and it's impact** – We examine the many facets of microfinance as a development tool opportunities and opportunities that are available via decentralized systems
- All of the above are covered by DFIN-535 Digital Currencies and The Developing World from the MSc.

Conclusions

Conclusions

- A large percentage of the global adult population does not have access to conventional finance infrastructure and services.
- M-Pesa is one example of an extremely successful private initiative to leverage a digital communication platform (mobile phones) into a financial transaction system in a country with a limited financial services sector. It is a great example of ‘leapfrogging’.
- The increasing prevalence of internet connectivity will bring many more newcomers to the internet that will want to interact with the global market.
- For many of these newcomers, conventional local infrastructure will be lacking and if newer, easier, digital solutions emerge, they might be able to ‘leapfrog’ a generation forward in a similar manner.

Further Reading

Further Reading

- Findex Report, Chapter 2 – The Unbanked

https://globalfindex.worldbank.org/sites/globalfindex/files/chapters/2017%20Findex%20full%20report_chapter2.pdf

- Mobile Money, Individuals' Payments, Remittances, and Investments: Evidence from the Ashanti Region, Ghana

http://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?vid=0&sid=1110a386-df6b-45d3-8a3d-3bf20ac8a772%40sdc-v-sessmgr01

- Moving cash within Africa is the untapped opportunity for money transfer firms

https://qz.com/africa/1220998/cash-remittances-to-africa-up-again-says-world-bank-world-remit-sees-opportunity/

- List of Countries by Inflation Rate

https://en.wikipedia.org/wiki/List_of_countries_by_inflation_rate

- M-PESA: how Kenya revolutionized mobile payments

https://mag.n26.com/m-pesa-how-kenya-revolutionized-mobile-payments-56786bc09ef

- Blockchain entrepreneurship opportunity in the practices of the unbanked

https://www.sciencedirect.com/science/article/pii/S0007681317301209

- A Look at BitPesa: Powering African Business with Bitcoin

https://medium.com/wolverineblockchain/a-look-at-bitpesa-powering-african-business-with-bitcoin-8b84f2140106

- Sierra Leone Blockchain Voting

https://www.coindesk.com/blockchain-vote-election-sierra-leone-got-wrong/

Further Reading

- M-Pesa

https://www.reuters.com/article/kenya-safaricom-western-union/update-1-kenyas-safaricom-takes-m-pesa-global-with-western-union-idUSL8N1XH5ZI https://www.standardmedia.co.ke/article/2001284962/safaricom-launches-loyalty-promotion-seeking-to-reward-m-pesa-customers

- Bitwala & M-Pesa

https://www.ccn.com/bitwala-allows-users-to-send-bitcoin-free-to-mpesa-accounts/

- Kenyan banks have joined forces to launch a mobile money rival to M-Pesa

https://qz.com/913761/safaricoms-m-pesa-has-a-new-rival-in-pesalink-from-kenyas-banks/

https://ipsl.co.ke/pesalink/

- Remittances Data by World Bank:

https://www.worldbank.org/en/topic/migrationremittancesdiasporaissues/brief/migration-remittances-data

- The future of not working

https://www.nytimes.com/2017/02/23/magazine/universal-income-global-inequality.html

- It's Taken Time But The African Crypto Revolution Is About To Get Started

https://www.forbes.com/sites/montymunford/2018/07/09/its-taken-time-but-the-african-crypto-revolution-is-about-to-get-started/#49da8f67438e

- Financial Inclusion and Innovation in Africa

https://www.researchgate.net/publication/282485720_Financial_Inclusion_and_Innovation_in_Africa_An_Overview

- Blockchain entrepreneurship opportunity in the practices of the unbanked

https://www.sciencedirect.com/science/article/pii/S0007681317301209

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