

# E.A.P.

## **Transformative Technologies & Models of Governance**

### *Essential Literature*

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  - 1.1. Mobile money platforms
  - 1.2. Cryptocurrencies
  - 1.3. Blockchain technology
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2. Social Infrastructures
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# 1. Financial Systems

## *FinTech, Digital Currencies and Regulation*

### [Overview]

- Important distinction between **e-money/mobile** money, and ‘virtual’/**cryptocurrency**
  - **e-money**: the asset transferred remains sovereign currency (backed and theoretically regulated by a central bank), innovation comes in the *platform* of **mobile** transaction
    - Only requires mobile phone and account - which is tied to phone number
  - **cryptocurrency**: a tradable commodity/asset not backed by any institution (central or otherwise), uses a *distributed ledger* (blockchain), no need for intermediaries
  - **blockchain technology**: the decentralised ‘ledger’ model itself; offers trust & security without the necessity of *intermediaries* - has applications beyond currencies

### *Explanatory article:*

- **Bank for International Settlements**, ‘Digital Currencies’ (November 2015)  
<https://www.bis.org/cpmi/publ/d137.pdf> - outlook of ‘bank for central banks’
  - Monitoring the “implications of developments in digital currencies and distributed ledger (i.e. blockchain) technology” - outlines a variety of possible use-models

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### 1. **Mobile money**

- **McKinsey**, ‘Mobile financial services in Africa’ (September 2017)  
<https://www.mckinsey.com/industries/financial-services/our-insights/mobile-financial-services-in-africa-winning-the-battle-for-the-customer>
  - “Africa is the global leader in mobile money”, over half of the 282 mobile money services operating worldwide are in Sub-Saharan Africa (source: GSMA)
  - Not just M-Pesa in **Kenya**, Paga payments company in **Nigeria**, MTN works across 15 countries and has 41 million registered users
  - Far greater *mobile* than *bank* penetration, vast customer base
- ‘African retail banking’s next growth frontier’ (February 2018)  
<https://www.mckinsey.com/industries/financial-services/our-insights/african-retail-bankings-next-growth-frontier>
  - Distinguishes different kinds of African market: ‘mature’ (SA and Egypt), ‘fast-growing transition’, high levels of innovation (Kenya, Ghana), and ‘sleeping giants’ (e.g. Nigeria)
- **Quartz**, ‘Mobile money is only just starting to transform some of Africa’s markets’ (July 2017)  
<https://qz.com/africa/1039896/m-pesa-mtn-orange-others-lead-africas-mobile-money-revolution/>
  - Story of local business benefiting from cross-border mobile money transfer **Uganda** to **Rwanda** via an MTN account
  - Growing from East-West Africa, adoption there is currently “almost 29% of active mobile money accounts in Sub-Saharan Africa are now based, compared to just 8% five years ago”

- Further news of African financial inclusion from the **World Bank** (April 2018)  
<http://www.worldbank.org/en/news/press-release/2018/04/19/financial-inclusion-on-the-rise-but-gaps-remain-global-findex-database-shows>
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## 2. Cryptocurrencies

**Conceptual** interest in cryptocurrencies (including Bitcoin), without real mainstream uptake  
Many examples of **local** enthusiasm and articles attesting to pilot uses of virtual currencies  
Will this localised excitement have more substantial implications?

- **UN Economic Commission for Africa**, ‘Experts’ meeting on blockchain technology use in Africa ends’ (November 2017)  
<https://www.uneca.org/stories/experts%E2%80%99-meeting-blockchain-technology-use-africa-ends>
  - Brief summary of important African innovation and tech meeting in Addis Ababa, mentioning Bitcoin specifically
  - “From **Kenya** they learnt that bitcoin and blockchain technology can play an important role in building social and solidarity finance, in promoting financial inclusion and **bottom-of-the-pyramid business efforts**”
  - Applications - ‘low-cost remittances’ [Bitpesa], providing a ‘decentralised global bank account’ without formal financial institution. But still *serious security issues*

### *Kenyan community model*

- **Bloomberg**, ‘Closing the cash gap with cryptocurrency’ (November 2018)  
<https://www.bloomberg.com/news/features/2018-10-31/closing-the-cash-gap-with-cryptocurrency>
  - Outlines community approaches to local virtual currency use, developing and piloting a “digital token based on the blockchain” in a small area of **Nairobi**
  - Funded by Swiss cryptocurrency trading platform, Bancor
  - A ‘wallet app’ that works like M-Pesa, discussion of risk management - “What happens if this protocol is unstable or it keeps having security breaches?”
  - “The real opportunity here with blockchain and crypto is that we can build railways for a financial system which doesn’t rely on so much profiteering to operate it, which means that **value can be redistributed**, reinjected to communities and people”

**BBC** articles on low-level African crypto use, with awareness of *risk* and idealism

- ‘Why African millennials can’t get enough of Bitcoin’ (January 2018)  
<https://www.bbc.co.uk/news/world-africa-42582343>
  - Describes **Ugandan** local trading, Bitcoin ‘classes’, but also warnings as to the instability of cryptocurrencies - distinction between use for *trading* and use for *payment*
  - Mention of **Bitpesa**, overseas Bitcoin *remittance* service - is this really a more efficient way of doing things than something like TransferWise?

- **‘Kenyan** crypto-currency pioneer: ‘I make my money from Bitcoin...’ (October 2018)  
<https://www.bbc.co.uk/news/world-africa-45889707>
  - “She holds classes in how to trade in Bitcoin every Sunday in her restaurant” - “Mobile phones make paying with crypto-currency at Betty’s Place and other retailers easy”
  - This is admittedly a very small-scale **Kenyan** example, and having a ‘bank’ on their phone could surely be achieved just as well through e-money apps
  - Admission that *‘cryptocurrency is a gamble’*
- **‘Akon wants to build ‘real-life Wakanda’ using a cryptocurrency called AKoin’** (June 2018)  
<https://www.bbc.co.uk/news/world-africa-44574969>
  - Outlines the rapper’s much-idealised image of cryptocurrency-based society that “brings the power back to the people” - virtual currency again used as **narrative** of empowerment
  - Chairman of the **Blockchain Association of Kenya**, Michael Kimani, thinks that this currency would need a much larger uptake to work: “I have seen the need for cryptocurrencies, but within the context of small communities...If there is a small business community somewhere, they could really benefit from having their own currency.”

Useful and emphatic outline of **risks** and **dangers** of crypto-assets given by the Financial Stability Board here:  
<http://www.fsb.org/wp-content/uploads/P101018.pdf>

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### 3. **Blockchain applications**

More likely to be utilised in “mainstream financial systems” by central banks

Would it end up reinforcing existing structures of centralised authority, or enhancing transparency?

- **UNECA**, ‘Blockchain Technology in Africa’ (November 2017)  
[https://www.uneca.org/sites/default/files/images/blockchain\\_technology\\_in\\_africa\\_draft\\_report\\_19-nov-2017-final\\_edited.pdf](https://www.uneca.org/sites/default/files/images/blockchain_technology_in_africa_draft_report_19-nov-2017-final_edited.pdf)
  - Full UN Africa commission report on Blockchain application, **‘Tunisia** is the first country in the world to issue its national currency via a blockchain-operated application’
  - **‘Senegal** plans to introduce a digital currency (the ‘e-CFA’) based on blockchain technology”
  - *Alternative uses: Blockchains can be used to represent, track, and trade many other types of asset as well, which include government issued money; stocks, bonds, options...real and intellectual property rights; contract rights; the movement of goods and services*
  - e.g. **Bitland**, a **Ghanaian** non-profit which is registering land and property ownership
- **Review of Finance**, ‘Corporate Governance and Blockchains’ (January 2017)  
<https://academic.oup.com/rof/article/21/1/7/2888422>
  - Anticipates that emerging markets (such as Africa) will be among the first to see blockchain technology integrated into large-scale financial structures

- **African Business Magazine**, ‘Senegal creates digital currency history’ (May 2017)  
<https://africanbusinessmagazine.com/african-banker/senegal-creates-digital-currency-history/>
    - Describes **Senegal**’s plans to introduce national e-currency, the ‘e-CFA’ - that works on a ledger system similar to ‘blockchain’
    - Statement from the managing bank; Alioune Camara, the chief executive of BRM, said: “We are committed to bringing digital financial services and true financial inclusion to West Africa. We can now facilitate full interoperability between all e-money payment systems”
    - Transformative tech. but working through centralisation rather than ‘atomisation’
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#### 4. Discussion points

[*mobile*]

How will the currency landscape develop on the continent?

Will mobile money applications and large **telco-bank** institutional partnerships continue to dominate?

Do they pose any threat to the authority of the **state** in their power and reach?

Do these **e-money structures** enable ‘individual empowerment’ in the population?

Or will they enable a new form of centralisation around private interest, continued ‘**conventional structures**’?

[*crypto*]

Will any form of **cryptocurrency** gain mainstream popularity?

Could high levels of mobile phone penetration lead to greater interest in other forms of ‘**virtual**’ **currency** in communities? - traded *commodities*, arising from & strengthening **self-organising entities** outside state control

In this case, how will governments respond? Will they simply ban their usage given associated **risks**?

If **Bitcoin** becomes popular in payment methods, could this be a *danger* to populations rather than a source of empowerment given its volatility and limited knowledge of its risks?

[*blockchain*]

Will governments develop and institute **blockchain**-based digital currencies?

Does this transition affect governance structures, by enabling greater transparency and accountability?

Or is this an example of transformative technology being adapted and **subsumed** under traditional organisational systems?

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Key countries: **Kenya, Senegal, [Uganda]**

## 2. Social Infrastructures

### *Automation, Communications and Power*

#### [Overview]

- Innovation in the fields of agriculture, healthcare, energy provision, and community social enterprise is being driven by transformative technologies
  - The idea of ‘**off-grid**’ models is an interesting one, where local groups are *self-sufficient* - or, at least, not reliant on the provision of a centralised institutional authority or national ‘networks’
  - If the provision of services and the advancement of development solutions continue to operate largely outside of **state** encouragement then could this *reorganise* conventional models of authority?
  - Important broader questions about the role of external/foreign actors: INGOs, states and private sector
  - Key tech. innovations:
    - automation/robotics
    - artificial intelligence (AI)
    - tactile communications
    - 3D printing
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#### 1. Remote healthcare

##### a. AI and digital platforms

#### Example of Babylon in **Rwanda**

- Aim: “To put an accessible and affordable health service in the hands of every person on the planet”
- Initially launched in 2016; then, in November 2017, partnered with the Rwandan **government** and the **Gates** Foundation to target entire population
- **Digital Health**, ‘Babyl service in Rwanda surpasses 2 million members’ (May 2018)  
<https://www.digitalhealth.net/2018/05/gp-at-hand-like-service-in-rwana-surpasses-2-million-members>
  - Now used by around **30%** of the population
  - Gained support through “grass-roots engagement by over 500 Babyl ambassadors living in rural villages and local communities”
- Many similar ‘app’ examples, some produced by local African startups
  - [Kangpe](#) (**Nigeria**), [MedAfrica](#) (**Kenya**), [Matibabu](#) (**Uganda**), [Hello Doctor](#) (**10** countries)
- **FT**, ‘Impact investing in digital health services: treat with caution’ (September 2018)  
<https://www.ft.com/content/4c2a7fbc-786d-11e8-af48-190d103e32a4>
  - Describes the scale of external private investment and healthcare application in Africa:
    - [Zenysis](#) (San Francisco), analyses tens of millions of data items for remote diagnosis
    - [Zipline](#) (Half Moon Bay, CA), uses drones to deliver medical supplies to rural hospitals in **Rwanda** and **Tanzania**
  - These technologies emerge to tackle African problems, without necessarily encouraging solutions to come from within - could lead to *external reliance*

- Dangers of external ‘for profit’ services:
  - “Technology can accelerate progress but also sharply reinforce and increase the **disparities** between people with digital access and those without”
  - *‘brain drain’* of healthcare workers from **state**-funded health provision
- Sensitivity to the limitations of private sector influence is necessary

### **Government** analysis

- **German Ministry for Development**, ‘Digital Health Ecosystem for African Countries’ (2018)  
[https://www.bmz.de/en/publications/topics/health/Materilie345\\_digital\\_health\\_africa.pdf](https://www.bmz.de/en/publications/topics/health/Materilie345_digital_health_africa.pdf)
    - Outlines capacity of 4 promising nations (39) - **Tanzania, Rwanda, Kenya** and **Namibia**
    - Comments generally on “the absence of a holistic, integrated infrastructure”, and the *“regulatory dearth of adequate governance and laws”*
    - This is made more difficult with the “great diversity of healthcare facility owners, donors, and financing sources” - many stakeholders rather than state-led **integration**
  - **Devex**, ‘Telemedicine Project in Ghana’  
<https://www.devex.com/impact/partnerships/telemedicine-project-in-ghana-699>
    - Partnership between government, Novartis Foundation (an arm of multinational pharma company, Novartis) and Ericsson to expand national healthcare coverage
    - [subsequently scaled up in 2018:  
<https://www.novartisfoundation.org/news/novartis-foundation-and-ghana-health-service-announce-successful-integration-and-scale>]
    - Here technology could strengthen centralised government role in providing health
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### b. 5G robotic surgery

- **PwC**, ‘What doctor? Why AI and robotics will define New Health’ (June 2017)  
<https://www.pwc.com/gx/en/industries/healthcare/publications/ai-robotics-new-health/ai-robotics-new-health.pdf>
  - Outlines the range of developments in healthcare robotics
  - Important figures suggest that there is a far higher willingness in African countries to engage with these non-traditional health services than in Europe
    - **94%** willingness in **Nigeria**, compared with **39%** in the UK
- **Ericsson**, ‘MTN and Ericsson first in Africa to trial 5G technology’ (January 2018)  
<https://www.ericsson.com/en/news/2018/1/5g-in-south-africa>
  - Offering the future possibility of remote surgery in Africa, enabled through tactile communications (overseas expert surgeons wearing haptic gloves for touch sense)
  - “With 5G, remote healthcare through connected robots could offer world-class surgery in the most remote parts of the continent and the world”
  - Could this actually *limit* local development by multiplying reliance on technology from **abroad**? How do **states** interact with these business developments?

## 2. Agri-tech

- **Harvard Business Review**, 'How digital technology is Changing Farming in Africa' (May 2017)  
<https://hbr.org/2017/05/how-digital-technology-is-changing-farming-in-africa>
  - Rising interest of African entrepreneurs in dealing with small-scale farmers, mobilising technology to increase productivity (outcompeting global corporations)
  - Specific example of *Zenvus*, precision farming startup in **Nigeria** - making use of automated and AI-based systems
- **Financial Times**, 'Technology hope for African farmers' (October 2018)  
<https://www.ft.com/content/3316885c-b07d-11e8-87e0-d84e0d934341>
  - External stakeholder influence: Precision Agriculture for Development (PAD), Boston non-profit assisting smallholders in **Ethiopia, Kenya and Rwanda**
  - AgroCenta platform enables digital sales to large companies (e.g. Nestle) in **Ghana**
  - Indigenous innovation in **Kenyan** agritech hub too, solar pumps and storage units
  - Key limiting factor is governance impact: progress "will hinge on education, connectivity and financing, all of which depend on governments", greater private sector role ('impact investing')
- **World Bank**, 'Why technology will disrupt and transform Africa's agriculture sector - in a good way' (July 2018)  
<https://blogs.worldbank.org/voices/why-technology-will-disrupt-and-transform-africa-agriculture-sector-or-good-way>
  - Again, innovation driven and financed by **non-state** actors from abroad - World Bank using "Internet of Things-enabled smart irrigation devices that combine automated soil water sensors and cloud-based data analytics"
  - 'technology-led transformation of the agricultural sector'
- **WEF**, 'These farms are shaping Africa's agricultural future' (July 2017)  
<https://www.weforum.org/agenda/2017/07/these-farms-are-shaping-africas-agricultural-future>
  - US, China, INGOs fund African 'demonstration' farms to educate local farmers about new technologies and practices to "accelerate the adoption of game-changing innovations"
  - Often doesn't directly involve individual state governments themselves
- **CNN**, 'African countries are importing robots and young people's jobs are at risk' (April 2018)  
<https://edition.cnn.com/2017/08/22/africa/robots-in-africa/index.html>
  - Concerns beginning about the impact of robotics in Africa on *employment* opportunities, "robots will take away 2/3 of jobs in developing countries" (**UN**)
  - In **Tanzania** and **Uganda**, "drones with sensors have replaced the need for some farmers because of their ability to detect stress in plants, ten days before humans can"
  - Given future directions of automated agriculture [see *Economist* article], how could the longer-term work consequences of this disruption impact specifically African state organisation? (<https://www.economist.com/node/21698612/content/site-index>)



### 3. Off-grid power

A useful **model** of this project's focus on possible societal 'atomisation'

- **The Economist *Special Report***, 'Africa might leapfrog straight to minigrids' (November 2017)  
<https://www.economist.com/special-report/2017/11/09/africa-might-leapfrog-straight-to-cheap-renewable-electricity-and-minigrids>
  - Describes the incredible expense associated with expanding national energy grids: "would cost **\$63bn** a year until 2030, compared with the **\$8bn** a year that is being spent now"
  - Mini rooftop solar installations can power a home or a 'micro-grid' model can serve a village; paid for daily using mobile money (50 cents vs. \$250 for entire system)
  - Largest example of this is **M-Kopa**, which operates in Kenya, Tanzania and Uganda
  - Far cheaper/easier than **full-scale national power grids**
- **Reuters**, 'Off-grid power pioneers pour into West Africa' (February 2018)  
<https://uk.reuters.com/article/uk-africa-power-insight/off-grid-power-pioneers-pour-into-west-africa-idUKKCN1G41Q0> - '**less than 40% of African households are connected to national networks**'
  - Rapid growth of 'off-grid' structures in West African countries: **Nigeria** and **Ivory Coast**
  - East African solar tech players - Greenlight Planet, d.light, Off-Grid Electric (OGE), M-KOPE Solar, Fenix International and BBOX - and European utilities companies interested too
  - e.g. **Lumos** Global kit, offers *lease-to-own* offers - does not tie any owners to endless payment requirements, but facilitates self-sufficiency
  - Comparison of "off-grid solar to the rise of the mobile phone, which leapfrogged landline networks on the continent"
- **Oxford [Energy Studies]**, 'The Politics of Renewable Energy in East Africa' (August 2018)  
<https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/08/The-politics-of-renewable-energy-in-East-Africa-EL-29.pdf>
  - An interesting and useful comparison of government approaches to regulation and private sector involvement in **Ethiopia** vs. **Kenya**
    - **Ethiopia**: centralised state dominance; until recently electricity was "*a state monopoly*"; now, 'large, on-grid projects are likely to be given preference', government attempts to "dominate off-grid sector"
    - **Kenya**: home to 40% of commercial microgrids in SSA; "contrary to Ethiopia, where the level of state control reduces scope for private sector growth, Kenya's welcoming environment has turned it into an innovation hub for these projects"
- **Norton Rose Fulbright**, 'Off the Grid in Africa' (February 2017)  
<http://www.nortonrosefulbright.com/knowledge/publications/149902/off-the-grid-in-africa>
  - Outlines role of US government agencies and international development finance institutions in various projects: **Nigeria, Benin, Zambia, Kenya, Senegal** and **Madagascar**

#### 4. **Tech for education** - *m-learning*

- **Brookings**, ‘Can technology help leapfrog education in Africa?’ (January 2018) <https://www.brookings.edu/blog/africa-in-focus/2018/01/23/foresight-africa-viewpoint-can-technology-help-leapfrog-education-in-africa/>
    - Suggests similar ‘leapfrog development’ model - “accelerating progress by skipping entire phases of infrastructure- and institution-building” - could be applied to **education**
    - Private sector program **Eneza** uses mobile phone (SMS) and television services, operating in **Ghana, Kenya, Tanzania, and Zimbabwe**
    - Not necessarily ‘transformative’ technologies, but being leveraged in a new way
    - (How) will advancing ed-tech remain under the auspices of the state? - curriculums etc.
  - **The Guardian**, ‘Using technology to bridge the learning gap across Africa’ (April 2016) <https://www.theguardian.com/media-network/2016/apr/04/technology-bridge-learning-gap-africa>
    - Describes attempts at *m-learning* schemes, in light of **failed** hardware projects such as ‘One Laptop per Child initiative’
    - Further detail on **Eneza** (above), which is aimed at local needs to avoid previous problems: “One of the biggest pitfalls is when the main revenue source is donors, philanthropy or foundations, because the product is then geared to satisfying the needs of those funders”
    - Delivery and content must be tailored towards *end-users* and individuals; potentially unconventional solutions could emerge
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#### 5. **3D printing & local ‘low high-tech’ innovation**

Original ‘headline’ **Togo** story

- **CNN World**, ‘How a West African lab made a 3D printer out of toxic e-waste’ (October 2018) <https://edition.cnn.com/2017/11/28/africa/3d-printer-electronic-waste/index.html>
  - First ‘Made in Africa’ 3D printer, built using format of higher tech models but from **e-waste**
  - The lab is “a grassroots network of inventors and entrepreneurs who want to build a ‘digital democracy’” - a **politicisation** of their practice, a force for *equality* and **community** focus
  - Sename Agbodjinou, founder: “the idea is that the African city of tomorrow will be built by our own innovation spaces”, 50 people currently, recently opened a second space in Lome
  - Describes other initiatives in **Tanzania** and **Sudan**

Recent updates on the Togolese lab - **WoeLab**

- **Techpoint Africa**, ‘In spite of territorial challenges, Togo’s first incubation lab, WoeLab is advancing with purpose’ (October 2018) <https://techpoint.africa/2018/09/26/woelab-lome-togo/>
  - **Togo** “climate...an entirely different one” to places like Nigeria and Kenya, describing Agbodjinou’s efforts “to ignite the startup/technology revolution in Togo”

- **Tech vision:** “the idea is not to wait for big companies like Microsoft and Google to build smart cities for Africa, and then promote their technology in the process. We can create African smart cities by launching startups that will change the city **from the bottom up**”
- A striking *alternative* model of innovation and tech influence, people-focused

Broader innovation ecosystem across Africa and in **Tanzania**

*Ecosystem Accelerator* program backed by **DfID**

- **GSMA** (mobile operators), ‘Africa: A Look at the 442 active tech hubs of the continent’ (March 2018)  
<https://www.gsma.com/mobilefordevelopment/programme/ecosystem-accelerator/africa-a-look-at-the-442-active-tech-hubs-of-the-continent/>
  - “since 2016, the number of active tech hubs across Africa has grown by over **50%**: from 314 in 2016. **442 hubs are now active on the continent** and a dozen is due to launch in early 2018”
  - ‘Ecosystems’ reported here are often backed by large MNCs, including Google, Facebook, Jack Ma’s Alibaba - many different actors exploring **synergy**, not just *local population*
  - 50+% of all hubs resort to public or corporate partnerships, especially with mobile operators
  - An awareness of start-ups’ role in developing the continent’s societies and economies
- **GSMA**, ‘Meeting African tech hubs in the vibrant ecosystem of Tanzania’ (October 2018)  
<https://www.gsma.com/mobilefordevelopment/programme/ecosystem-accelerator/afrilabs-annual-gathering-2018-meeting-african-tech-hubs-in-the-vibrant-ecosystem-of-tanzania/>
  - Important role of a variety of stakeholders; in **Tanzania**’s case, the government invested in undersea cable that allowed high data penetration at affordable rates
  - One health insurance start-up working with Vodacom and its M-Pesa platform
  - ‘AfriLabs’ gathering 2018: “governments were urged to continue investing in the tech space both in infrastructure and policies that create conducive environments for innovation”

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## 6. Discussion points

[*general*]

Will these technological developments bring about genuine **self-sufficiency** amongst local populations?

In the cases of *agri-tech*, *remote healthcare*, and *off-grid solar power*, do these innovations **empower** individuals and work outside conventional structures?

Do **private interest** and overseas investment undermine centralised government’s role as an investor in national development?

[*ai healthcare*]

Will digital health platforms operate outside of governance structures, or become a **national** service that advances central government infrastructure? (as in the cases of **Rwanda** and **Ghana**)

What impact would remote surgery have on **local** capacity and learning? In this overseas practice, could the perceived coherence of international **borders** be affected?

[*agri-tech*]

Will this develop more through **African** entrepreneurs or **external** stakeholders (inc. US)?

Could future automation free large swathes of the African population to seek out different forms of work? What might these mean in terms of **individual empowerment**?

[*off-grid power*]

What happens when electricity stops being a **state** monopoly (as in Ethiopia's case)? Could the resulting model of self-reliance, in terms of energy, more broadly affect conventional systems of governance?

Does **private** involvement threaten *either* the possibility of this individual freedom *or* government influence?

[*innovation ecosystems*]

How serious/realistic is the **politicisation** (*digital democracy*) of 'low high-tech' practice in African tech labs?

Will these eventually fall under the umbrella of large MNCs like Microsoft and Google, or follow the independent Togolese model? If so, where would **investment** come from?

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Key countries: **Rwanda, Nigeria, Togo, Tanzania** [**Ethiopia**, *see below*]

### 3. State Security & Protest

#### *Big Data, AI and Cyber Surveillance*

#### [Overview]

- The role of the **state** in mobilising tech to interact with its people is being understood differently on the continent: in **Zimbabwe**'s case, **Chinese** influence points towards a concerning digital authoritarianism
  - AI, data gathering ('big data') all potentially foster mass surveillance schemes which would utterly reverse any "*individual empowerment*" and allow governments to be **dominant**
  - Although **Kenya** is bringing in state-wide **e-government** services, not necessarily *repressive*
  - **Ethiopia** offers an interesting, changing case study with its new president - (how) will it move (/can it move) from surveillance systems (also **China**-influenced) towards tech freedom for its people
  - Can AI actually be *empowering* given it relies on gathering mass data?
  - A form of '**digital colonialism**' can emerge with the involvement of MNCs like Google
    - Digital 'protest', although sometimes used (to a limited extent in **Togo** recently) is not necessarily a sustainable model if state tech control and private influence increases
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#### 1. Surveillance, Big Data, AI

The case of China in **Zimbabwe**, facial recognition

- **Quartz**, 'Zimbabwe needs China for its tech and ICT ambitions' (June 2018)  
<https://qz.com/africa/1306520/zimbabwe-needs-china-for-its-tech-and-ict-ambitions/>
- 'China is exporting facial recognition software to Africa' (May 2018)
  - Looking to build one of the continent's biggest IT hubs, underpinned by big data and AI
  - Backed by **China**, Zimbabwean government "signed a strategic partnership the Guangzhou-based startup CloudWalk Technology to begin a large-scale facial recognition program throughout the country" - part of *Belt and Road initiative*
  - Concerns about giving up population's personal data to Chinese databases, without necessary ethical/legal oversight; it also means that African startups can't compete
  - Special advisory to **Zimbabwe** presidency describes building a "national artificial intelligence"
    - As CloudWalk CEO has said, this would include a broader package plan "for areas such as infrastructure, technology and biology"
    - Could these 'smart cities' follow the Chinese **surveillance model**?
- **Foreign Policy**, 'Beijing's Big Brother tech needs African faces' (July 2018)  
<https://foreignpolicy.com/2018/07/24/beijings-big-brother-tech-needs-african-faces/>
  - Further detail:

- “The deal between CloudWalk and the Zimbabwean government will not cover just CCTV cameras...smart financial systems, airport, railway, and bus station security, and a **national facial database** will all be part of the project”
- Deep concerns amongst locals that “the Zimbabwe government will use this tech to try and control people’s freedom”

Developments in **Ethiopia**, loosening authoritarianism

- **Human Rights Watch**, ‘New spate of abusive surveillance’ (December 2017)  
<https://www.hrw.org/news/2017/12/06/ethiopia-new-spate-abusive-surveillance>
  - Reporting 2017 “digital attacks on activists and independent voices”, renewed campaign of malware attacks - government monitoring and extracting information from remote computers
  - Earlier **HRW** report from 2014 describes how “most of the technologies used to monitor telecom activity in Ethiopia have been provided by the Chinese telecom giant ZTE”  
<https://www.hrw.org/news/2014/03/25/ethiopia-telecom-surveillance-chills-rights>

[further examples of Ethiopian cybersecurity dynamics, including dissenting ‘hacktivism’ can be found in the earlier 2017 **EAP** Bibliography - before former PM Dessalegn’s resignation in *February 2018*]

*Changes since April 2018*

- **CIPESA**, ‘The Reforms Ethiopia Needs to Advance Internet Freedom’ (July 2018)  
[https://cipesa.org/?wpfb\\_dl=273](https://cipesa.org/?wpfb_dl=273)
  - New administration, led by Abiye Ahmed, has reconnected mobile and broadband services that had been cut off since 2016, and unblocked 246 sites after over a decade
  - Suppressive measures used by previous regime: “arbitrary arrests, detention, and torture of members of the Zone Nine bloggers collective”
  - Document makes many recommendations on how to liberalise telecoms sector, repeal harmful legislation and challenge culture of *surveillance*
  
- **Quartz**, ‘Ethiopia’s futurists want AI to drive development’ (June 2018)  
<https://qz.com/africa/1301231/ethiopias-futurists-want-artificial-intelligence-to-drive-the-countrys-development/>
  - [could also be relevant to ‘innovation hubs’ above]
  - Talking with Assefa, “a computer scientist, a futurist, and a utopian - but a pragmatic one at that. He is founder and chief executive of iCog, the first AI lab in Ethiopia”
  - Potential for expansion with reversal of *‘internet crackdown’*, students with **agri** ideas
  - Key point about **‘digital colonialism’** - www foundation, Renata Avila on *‘going local’* to avoid data monopoly of Silicon Valley tech giants through:
    - ‘Decentralised social media’
    - placing developments closer to the people, empowering local communities to participate in its design, benefit from the data they generate & increase the accountability of the systems serving them
  
- **Refworld**, ‘Freedom on the Net - Ethiopia’ (November 2018)  
<http://www.refworld.org/docid/5be16b1a4.html>

- Lots of key details about Ethiopia's telecoms history and progress June 2017-May 2018
  - Government surveillance has **not** been reformed since April (even with new president), earlier "strong suspicions that the Ethiopian government has implemented highly intrusive surveillance practices styled after the **Chinese** system"
  - Suspicions strengthened after AU headquarters (in Addis) were hacked in Jan 2018, *see below*
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## 2. Chinese influence

- **FT**, 'Inside China's surveillance state' (July 2018)  
<https://www.ft.com/content/2182eebe-8a17-11e8-bf9e-8771d5404543>
    - Given the Chinese involvement at state-tech level (as outlined above), this article gives a useful sense of the structure of 'constant monitoring' that is being created in China
    - 'By 2020, a national video surveillance network will be "omnipresent, fully networked, always working and fully controllable"' - mentions tech 'export' to Zimbabwe
    - Also the concept of 'social credit' scored on monitored good/bad behaviour
  - **BCG**, 'Pioneering One Africa' (April 2018)  
<https://www.bcg.com/en-gb/publications/2018/pioneering-one-africa-companies-blazing-trail-across-continent.aspx>
    - Important description of Chinese tech impact on the continent: "Huawei Technologies, a Chinese multinational company has built more than **70%** of the numerous commercial 4G networks that operate in Africa", important *tie* to China-based knowledge
  - **FT**, 'African Union accuses China of hacking headquarters' (January 2018)  
<https://www.ft.com/content/c26a9214-04f2-11e8-9650-9c0ad2d7c5b5>
    - Example of "the risk African nations take in allowing Chinese technology companies such prominent roles in developing their telecoms backbones" - including Huawei and ZTE
    - This apparently took place every night for **5 years** at the Addis Ababa headquarters - \$200bn building funded by Beijing and built by a state-owned company
    - Problem now fixed, communication encrypted on separate AU servers and no longer passes through Ethio Telecom; Ethiopia's state-run operator, which has a history with ZTE
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## 3. e-government

The **Kenyan** example

- **Brookings**, 'Harnessing Africa's Digital Potential' (January 2018)  
<https://www.brookings.edu/research/harnessing-africas-digital-potential/>
  - A section that describes digitised government service delivery, Kenya's World Bank-financed 'eCitizen' system that allows mobile money payments
  - Services accessed include: business licenses, permits, and registrations; driver's licenses; police clearance certificates; official land titles for Nairobi blocks; applying for passports
  - Introduction of iTax and efficient, real-time monitoring of revenue collection

- **Daily Nation**, ‘Inside raging battle for the control of key eCitizen system’ (October 2018)  
<https://www.nation.co.ke/news/battle-for-control-of-key-eCitizen-system/1056-4788842-6ad2jo/inde.html> - local news on “holes in project implementation”, controversy about digital fund collection
    - Money initially not direct to government but via M-Pesa of small local firm, Goldrock Capital!
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#### 4. ‘Digital activism’

The concept of ‘digital activism’

- **Reuters**, ‘African Rulers’ weapon against web-based dissent: the off switch’ (October 2017)  
<https://www.reuters.com/article/us-africa-internet/african-rulers-weapon-against-web-based-dissent-the-off-switch-idUSKBN1CL28F>
  - Internet as a way of grassroots organisations taking on authoritarian regimes, but response is switching off national internet:
    - since 2016 (-Oct 2017), **13** African nations have shut down the internet on **21** occasions, mostly during elections and protests
    - Cameroon, DRC, Togo, Gabon, Gambia, Togo
- **Quartz**, ‘African governments silence social media bloggers’ (July 2018)  
<https://qz.com/africa/1329145/african-governments-silence-social-media-bloggers-on-twitter-whatsapp-facebook/>
  - Reports on a tax on social media in Uganda, high fees for blogging in Tanzania
  - But “activists are pushing back, resorting to ‘naming and shaming’ nations infringing on digital rights”, urging telcos to be more *accountable* to their users
  - Interesting case of Togo, when president Faure Gnassingbé faced protests last year, he cut off the internet and blocked Whatsapp
    - But “a **decentralized group of 5,000 activists** worked from both within Togo and in neighboring Ghana to take down government websites including the presidency, the revenue authority, and the national television”
- ‘Pan-African activists network fight online to strengthen democracy in Africa’ (June 2018)  
<https://qz.com/africa/1216713/pan-african-activists-network-activists-fight-online-to-strengthen-democracy-in-africa/>
  - Story of the ‘Africtivists’, community of 200 cyber-activists from 35 different countries with particular involvement (they say) in the fall of former Gambian dictator in January 2017

2 more potentially useful academic books on the subject of *digital activism*:

*Digital Activism and Cyberconflicts in Nigeria* (2018)

<https://www.emeraldinsight.com/doi/book/10.1108/9781787560147>

- Chapters on ICT infrastructural development in **Nigeria**, direct accounts of **cyberconflict** and the actions of Boko Haram & ‘Occupy Nigeria’ protests



*Digital Activism in the Social Media Era: Reflections on Emerging Trends in Sub-Saharan Africa* (2016)  
<https://www.palgrave.com/gb/book/9783319409481>

- Looking at a continent “booming with mobile innovation”
  - “this book probes the vitality, potentiality and ability of new communication and technological changes to drive **online-based civil action** across Africa”
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## 5. AfCFTA: a cross-border future

- **CIO East Africa**, ‘Unlocking markets, cross-border trade in Africa using technology’ (October 2018)  
<https://www.cio.co.ke/unlocking-markets-cross-border-trade-in-africa-using-technology/>
    - Local response to the African Continental Free Trade Agreement (AfCFTA), signed March **2018**, aiming to create single market based on free movement of people, goods and services
    - Enabled specifically by technology innovations:
      - “the increasing interconnectedness of market participants via mobile technology”
      - “the combined impact of such fields as data analytics, AI and blockchain technology in optimising the production and flow of these goods and services”
    - Transaction challenges cross-border are limited over digital platforms, national business clusters might become **continent-wide** opportunities, ‘a more integrated African economy’
    - Blockchain technology can deal with information asymmetries, driving transparency along trade flows - verifiable by different participants in these movements
  - **International Centre for Trade and Sustainable Development**, ‘Empowering Women by Supporting Small-Scale Cross-Border Trade’ (June 2018)  
<https://www.ictsd.org/bridges-news/bridges-africa/news/empowering-women-by-supporting-small-scale-cross-border-trade>
    - Interesting emphasis on small-scale cross-border trade across Africa, statistical estimate from 2011 in Rwanda: informal exports to neighbouring countries 51% higher than formal exports
    - The article links this trading to *women’s economic empowerment*
    - Difficulties emerge when these local people have “limited knowledge and skills in the context of increased market linkages through information and communications technology (ICT)”
    - The potential for tech advances to leave out marginalised communities who are at a knowledge deficit - will the AfCFTA improve this?
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## 6. Discussion points

[*general*]

Could transformative technology usage models, such as AI and ‘Big data’, enable a more complete dominance of the **state** rather than empowerment of populations?

Given the influence of **China** in tech infrastructure, how might this be reflected in **governance** approaches?

Does the very existence of ‘Big data’ approaches intrinsically empower larger, **multinational actors** - tech giants - and could these forces become more powerful than states themselves?

[cf. Zimbabwean & Chinese face databases]

[*AI, Data, Surveillance, China*]

Could the influence of external stakeholders lead to **'digital colonialism'**, whereby the privacy and influence of individuals is co-opted by either powerful **states** or Silicon valley tech giants?

What does Chinese involvement mean for the future of the African state, could it encourage its own model of authoritarianism by providing the necessary **tech**?

Will **Ethiopia** move away from this framework with a new leader, and how will the population respond and society change - will forms of 'atomisation' be visible?

[*e-government*]

Is this a feasible and more likely model of future African service delivery, which improves and strengthens centralised state organisation?

Will tech foundation create difficulties between **states** and the **private sector** actors who have created these services? (as has happened in **Kenya**)

[*digital activism*]

Is this realistically a powerful force capable of disrupting the dominance of centralised state regimes?

Does/will the internet in Africa represent a space of government **monopoly** and control or individual, dispersed **power** in state terms?

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Key countries: **Zimbabwe, Ethiopia, [Kenya]**

## 4. Possible partner groups

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### *African Centre for Technology Studies*

<https://www.acts-net.org/>

Founded by **Calestous Juma**, a prominent writer about the developmental impact of technology in Africa. Books include *Innovation and its Enemies* (2016) & *The New Harvest: Agricultural Innovation in Africa* (2011)

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### *Centre for Frugal Innovation in Africa*

<https://www.cfia.nl/home>

New research centre based upon this form of low-cost high-tech innovation on the continent - focusing on projects within the water-energy-food nexus and sectors like health and ICT. Bringing together 3 universities based in the **Netherlands**.

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### *African Institution of Technology*

<http://www.afrit.org/>

An institution founded (in 2018) with the goal of ‘supporting technology diffusion in Africa’, based in **Nigeria**. A particular goal of setting up/partnering with educational institutions.

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### *UCT Centre in ICT for Development*

<http://ict4d.cs.uct.ac.za/>

Based at the University of Cape Town (and recommended in KCL feedback as a useful partner), a field of research and practice that “aims to harness information and communication technologies (ICTs) to achieve economic, social and political goals in low-resource or low-income regions.”

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### *Development Reimagined*

<https://developmentreimagined.com/>

A team of international consultants (with Kenyan-UK-China backgrounds) based in Beijing with an interest in African start-ups and development; they work with governments, businesses and development organisations.

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### *GSMA Mobile for Development*

<https://www.gsma.com/mobilefordevelopment/>

GSMA (representing the interests of MNOs worldwide) have a specific team for 'development': "brings together tech innovators, the development community and governments, to prove the power of mobile in emerging markets". Relevant focus on mAgri, mHealth, mobile money, development utilities.

They have their own 'innovation funds' which support start-ups/projects that foster mobile technology innovation - could ask if they would be interested in supporting our research outputs in the area.