ITU Regional Training Workshop on "Spectrum Management: Strategic Planning and Policies for Wireless Innovation"

Policy and Planning – Methods and Techniques – Spectrum Master Plans and Band Planning

Place: Algiers

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Session Topics

- Why is Planning Important – the case for Broadband
- Report ITU-R SM.2015 Long Term Spectrum Planning
- Introduction to Master Planning
- Country Examples
- ACMA Spectrum Planning Framework

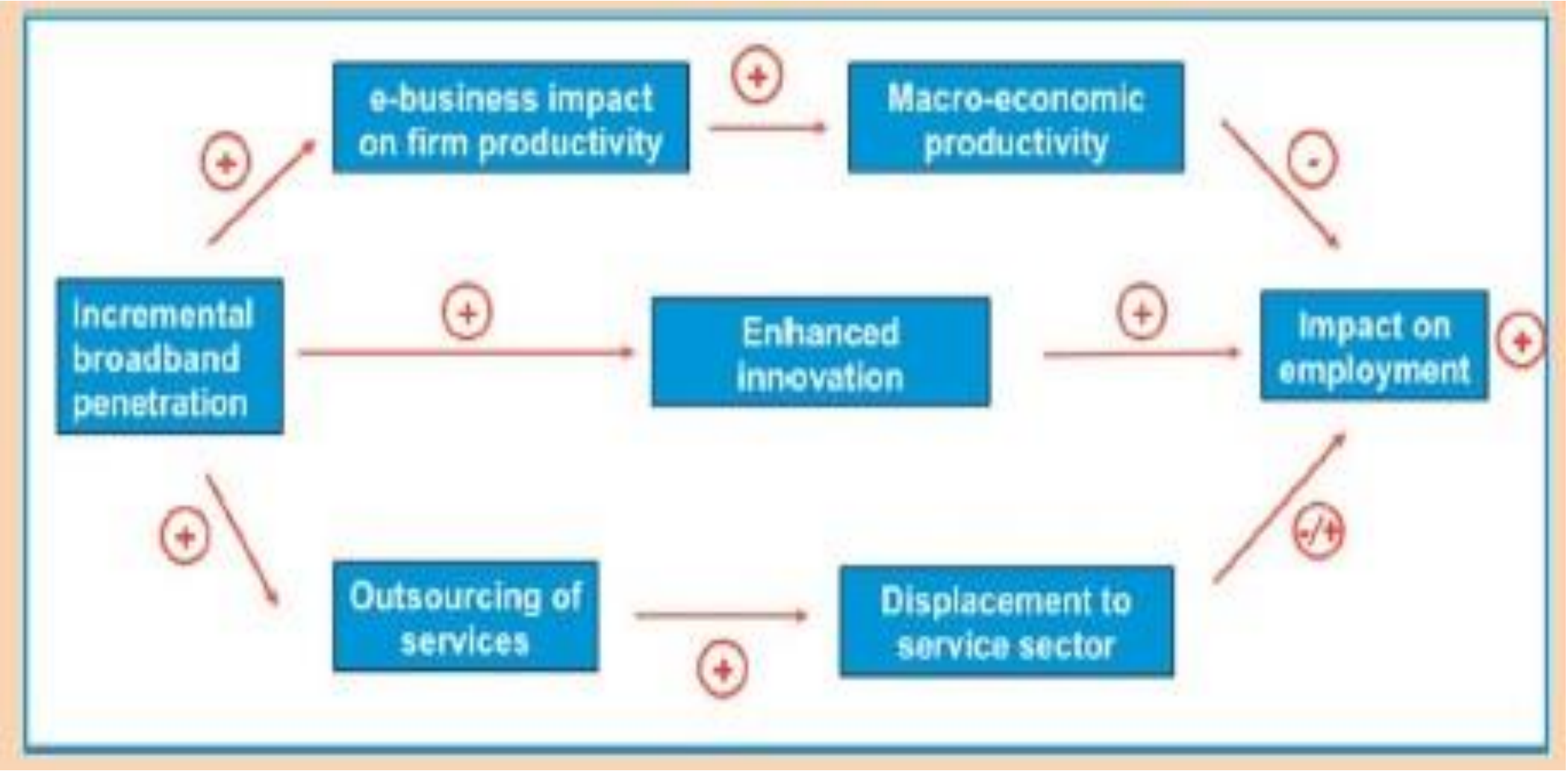
Why Plan? The case for Broadband

- There is now quite substantial evidence supporting ICT's significant contribution to modern economies. Initially it was difficult to measure how ICT's contributed to growth and income, Likewise, measures of the contribution of broadband to economic development are beginning to emerge.[1]
- However, is crucial to remember that broadband services in themselves are not desirable except for what broadband capability does as an enabler and the linkages which allow productivity, employment and incomes to grow are crucial and strengthening these linkages will be amongst the critical steps taken.[2]

1.W. Lehr - Macroeconomic Impacts of Broadband in Egypt, World Bank, 2011

2.Katz – Impact of Broadband on the Economy, Columbia University 2011

Network Effects of Broadband on the Economy

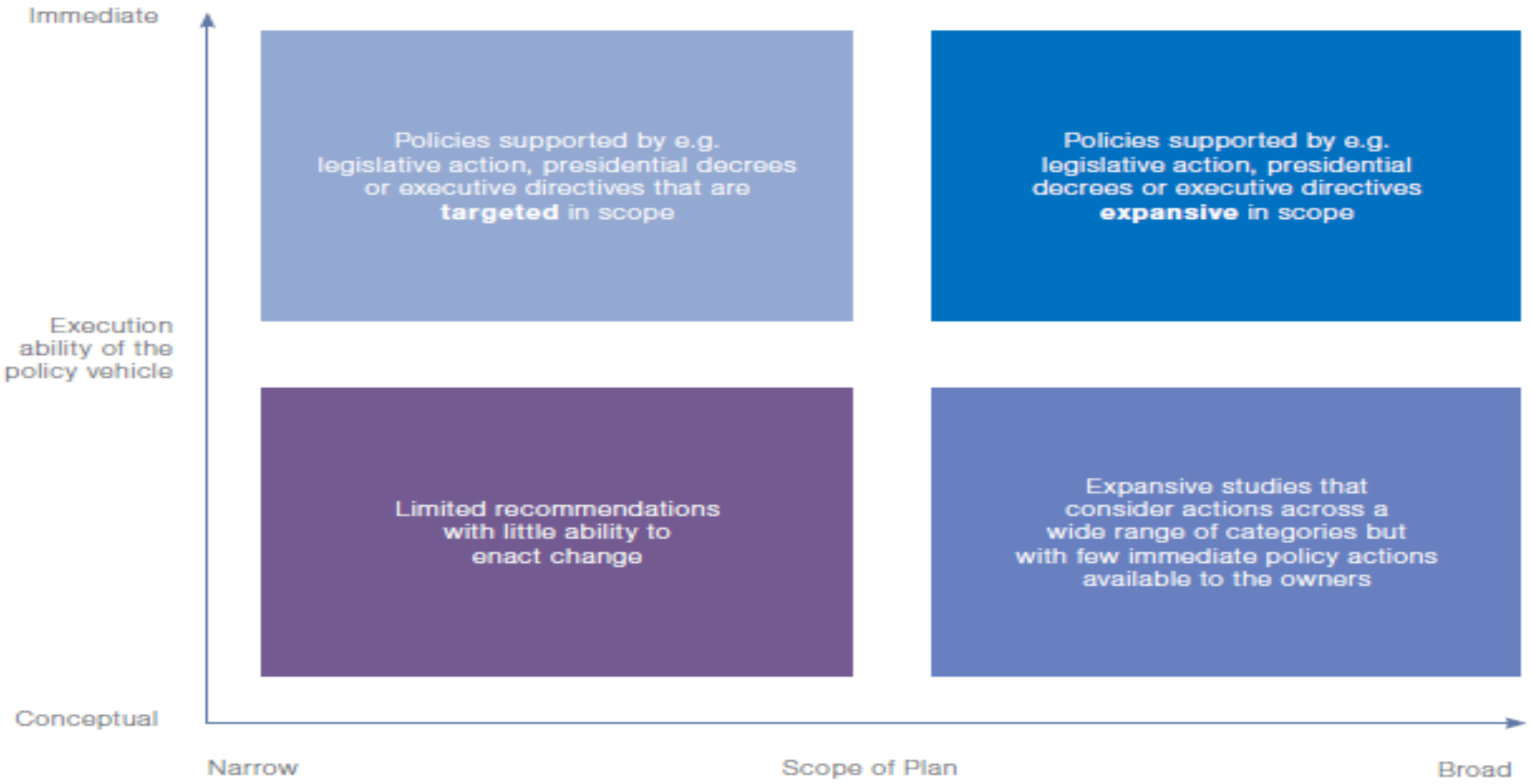


Source: Adapted from a model originally developed by MICUS in a report for the European Commission (see Fornefeld et al., 2008)

Broadband Planning – A key success factor

- Many factors influence how fast broadband spreads across a country. Income and investment levels, regulation, competition and urbanisation all play a role. New research from the International Telecommunication Union (ITU) suggests that the presence of a national broadband plan is the most important success factor, followed by competitive markets.
- The ITU has conducted a statistical analysis on 165 countries for the ten years to 2011, to test for correlation between broadband penetration and six variables: the presence of a national plan; GDP per capita; urbanisation; the presence of a regulator; levels of private sector investment; and the level of market competition.

Designing Effective Broadband Plans



Key Components of Broadband Plans

- Clear vision with a clear strategic path to improve accessibility and affordability. Plans can be:
  - Broad based
  - Supply Driven
  - Demand Driven
- Convergence on Goal of enhancing economic development.
- Infrastructure deployment targets with 3-5 year timeframes

Intro - Spectrum Planning – Phases Report ITU-R SM.2015 on 'METHODS FOR DETERMINING NATIONAL LONG-TERM STRATEGIES FOR SPECTRUM UTILIZATION'

- Four Phases are described managed by group within the Spectrum Management Organization responsible for planning
  - Determining spectrum requirements
  - Determining spectrum availability
  - Considering spectrum planning options – band planning
  - Spectrum planning implementation
- Spectrum planning is an iterative and consultative process

Intro - Spectrum Master Plans

- Regulators are publishing Spectrum Master Plans.
- One of the first to publish a plan on a continuous basis is Infocomm Development Agency (IDA) in Singapore.
- Others include: NBTC in Thailand, Ofcom in the UK which annually publishes two related documents:
  - Telecommunications Market Sector Outlook
  - Spectrum Outlook.
- Master Plans vary in approach:
  - Policy and Strategy oriented;
  - Service and band oriented.

Spectrum Master Plan Overview

- Approach – administrative (interventionist) and market-based
- Principles
- Objectives
- Requirements
- Implementation.

Principles - Review

- Allocate Spectrum to the Highest Value Uses or Users (e.g. economic or social)
- Enable and Encourage Spectrum to Move to its Highest Value Use
- Use the Least Cost and Least Restrictive Approach to Achieving Policy Objectives
- To the extent possible, Promote both Certainty and Flexibility
- Balance the cost of Interference and the Benefits of Greater Spectrum Utilization
- Spectrum Allocation and Assignment should be transparent

Spectrum Policy Objectives - Review

Spectrum Planning supports the Spectrum Policy Framework:

- Promote and support the orderly development and efficient operation of radiocommunication systems and services to provide economic, social and cultural benefits for citizens while meeting the country's sovereignty and security needs;
- Plan and manage the utilization of the spectrum resource in accordance with legislative and public policy objectives and international agreements;
- Via an automated spectrum management system to improve efficient and optimum use of the spectrum resource through adoption of advanced spectrum allocation, management techniques and licensing processes based on operational requirements and technical and economic viability.

Spectrum Policy Objectives - Review

Core Objectives cont'd:

- Ensure flexibility and adaptability and ease of access to the spectrum resource in response to technological advances, and economic, social and market factors.
- Ensure national interests are protected when harmonizing and coordinating spectrum policies and utilization with other countries, regional and international organizations and with treaty obligations, including those of the ITU.
- Support and promote innovation, research and development in new radiocommunication techniques and spectrum-based services and applications
- Coordinate and establish well balanced national spectrum and radiocommunication policies and plans by widely consulting with all interested parties and the general public.

Requirements

Spectrum master planning is done within an appropriate framework:

- Clear spectrum policy and objectives;
- Regulatory framework (converged framework);
- Legal and regulatory framework;
- Authority to harmonize planning at international level;
- Development of good information and planning practices;
- Good monitoring and enforcement capability;
- Understanding demand and supply for spectrum

Implementation

- Develop a set of feasible action plans to address deficiencies and information requirements:
  - Consultation with Stakeholder
  - Band Plans
  - Spectrum Demand and Supply Studies
  - Licensing Requirements
  - Refarming tools
  - Monitoring and Enforcement

Approach - Considerations

- The Master Plan should promote certainty over a long-term using transparent rules:
  - Avoid interference (implies tolerance for acceptable levels of interference not elimination);
  - Spectrum use needs to be harmonized internationally and regionally;
  - Transparent allocation and assignments to ensure availability – cannot guarantee equal access unless policy driven (for example community radio).

Approach - Considerations

- The Master Plan should be based be principle based: i.e. transparent, logically coherent, and sustainable over the long-term.
  - The underlying rationale behind the publication of an SMP and any subsequent changes allows an NRA to establish a coherent consistent strategy to ensure long-term objective decisions
- The Master Plan should also be "policy oriented“
  - a statement of intent that guides and limits the decision-making;
  - Spectrum management looks for a highest economic and maximum social benefit use to ensure the maximum benefits for the country (invariably involves a trade-off);
  - Employ flexible mechanisms to promote flexible spectrum use, whilst guaranteeing the long term stability of current and planned licenses;

Approach - Considerations

- The Master Plan must have specific goals to:
  - Promote radio services should support economic, social and cultural rights for citizens, contributing to the sovereignty , safety and security needs;
  - Be adaptable and provide easy access to spectrum for use in new services and technologies;
  - Guarantee that spectrum policy includes important input gained through consultation with stakeholders;
  - Use of spectrum resources must be consistent with international agreements, national laws and regulations, and government policy;
  - Promote innovation, research and development of new techniques, services and applications;
  - Adopt advanced techniques for allocation, assignment, supervision and monitoring of spectrum.

Approach - Considerations

- The Master Plan should maintain proper balance between planning for command and control unlicensed spectrum, and the use of market mechanisms and flexible spectrum:
  - The command and control approach to spectrum planning is probably still relevant for non-commercial bands (government service – military, etc.);
  - Market mechanisms are recommended only for commercial bands;
  - Establish policy(ies) to maintain and possibly extend the use of unlicensed devices.

Approach - Considerations

Take steps to ensure proper conditions exist to support Spectrum Planning:

- Develop clear spectrum policy objectives;
- Review and revise where necessary the institutional framework;
- Appropriate regulatory framework;
- International collaboration and harmonization;
- Prepare forecasts of spectrum supply and demand;
- Resources and time needed to plan are considerable;
- Allow for time and take steps to increase involvement in international planning efforts;
- Detailed band plans should be developed, according to the priorities identified in the Spectrum Master Plan – Digital Switchover, Digital Dividend, etc.

Approach - Considerations

Spectrum Audits should be conducted periodically to confirm spectrum usage. Requires an integrated approach with feedback:

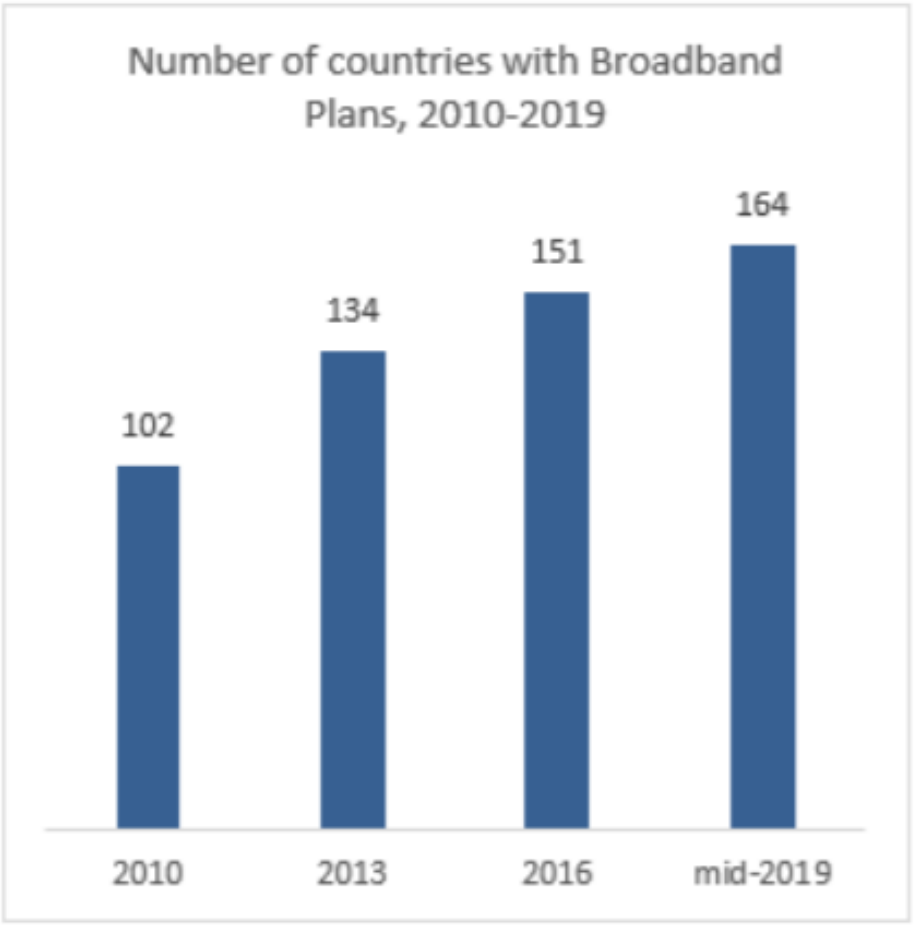
- Good systems are needed e.g. monitoring
- Good meaning timely reliable data
- Spectrum forecast tools

Broadband Planning

- By mid-2013, 134 (69%) countries have broadband plans in place which take various forms[1]:
  - legislation,
  - policy framework,
  - strategy
  - and/or regulations
- Emphasizing - Information Society, IT/ICT, Digital Agenda or Broadband

1. 160 countries have NRAs.

Situation in 2019

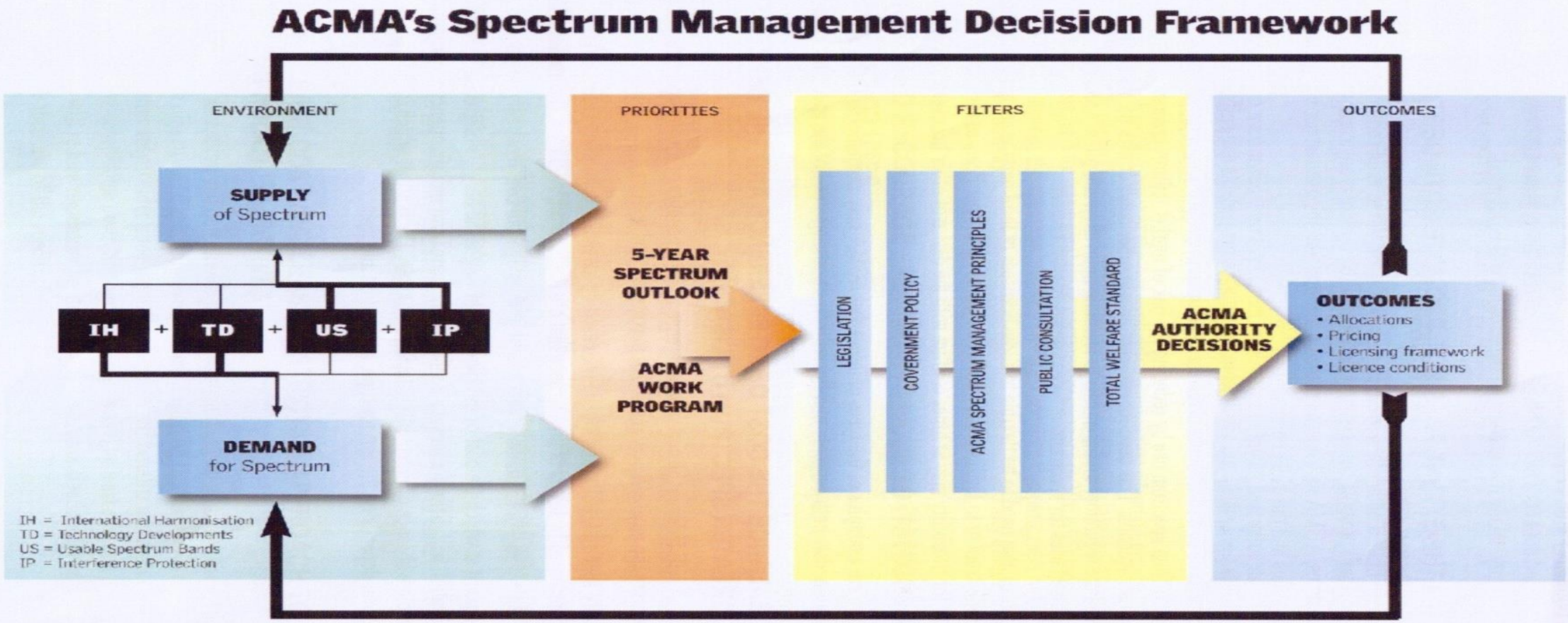


Benchmarking: Australia, USA, UK

- The common spectrum planning characteristics exhibited in the plans of Australia, the USA and UK are:
  - Common view held by these NRA's is that "Command and Control" has shortcomings which can be overcome by Market-based approaches;
  - The common catalysts driving the need to plan are
    - changes in markets (globalized and harmonized)
    - technology,
    - consumer tastes.

ACMA Decision Making Framework

Figure 1 ACMA Spectrum management decision framework



Benchmarking: Australia, USA, UK

Increasing emphasis on use of market-based mechanisms;

- Spectrum supports economic growth;
- Should be used in its most valuable use;
- Competitive allocation is superior;
- Flexible authorizations – technology and service;
- Market-based methods are more efficient and economic;
- Opportunity costs need to be measured and evaluated;
- Develop priorities – Digital Switchover, Digital Dividend, Broadband

Benchmarking: Australia, USA, UK

- Growing Importance of Unlicensed Spectrum;
  - Use of Unlicensed shown to support innovation;
  - Amount of usable spectrum expands – i.e. whitespaces.
- Interference avoidance remains paramount
- International Harmonization – fundamentally important
- Creation of Spectrum User Right Framework
- Spectrum important for National Security

Benchmarking: Australia, USA, UK

- Importance for a single spectrum authority:
  - Transparency
  - Public and Commercial
- Clear planning process outcomes:
  - NTFA
  - Band Plans
  - Licensing Framework
  - Spectrum Standards
  - Master Plan Principles, Objectives and Processes

Singapore IDA

- iN2015 is the Master Plan strategy developed by the NRA – Infocomm Development Agency
  - To establish an ultra-high speed, pervasive, intelligent and trusted ICT infrastructure;
  - To develop a globally competitive ICT industry;
  - To develop an ICT-savvy workforce and globally competitive ICT manpower;
  - To spearhead the transformation of key economic sectors; government and society through more sophisticated and innovative use of ICTs.
- Desired outcomes include:
  - Enriched lives of citizens;
  - Enhanced economic competitiveness and innovation through the use of ICTs;
  - Increased growth and competitiveness of the ICTs industry;

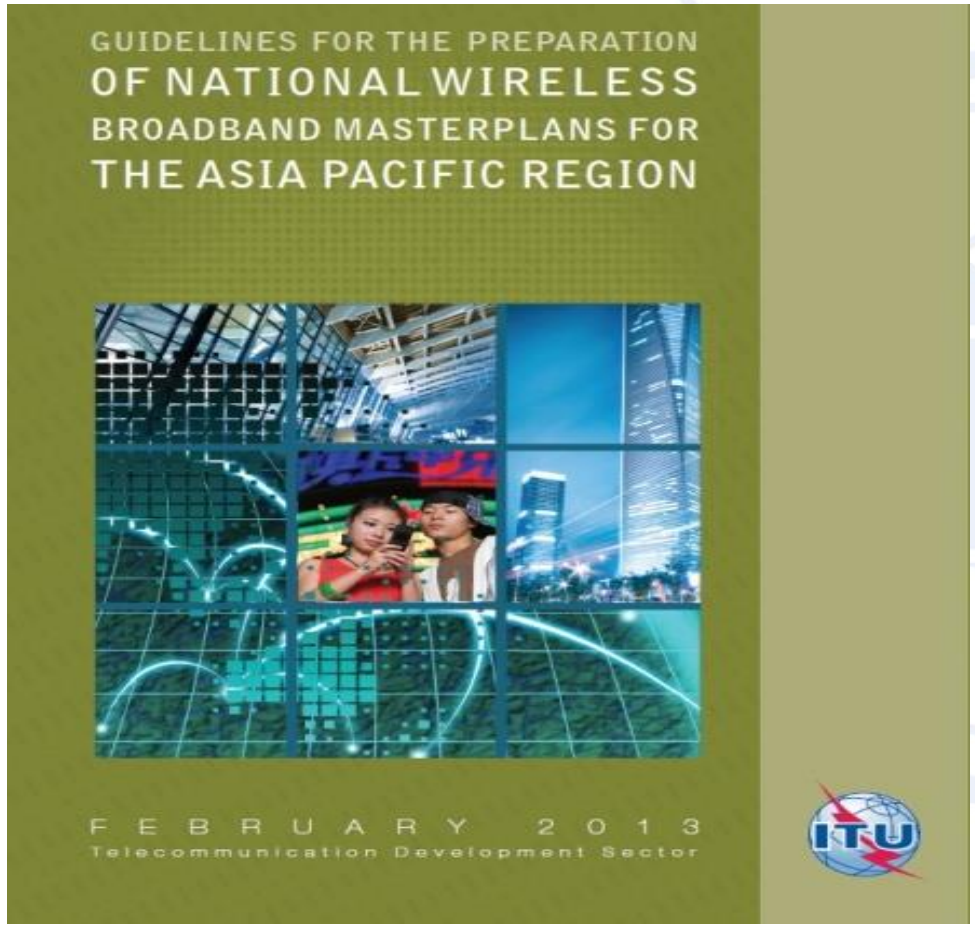
Singapore IDA

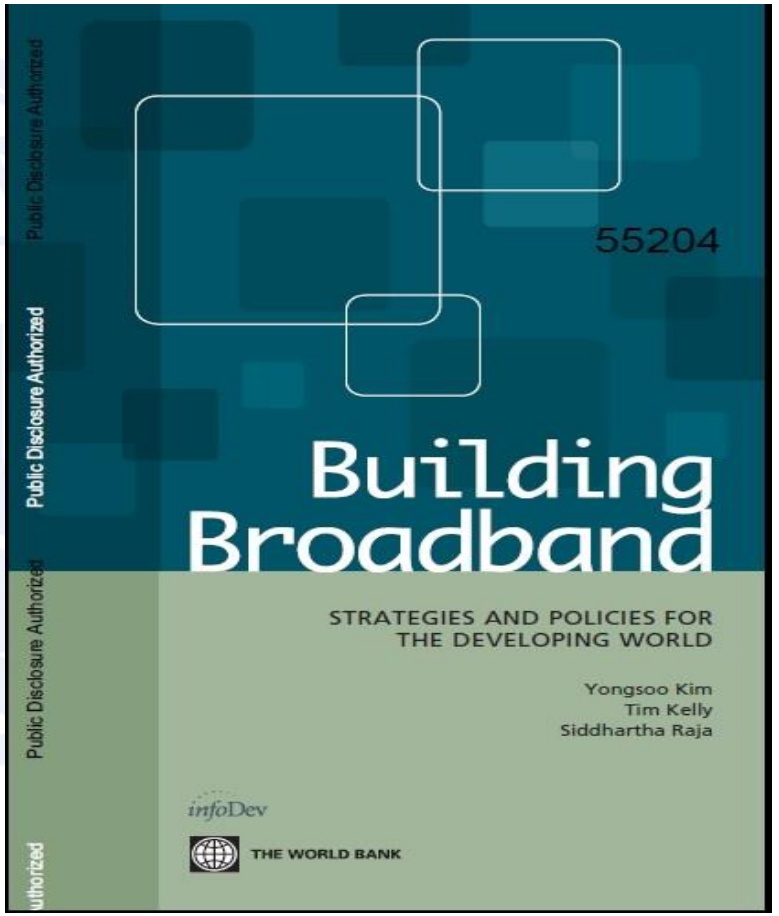
- iN2015 strategy Goals:
  - To be #1 in the world in harnessing infocomm to add value to the economy and society
  - To realise a two-fold increase in the value-add of the infocomm industry to $26 billion
  - To realise a three-fold increase in infocomm export revenue to $60 billion and
  - To create 80,000 additional jobs
  - To achieve 90 per cent home broadband usage
  - To achieve 100 per cent computer ownership in homes with school-going children

References for further reading:

- Radio Spectrum Master Plan 2014, Infocomm Development Agency, Singapore
  https://www.imda.gov.sg/~/media/imda/files/regulation%20licensing%20and%20consultations/frameworks%20and%20policies/spectrum%20management%20and%20coordination/rsmp.pdf
- Forecasting the Take-up of Mobile Broadband Services, Tellabs
  http://www.tellabs.com/resources/papers/tlab_forecastmobbrdbnd.pdf

Other Background





Thank you