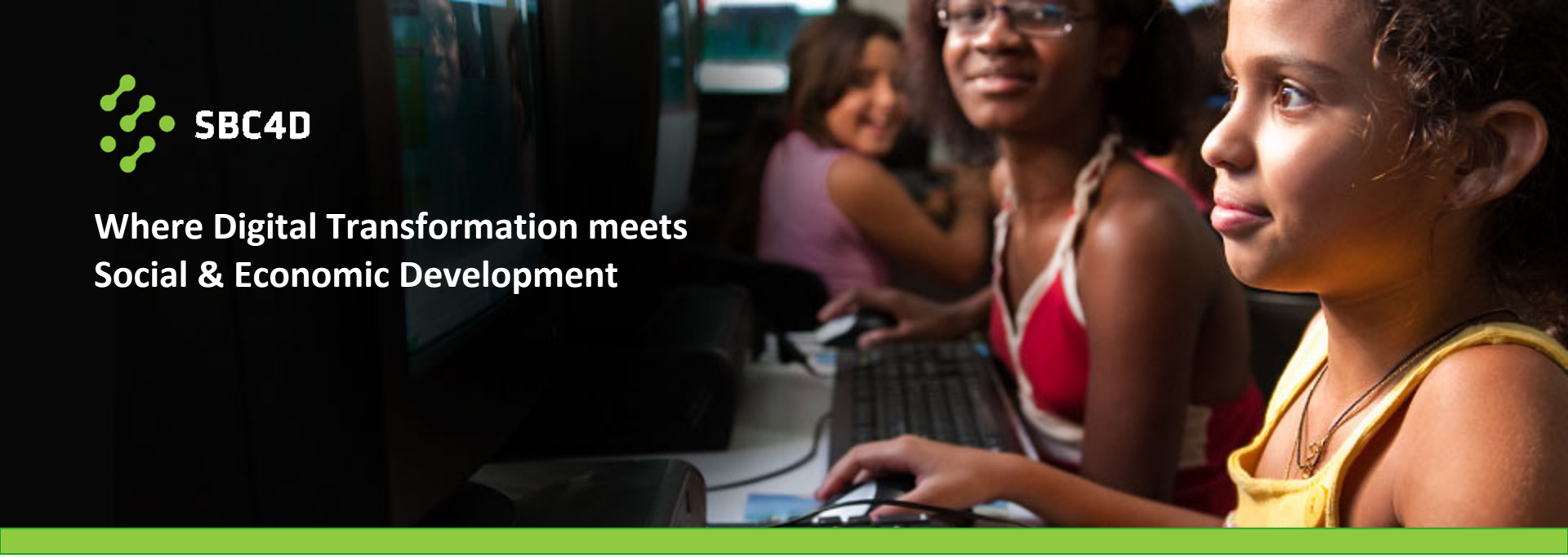

SBC4D

**Where Digital Transformation meets Social & Economic Development**

# Digital Services for rural communities

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EURIDICE

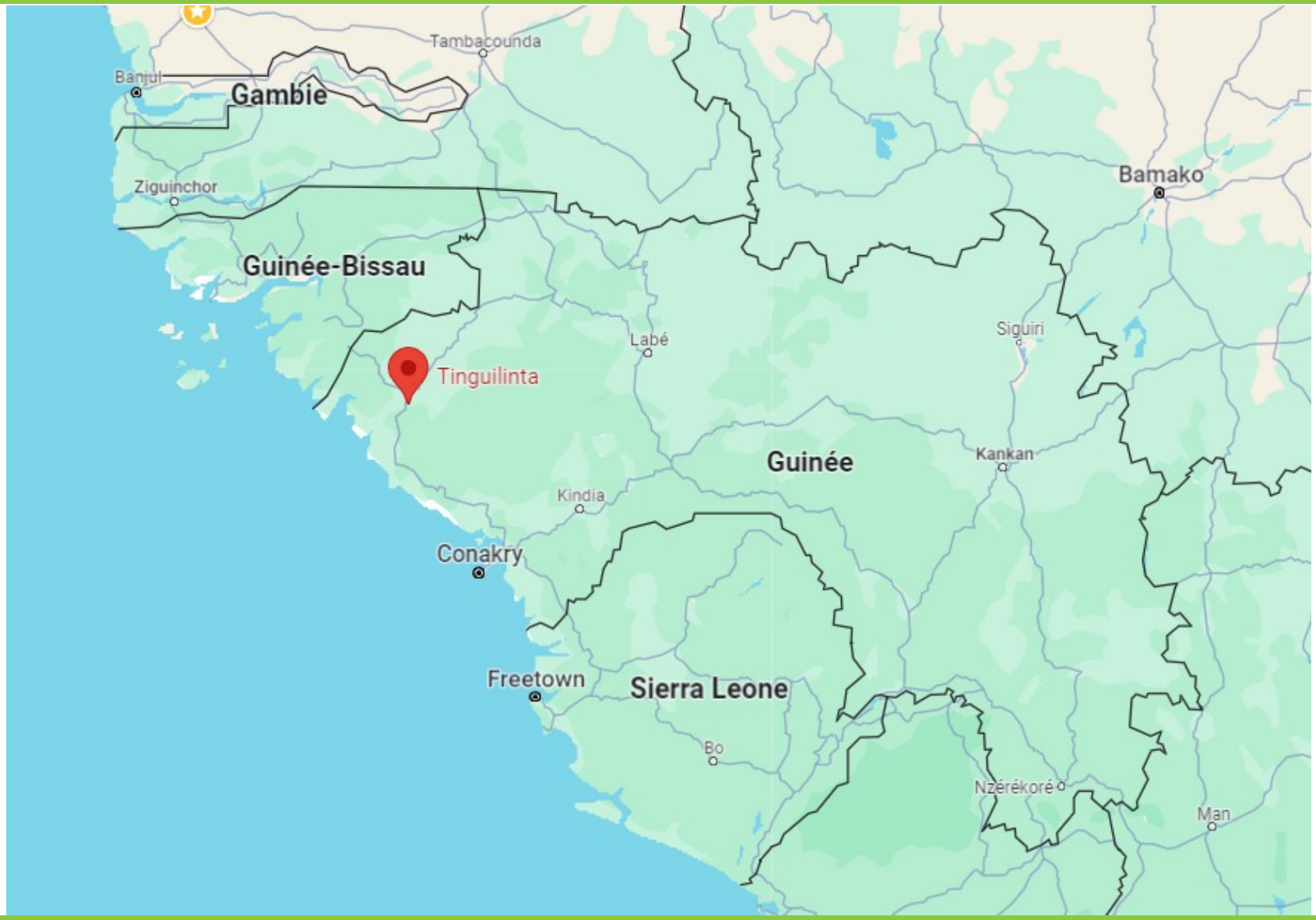
European Inclusive Education for Digital Society, Social Innovation and Global Citizenship

# Overview

- Setting the scene
- Digital services for social and economic development
- Actionable Information
- Trust challenges
- Sustainable services and business models
- Gender barriers
- Technologies

# Setting the scene

# A village in Guinée



# Tinguilinta


# Life & Work in Tinguilinta

- 268Km from Conakry, 7 hours drive
- No running water, no electricity (grid)
- Illiteracy rate: 61% global, 72% for women
- Language: 100% Soussou & Pular, 10% French
- 75% of people in agriculture
- 90% earn less than 2 eur/day
- 92% (individuals) have a mobile phone (100% prepaid)
- 33% (individuals) have a smartphone
- 34% (individuals) use mobile money
- 100% (households) have a radio, 0% a TV
- Unstable localized mobile connectivity
- Very unstable localized 2G connectivity

# Digital services?

# How can digital services help?

- Growing population and stress on agriculture
- Climate change hurts:
  - Traditional knowledge no more helps
  - Seasons, rainfall volume, pest and disease are changing
- World situation hurts
  - Prices volatility increase
- People need information to adapt
  - Which commodity, which variety to plant?
  - Where to buy agricultural inputs?
  - When to harvest ?
  - How to cope with pest and disease?
  - How to sell and at which prices?
  - Where to find new and access new markets?

- Digital services is the easiest way to bring information to people at scale

# Challenges

- Which information do people need exactly?
- How to deliver this information to them?
- How to sustain services?
- Incentives and disincentive to bridge technology gaps, use new tools and acquire new skills

# Information?

- Potatoes variety you should plant should be adapted to your soil. potatoes A14 is good for soil with a PH of 7.3, A12 for PH of 6.9
- The variety of potatoes you should plant is A14
- The variety of potatoes you should plant is A14 and you will find it in Boké, store amadou
- The variety of potato you should plant is A14, you need 5kg for your field planted every 10cm, and you will find those in Boké store amadou
- It will rain in the next 5 days
- It will rain 3 mm today, and 5mn tomorrow then 15mm the day after and 11mm the day after
- You should harvest your potatoes before end of day tomorrow

➢ It is all about actionable information

# Actionnable Information Challenges

- Content
  - Detailed information about farmer, farm and fields
  - Detailed information about soil
  - Detailed information about input providers & stocks
  - Detailed agriculture weather forecast
  - …
- Lifetime of information
- Data collection & Update
- Legal context
  - Personal data protection
- Costs
- Opportunity: Open Government Data

➢ Can I get the data I need to make my service?

# Providing information?

- What you send is information
- What is received is content and sender details
  - you just won 50 millions dollars in a lottery you did not participate in, but I need 1 million from you to initiate the transfer
- This is all about trust !
  - Who is sending the information?
  - What does experience tell me?
    - Did I experience scams in the past?
  - What are the heuristics I can use to build trust?
  - What are the risks for me?
    - What I plant impact my life! When I harvest or where I sell has less impact

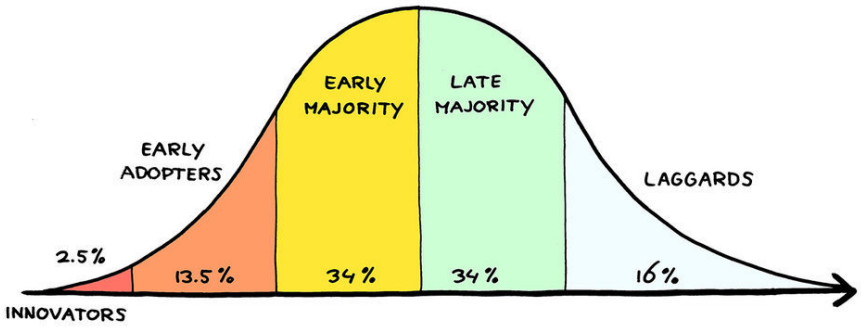

- Trust building is a step-by-step journey with no place for error
- Trust depends on the communication channel

# Trust building best practices

- Analysis risks: Different services different trust levels
  - Weather forecast or market prices are easy to implement
    - Known and recurring source of information
    - Little impact
    - Easy to verify
  - Virtual marketplaces miserably fail because of trust
    - Buyer don't want to send money
    - Seller don't want to send products with money
- Identify trusted sources
- Identify communication channels opportunities and specific challenges

# Change management

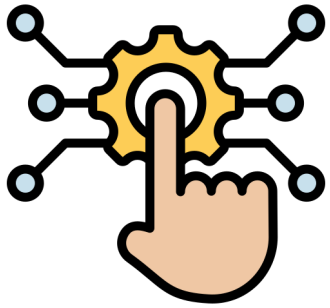
- Changing the way we work has a cost
  - Acquiring new skills requires effort and investment
- Using digital tools is a major change
- Incentives for change
  - No direct measurable benefit no adoption
- Disincentives
  - The gap is too high
  - Trust
  - Risks
- Everett Rogers adoption of innovations




CHANGE MANAGEMENT

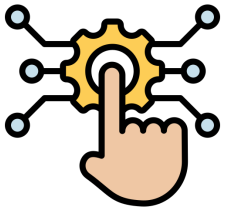
# Digital tool vs Digital transformation

- Digital tools are only tools not solutions
- A digital platform never resolves issues
- New processes with digital tools may resolve challenges of existing processes
- Design of digital tools:
  - Mapping of existing processes and people
  - Modelling of new processes and people
  - Designing transition processes from one to the other
  - Identifying knowledge and skills gaps



# Digital transformation

- Most of the processes are multi-stakeholders
- Different stakeholders have different digital skills, digital environment and devices
- Powerful interface are not accessible to most disadvantaged stakeholders
- Accessible interfaces are too simple and not powerful enough for internet-savy users
- Multi-channels application are almost always required
  - Provide the most powerful accessible interface to each stakeholder



# Making digital services sustainable?

- A digital service must be sustainable from an organizational perspective
- A digital service must be sustainable from a technical perspective
- A digital services must be sustainable from a financial perspective

# Organizational sustainability

- Who is going to operate the platform?
  - Is there appropriate skills in the organization?
  - Is there appropriate tech. infrastructure?
- What are the incentives to maintain the service?
  - Is there a financial benefit?
  - Other benefits?
- What are the maintenance challenges of the services ?

# Technical sustainability

- Can the solution evolve as technologies evolve?
- Can the solution evolve as users, stakeholders and ICT context evolve?
- Can the solution scale?

# Financial sustainability

- Cost
  - Capex (infrastructure, development, deployment cost…) and opex (Infrastructure, skills…)
- Revenue
  - Direct revenue
    - Fees/payment…
    - Savings: paper, HR…
  - Indirect revenue
    - Business intelligence??? Unmet dream!
      - Needs capacities
      - Needs products
      - Needs experience
      - Needs commercial activities
- Sustainability=Revenues-Costs>0 ?
  - Public entities have budget, most important element is impact per $
  - The cost of the absence of services is higher than the cost of services
    - Increasing food security saves on safety nets programs

# Business models pitfalls

- Those who pay (cost, time) are not the beneficiaries
  - Example: doctors moving from paper reporting to digital reporting
- Consider the total cost for the evaluation of affordability
  - Cost of communications
  - Revenue sharing with operators
- Cost/benefit ratio is critical
  - E.g. mobile phone
- The absolute value of the cost matters
  - E.g.: People using services too late
- Payment and collection of money is a critical step
  - E.g. mobile prepaid
  - Depends on the communication channel

# Services audience

- Final end-users
- Intermediaries (aka infomediaries)

- Intermediaries are a nice, easier option if they exist
- Intermediaries solve capacities and trust issues
- Intermediaries can be a transient option
- Intermediaries are costly
  - Almost impossible to build an intermediary network
- Intermediaries increase costs for end-users and impact sustainability
- People are autonomous if they can use services directly

# Technologies

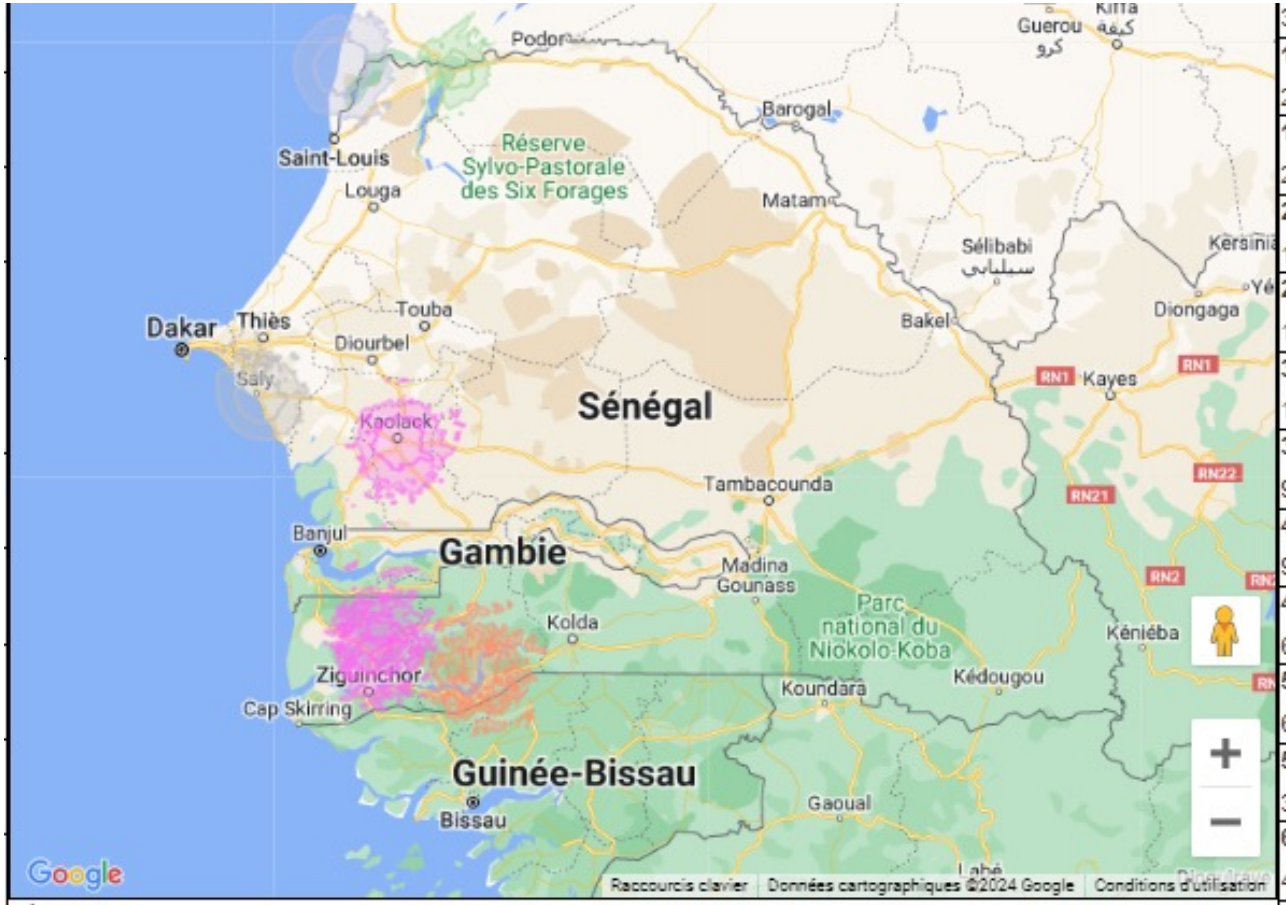
# Technologies

- 95% of the issue is not related to technology
- Technologies change at light speed
- People change slowly
  - Innovation, devices and capacities takes time to reach rural areas
  - Service designers focus on technology and forget to focus on adoption
- Technologies
  - Technologies to deliver information
    - Media: Radio, TV
    - Mobile technologies: Interactive voice services, SMS, USSD
    - Mobile internet technologies
      - Mobile App
      - Social network
      - Web site
    - Other: video, audio…
  - Technologies to collect data: mobile, mobile internet, IoT, drones, satellite…

# Média

- TV is too expensive and has limited usage
- Radio is ubiquitous in all households across Africa
  - Radio is great and cheap to reach a large population
  - People trust radio
  - Listening to radio is free
  - New approach around interactive radio programs
    - General content broadcasted
    - Individual content through mobile phones
    - E.g. education program like BBC Janala
  - Radio is not appropriate for all content: e.g. market prices
  - No personalized actionable information
  - A radio component is usually useful for advertisement, introduction…
  - Low deployment cost (audio files)
  - Relatively expensive opex (airtime)

# Radio audience tool




| | | |
|---|---|---|
| Répartition par genre | hommes : 1080617 (50.41%) | femmes : 1063001 (49.59%) |
| Répartition urbain/rurale | Urbain : 1394452 (65.05%) | Rurale : 749166 (34.95%) |
| Population totale : 2143618 | | |
| Population d'agriculteur : 392798 (18.32%) | | |
| Répartition par genre des agriculteurs | hommes : 198013 (50.41%) | femmes : 194785 (49.59%) |

| | |
|---|---|
| | 324626 (15.14%) |
| 10 - 15 ans | 299852 (13.99%) |
| 15 - 20 ans | 254467 (11.87%) |
| 20 - 25 ans | 193753 (9.04%) |
| 25 - 30 ans | 147105 (6.86%) |
| 30 - 35 ans | 126732 (5.91%) |
| 35 - 40 ans | 99927 (4.66%) |
| 40 - 45 ans | 90740 (4.23%) |
| 45 - 50 ans | 68514 (3.20%) |
| 50 - 55 ans | 62505 (2.92%) |
| 55 - 60 ans | 39639 (1.85%) |
| 60 - 65 ans | 42687 (1.99%) |
| 65 ans et plus | 82155 (3.83%) |

# SMS

- SMS was the very first mobile technology used (~2006)
- Principles: automation of sending/processing of messages
- Pro
  - Works on all phones and all networks
  - Very easy to setup everywhere
  - System or user-initiated services
  - Infrastructure: only one simple phone and free software packages
    - No tech knowledge (software development…) required
  - Storage & sharing
  - Unconnected mode: e.g. postal service in the desert
  - Shortcodes
- Thousands of examples of services
    - Some innovative ones like money transfer program
  - Flexible business model with tollfree or premium numbers… but revenue sharing with operator

# SMS (2)

- Cons
  - Very limited amount of information per message
  - Not accessible to illiterate people
  - Require written language
  - Function not usually used on phone
  - Quite expensive for both service providers and users
- Key Challenges
  - Trust : tons of scams and advertisements
  - Unpredictable costs (shortcodes)
  - Hard cross-operators implementation
    - Shortcodes
    - Costs
- Almost fully abandoned since 4-5 years

# USSD

- Principle: Basic text menus accessible through specific code dialing: *123*20#
- Open for service provision since about 10 years
- Pro
  - Works on all phones and all networks
  - Very heavily used by mobile operators: mobile money, credit balance…
  - Function well known by all phone owners as it is used for prepaid account top-up
  - Easy to implement (simple rest interface)
  - Payment via operators but revenue sharing
  - Guided menus that can drive people to the right place/information
  - Free technology from the user perspective
    - Used to be, now some operators are charging USSD services
  - No trace on phone on the use of services
    - Very useful for some services: e.g. reporting in dictatorship regimes, women-specific services, HIV-related services…

# USSD (2)

- Cons
  - Connected mode: require a stable mobile connection
  - Not accessible for illiterate people (still only text)
  - No storage and hard to advertise
    - Codes: not-easy-to-remember codes with * # and digits
    - Content cannot be reused
  - Only at the initiative of the user (e.g. cannot manage alerts)
- Challenges
  - Requires contractual and technical agreement with each and every mobile operator
  - Each operator has its own system
  - Extremely hard cross operator implementation
  - Trust is difficult to build
  - Unpredictable costs


- Still attractive for some service providers, but very little value

# IVR – Voices services

- Principle: automated call answering/processing using keypad or voice recognition
- First commercial use of IVR was in 1973
  - Use in digital services for development since ~2005
- Pro
  - Works on all phones and all networks
  - Works also on VoIP
  - Works with all languages
  - Voice is the only accessible technology for illiterate people
  - The most used function on all phones for everyone
  - Flexible business models with tollfree or premium number but revenue sharing with mobile operator
  - Generic easy to use markup languages (VoiceXML)
  - System or user-initiated services
  - Easy cross-operator implementation
  - Easy-to-store phone numbers

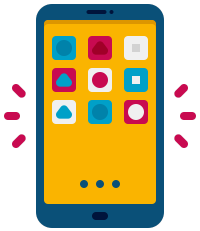
# IVR – Voices services (2)

- Cons
  - Heavy expensive infrastructure for scalable services (concurrent calls)
  - No content storage
  - Connected mode: Require a stable connection to the mobile network
  - Management & processing of audio files is very hard
  - Automated technologies (TTS, SR) are very expensive and not available in all languages
- Challenges
  - Trust building is difficult but easier with audio file (Gender, known voice…)
  - Audio interface design: People can't easily navigate through menu
  - Use by people is not obvious
    - Use of system-generated calls is even harder
  - Training is needed


- Hard technology but still often the only option

# Mobile App

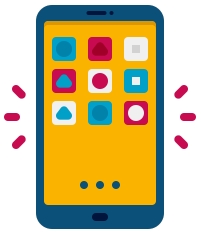
- Android is the only option
- Pro
  - Easy deployment with Play store
  - Totally independent of the internet provider (mobile operator, wifi…)
  - Work offline
  - Easy to develop for a software developer
  - Can use icons and audio messages: potentially accessible but not used that way
  - Can use all functions of a smartphone (recording audio, taking picture, location-based services…)
  - Storage of content and application



# Mobile App (2)

- Cons
  - Managing payment is very difficult:
    - People has no way to pay on Play store
    - Developers have hard time being paid from Play store
  - Require basic digital skills
  - Require smartphone
- Challenges
  - Not accessible to illiterate people
  - Not accessible to people without previous exposure to ICT
  - Payments have to be handled separately but not revenue sharing with operators

➢ Today, still mainly for intermediaries



# Mobile Web Technologies

- Technology: HTML 5
- Alternate option to native android app with same pro and cons
- HTML5 Pro:
  - Portable applications (web+mobile)
  - Offline application
  - 75% of a phone functions accessible from a browser
- Cons:
  - Payment issues
  - Need to know the URI

- A nice usually better option compared to native apps

# Social network

- Principle: Automatic messages sending/processing via social network
- Pro
  - Very popular app that people use (e.g. 95.1% of internet user use whatsapp in Nigeria)
    - Easier adoption, less training required
  - Desynchronized/offline sending/receiving mode
  - Local storage
  - Multimedia
    - Illiterate people do use social network with audio message
  - Geolocation
  - No client to develop
  - All social network have API

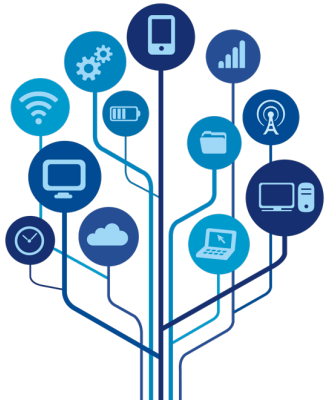
# Social network (2)

- Cons
  - Same challenges as IVR : hard processing/generation of audio message in local languages
  - More complex applications (conversational bot)
- Challenges
  - WhatsApp, by far the most popular network in Africa, has limitation
    - Very expensive message sending with pre-approved format (no audio)
    - Cheap but not free responses
  - Other networks (WeChat, telegram, signal) have open free API but are far less popular

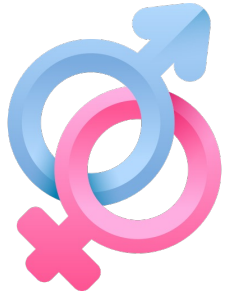
➢ Use of social networks on the rise

# Best technologies?

- No best technology only appropriate technologies
- One technology is usually not enough
- Each technology has its own context
  - Users' skills
  - Users' ICT context and devices
  - Content
  - Business model
  - Developer capacities
  - Infrastructure



# Gender barriers



- Women have specific challenges
  - Access to phone and right to use credits
  - Right to talk to other men than their husband
    - Issues with intermediaries
    - Issues with operators
  - Less access to education
- Women have different behaviors than men
  - Availability at different time of the day
    - Impact e.g. on radio program schedule
  - Willingness to discuss specific topics with men
- Women have different trust models
  - Women group are critical

➢ It is critical to adopt a gender-sensitive approach

# Conclusion and summary

- Success is difficult and rare
- Technology is rarely an issue
- Key elements
  - Target digital transformation and not a digital platform
    - Adopt a holistic approach
    - Don’t focus on platform but on new processes with digital tools
    - Map existing processes and model future processes
  - Focus on actionable, accessible, trustable, affordable information
  - Select appropriate technologies
  - Develop sustainable solutions
  - Take into account gender barriers


THANK
YOU!