Global Economic Modelling Study (GEMS)

An introduction to the GEMS methodology used to quantify the economic impact of digital transformation

GEMS OBJECTIVE:
Collaborative Economic Model & Strategic Enabler for Connectivity

1. CORE PURPOSE:
Address Deployment Challenges (Economic & Financial)



Deployment in Rural & Remote Areas



Economic & Financial Assessment



Econometric Modeling & Economic Impact Measurement

2. STRATEGIC ENABLER & PLATFORM
(Whole-of-Government)



"Diplomatic Instrument" for Negotiation (MDBs, Ministries)

Advocacy Platform for Collaborative Digital Investment

Help Private Sector Access to Capital

Whole-of-Government Strategic Platform & Coordination

Stimulate Awareness in Other Government Agencies

3. KEY FEATURES & TAILORED OUTPUTS
(Contextual & Modular)



Tailored to Country & Regional Context (Urban, Suburban, Rural)



Estimate Investment Requirements & Private/Social Returns



Test Impact of Regulatory & Funding Mechanisms



Conceptually Structured Around Four Modules

GEMS integrates economic assessment and econometric modeling to guide investment and regulatory practices, tackling the connectivity challenge through structured engagement.

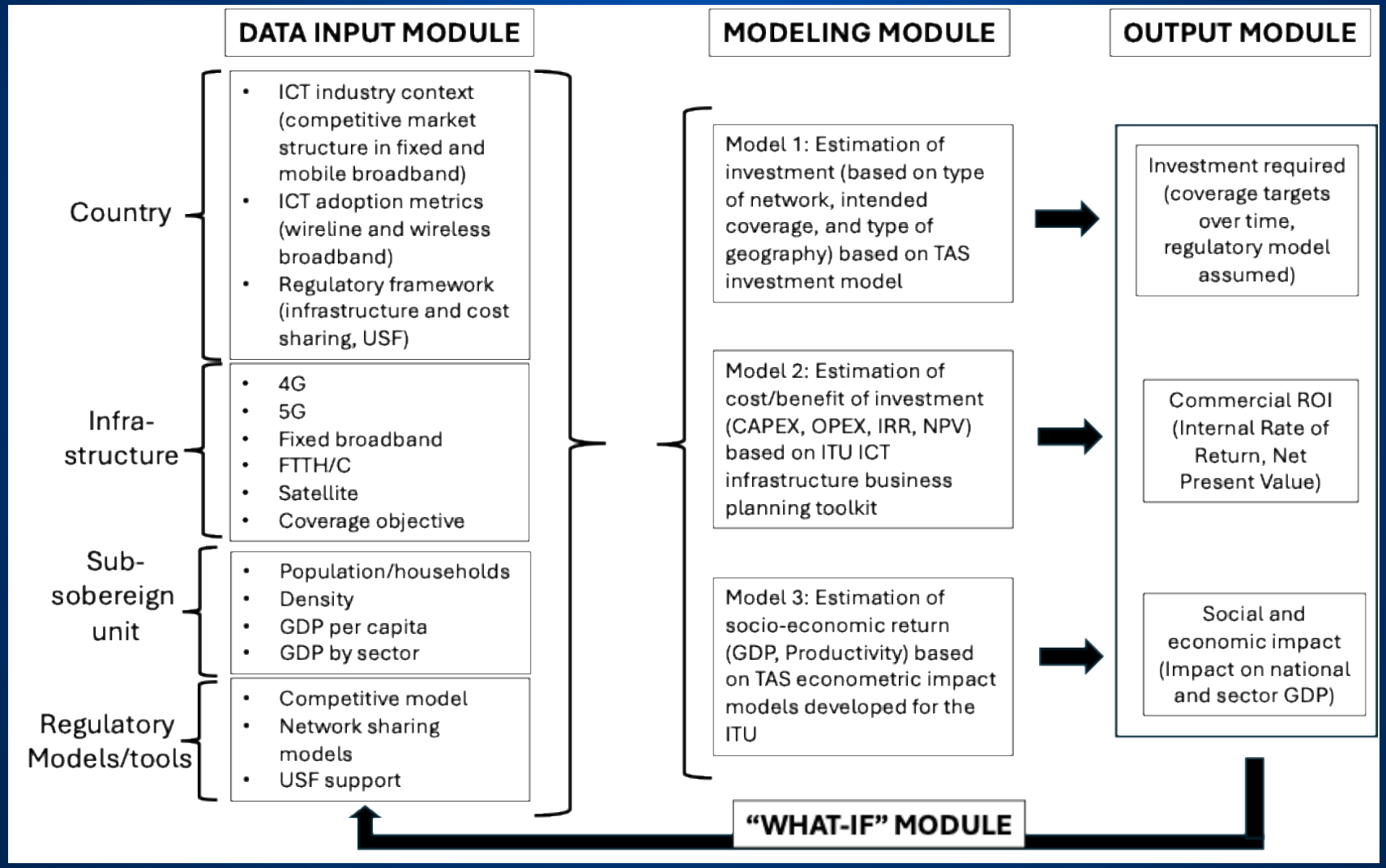
THE GEMS STUDY HAS TO BE SUPPORTED BY AN ECONOMIC MODELLING TOOL CAPABLE OF ANALYZING INVESTMENT IN NETWORK INFRASTRUCTURE AT A REGIONAL, NATIONAL OR LOCAL LEVEL

PROJECT REQUIREMENTS

- Guide policymakers, regulators and the private sector on investment decisions, and in the application of regulatory practices
- The tool estimates investment requirements, potential returns on such investment, stipulating business opportunities and models
- The output is tailored to the context and capabilities of each country and region
- Finally, the tool leverages the use of models and resources already developed for the ITU

THE GEMS TOOL IS CONCEPTUALLY STRUCTURED AS FOLLOWS

CONCEPTUAL STRUCTURE OF GEMS TOOL



THE OBJETIVE OF THE GEMS TOOL IS TO ASSESS NETWORK DEPLOYMENT INVESTMENT REQUIREMENTS, EXPLORE IMPACT OF REGULATORY PRACTICES, AND QUANTIFY THEIR ECONOMIC IMPACT

GEMS TOOL

- Simulation can be done for 4G, 5G, FTTH, and satellite individually or jointly
- Coverage and period target must be set, and the amount required for investment will be calculated
- This will trigger a chain of effects through lower prices, higher speeds, increased penetration, and GDP spillovers (national and sectoral)
- Simulation outcomes will include sectors of the economy and social (GDP) returns of the investment

IN THE FIRST INPUT TAB, THE USER ENTERS ALL THE INFORMATION OF THE COUNTRY TO BE ANALYZED

Current sectoral data for base year

Fixed Broadband (FBB) indicators	
FBB Capex per capita ($/year)	$ 3.32
BAF coverage (% households)	4.29%
FTTH coverage (% households)	3.87%
FBB speed (Mbps)	50.42
FBB price ($/month)	$ 7.28
FBB adoption (% households)	3.63%
Revenue from fixed services ($ million/year)	$ 34.20

Target	Years
61%	8

Overall Telecom sector	
Share of investment for current maintenance	0%
ITU - Regulatory Tracker Regulatory Regime pillar	17

Mobile Broadband (MBB) indicators		Target	Years
Mobile Broadband Capex per capita ($/year)	$ 6.52		
4G coverage (% population)	99.29%	99%	5
5G coverage (% population)	13.57%	61%	5
MBB speed (Mbps)	21.20		
MBB price ($/month)	$ 2.18		
MBB adoption (unique subscribers % population)	33.59%		
Revenue from mobile services ($ million/year)	$ 1,249.56		
4G - 5G overlapping investment	0%		

Satellite broadband indicators	
Existing LEO users	100000
Price of LEO broadband service ($/month)	$ 46.34
Price of LEO hardware kit ($)	$ 204.00

Telecom sector data

Main socioeconomic indicators

GDP ($ billion)	$ 88.33
Total population	35,605,523
Households	9,890,423
Discount rate	1%

Sectoral structure of the economy

Sector	GDP share	GDP ($ billion)
Administrative and Support	1%	$ 0.51
Construction	5%	$ 4.36
IT	3%	$ 2.57
Manufacturing	11%	$ 9.53
Transportation and Storage	6%	$ 5.30
Wholesale and Retail Trade	22%	$ 19.68
Financial and Insurance	4%	$ 3.14
Professional, Scientific and Technical services	1%	$ 0.51
Health	2%	$ 1.54
Other sectors	47%	$ 41.20

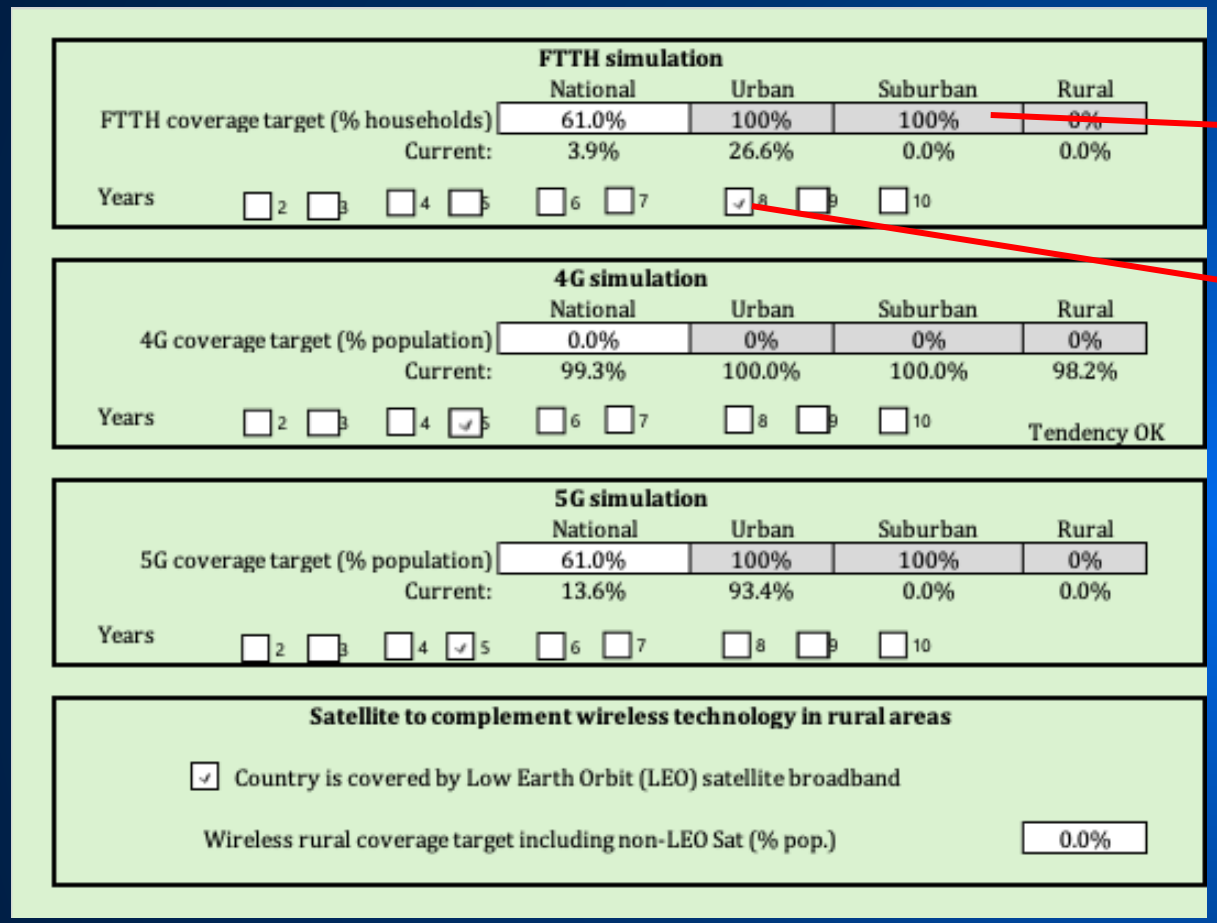
Indicators by sub-national regions

Urban areas	Population density (persons/km2)	4,935
	Share of population living in this region (%)	15%
Suburban areas	Population density (persons/km2)	230
	Share of population living in this region (%)	47%
Rural areas	Population density (persons/km2)	90
	Share of population living in this region (%)	39%

National data

Assumptions (can be changed)

IN THE SECOND INPUT TAB, THE USER ENTERS ALL THE DATA REGARDING NETWORK DEPLOYMENT OBJECTIVES



FTTH simulation

	National	Urban	Suburban	Rural
FTTH coverage target (% households)	61.0%	100%	100%	0%
Current:	3.9%	26.6%	0.0%	0.0%

Years: ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☑8 ☐9 ☐10

4G simulation

	National	Urban	Suburban	Rural
4G coverage target (% population)	0.0%	0%	0%	0%
Current:	99.3%	100.0%	100.0%	98.2%

Years: ☐2 ☐3 ☐4 ☑5 ☐6 ☐7 ☐8 ☐9 ☐10 Tendency OK

5G simulation

	National	Urban	Suburban	Rural
5G coverage target (% population)	61.0%	100%	100%	0%
Current:	13.6%	93.4%	0.0%	0.0%

Years: ☐2 ☐3 ☐4 ☑5 ☐6 ☐7 ☐8 ☐9 ☐10

Satellite to complement wireless technology in rural areas

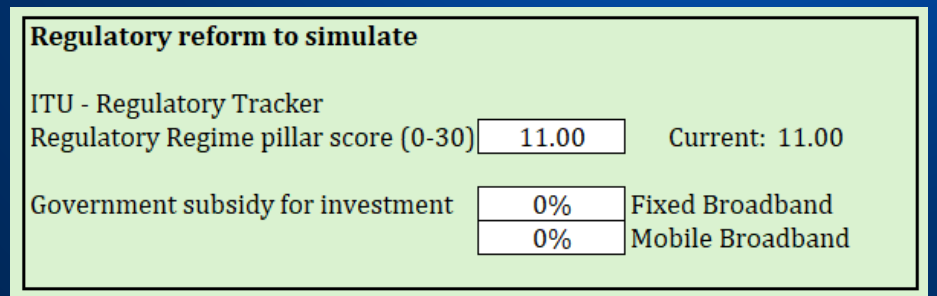
☑ Country is covered by Low Earth Orbit (LEO) satellite broadband

Wireless rural coverage target including non-LEO Sat (% pop.) 0.0%

For each technology, fill the level of national coverage to simulate (subnational groups will be adjusted automatically)

For each technology, fill the years to reach the target (from 2 to 10)

If you do not want to make simulation of a certain technology, just leave the white cell empty (or put a zero)



Regulatory reform to simulate

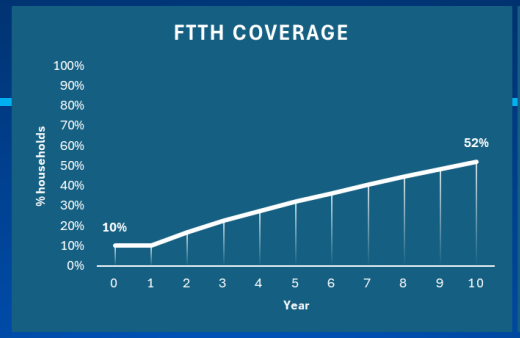
ITU - Regulatory Tracker
Regulatory Regime pillar score (0-30) 11.00 Current: 11.00

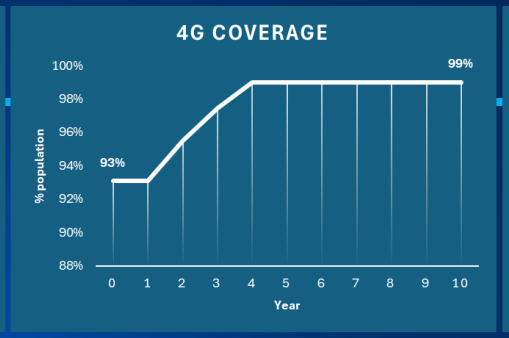
Government subsidy for investment 0% Fixed Broadband
0% Mobile Broadband

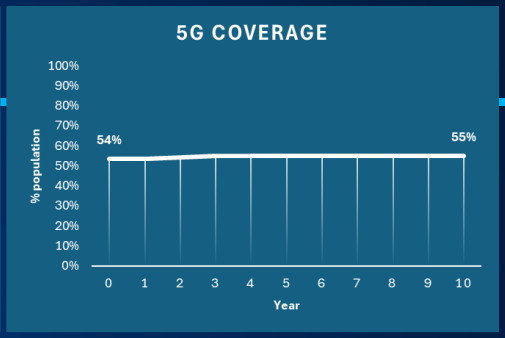
Potential regulatory reform to simulate & government subsidies → Improved regulation saves costs!

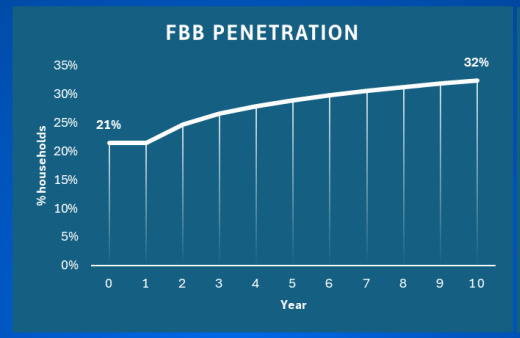
FIRST OUTPUT: NETWORK DEPLOYMENT OUTCOMES

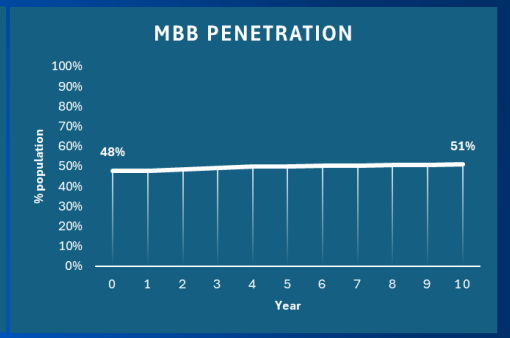
- Outcomes presented for a period of 10 years
- Outcomes for both fixed and mobile technologies

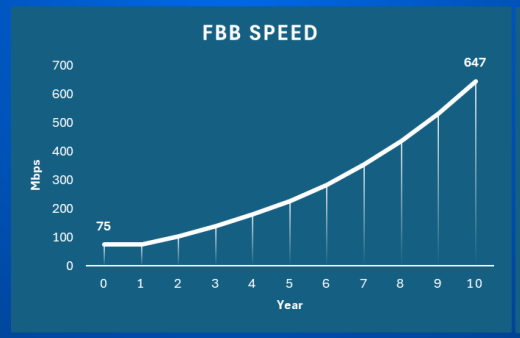


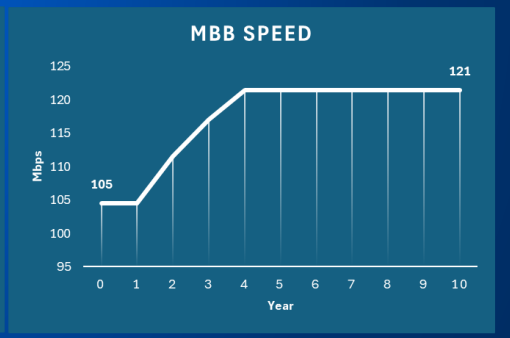
















SECOND OUTPUT: OUTCOME FOR THE TELECOM OPERATOR

Wired investment needed	$1,386,442,874
Wired investment induced by reg. reform	$30,250,140
Wired investment covered by government	$0
Wired investment covered by other sectors fee	$210,116,382
Wired revenues generated	$850,394,726
Net result for operator	-$295,681,626
ROI for operator (%)	-21.33%
4G+5G investment needed	$1,227,746,045
Satellite investment needed	$0
Total wireless investment needed	$1,227,746,045
Wireless investment induced by reg. reform	$29,155,964
Wireless investment covered by government	$368,323,813
Wireless investment covered by other sectors f	$186,065,767
Wireless revenues generated	$745,375,287
Net result for operator	$101,174,787
ROI for operator (%)	8.24%
Wired investment for maintenance	$0
Wireless investment for maintenance	$0

- Results are grouped for wired / wireless technologies.
- Maintenance of legacy infrastructure is omitted from investment requirements
- Investment induced by regulatory reforms is also omitted, as it comes from cost-savings reform

THIRD OUTPUT: RESULTS BY ECONOMIC SECTOR

Impact on IT sector	
IT sector investment needed	$ 2,614,188,918
Cost savings due to reg. reform	$ 59,406,104
Investment covered by government	$ 368,323,813
Investment covered by other sectors fee	$ 396,182,149
IT sector revenues	$ 1,595,770,013
Net result for operator	-$ 194,506,839
ROI for operator (%)	-7.44%
IT sector spillovers	$ 660,013,457
Net result IT sector (inc. spillovers)	$ 465,506,618
Net result IT sector (% of investment)	17.81%
Net result IT sector (% of cummulated sector GDP)	1.82%
Investment for maintenance	$ 0

Impact over the rest of the economy	Impact	% of cumm. GDP Impact	After fee
Administrative and Support	$ 108,993,125	2.18%	2.13%
Construction	$ 93,401,809	0.24%	0.19%
Manufacturing	$ 916,073,498	1.05%	1.00%
Transportation and Storage	$ 185,797,901	0.40%	0.35%
Wholesale and Retail Trade	$ 2,359,665,290	1.29%	1.24%
Financial and Insurance	$ 376,784,795	1.29%	1.24%
Professional, Scientific and Technical services	$ 61,269,941	1.29%	1.24%
Health	$ 184,542,336	1.29%	1.24%
IT	$ 660,013,457	2.58%	
Other sectors	$ 4,940,901,694	1.29%	1.24%
Total	$ 9,887,443,846	1.21%	
Total spillovers	$ 9,794,042,037	1.20%	

Overall results for the Telecom operator (includes investment, revenue and spillovers)

Impact on the rest of the economy

FOURTH OUTPUT: NATIONAL LEVEL RESULTS

Investment needed	$2,614,188,918
Cost savings due to reg. reform	$59,406,104
Investment for maintenance	$0
Cost for the government	$405,618,104
Cost for other sectors	$396,182,149
Total economic impact	$11,483,213,859
Total economic impact (% GDP)	1.40%
Net result	$9,334,049,149
Net result (% investment)	357.05%
Net result (% of cummulated GDP)	1.14%

Social results

An investment may not be worth for the telecom operator, but it is surely good for the society as a whole!