



IBSG Innovations Brown Bag: Broadband Dynamic Value Assessment Models and Program

"You can see the computer age everywhere but in the productivity statistics." Robert Solow (1987)

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What is Broadband Dynamic Value Assessment (BDVA) ?

BDVA is an engagement type that facilitates discussion with developing country public sector officials about how to create broadband implementation programs that will maximize the economic and social benefits of broadband investments.

- **Situation** – Developing countries need a framework with which to justify national investments in broadband and public policies that promote greater ICT investment.
- **Complication** – Empirically, this is an impossible task to perform with any degree of empirical credibility.
- **Implication** – Many conversations and simplifying assumptions are necessary with country officials to measure these benefits. And then, the best outcome is the development of a public-sector oriented broadband implementation strategy rather than the calculation of a specific numerical benefit.
- **Position** – Cisco can propose broadband (and ICT) investment programs based on comparisons with peer countries and can use the BDVA models as problem-framing tools.
- **Benefits** – The result of a BDVA engagement will be the development of broadband implementation strategies that will generate the greatest amount of economic growth.

Source: Cisco IBSG Emerging Markets and Economics & Research Practice, 2009

What is a Broadband Dynamic Value Assessment (BDVA) Engagement?

Concept

- **Demonstrate the value of broadband, specifically for major sectors of the economy and public life**
- **Assist in prioritizing types of broadband enablement projects**
- **Demonstrate impact of various SP operating models and how regulatory intervention can increase broadband affordability**

Process

- Expert workshops to validate assumptions, methodology and populate with customer specific data
- Senior government workshop to share results and discuss implications
- Discussions of SP operating model and impact on country

Expected outcome

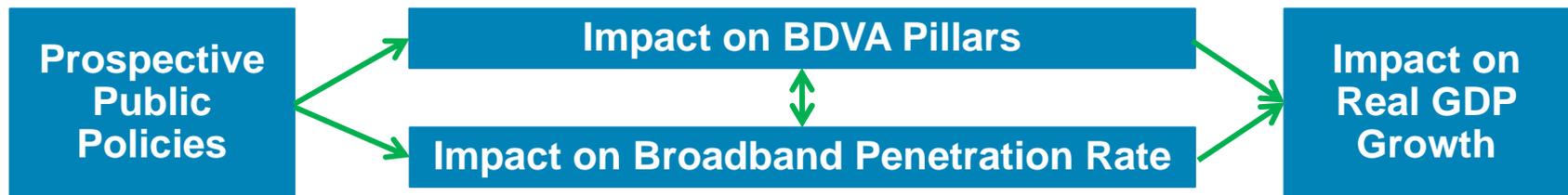
- Strong government commitment to support broadband projects
- Clear view of relative importance and prioritization of sectors
- Solid understanding of tradeoffs involved in various SP operating models

Requirements

- Good relationship at central government level (e.g., mayor)
- Local resources to assist in data collection and metric validation
- Central resources to support key workshops
- BDVA “toolkit” including BDVA model and workshop scripts

The BDVA engagement and modeling approach measure the economic impact of broadband-related public policy programs.

A BDVA engagement links public policy proposals to improvements in “pillars” and the broadband penetration rate, which are, in turn, linked to GDP growth.



Our case study: Ministry of Communications of Brazil Broadband Expansion Plan



CUSTOMER CxO SPONSORS

- Hélio Costa, Minister of Communications
- Roberto Pinto Martins, Secretary of Telecommunications

CUSTOMER BACKGROUND

Ministry of Communications (MC) of Brazil is responsible for defining policies and launching government programs to foster the development of Telecommunications in Brazil. The main priorities of Minister Helio Costa has been the development of digital TV and to promote social inclusion through access to broadband Internet for all citizens.

In a first engagement with the MC IBSG helped it to identify the main gaps and barriers for BB expansion. As a result of IBSG recommendations MC and the regulator Anatel conducted a huge negotiation with the ILECs. **That led to a new set of obligations which will make the incumbents to deploy new backhaul infrastructure in more than 3,000 municipalities and connect around 55,000 public schools, removing 2 major barriers to BB expansion.**

CUSTOMER CHALLENGES (situation, complication, question)

- **SITUATION:** Broadband penetration in Brazil is still pretty much concentrated in the classes A and B living in the main cities. Despite the outstanding results of the backhaul negotiation with the ILECs, there are no clear rules about how the backhaul should be implemented and explored. The barriers of entry for new small players to cover the market gap are still high.
- **COMPLICATION:** ILECs have a very dominant position in the market facing real competition only from the mail MSO – Net – in the top segments. Though concerned about finding a business model to offer BB for Class C in the main cities, ILECs will use as much as possible their economic, political and market power to prevent competition in their regions while not interested in exploring BB service in most small and medium cities.
- **QUESTION:** What is the proper set of initiatives the MC should launch to foster BB in a competitive and sustainable way?

IBSG ENGAGEMENT

- To provide MC with recommendations of policies, programs and regulatory actions to foster the BB expansion to all municipalities and segments of Brazilian society. In support to that to suggest a regulatory approach for the backhaul.

DELIVERABLES AND EXPECTED RESULTS

- **Deliverable:** study of alternatives and recommendations for a plan to stimulate the BB expansion in all country .
- **Result:** through the implementation of the plan, the dramatic increase of BB penetration in all regions of Brazil in 2/3 years.

What is Broadband Dynamic Value Assessment (BDVA) ?

- **BDVA engagements include two primary models:**
 - **MICROECONOMIC**: An SP model that identifies the ideal level and scope of interaction between a government and an SP, including an SP's operating, competitive, marketing and technical environments.
 - **MACROECONOMIC**: An Economic Model that identifies the best public policy strategies that generate the greatest amount of economic benefits.

Today's focus

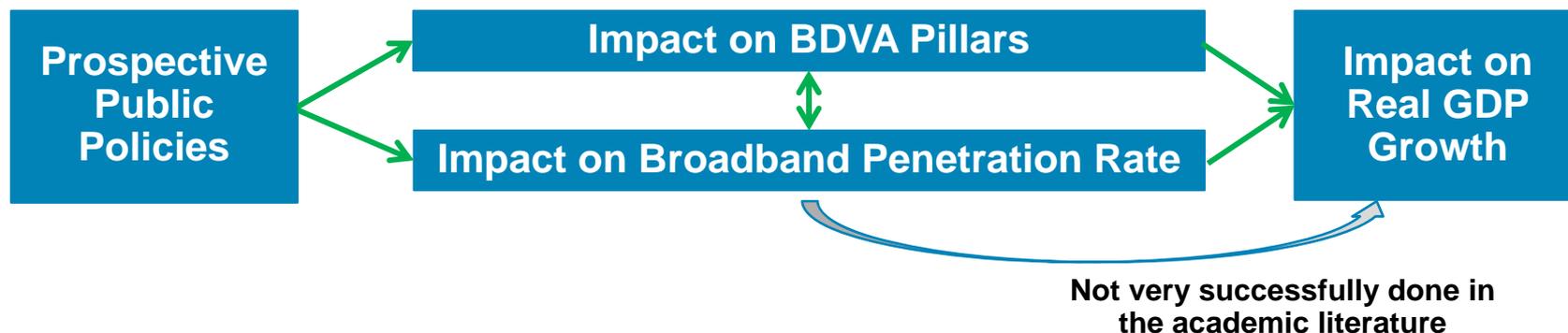
BDVA Country Coverage

Argentina	Egypt	Phillipines
Boliva	Hungary	Poland
Brazil	India	Romania
Chile	Indonesia	Russia
Columbia	Malaysia	South Africa
Croatia	Mexico	Thailand
Ecuador	Peru	Turkey

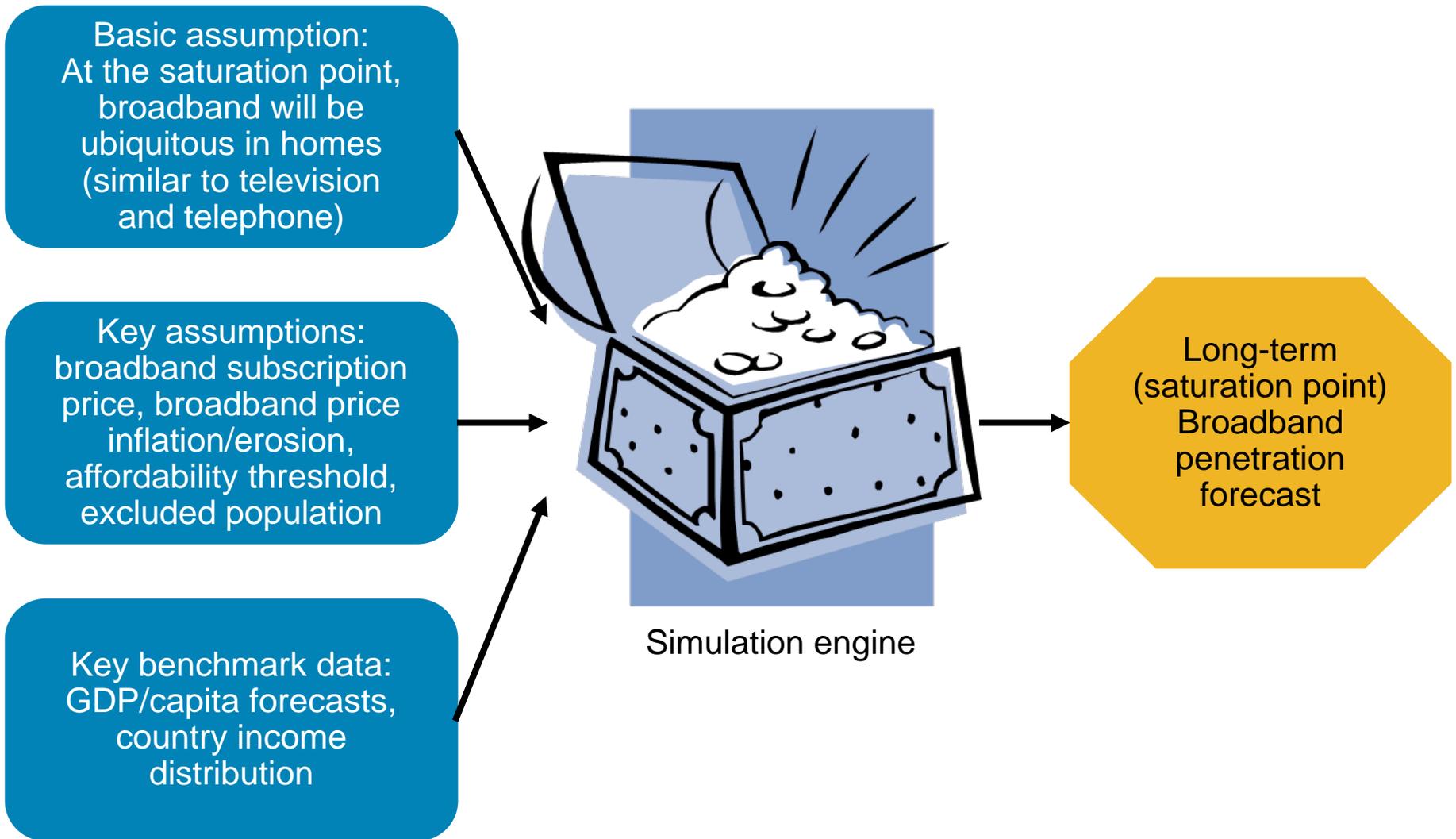
Source: Cisco IBSG Emerging Markets and Economics & Research Practice, 2009

How the BDVA (macroeconomic) model is and isn't special.

- Existing broadband benefit measurement models are either too narrow or too broad to meet the BDVA objectives.
 - TOO NARROW: Models may measure benefits of specific broadband applications, such as adding broadband connections in schools.
 - May not be able to specify all the possible applications and uses on an economy-wide basis.
 - May not take cognizance of network benefits whereby the benefits from one application are tied to the usage of other applications.
 - TOO BROAD: Models may attempt to link broadband penetration rates to changes in GDP growth.
 - Only sparse broadband data exist, mostly for households and consumers, and then only for a short period of time.
 - Benefits may accrue over long periods of time (5+ years).
 - Difficult to extract broadband value from collaboration benefits and other network and IT infrastructure developments.
- BDVA takes an middle ground by linking public policy proposals to improvements in “pillars” and the broadband penetration rate, and then linking both to GDP growth.



Long-term broadband penetration is forecast using a simulation engine based on “saturation point” logic



The measurement of benefits to specific sectors is based on 13 pillars representing 4 broad sectors. Here is an example from Brazil.

Sector	BDVA Pillar	Definition	Value-add argument	2008 Brazil example	2029 Brazil target
SMB	Time to start a business	Days	Proxy for streamlined business planning, licensing and capital access processes	152.0	6.0
SMB	SMB business environment index	< 100 = too lax; > 100 = too bureaucratic;	Measures risk of doing business with an unknown entity; and regulatory costs of staying in business	26.5	100.0
SMB	Clustering	1 = SMB clusters are rare; 7 = widespread in many fields	Proxy for extent of collaboration that takes place (ITC and non-ITC driven)	3.9	5.1
GOV	Laws relating to ITC	1 = virtually non-existent; 7 = well-developed and enforced	Privacy laws, intellectual property, SP competition, etc., are conducive to economic growth	4.2	5.2
GOV	Government prioritization of ITC	1 = not a priority 7 = strong priority	Proxy for the extent to which government technology policies encourage broadband penetration and usage.	3.9	4.9
GOV	Presence of ITC in government offices	1 = very rare; 7 = commonplace	Government usage of ITC applications promotes complementary private sector usage	4.5	5.3
EDU	Internet access in schools	1 = very limited; 7 = extensive	Proxy for quality of IT in schools and training of teachers to use it	4.2	4.8
EDU	Quality of math and science education	1 = lags other countries; 7 = among best in the world	Ability to utilize IT and IT-usage concepts effectively	2.8	4.6
EDU	University / Industry collaboration	1 = minimal to non-existent; 7 = intensive and ongoing	Proxy for degree of intra-country collaboration	3.7	5.2
ENV	Production process sophistication	1 = labor intensive methods; 7 = world class process technology	Proxy for assimilation of new technologies and culture of innovation	4.6	5.8
ENV	Buyer sophistication	1 = purchase decisions make solely on cost 7 = based on sophisticated analysis of performance attributes	Requirements of customers for improved TCO; Proxy for shift from manufacturing-based economy to services.	3.6	5.0
ENV	Ease of access to loans	1 = impossible; 7 = very easy	Proxy for efficiency and effectiveness of financial sector	3.2	4.2
ENV	Venture capital available for risky projects	1 = impossible; 7 = very easy	Proxy for information dissemination driving entrepreneurial goals	2.9	4.3

* All pillars are based on data drawn from the 2008-2009 World Economic Forum Global Competitive Report and/or from the World Bank's World Development Indicators (WDI) database.

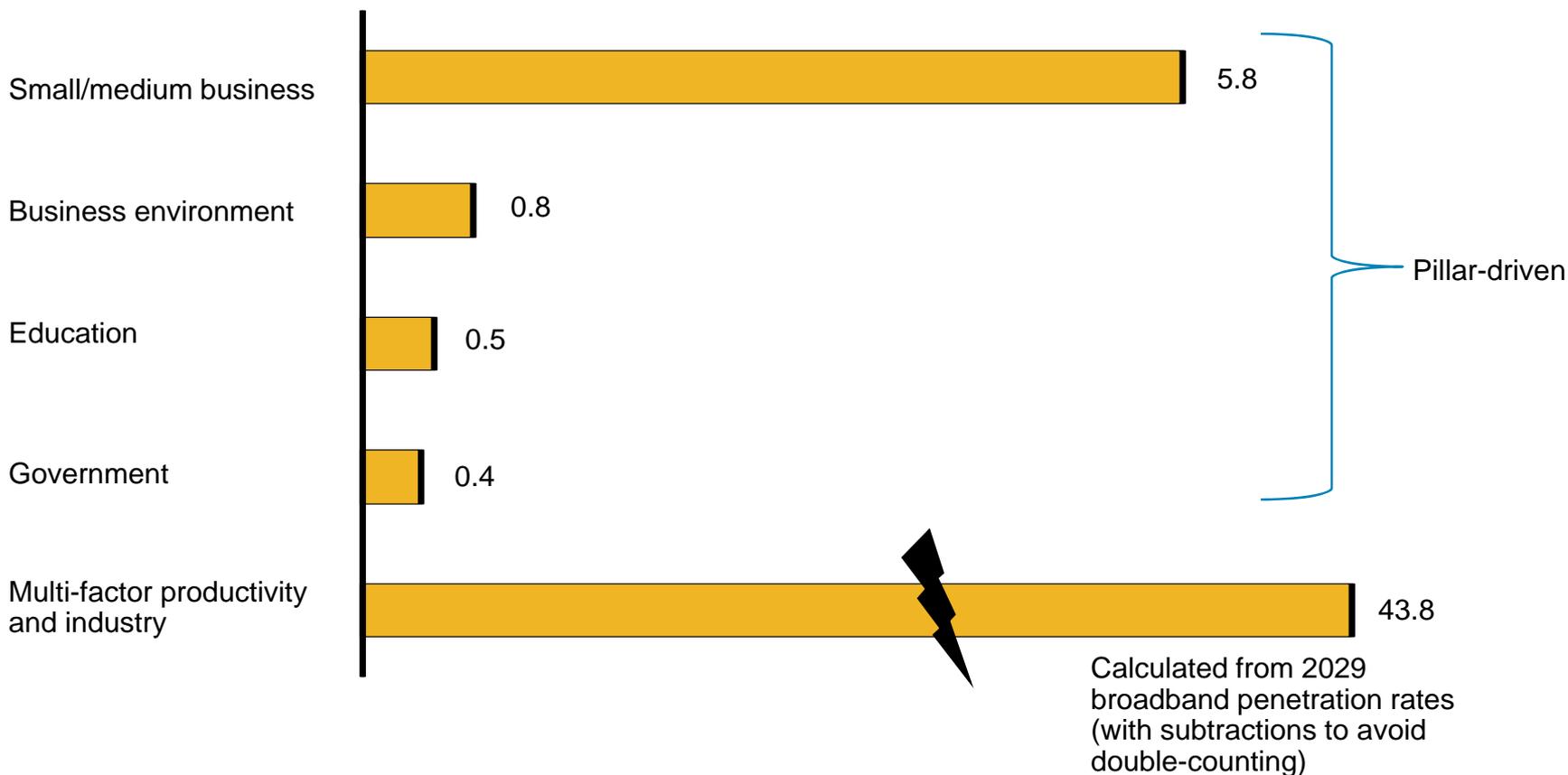
Source: Cisco IBSG Emerging Markets and Economics & Research Practice, 2009

Examples of broadband-led benefits from the pillars.

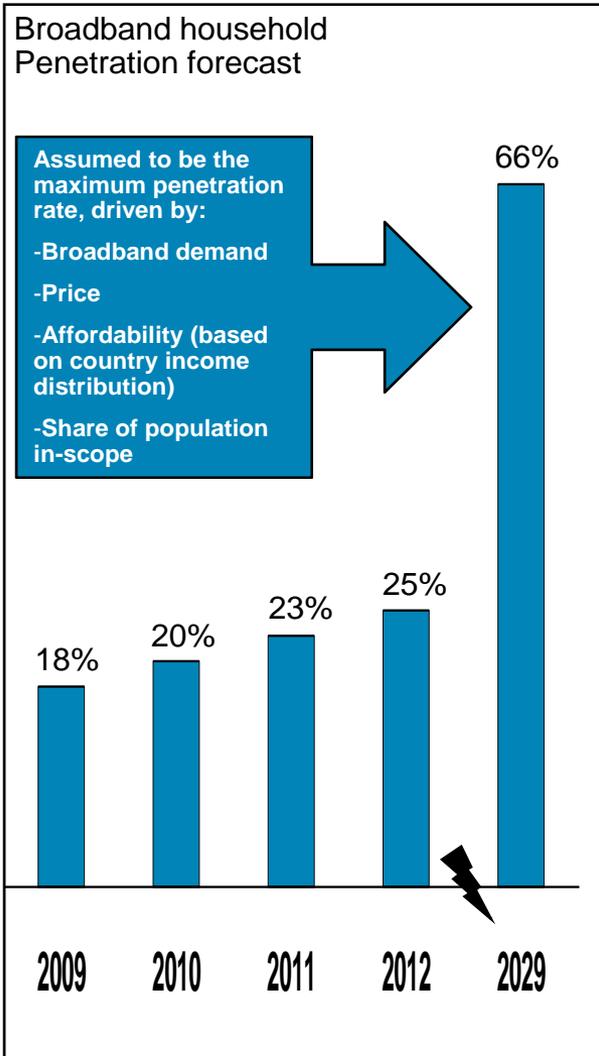
Sector	Anecdote
SMB	<ul style="list-style-type: none"> •“Creating electronic one-stop shops for businesses, shrinking regulatory delays, improving credit registries and introducing more flexible labor laws...” (CNN Money) •Registering transfers of property •Constructing and closing business deals. •Applying for and obtaining bank credit. •Shifting the industry-mix of start-ups from goods-producer firms (e.g., manufacturing, construction or agriculture) to services-producing firms (e.g., business services, household services, retail, etc.). •An online filing and payment system with advanced accounting software for calculating taxes due, saving individual businesses more than 500 hours a year in dealing with paperwork, on average. •An increased amount of legal and court resources to handle additional commercial cases and enforce contracts. •Additional shareholder rights, including mechanisms that hold a company’s board of directors liable where culpability for damages and profit issues are found. •Most growth from to small business can be attributed to a very small subset of companies called “gazelles” who grow substantially and are fostered by the development of clusters.
GOV	<ul style="list-style-type: none"> •International trade governance (intellectual property rights, taxes, tariffs) •Safeguarding personal privacy •Facilitate e-commerce (e-contracts, digital signatures, and e-payment systems). •Tendering public services, providing digital public services, collecting taxes or procuring goods and services online (OECD)
EDU	<ul style="list-style-type: none"> •Reduce costs of educational materials, and provide resources to poorer or more rural areas in place of other “hard copy” assets. •Create a culture of being able to look-up information on-line, and being able to discern fact from hearsay. •Promote better training of teachers and provides them with access to a wider array of educational materials. •Better integration of the schools with the surrounding community. •Reduce dropout rates and can reduce illiteracy rates if extended to adult education programs. •Teach English to students who might find it a competitive advantage to achieve further education or career opportunities. •Generate academic-led innovation, leading to new products and services.

SMB and cross-sector collaboration should be major foci in Brazil's broadband services development program

Forecast real GDP contribution (units: indexed 2008 GDP = 100, 2009-2029 incremental benefit)

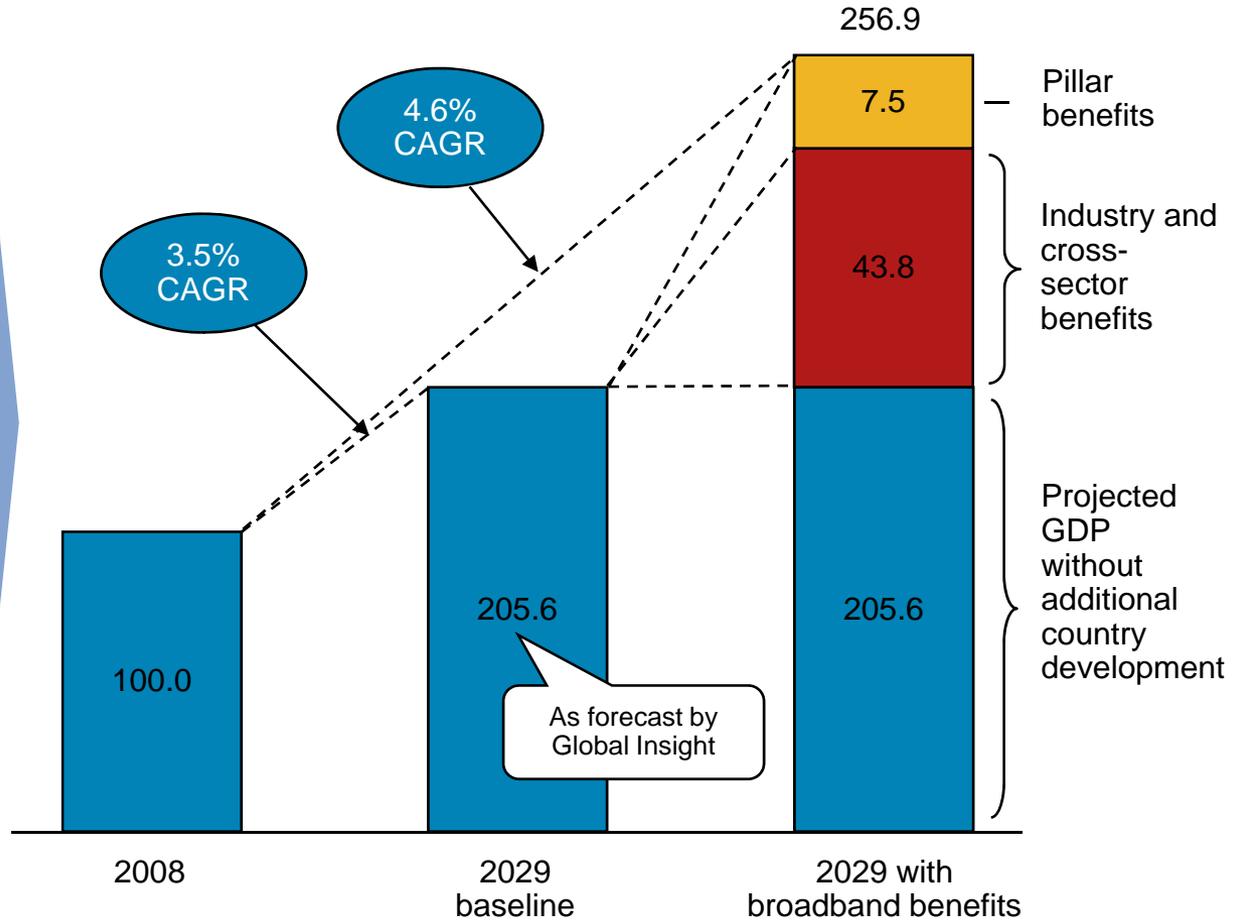


Brazil example: Long-term real GDP growth rate can increase from 3.5% to 4.6% with support from broadband development programs



GDP, real (indexed 2008 GDP = 100)

NOT DRAWN TO SCALE



Economic forecast health warnings

- **The linkage between broadband penetration and GDP or productivity growth has not been well-measured and will certainly vary as current economic conditions vary.**
- **Changes from a “baseline” are even more dangerous since the baseline may implicitly include some degree of broadband penetration already.**
- **The model results are intended to facilitate a discussion about implementing national broadband strategies rather the coming up with “the number”.**
- **Household penetration rates are used as proxies to measure the extent of corporate broadband usage.**
- **Economic gains emanating from the pillars and the pillar-sectors may include benefits from tangentially related activities (i.e., larger companies may benefit from programs aimed at SMBs).**
- **Improvements in broadband may destroy rather than create new jobs in the short-run, depending on if the adopting industries create new intellectual property or re-use existing IP.**

Sensitivity analyses on long-term broadband penetration rate:

Broadband demand and pervasiveness impact national benefits the most.

Long-run (2029) broadband penetration rate driver	Baseline assumption: <i>66% household penetration rate in 2029</i>	Possible scenario	Impacts of assumption change
Broadband demand	Broadband households will pay up to 5% of income for service (if this is sufficient to cover the price of service).	Change threshold to 2%	Reduces 2029 baseline penetration from 66% to 51%.
Pervasiveness	10% of population who can afford broadband will never purchase it (elderly, infirm, etc.), and an additional 9% will be located in regions that are too rural to ever be served. (Effective availability rate = 81%.)	An additional 10% of households may be located in areas that are too rural to serve. (Effective availability rate = 71%.)	Has 1-1 impact on baseline penetration rate, reducing rate from 66% to 56%.
Price	\$18 / month in 2009, 1.5% per annum increase through 2029.	Increase annual price growth to 3% per annum.	Reduces 2029 baseline penetration from 66% to 63%.

Variables that impact long run penetration rate, not explicitly shown in the model:

- GDP growth, inflation
- Population growth, household formation
- Distribution of income

