SHARING & REUSE

CONFERENCE

OPEN.SHARE.LINK.

Open Access, Open Data, Open Knowledge, Open Code: World Bank perspective

STELA MOCAN

Lead, Technology & Innovation Lab
World Bank Group
Chief Information Office
Information and Technology Solutions

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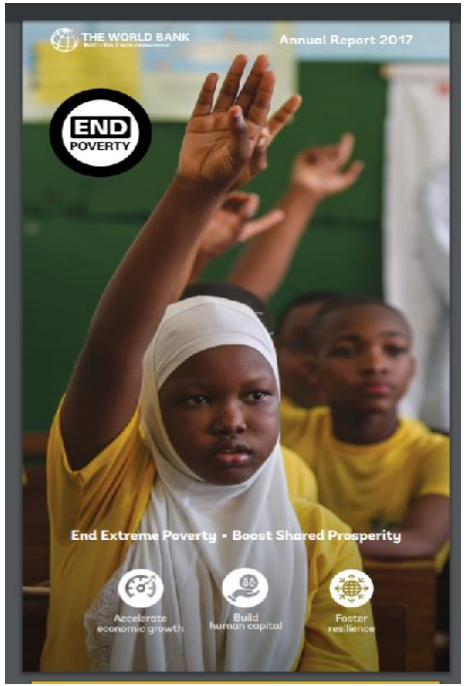
#SRCONF19

Overview

1. Open Access, Open Data, Open Knowledge, Open Code: World Bank Group Journey …

2. Is Open Code re-setting the Development Paradigm?

3. Open Development for the Global Public Good.



Photography credit: Sarah Farhat/World Bank

DATA – Enabled Development

- Mobile, Cloud, Big Data, Digital Connectivity and Emerging Technologies are accelerating Digital Transformation and Global Development.
- **Data** has become a key asset in Digital and Economic Development.
- Multi-lateral Organizations need to actively participate and shape new knowledge flows to adapt and accelerate Inclusive Development

DATA REVOLUTION

=

GroundTruth

(Data + Domain Expertise)

×

BIG DATA

×

CLOUD

×

open source™

Algorithms

Opening Access to WB Data & Knowledge

THE WORLD BANK Policy on Access to Information

1995

Recommended focus on commercial to recover costs

2000s

eBooks; WB databases (statistical); WB eLibrary database (knowledge); Licenses to use Bank content (print/electronic); Free: WDR Online

2010

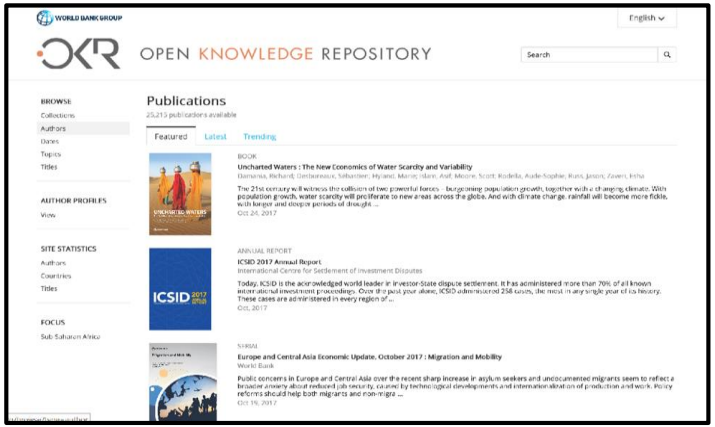
Access to Information Policy
Open Data;
Consultations Begin

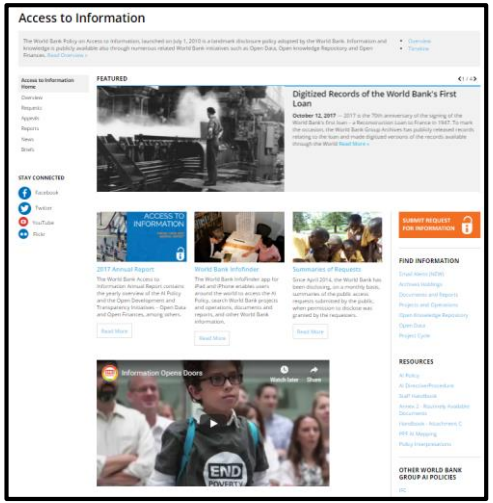
2010s

Print to digital / Institutional focus on "public good"

2012

Open Access Policy; Launch of Open Knowledge Repository (OKR) using DSpace





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WBG Archives Holdings www.worldbank.org/archives

Records related to World Bank Group member countries dating from 1946 to the present. The holdings include lending project files, country files, economic and sector work records, policy files, oral history interviews, films, videos, photographs, and much more.

499 million pages of paper records from 1946.

Over 315 oral history interviews.

Over 1000 linear ft. photographic material.

Over 100 linear ft. film reels.

Over 30 linear ft. audio & video tapes.

295,000 formal Bank reports and serialized publications available on-line.

Stacked, the boxes would reach 7 times as high as Mt. Everest.
…and growing!

Open Data at the World Bank Group

Open about what we do

Open about what we know

Open to new engagement

Supporting others to be open

data.worldbank.org
data@worldbank.org
@worldbankdata

11 June 2019, Bucharest Romania

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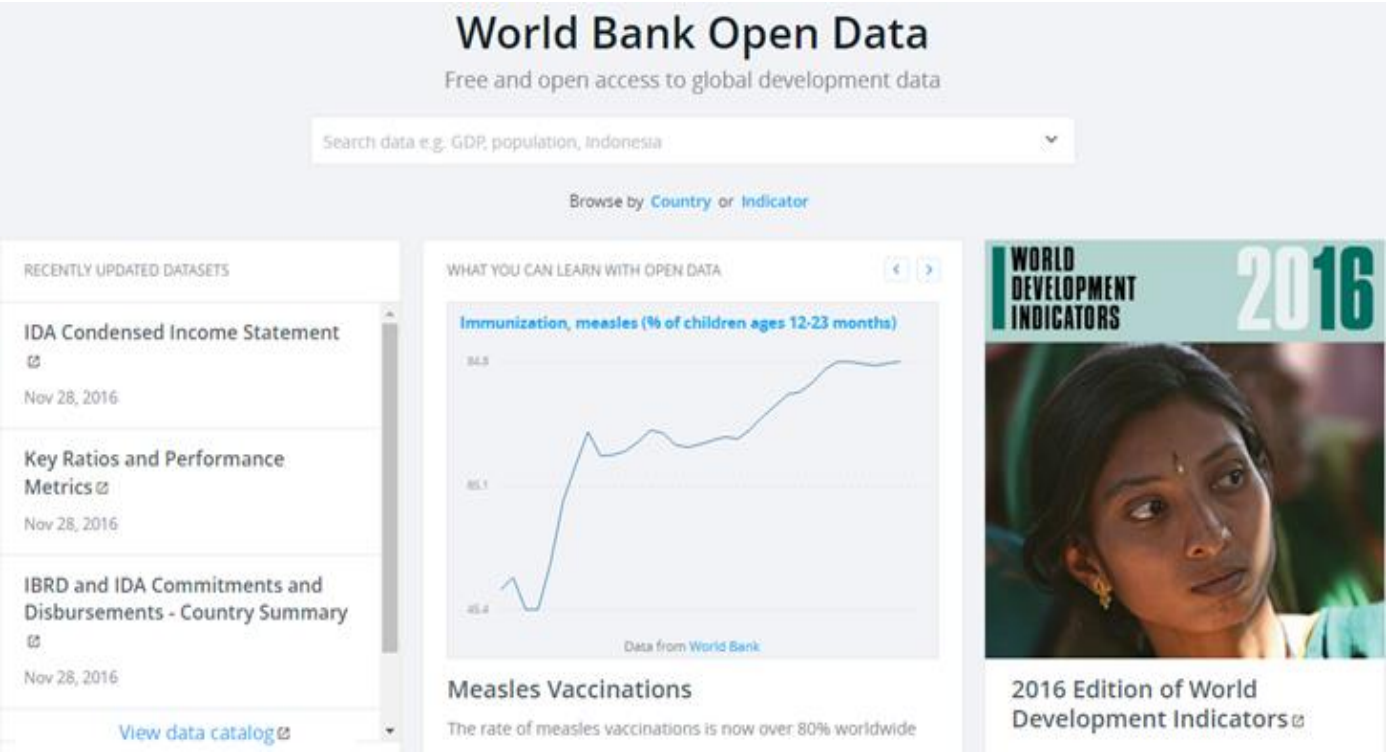
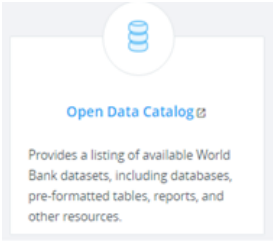
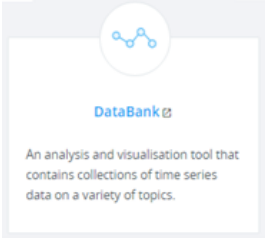
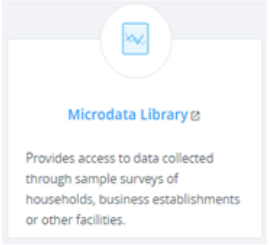
Open about what we know - data.worldbank.org

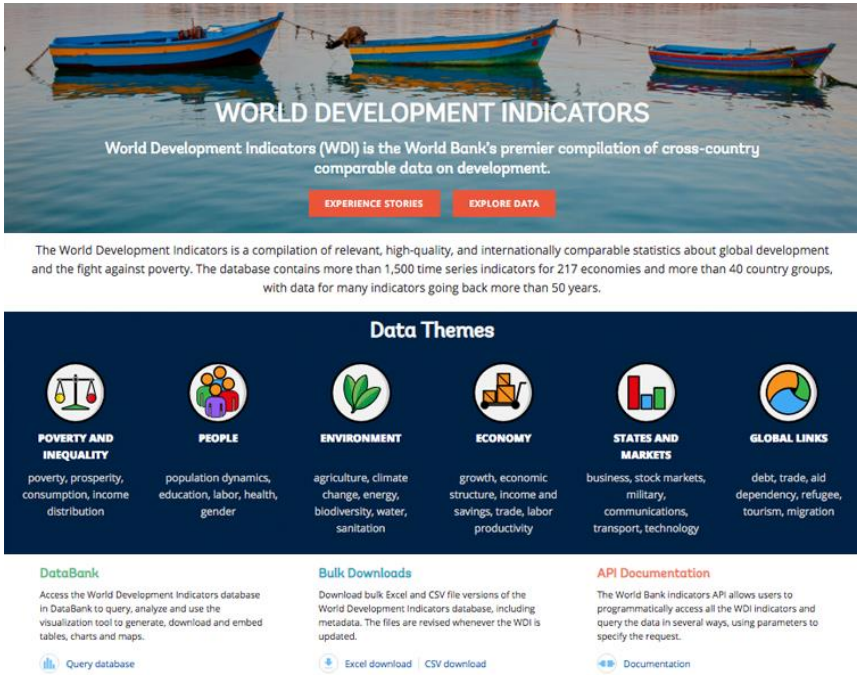








WDI is primary source for data.worldbank.org



2018: World Development Indicators website launched

World Bank supporting others to be open

Country support for Open Data since 2012:

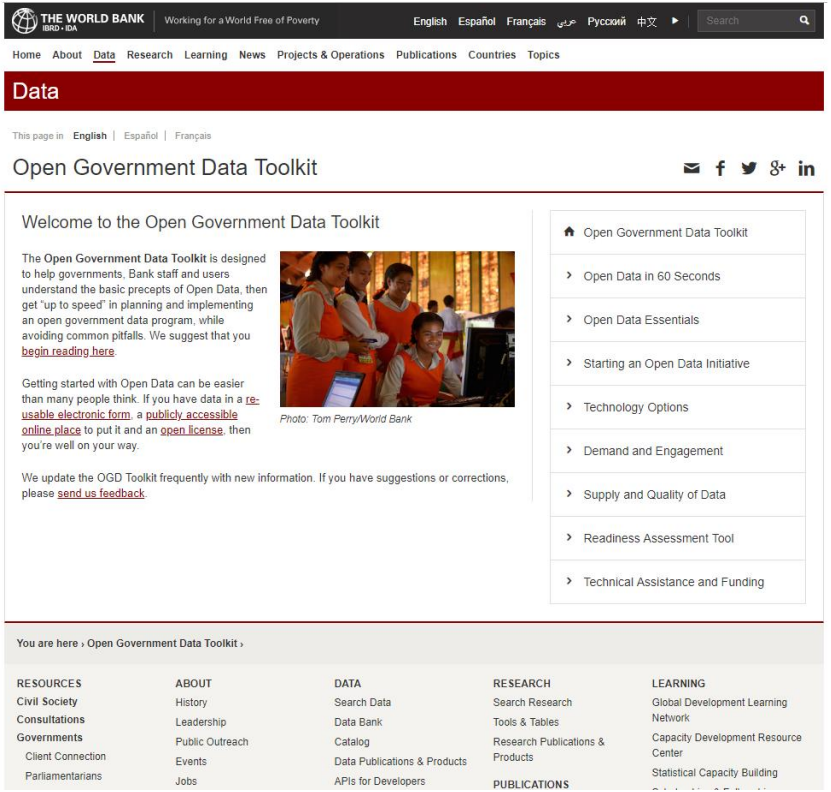
- Open data country programs launched, World Bank Support for Open Data, WB projects portal
- Open Data Readiness Assessments (ODRAs) through the Open Data Readiness Assessment methodology, and the Open Data Toolkit resources across regions.
- Championing the Open Contracting Data Standard; the International Open Data Charter.
- .

WB-supported analysis on the impact of open data:

- Annual Report of the Open Data for Development ("OD4D).
- The State of Open Data delivered under the World Bank-supported Open Data for Development ("OD4D") initiative (run by IDRC).
- "From Theory to Practice: Open Government Data, Accountability, and Service Delivery", 2019, WB Governance Global Practice.

Global Forum on Open Data:

- The World Bank is a co-organizer of the International Open Data Conference, the next conference is scheduled for June 2020 (Nairobi, Kenya).



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Open Code Enabling Innovation and Digital Development

Why Open Source Software Matters?

- OSS has Democratized Technology Development and Access.
- Democratization enables access to the global pool of creativity, knowledge and talent: Opportunities to be a Co-Creator of Code, a User, a Practitioner and solve real problems, have increased Exponentially.
- OSS enables the development of higher quality software through collaboration.
- The costs of Software Development have decreased . OSS is freely available to use and re-use, however, new challenges, like the cost of implementation & maintenance, do persist.

96% of IT applications in the world use open source software

An average of 56% code in the codebase is from open source

Why do we care?

- Open Code can enable open collaboration and inclusive development ecosystems.
- Government play a critical role in enabling Digital Development, leading by example, and driving government digital transformation. An effective strategy and approach towards Open Source can help governments deliver effectively and build future-proof digital infrastructures and service-delivery platforms.
- People, communities, organizations, governments have tremendous opportunities to learn faster from each other, co-create together from a global pool of talent and digital skills, speed-up the development process through open innovation.

World Bank's Approach to OSS

Build Knowledge, Understand the Challenges, Formulate the Strategy

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World Bank endorsed **Principles of Digital Development**
May 2016

digitalprinciples.org

Nine "living" guidelines designed to help digital development practitioners integrate established best practices into technology-enabled programs.

Principle 6: Use Open Standards, Open Data, Open Source and Open Innovation.

An Open approach to Digital Development can help to increase collaboration in the digital development community and avoid duplicating work that has already been done.

- Define and communicate what being open means for the specific digital development initiative.
- Adopt and expand on existing open standards; Use existing open platforms.
- Invest in software as a public good.
- Develop new software code to be open source, which anyone can view, copy, modify and share, and distribute the code in public repositories.
- Enable innovation by sharing freely, collaborating widely and co-creating tools when it makes sense.

World Bank's Approach to OSS

Build Knowledge, Understand the Challenges, Formulate the Strategy

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WBG staff as co – creators of Open Source Code	WBG joined the GitHub in January 2014 with a Reproducible Research Pilot, initiative by the Development Economics and Chief Economist Group (former GOKMU unit). github.com/worldbank
WBG Open Source Software Working Group	Drive the adoption of Open Source Software at the WBG, by facilitating the development of community-led and industry-supported open source frameworks, defining key policies and procedures and fostering better collaboration and knowledge sharing.
World Bank Group Archives Memberships in OSS Communities	IGO Working Group on Open Access/Open Licensing DuraSpace Community overseeing the development of DSpace OS Repository COAR (Confederation of Open Access Repositories)

Use of Open Source (OSS) @ the World Bank Group

WORLD BANK GROUP
Information and Technology Solutions

OSS use in Data Center

Web Services
Application servers
Operating systems

Linux

Tomcat

We use OSS web & social tools to collaborate

Blogs
Content Management

Drupal

We use OSS tools & methods to develop software

Tools &
Libraries

.NET foundation

Visual Studio Code

Angular

node JS

We use OSS on our desktop

Browsers

Google Chrome

Development Economics and Chief Economist (DEC)

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP
Development Economics • Data

World Bank Group

END POVERTY

Joined GitHub 20 Jan 2014

worldbank

"Reproducible Research Pilot. Does not represent official World Bank Group positions, policies, recommendations, etc. Initiated by GOKMU unit.

Repo types

Pushed to repos	Main languages	Total issues	Total forks	Total stars	Followers	Following
32	7	171	207	458	0	0

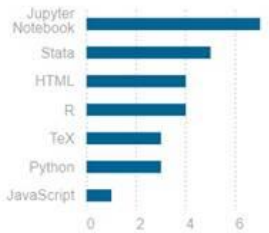
Summary

World Bank Group has 34 repositories on GitHub, the latest 34 with user activity were loaded from GitHub's web service for this evaluation. World Bank Group has pushed to **32** of these repositories. This is a high ratio congratulations!

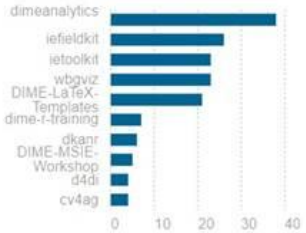
7 different main languages were identified across all repos pushed to. The main language is the one with the largest amount of code in a given repository, as identified by GitHub's linguist. Assuming a basic level of proficiency in all these languages World Bank Group can be considered hyperpolyglot in the world of computer languages. **Jupyter Notebook** occurs most frequently – 7 times – as the main repo language.

Rankings

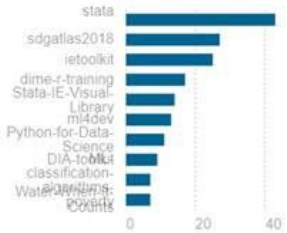
Languages



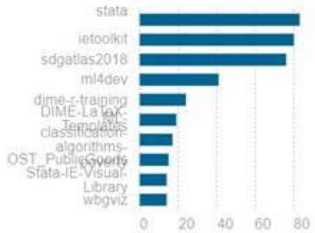
Issues



Forks



Stars



github.com/worldbank

World Bank Open Code Contribution via github.com/worldbank

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- Development Impact Evaluation (Dime)
- Ietoolkit – Open Code for Impact Eval

- These commands or codes are developed by people that work at or with the Development Impact Evaluations (DIME) unit at the World Bank.
- The commands are developed with best practices for impact evaluations in mind.
- Opening up Standardized Code for impact evaluations practiced by DIME at World Bank

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- **South Asia Region Team for Statistical Development**
- **Micro Database – Open Code on Open Data**

- Analysis of household surveys from South Asian countries allows to compare social and economic statistics among the eight countries in the region.
- All the text files, codes, underlying data, and Tableau dashboards can be found in its GitHub repository
- Understanding poverty through open data and code

- **Geospatial Operations Support Team**
- **GOST Public Goods**

- Urbanization Toolbox: aggregation of a number of tools developed for and by the World Bank Group for classifying, quantifying and creating urban analytics.
- Open code to work on geospatial data to carry out development operations in the most cost-efficient and effective manner

WBG Open Source Working Group

Drive the adoption of Open Source Software at the WBG, by facilitating the development of community-led and industry-supported open source frameworks, defining key policies and procedures and fostering better collaboration and knowledge sharing.

Legal

WBG relevant key policies and procedures on the use of Open Source Software

Training & Awareness

Rich learning environment and training program around Open Source Software.

Open Source Program Office

Structure around the business and technical governance.

Knowledge Sharing

Diverse stakeholders across WBG, technology partners and solution providers

WBG Open Source Working Group

Code developed by WBG in collaboration with technology partners

(e.g. AI for Famine)

WBG-developed datasets with embedded code

(e.g. datasets published by DEC)

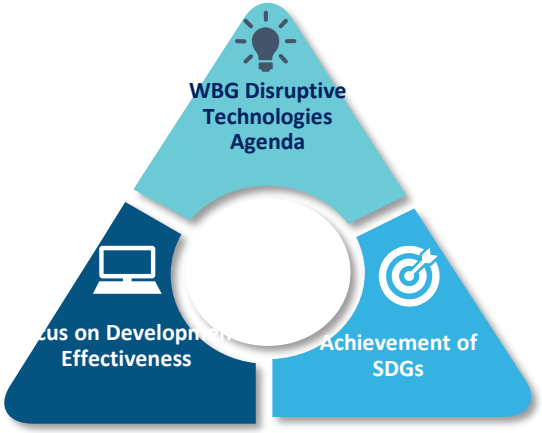
Code developed for a specific WBG project that can be reused for other projects

(e.g. West Bank Gaza, Trash Collection System)

Code developed by 3rd party where WBG is involved, copyright held by 3rd party

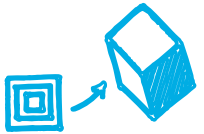
(e.g. Modular Open Source Identity Platform - MOSIP)

WBG Emerging Technologies (DTs) Agenda

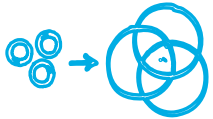


Build: Develop the foundational building blocks for sustainable, technology-led economies

Boost: Expand the capacity of people and institutions to thrive in a resilient society in the face of disruption



Broker: Harness disruptive technology, data, and expertise to solve development challenges and manage risks



WBG Emerging Technologies Agenda

To support its vision and stay competitive in the market, the WBG is pushing a unified Disruptive Technologies agenda.

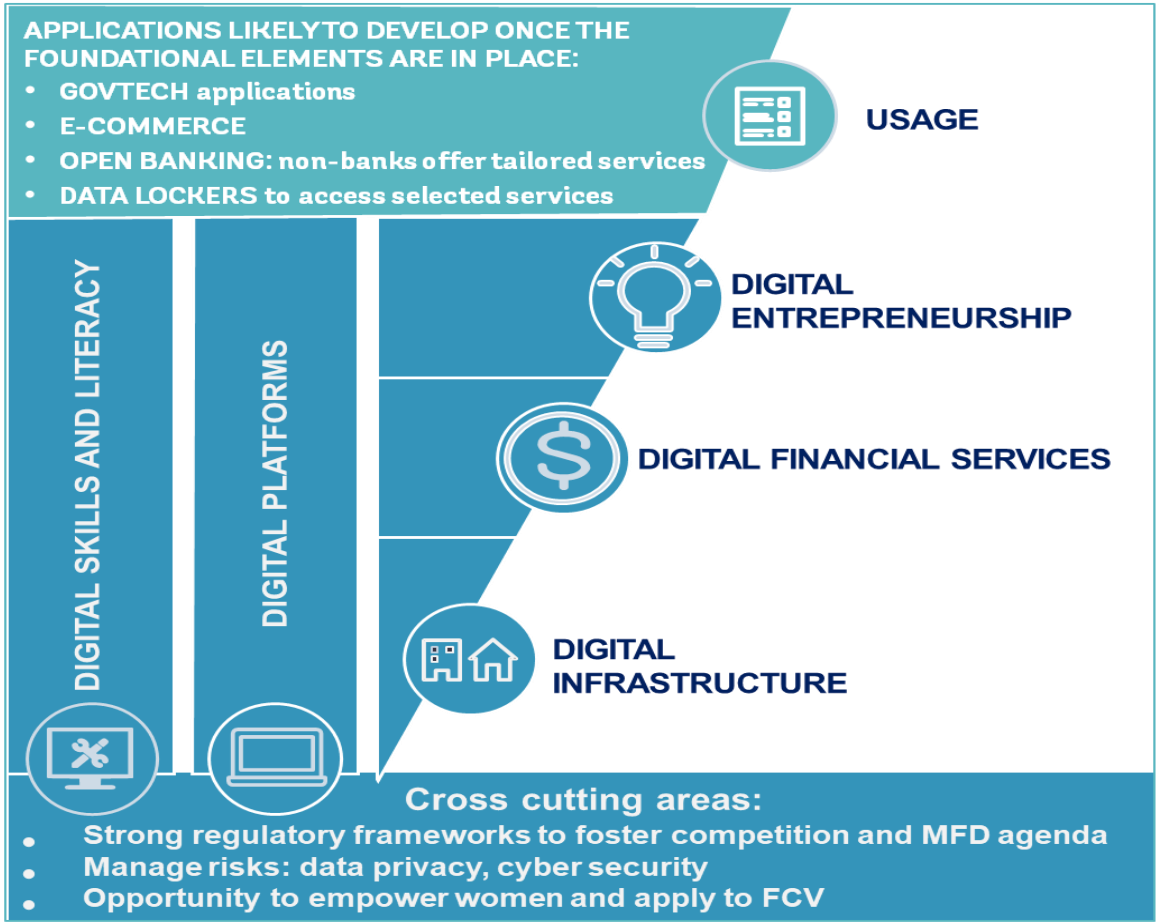
Focus on Technology Effectiveness

Now more than ever, technology can address and solve development challenges and problems more effectively.

Achievement of SDGs

Look at emerging technologies to accelerate progress towards Sustainable Development Goals' achievement while managing risks.

Digital Economy for Africa (DE4A) Framework



DE4A Moonshot:

Every African individual, business and government is Digitally Enabled* by 2030

DIGITAL INFRASTRUCTURE

Universal Internet network coverage

Affordable Internet for All at less than 2% of GNI per capita

Interim Milestone
Doubling broadband connectivity by 2021

DIGITAL SKILLS

All 15 year old students with basic 'digital skills' competencies

100,000 graduates in advanced digital skills programs annually

DIGITAL PLATFORMS

Doubling of Online Services Index rating for all Governments

All individuals are able to prove their identity digitally

At least 50% of the population regularly uses the Internet to access Government or Commercial services

DIGITAL FINANCIAL SERVICES

Universal Access to Digital Financial Services

Africa-wide payments infrastructure/platform in place

DIGITAL ENTREPRENEURSHIP

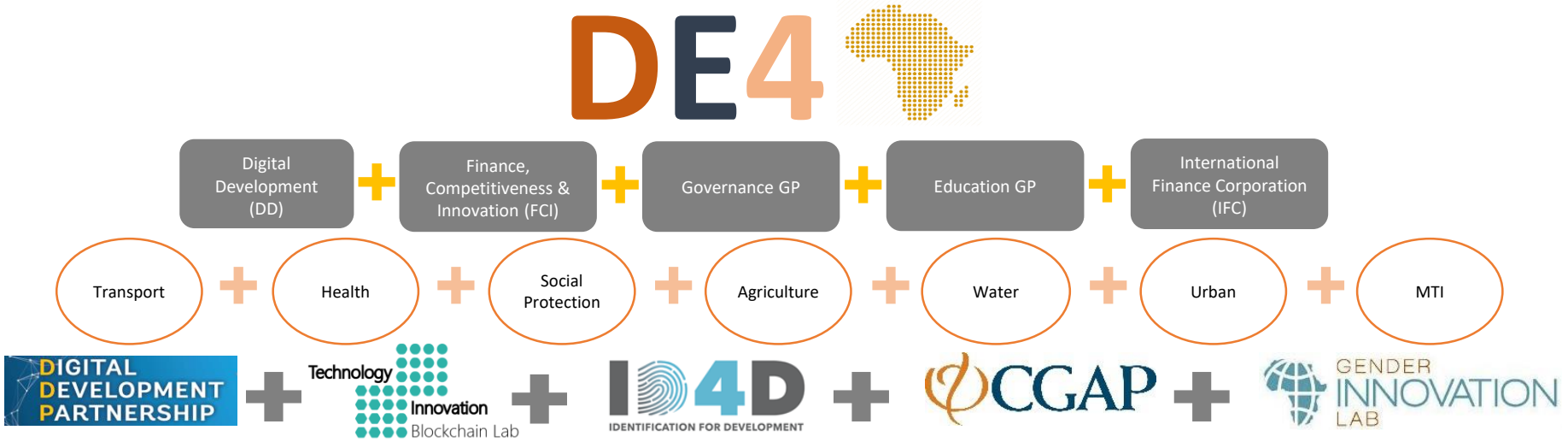
Tripling the number of new digitally-enabled businesses created annually

Financing for Venture Capital to reach .25% of GDP

Increase the percentage of businesses that have access to internet / use internet to connect to customers or suppliers

* Being "Digitally Enabled" implies having digitally-enabled access to services, markets, opportunities.
The WBG's Digital Adoption Index may be a relevant indicator for measuring this, complemented by the headline measures above for the 5 foundations

All Hands on Deck: A Cross-Sector, WBG-wide Approach Needed to Support the Digital Economy Moonshot



The advance towards a Digital Economy in the context of Africa's large infrastructure, technology, and policy gaps require a new set of cross-boundary support mechanisms for building digital economies in a coordinated manner, rather than implementing multiple, fragmented interventions found in more traditional approaches. For Africa to experience major positive transformation, there needs to be a more holistic approach to innovation and technology adoption.

GovTech
Putting people first

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GovTech aims to enable simple, transparent and efficient government.

Three Focal Areas of GovTech:

- Designing human-centered services that are simple, transparent, and universally accessible.
- Engaging citizens to increase participation, foster transparency and accountability and build trust.
- Transforming core operations to bring government into the 21st century.

GovTech
Putting people first

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4 Windows of Engagement

Analytical Work and Thought Leadership
Research and case studies on policies, implementation and impacts of GovTech

Global Public Goods and Convening Global access to tools, knowledge and solutions

Country and Regional Engagement
Interventions: diagnostics, operationalizing emerging tech, capacity building

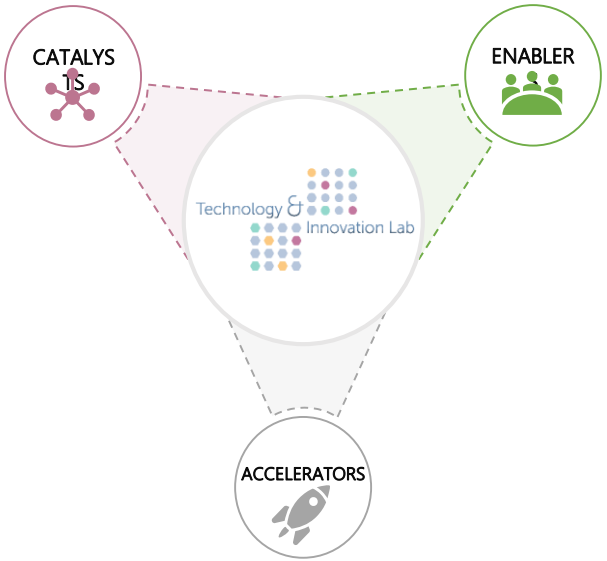
Program Management
Coordination, reporting, monitoring and evaluation, outreach and knowledge sharing

WBG Technology & Innovation Unit/Lab's Mandate

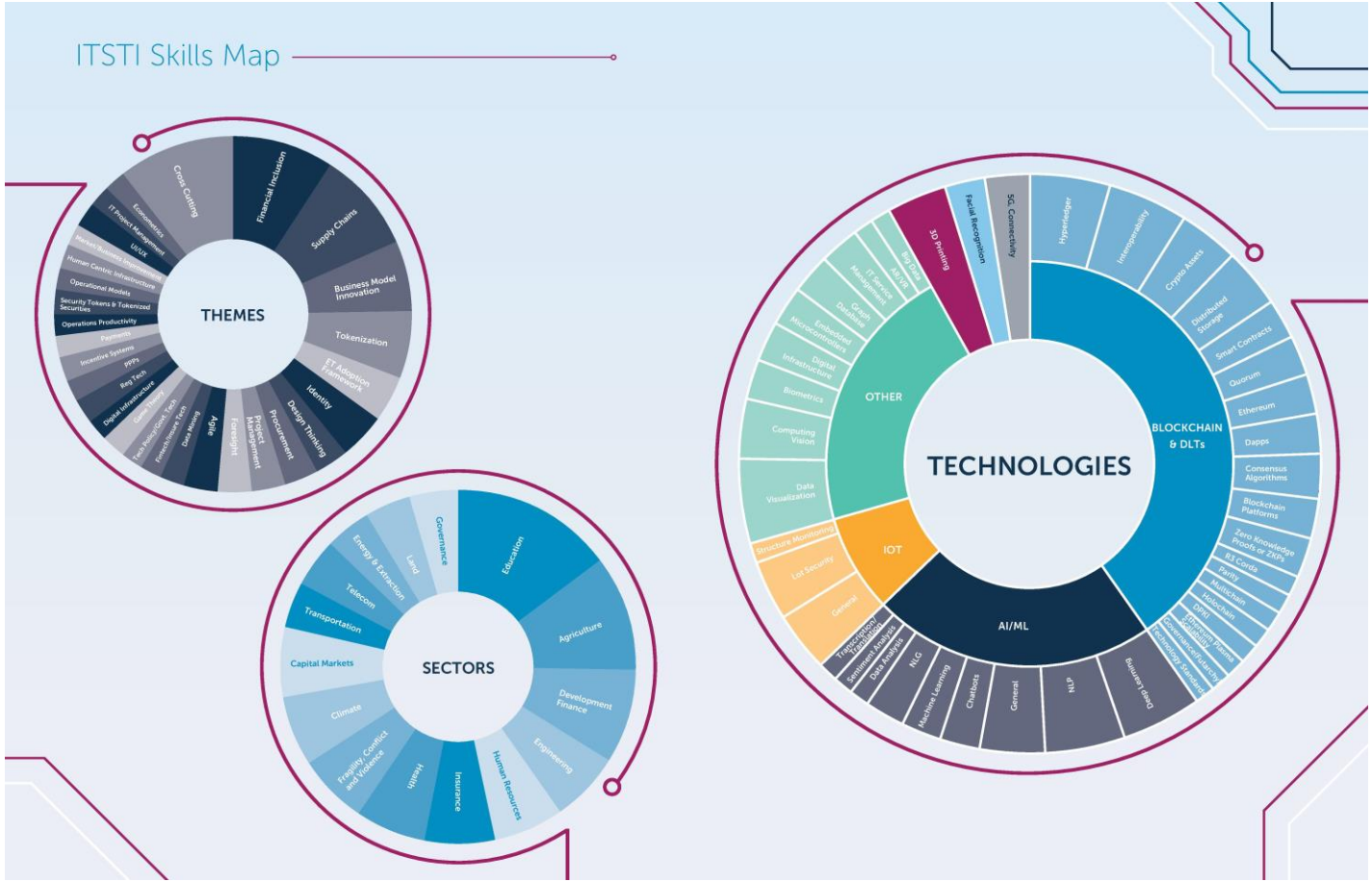
Learning Platform. Exploration Space. Technology Advice on Emerging Technologies.

We **EXPLORE**, **TEST**, **UNDERSTAND** and **CREATE INTERNAL KNOW-HOW** about new technology capabilities that will enable the WBG to be **FUTURE READY** and **competitive in the digital age.**

- We conduct rapid **proof of values** and **prototyping** test new capabilities and expedite learning of emerging technologies.
- We provide **technology advice, hands-on experience** and **learning by doing**, and a lab environment for the WBG stakeholders to test the potential of emerging technologies.
- We serve as an **internal technology advisor** and **knowledge hub** around emerging technologies to the WBG community.



WBG Technology & Innovation Unit/Lab's Mandate



Open Development through Emerging Tech for the Global Public Good

Technology & Innovation Lab

Open Source is crucial for building trust, safety and resiliency in decentralized Blockchain network development

- Code that builds decentralized network need to be itself decentralized
- Proprietary foundational protocol codebase will defeat the purpose of blockchains
- Open standards are also critical for blockchain development to ensure interoperability & smooth adoption
- Blockchain technology could provide much needed funding sustainability to open source software through novel ways
- Legal and regulatory challenges on where the liability remain on open source code usage

Open data, Open Source could help in democratize AI & ML but also pose challenges to ethical AI use

- World Bank initiatives on Open Data could foster development of algorithms to address development challenges
- Private sector controls lot of user data which could be leveraged through initiatives like Open Algorithms (OPAL)
- Concerns over ethical use of open source AI & ML projects exist as there is no control on how code could be used
- Open source code in this context could help address the black box problem and the biases of algorithmic models through higher availability of data and scrutiny

Open and Collaborative Development for the Global Public Good

- OSS development has proven that openness and collaboration can produce commercially sound and high quality software.

→ Economics of software development is being reset: economic patterns of OSS development and the future of the “off-the-shelf” economic models?

- The collaborative nature of OSS development has enabled organizations’ innovation and restructuring, helping transform infrastructures, platforms and service delivery to meet data-driven demands.

→ How can we ensure the sustainability of our digital infrastructure, which changes frequently and requires frequent maintenance? and manage effectively the direct and indirect costs?

- Rapid adoption of OSS across organizations provides a network-effect reliability in resilience, scalability, affordability, adaptability.

Can OSS help us operate and stay relevant and competitive in a time of constrained budgets and fast-changing technologies?

→ How can we leverage safely, securely and efficiently the benefits of the Networks’ Effects of the global OSS Community to support Digital Transformation of governments, economies and society?

What is the right balance between OSS and proprietary software in providing value and enabling viable business models?

Open and Collaborative Development for the Global Public Good

- Agility and Innovation are critical in the Age of Exponential Growth.

  OSS development is User- Driven innovation.

  → OSS moves at the speed of Digital innovation and enables us to leverage OSS platforms to innovate: explore, experiment with emerging technologies.

  Agility and Speed become easier to achieve.

- Individual solutions have become FAST global solutions, deriving from the Open Source Community Knowledge, Skills and Speed of Innovation.

  → Investment in human capital/talent to leverage OSS become critical!

- Are we moving towards a more Decentralized Future?

  → OSS is already fuelling the growth and scaling of emerging technologies, like Blockchain, AI/ML, IoT, etc. How are we getting ready for the Decentralized Future?

  What is the future of IP rights in the Open Source-driven decentralized innovation?

Open and Collaborative Development for the Global Public Good

- Design, deployment, operation and upgrade of the digital Infrastructure and platforms powered by OSS.

- Put in place effective support strategies through collaboration with stakeholders across sectors.

- **To understand how to protect our future, first we need to understand software itself.**

  We have to bring in and grow tech talent with OSS mindset, culture and skills. Open our knowledge repositories and work closely with OSS software communities to improve standards, security and code.

- **We have to keep recognizing opportunities, not just risks. OSS operating systems and languages are the great equalizer and powering the next generation of programmers all over the world.**

  How do we tap into the global OSS community of creativity to fuel, embrace and scale innovation, help empower more people to become digitally skilled, build code to solve societal and community challenges, but also build a legacy of support and sustainability for inclusive development?

Technology & Innovation Lab

Thank you!

technologyinnovation@worldbankgroup.org