FINAL REPORT

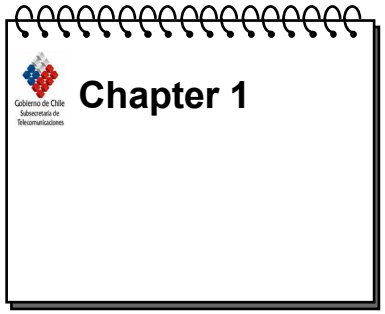
Supporting Subtel in developing a regulatory framework for the launch of DTT services in Chile

Subsecretaria de Telecomunicaciones

2007

Contents

About this section – Introduction



- **This introductory chapter defines the project context, objectives and approach**

  It is structured as follows:

  - Project objectives and focus areas
  - Approach and timeline
  - Interviews conducted

The Chilean Government has asked Spectrum to support it in developing a regulatory framework for the launch of DTT

Project Objectives

- **Support the Chilean government in developing a regulatory framework** to promote a successful migration to DTT by:

  - **Reviewing lessons learnt from selected international experiences**:
    . EU: UK, Italy, Spain, France
    . North America: US
    . Asia Pacific: Australia, New Zealand

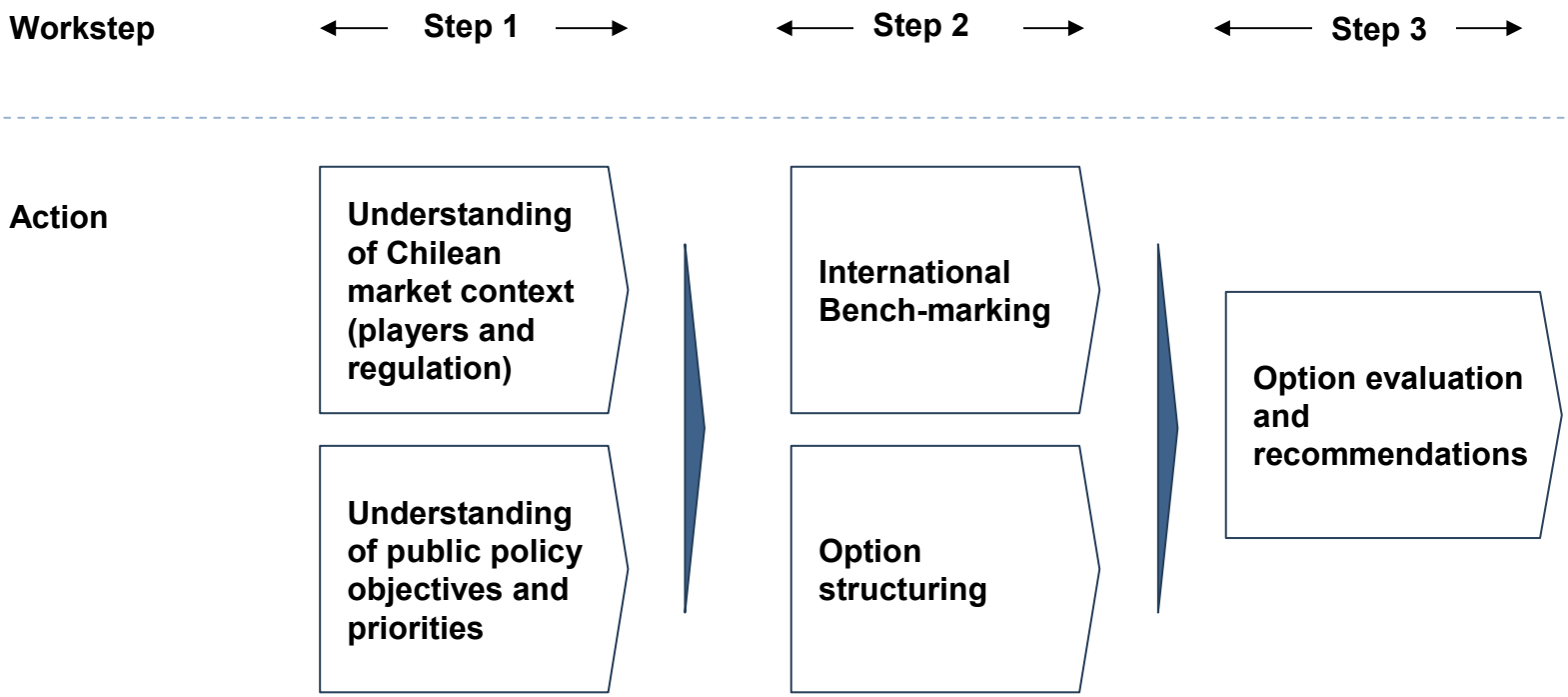
  - **Adapting these learning to unique Chilean market characteristics**, existing regulations and public policy objectives

  - **Interviewing** relevant stakeholders both in Chile (broadcasters, academics, regulators) and internationally (regulators, industry experts, broadcasters)

Key focus areas

Regulation on technical aspects	• May be required to achieve public policy or cost effectiveness objectives
Spectrum allocation	• Amount of spectrum for DTT • Possible usage reservations • Methodology for allocation to players
License duration and obligations	• Length of license awarding and renewal criteria • Related obligations (reach, content, competition, …)
Business models	• FTA, Pay or Hybrid • Possible government subsidies / incentives
Impact on industry structure	• Possible separation of content provider and transmission licenses • Facilitation of network efficiency

Spectrum has followed a 3-step approach to deliver across the planned 3 week project time-span



In particular, Spectrum carried out over 20 interviews to support its analysis and recommendations

Chilean interviews

- Francisco Geeda, **academic**
- Lucas Sierra, **academic**

- Jorge Navarrete, president, **CNTV** (independent regulator)

- David Belmar Torres, managing director, **TVN** (PSB)
- Jaime Sancho Martines, technical manager, **TVN** (PSB)

- Sergio Cavagnaro, managing director, **Canal 13** (CSB)
- Ignacio Arraigada, business development, **Canal 13** (CSB)
- Carlos Daza, operational engineering manager, **Canal 13** (CSB)

- Mario Conca, managing director, **Chilevision** (CSB)
- Jaime de Aguirre, executive director, **Chilevision** (CSB)

- Rodrigo Moreno, operations manager, **Aretel** (Association of local channel on cable)

- Angela Vivanco, executive secretary, **Anatel** (Association of national broadcasters)

- Lorenzo Marusic, president, **Arcatel** (Association of local analogue channels)

International interviews

Spain
- Ricardo Alvariño, subdirector general de telecommunicaciones (Telecommunications Ministry)
- Santiago Ramentol, director general, direccio general de mitjans audiovisuals (regional government of Catalunya)

Italy
- Guido Salerno, government policy advisor, Ugo Bordoni foundation (research body advising the Ministry of Telecommunications)

France
- Thierry Vachey, adjoint a la directrice des operateurs audiovisuels, CSA (regulator)

UK
- Gregory Bensberg, technology group manager, Ofcom (regulator)
- Andy Townsend, former COO Digital UK (crossplayer DTT consortium)

US
- Tracey Weisler, manager, FCC (regulator)
- Francisco Montero, manager, Fletcher Heald & Hildreth (law firm specialised in FCC matters)

Australia
- Andy Townsend, CEO Digital Australia (crossplayer DTT consortium)
- Bridget Fair, general counsel, Seven Networks (CSB)

New Zealand
- Jo Tyndall, development leader of digital broadcasting strategy, NZ Telecommunications Ministry

About this report

- The Spectrum project is aimed at informing the Chilean communications regulator on current developments of international regulatory frameworks for DTT and at illustrating possible open options for local application; Spectrum's recommendations, however, are by no means to be considered binding

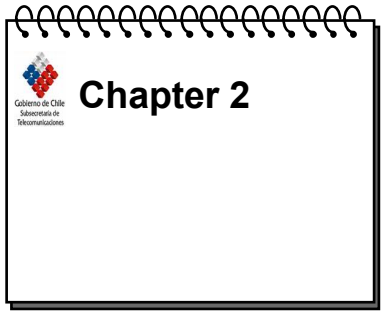
- Aspects relating to the definition of the technological standard for the digital terrestrial transition (e.g. DVB, ATSC or ISDB) have been excluded from the scope of this project and Spectrum has consequently not addressed related issues

- Economic modelling of potential DTT scenarios has been excluded at this stage

- Given the time constraints, we have not audited inputs received across interviews (e.g. frequency plan analysis, detailed review of local legislation, …)

Contents

About this section – Key public objectives for DTT



- **This chapter presents Subtel's initial vision for the future Chilean DTT market and defines key public policy objectives**

  - The section introduces Subtel's **vision for digital Chile**

  - It then indicates the **objectives to be achieved** in order to ensure a successful transition from the current analogue TV environment to the future digital TV one

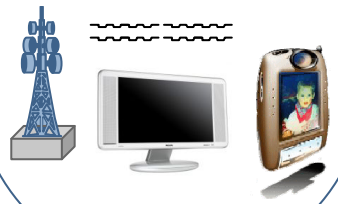
  - In light of the vision and the objectives, **5 key pillars** (and their implications) **are identified as the basis to develop a regulatory framework** to support the country's digital switch-over

Vision for digital Chile

Wide offering of diverse channels
- Regional / local coverage
- Segmented / thematic offering
- FTA / Pay

Efficiency in use of spectrum
- SFN

Digital Chile



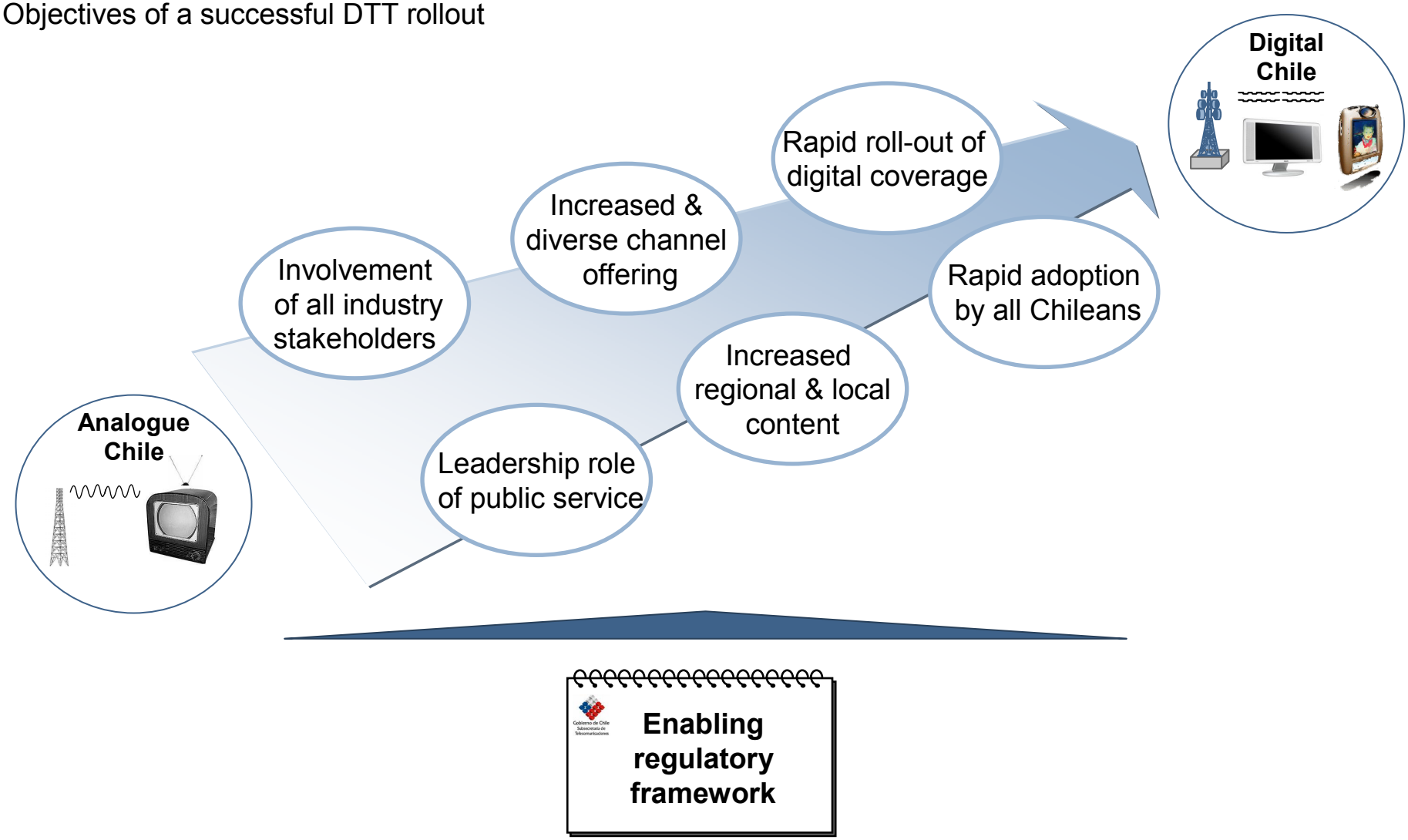
Improved image and sound quality

Interactive services
- T-Government
- T-Banking
- T-Voting
- T-Gaming

Cross platform connectivity
- PC
- Mobile
- PDA

A successful launch of DTT will require the achievement of a number of objectives, which will have to be facilitated by a new DTT regulatory framework

Objectives of a successful DTT rollout



Based on the current Chilean situation the regulator has set five key pillars to guide the development of the new DTT framework

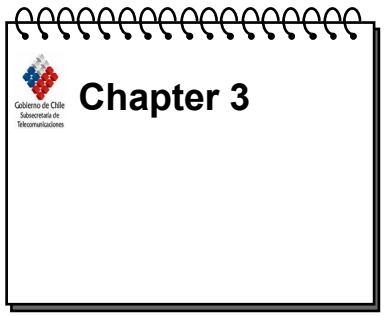
Underlying situation	Pillars of public policy
• A quality TV offering is a **right for all** but a large majority of Chileans are **unlikely to be able to pay** • It is **unlikely that subsidies will be made available** to support uptake	1 **Free To Air DTT for all**
• There is a widespread perception that the **quality of TV is worsening** • **Chileans** would **prefer a wider number of diverse channels** to a mere increase in quality	2 **Increase offering with more diverse programming**
• The **current offer does not** sufficiently **represent** the Chilean **regional diversity**	3 **Promote development of regional / local TV**
• The **TV industry will have to play a crucial role** in developing DTT	4 **Involve TV industry in process seeking "win-win" framework**
• **The current TV market is competitive but** the **risk of concentration** is a key political concern in light of recent developments in the print and radio industry	5 **Protect / Enhance competition**

The identified pillars will drive relevant implications for the regulatory framework

Pillars of public policy	Implications
1 **Free To Air DTT for all**	• **Minimum FTA offer** • **Minimum reach** targets • **Low priced STBs** or other incentive mechanisms
2 **Increase offering with more diverse programming**	• Achieving a **greater number of TV channels** is a priority • **Greater diversity is required** (e.g. greater programming segmentation) • **Increased image/sound** quality only is not sufficient
3 **Promote development of regional / local TV**	• Provide **separate regulatory framework** to ensure better representation of local diversity
4 **Involve TV industry in process seeking "win-win" framework**	• **Balance obligation requirements for industry players with flexible concessions** to favour the exploitation of new business opportunities
5 **Protect / Enhance competition**	• **Regulation** will **include measures** to minimise the risk of concentration

Contents

About this section – Chilean market peculiarities



- **This chapter reviews the Chilean TV market peculiarities and the key elements of current regulation that will need to be taken into account in developing the future regulatory framework**

It covers:

- General market overview
- Current analogue market license status and coverage both at national and at regional level
- Emerging concerns
- Possible implications for potential regulatory framework from current market characteristics, regulatory framework and concerns

Total digital penetration in Chile is low with the TV market dominated by analogue television and cable; the advertising market is relatively small and TV has a significant share

2007

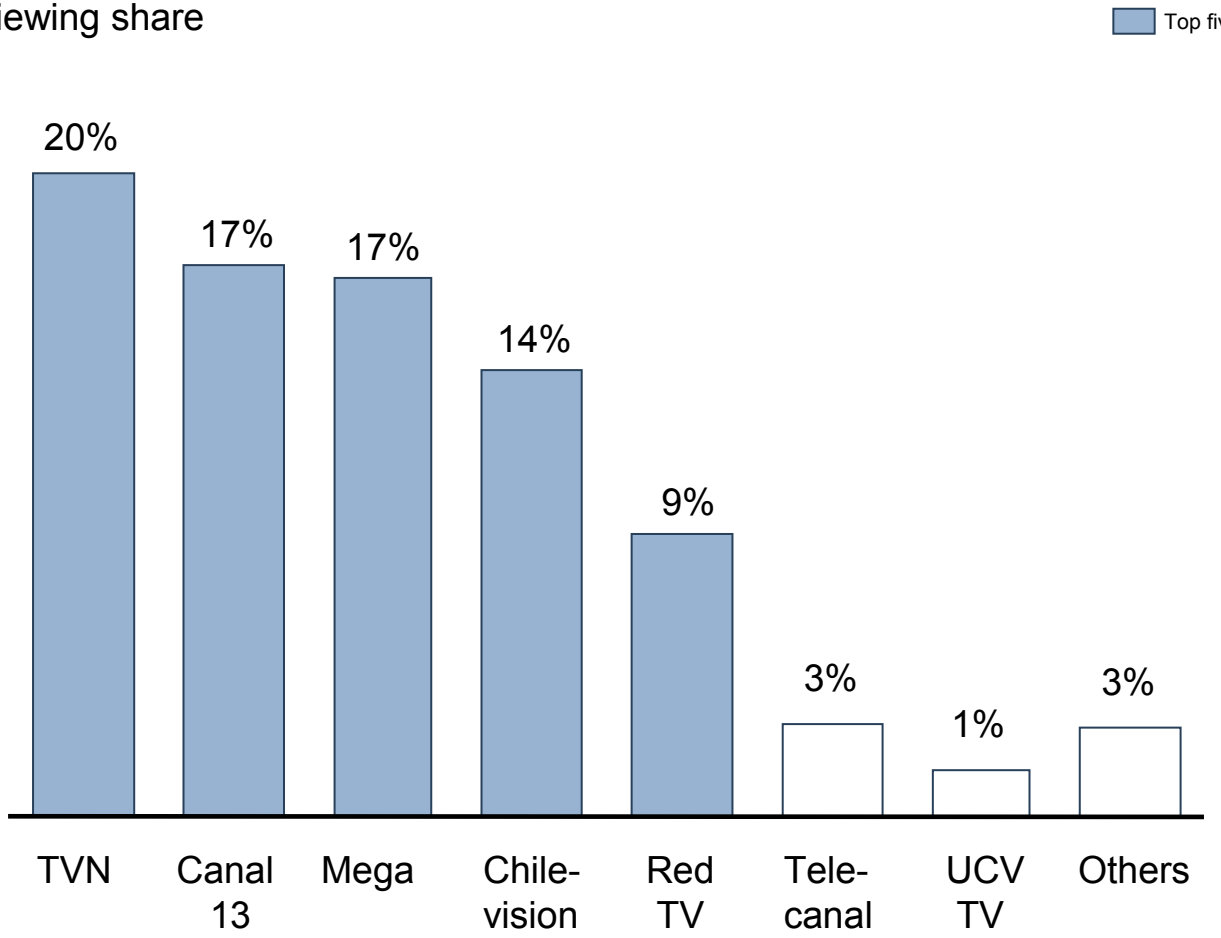
General Indicators	
Population (millions)	16.4
HH (millions)	5.2
GDP (US$ bn)	146
GDP ($ per capita)	8,900
Total Adv Market (US$ bn)	0.8
% of GDP	0.6%
TV advertising (US$ bn)	0.4
% of Advertising market	47%

TV market indicators	
TV HH (millions) (% of total HH)	4.1 (79%)
Digital penetration (millions) (% of TV HH)	0.6 (14%)
DTT HH (millions) (% of TV HH)	0 (0%)
DTH HH (millions) (% of TV HH)	0.3 (7%)
Cable HH (millions) (% of TV HH)	1.0 (25%)
of which digital cable (millions) (% of TV HH)	0.3 (7%)
IPTV HH (millions) (% of TV HH)	0.004 (0%)

Sources: CIA Factbook; Informa 2007; Chilean Peso / USD: 507 (Oct 2007), Economist Research

The TV market is competitive with five channels of the seven main channels accounting for 75% of viewing share

2006, TV channel viewing share



Source: Eurodata TV Worldwide / Ibope Media Information

Despite no formal distinction between national and regional channels, five of the seven main channels have coverage between 80% and 98% and can be considered "national"

2007

National channels
Regional / Local channels

	TVN	Canal 13	Mega	Chile-vision	Red TV	Tele-canal	UCV TV	Others
Total analogue frequency licenses (#)	**199**	**173**	**81**	**30**	**21**	**na**	**6**	**60**
Of which:								
Perpetual	*120*	*52*	*20*	*27*	*15*	*na*	*5*	*1*
25 years	*79*	*121*	*61*	*3*	*6*	*na*	*1*	*59*
Population coverage	**~99.9%**	**~98%**	**~98%**	**~85%**	**~80%**	**na**	**>40%**	**na**

- **TV licenses are awarded on an area-by-area basis "for a single FTA analogue TV signal":**
  - National broadcasting results from a collection of area concessions with no official separation between national and regional / local licenses
  - Licenses have been awarded either in perpetuity or for 25 years
- The **top 5 players** have population coverages of over 80% and **can be considered "national"**

Source: Eurodata TV Worldwide / Ibope Media Information

The market is also characterised by multiple regional/local TV channels (both analogue terrestrial services and on cable)

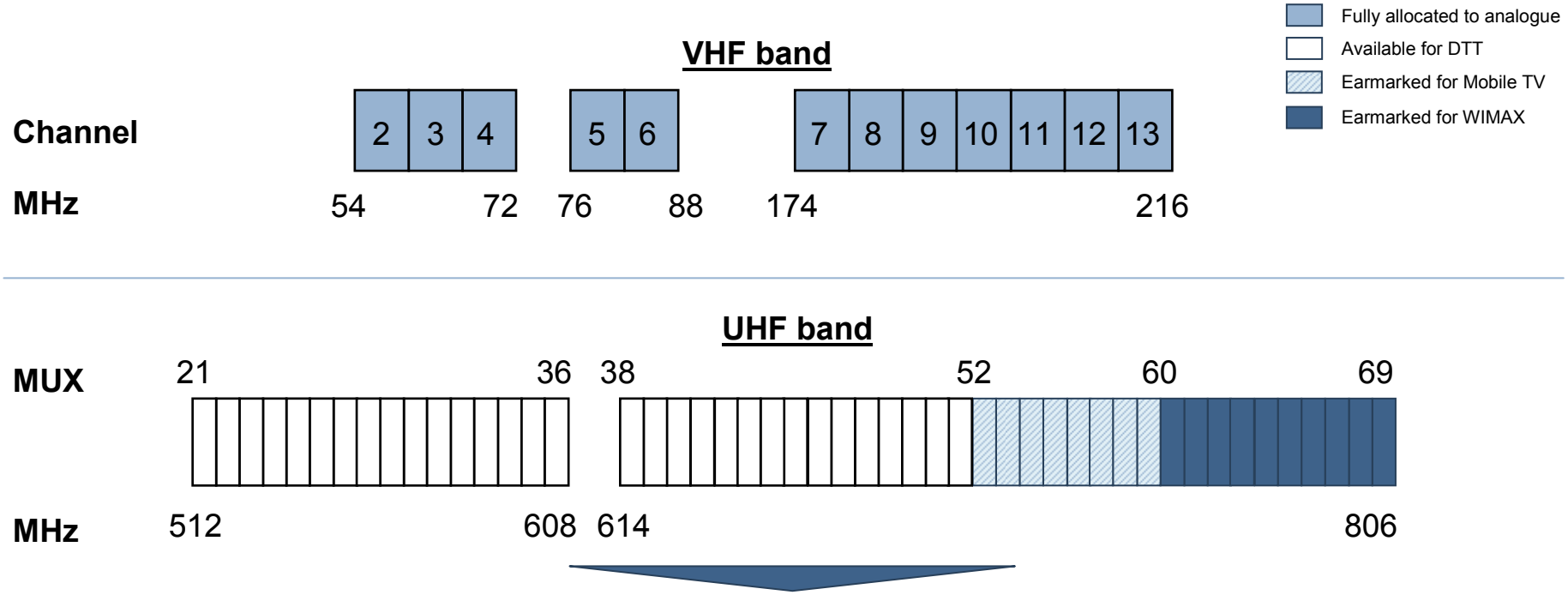
Regional channel overview

- There are **~150 regional / local TV channels**, operating both as analogue **terrestrial services (~30) and on cable (~120)**
- These channels **set up either as municipal projects** or as **private business initiatives** (sometimes linked to local radio stations)
- These channels are **represented by associations**, such as **Aretel (cable)** and **Arcatel (analogue)**
- **Regional spread of channels is not homogeneous** (on average 4-10 channels per region)
- **The majority broadcast 6-12 hrs/day** with **only few** channels broadcasting **for a full 24 hours**
- Amount of **locally produced content** (e.g. news) **varies** (ranges from 15%-70%)
- **Quality of content and signal is relatively poor** (with strong regional variability)
- **Demand for regional / local channels also varies** significantly:
  - IquiqueTV brought back to cable due to high demand after a year of broadcasting on the Internet
  - In Santiago, however, many frequencies are not used

- **No clear regional / local channel model defined**
- **High variability in channel nature**

Sources: CNTV Report, Interviews, Subtel

Spectrum for DTT appears not to be scarce but MFN usage would somewhat limit efficiency of capacity utilisation reducing the actual spectrum that can be allocated to players by ~50%



- The **VHF band** is currently **allocated to analogue TV** and will become available only after Analogue Switch-Off
- **MUXs** (blocks of 6MHz) **from 52-69** have been earmarked to develop **Mobile TV** and **WiMax services**
- **Ample spectrum (~30 potential channels** – from 21 to 52) remains **available for DTT** allocation
- Nevertheless, **inefficient MFN usage reduces the actual capacity utilisation potential by ~50%** (estimated efficiency ratio)
- **This means that in order to accommodate the same number of channels currently broadcast today in analogue, more spectrum will be needed; less frequency may therefore be made available to individual players to accommodate incremental demand**

Summary of current market situation and analogue regulatory framework in Chile

Technical aspects

- NTSC TV standard (US standard)*
- 6MHZ frequency blocks/bundles
- Widespread MFN usage but not regulated

Spectrum allocation

- Licenses awarded on service area basis (area covered by transmission tower)
- No separation between national and regional licenses
- VHF band fully allocated to analogue TV – UHF largely free for alternative uses (frozen since year 2000)
- License covers (FTA) analogue TV services only
- Licenses awarded subject only to technical plan approval
- No license separation between content provisioning and transmission

License duration and obligations

- Licenses awarded either perpetually or for 25 years
- Maximum 1 license per service area (= no more than 1 channel per player)
- 40% minimum quota for national production

Business models

- FTA only – pay TV on cable and satellite only
- Central budget available to all players (~$3-4million representing only ~1% of advertising market) to promote specific content / programming
- No must-carry agreements
- Public broadcaster receives no public funding and operates as a commercial broadcaster (advertising funded business models)

Industry structure

- Vertically integrated players operate their own transmission towers
- Relatively competitive market

* Standard definition out of project scope

There are a number of market specific peculiarities that need to be considered upon developing a new DTT regulatory framework

Market characteristic	Implications (hypotheses)
• **Spectrum appears not to be a scarce resource** with almost all of UHF bandwidth available for allocation (channels 21 to 52) - MFN networks are widespread leading to less efficient spectrum usage	• In contrast to the experience of some benchmark countries **measures aimed at optimising Spectrum utilisation efficiency may play a secondary role** vs. primary objectives such as digital development and pluralism of offering • **Allocation of spectrum by MUX** vs. by channel seems **possible**
• There is a **widespread perception that the quality of Chilean TV** is worsening	• **A trade-off may exists between increasing the number of channels (government objective) and achieving better quality** of programming (especially in light of shrinking production budgets)
• **TVN is not publicly funded** (no TV license fee) but relies on auto-funding (advertising based model)	• There is **less scope to promote quality improvements via a public remit** vs. major benchmark countries • This **may limit the role of the national TV channel in leading the DTT transition**
• **Cable operators currently broadcast analogue channels for free** without explicit permission from analogue broadcasters (which have taken legal action to protect their content) • A number of **regional channels broadcast on cable only** and pay a transmission fee to cable operators	• **Must-carry regulation** is **likely to be necessary** to protect audiovisual IP and to support the diffusion of digital TV - this **may require an economic agreement between parties** (in absence of which regulator intervention may be necessary) • This **may require allocation of digital spectrum to support regional / local** players
• Chile has a **vast amount of the population concentrated in urban areas** (~40% of population in Santiago) with **inefficient infrastructure requirements** for the coverage of population tails at local level	• Achieving a widespread FTA offering, will require **establishing reach obligations** for new digital licenses in order to avoid digital divide • Possible consideration of **alternatives such as DTH** or **measures to facilitate infrastructure efficiency** in remote areas
• All **players vertically integrated** operating own transmission towers	• May require **regulatory intervention to lower barriers for new entrants**, **increase overall infrastructure efficiency** or **minimise environmental impact**

The existing TV regulatory framework is relatively liberal, however a number of issues need to be considered ahead of developing a new DTT regulatory framework

Current regulatory framework	Implications (hypotheses)
• Existing analogue licenses relate to "a **frequency concession to broadcast a single TV signal**": - in a specific service area - FTA only - cannot adopt pay model - for terrestrial analogue transmission only	• **Current concession limitations** to "analogue terrestrial" and "FTA only" **provide an opportunity to incentivise incumbent players to support digital transition**. Examples of new opportunities: - assign new digital licenses for full MUXs (bundle of 6MHz frequencies) possibly subject to reach/content obligations - assign pay concession (in exchange for obligations)
• The current regulatory framework does **not** allow to have **more than one license per service area**	• Current regulation would **hamper simulcasting** if not reviewed: - review needs to **preserve guarantee of pluralism**
• **No differentiation** between **national or regional** concessions with national service resulting from a "collection" of area concessions	• **Specific regulation to promote** the development of **regional channels** would require a **separation of national vs. regional concessions**: - Would require need to define national vs. regional
• Licenses currently **granted either "in perpetuity" or "for 25 years"**	• **A trade-off** exists in deciding on **length** of new digital licenses**:** - Too long: limits government flexibility to control future developments - Too short: geopardises certainty of return on investment for broadcasters • **A transparent renewal process** needs to be defined
• **No limitations** with reference to **concession trading**, **reach** or **genre** • **Quotas** are set to support **national production**: 40% of programming	• **Trading, reach and content obligations may have to be considered**
• **Currently no separation of content provider rights vs. transmission** service provider rights	• Lowering barriers for new entrants may require **separation of licenses**
• There is a **central budget available to all players** (~$3-4million representing only ~1% of advertising market) to **promote specific content / programming** (e.g. educational, regional, …)	• The **allocated budget may be insufficient** to guarantee some of the objectives related to the DTT transition and incremental funding is likely to be required to support DTT development

Key TV operators have expressed concerns related to the development of the DTT service that need to be considered to develop a "win-win" proposition and gain industry support

Emerging concerns	Implications (hypotheses)
• **Attitude** is rather **focused on risks than on opportunities**: - **DTT will not drive an increase in the TV advertising market** but will result in an **increase of competition for the same pie** - Analogue broadcasters see themselves at a regulatory **disadvantage** (lower flexibility) vs. **cable / satellite players** - Strong perceived **threat from Telco new entrants** • **Key perceived benefits are linked to:** - **HDTV** not to lose out vs. DTH/Cable HDTV or high definition DVD - **Pay TV** • Given spectrum availability, **broadcasters would not understand allocation of Spectrum by channel rather than by MUX and would resist limitations to their flexibility** in use of frequency **within a MUX** (e.g. minimum quota of channels, allocation between SDTV and HDTV usage, obligations on use of technology, frequency to be reserved for independent broadcasters, …)	• In order to ensure TV industry's support to the development of DTT potential **opportunities for incumbent players need to be enabled**: - Possible spectrum allocation by MUX rather than by channel - Possible allocation of more than one MUX - Reasonable flexibility in use of spectrum within MUXs (e.g. for HDTV) and minimisation of technology related obligations - Possible offer of pay TV concessions • As the TV industry is reassured on opportunities, **acceptance of possible obligations** (linked to pulic policy objectives) **may be more likely**: - Reach obligations - Content obligations - Contributions of diffusion of STBs or marketing of DTT • Incumbents **will have to be reassured** that new regulation will provide **equal opportunities** to all to operate in adjacent markets through a variety of business models
• **TVN currently uses MFN to differentiate** its programming / advertising offer **on regional basis** (8 regional production centres) and may play an important role for local offering	• **MFN may have to be maintained** to deliver regional offering
• The **implementation of a SFN system is considered not viable** for complexity/cost reasons (despite spectrum efficiency potential)	• **SFN objective may have to be deprioritised** (evaluation of implementation complexity and economic modelling required)
• **Multichannel offering for incumbents, new entrant offering or local channels may not be economically sustainable** due to size of the market, entry barriers (e.g. transmission infrastructure) and dilution of advertising budgets	• **Specific regulation is likely to be required to support economic sustainability** of new offering (e.g. incremental central funding with clear allocation rules, allow usage of existing transmission networks, …)

Regional / local operators have also expressed concerns mainly relating to the economic sustainability of the transition to digital

Emerging concerns

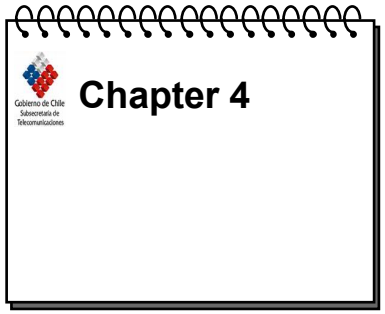
- **Unaffordable high costs** will be incurred for transition to digital
- **Existing FTA analogue channels concerned that local cable TV channels will get a terrestrial licence** and will be competing for the same resources
- **Other emerging concerns relate to:**
  - must carry agreement definition
  - possible opportunity to rely on third party transmission service providers
  - The need to ensure fairness of competition for all channels
- **There is also a wide-spread concern on how to guarantee the independence / pluralism of the local TV sector** (avoid concentration process recently occurred in radio business)

Implications (hypotheses)

- There is a **need to define a clear model for regional / local channels** covering:
  - Definitions (national vs. regional, analogue vs. cable)
  - Obligations
  - Access to spectrum
  - Access to transmission
  - Supporting measures
- **Differentiation of regional/local regulation** vs. national will enable the government to **dedicated ad hoc measures** to support the development of regional/local content and channels:
  - **Possible ad hoc funding** (content or transmission)
  - **Possible reservation of dedicated spectrum** (full MUXs or channels within a MUX)
- **Measures to protect competition** need to be introduced to ensure pluralism of offering is maintained (to be developed banking on lessons learnt from radio / print market)

Contents

About this section – Findings from international benchmarks



- **This chapter summarises the best practices and lessons learnt from analysing the experience of 7 key markets (UK, Italy, Spain, France, US, Australia, New Zealand)**

It includes:

- Summary of key success factors of digital roll-out
- Relevance of specific markets vs. Chile
- Overview of best practices by key element
- A comparison table by country is provided in the attachments to this document and single country reviews are provided in a separate Appendix document

There are 7 key success factors for DTT launches that can be derived from the country benchmarking study

	KSF	Comments
1	**Attractive (mainly FTA) offering to the consumer**	• **FTA** offering has been **crucial** to the take-up of the platform: - Pure pay models have failed - **Hybrid models** may be allowed/favoured as further **incentive to gain** vital **TV industry support** • **Multiple channels, new offering** and **increased quality** have driven offer attractiveness • **HDTV has driven demand but alone is probably not a sufficiently appealing proposition** • **Interactivity offering** has had **limited appeal** to date
2	**Support from TV Industry**	• Especially where limited subsidies will be made available **support from the TV industry is crucial**: - **Incentives** include free awarding of spectrum, must-carry obligations on cable and DTH, extra channel offering, HDTV and pay opportunities - **Coverage obligations** need to be ambtious but realistic (**differentiating CSBs and PSBs**) - Successful DTT countries have created **dedicated switchover bodies** to coordinate efforts of government, broadcasters, equipment manufacturers and consumers (best practice)
3	**Low cost and availability of STBs**	• **Market driven by entry level models** • May require imposing lower compression standards and **possible (technology neutral) subsidisies** to incentivise STB take-up
4	**Government funding**	• **Market forces alone** seem **not sufficient** to ensure take-up with some sort of government incentive required (in many markets license fee proceeds for PSBs are dedicated to support DTT)
5	**Marketing and Communication**	• **Consumers are unaware of the value of DTT** and need information on presence and content of the offering, benefits, technical assistance and precise switchover dates
6	**High service levels**	• **High technical service levels** (no interferences) are key to avoid hampering **consumer confidence**
7	**Credible plan for ASO**	• Specific **indication of ASO** date is crucial as it represents **industry focal point** in managing DSO • **ASO** may be **phased on a region by region basis** to minimise risks • Early DTT ventures have suffered from imposition of unrealistically high coverage obligations and overambitious phase-out plans • **DTH may be considered to complement** digital terrestrial coverage as ASO target date approaches

The UK, Spain, Italy and France seem to be the most relevant countries to the Chilean case in terms of DTT success and similarities in public policy objectives

● High relevance
○ Low relevance

Country	Relevance	Drivers of relevance for Chile	Differences vs. Chilean context
UK		• Major DTT success story (40% penetration achieved) • Highly liberal approach • Opening to hybrid business models	• Spectrum availability constraints • No regional / local development objectives • No vertical integration
Spain		• Very similar public policy objectives • Strong priority to regional / local development • Good DTT penetration (25%)	• Spectrum availability constraints • No vertical integration
Italy		• Industry vertical integration • Good DTT penetration (22%) • Hybrid business model • Similar public policy objectives • Strong push on interactive services	• Strong spectrum constraints • Analogue market is a duopoly • No immediate regional / local development objectives (despite MUXs will be dedicated to regional channels in the future)
France		• Similar public policy objectives • High DTT penetration achieved (38%) • Hybrid business model • Some focus on local development • High population concentration in Paris area	• More interventionist approach by regulator • Strong spectrum constraints • No vertical integration
Australia		• Ample spectrum availability • Used to be vertically integrated 10 years ago and TV industry shifted to separate transmission service providers • Strong focus on HDTV	• Differences in public policy objectives (e.g. HDTV imposed, restrictions to new entrants, …)
New Zealand		• Ample spectrum availability • Some examples of vertical integration	• DTT not yet initiated in the country (early stage of regulation): too early to make judgments
United States		• NTSC standard • Strong focus on HDTV • Mix of vertical integration and independent transmission service providers • Licenses allocated by tower	• Very different market: only very few households rely on analogue signal and TV market dominated by cable • Strong penetration of pay models • Low DTT penetration • Desire to monetise spectrum (allocation by auction)

Lessons learnt: Technology standards

Regulation on technical aspects

Spectrum allocation

License duration and obligations

Business models

Impact on industry structure

Other

- Other than mandating the overall technical standard (e.g. DVB vs. ATSC), **regulators have mainly followed a technology neutral policy** minimising intervention:

  - All country regulators have recommended **usage of a common compression standard**, with the majority of countries (France and Australia being the key exceptions) leaving the final decision to the industry; **higher compression standards may drive higher STB prices** in the short term **but prices are rapidly falling** and regulators have been reluctant to force inefficient technology standards

  - **The SFN objective** (to maximise spectrum efficiency) is generally considered but **subordinated to other priority objectives** (**minimise complexity** and cost burden throughout transition phase):
    . Spain is the primary example of effective SFN roll-out for national licenses
    . The UK, Italy and France have postponed their SFN plans post ASO
    . MFN has been particularly used when promoting regional/local TV (e.g. Spain)

  - **Interactivity**:
    . has been **promoted in some countries through mandating MHP STBs** (in particular Italy, France, Spain and Australia)
    . has been **entirely left to market forces** (low priority) **in the UK**
    . seems to suffer from **limited consumer interest**, in particular, due to the inconvenience of phone line modem return channels and despite regulatory efforts to promote it

  - Regulators have also required (e.g. Italy and France) that **Pay TV offers share common access technology**; this ensures that set top boxes can support multiple competitive Pay TV channels (consumer can switch to competitor's offer without having to change STB)

Lessons learnt: Spectrum allocation

- Regulation on technical aspects
- **Spectrum allocation**
- License duration and obligations
- Business models
- Impact on industry structure
- Other

- **Allocation of full MUXs has been prioritised**, where spectrum availability is not an issue, in order to **minimise complexity** and favour TV industry
- **In France** (and in Spain until ASO), **frequency has been awarded by channel** (within a MUX), due to scarcity of spectrum; this requires set-up of a MUX operator (requires further regulation)

- **Preference** for spectrum allocation has **generally been granted to incumbents** (direct free spectrum allocation e.g. for the BBC in the UK, for RAI in Italy, for all PSBs in France, for established players in Spain, NZ, Australia and the US)
- **Additional capacity** has been awarded:
  - mainly through **beauty contests** (UK, France for CSBs, Spain for new entrants) where criteria such as “diversity of programming” are key
  - **by auction** in the US and in potentially in the UK following ASO

- In Spain, France and Italy, where, promoting regional / local channels is a key policy objective, **specific MUXs have been reserved for regional channels**
- **France** is the only country that has **reserved frequencies for Pay TV and HDTV**

- The **analogue spectrum is mainly handed back to the government** after ASO. Regulators have **frozen this spectrum for future decisions,** except for in Spain where frequencies have already been allocated to broadcasters (this is seen as a potential problem for the future)

Lessons learnt:
License duration and obligations (1/2)

- Regulation on technical aspects
- Spectrum allocation
- **License duration and obligations**
- Business models
- Impact on industry structure
- Other

- In most countries there are **separate licenses/authorisations for content providers** (the channel), **MUX operators and transmission service providers**:
  - Examples of this include Italy, despite vertical integration, UK, Spain, France and Australia

- **Most licences last for 10-15 years** with **transparent renewal process / conditions** defined upfront to provide certainty for the channels:
  - automatic renewal (e.g. Australia, Spain)
  - automatic renewal for 5 years and then further 5 subject to DTT coverage conditions (e.g. France)
  - UK still to define conditions for renewal
  - no country has perpetuity licences

- There are **specific regional/local licences** where the promotion of regional/local is an objective:
  - Examples include Spain, France and Australia
  - This requires specific definition of local service areas and obligations (e.g. local content quotas)

- **Reach targets** (specific population coverage over time) have been set for all countries, but **deadlines to reach specific requirements have recently been softened**
  - Most countries impose minimum (>90%) coverage to be achieved before ASO
  - PSBs have even more stringent targets (government funded)
  - Coverage targets set by regulator are based on consideration of actual analogue coverage

Lessons learnt:
License duration and obligations (2/2)

- Regulation on technical aspects
- Spectrum allocation
- **License duration and obligations**
- Business models
- Impact on industry structure
- Other

- **Simulcast of (FTA) analogue offering is mandated:**
  - in Australia and Italy this is explicitly mandated to be in SD
  - this is not explicit in the EU as the focus is on multi-channelling and therefore given for granted
- The **number of channels to be broadcast by MUX** is **not directly mandated**
  - In Italy 40% of MUX capacity is to be sold to 3rd party channels
- **Obligations are in place to impose that allocated frequencies are used ("Use it or lose it")**
- **Limited obligations relating to genres** (if not through PSB remit)
- Most countries have **national content production quotas**
  A European Union directive specifically addresses this subject:
  - 51% broadcast content to be produced in the EU
  - At least 10% must come from **independent** production companies)
- **Some countries** (e.g. UK and Spain) **have limited the extent of usage of capacity** (up to 10% or 20% per MUX) **for interactive services** to favour the development of a wide TV offering – this has proven superfluous as the market has had limited developments in this area
- **Licences are in most cases (UK exception) freely tradable** although in many cases subject to award conditions (e.g. Spain, France, Australia) or require approval of the regulator (US)
- **Where regional/local frequency has been reserved** (e.g. Spain and France) there are specific content requirements. For example in Spain:
  - Local programmes/production quotas – daily (3-4 hours per day) or weekly
  - Creation of own studios (Cataluña)
  - Limitations to content syndication (e.g. maximum 25%) to avoid them becoming a national TV

Lessons learnt: Business models

- Regulation on technical aspects
- Spectrum allocation
- License duration and obligations
- **Business models**
- Impact on industry structure
- Other

- **Mainly FTA models** have been adopted (following the failure of initial UK and Spanish Pay TV only digital services), although there is a **recent (European) trend toward accepting hybrid models** (e.g. UK, France, Italy and possibly Spain), as pay TV is seen as an incentive for established players

- **In most countries** (e.g. UK and Italy but not France where a specific Pay TV license is required), the right to launch a pay offer is embedded in the license (**flexible licences covering both FTA and Pay**)

- **Pay TV** seems to be an **attractive consumer proposition if channels are able to compete with other Pay TV platforms on content** (e.g. football and movies)

- Governments have taken **different approaches to subsidise DTT**:
  - **Supply side subsidies:**
    - . **PSBs have received ad hoc government funding** (for content and coverage) to play a leadership role in driving DTT (e.g. UK, Italy, NZ and Australia)
    - . Support for **infrastructure investment** (e.g. Australia)
    - . Support to **content production**
  - **Demand side subsidies:**
    - . Consumers have been granted **subsidies for purchase of STBs** (e.g. Italy and US)
    - . **Marketing** (most countries)

Lessons learnt:
Impact on industry structure

- Regulation on technical aspects
- Spectrum allocation
- License duration and obligations
- Business models
- **Impact on industry structure**
- Other

- Only **Italy** maintains a **vertically integrated** industry structure with each broadcaster owning its transmission infrastructure: **vertical integration in Italy is proving to be an issue for DTT channel development** as broadcasters are directing investments to upgrading (inefficient) multiple networks rather than focusing investment on content
- **Many markets analysed have efficient independent transmission service providers** separate from content providers (e.g. Abertis in Spain, TDF / Antalis / Towercast in France, Arqiva/NGW in the UK, Broadcast Australia and TX in Australia)
- **In most countries, regulators have facilitated this value chain optimisation** through **license separation** between content providers (channels), MUX operators (UK) and transmission service providers
- **Australia was vertically integrated 10 years ago, but has shifted to 2 main independent transmission service providers**: this has been **driven by the industry** but has been **facilitated by the regulator**
- The **US** and **NZ** have a **mix of vertical integration and independent providers**
- **In Italy steps are being taken to favour separation of transmission networks** (legal entity separation of transmission tower business imposed); this may lead to a possible cross-player consolidation (talks underway for spin-off and merger of networks)

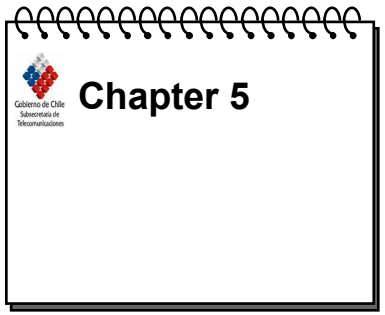
Lessons learnt: Other

- Regulation on technical aspects
- Spectrum allocation
- License duration and obligations
- Business models
- Impact on industry structure
- **Other**

Digital Switchover timeline	• All countries have **set a fixed date** for ASO **to focus stakeholder efforts** • The **transition period** typically ranges **from 5 to 12 years** • Most countries adopt a **regional approach to DSO** to minimise risks
Other measures to support DTT transition	• Italy, France and the US have imposed that **as of specific dates only TV sets with incorporated digital decoders are sold to the public** • Most regulators have facilitated / recommended the **creation of cross-player industry consortiums** to support DTT transition (e.g. **Digital UK, Digital Australia, DGTVi and Sistema Digitale in Italy**) • A number of countries are considering **complementing DTT coverage** (for remote areas) **with free DTH services** (e.g. UK, France, possibly Italy) • In some countries incumbent analogue channels benefit from **"must-carry" agreements** on alternative platforms such as cable (in many cases limited to the DTT transition phase): e.g. Spain, France and the US
Measures to protect competition	• Many countries have imposed **limitations to concentration**: - **Ownership restrictions on number of channels** (e.g. France, Spain, Italy, US, Australia) - **Obligation to sell spectrum** to third parties (e.g. 40% of spectrum in Italy) - **Cap on market share** (e.g. Italy)

Contents

About this section – Pros and Cons of main options



- **This section evaluates a number of possible options for discussion (hypothesis driven and not exhaustive) relating to each of the relevant regulatory elements to inform the development of a future guiding framework for DTT**

- The options presented have been developed on the basis of:
  . the lessons learnt from international best practices
  . the consideration of specific peculiarities of the Chilean market context

- Options are evaluated against the key prioritisation criteria discussed in the "Public objectives" chapter of this report; this evaluation provides the basis for the recommendations section

- The development of a regulatory framework to guide the transition to digital terrestrial television is, however, a highly complex task that will require:
. further in depth analysis of market implications
. evaluation of legal implications
. further extensive economic modeling

Open questions discussed in this chapter

Regulatory element	Open questions
Regulation on technical aspects	• Is there a need for regulatory intervention on technical aspects related to DTT roll-out such as compression standards or STBs*? • Is there a need for regulatory intervention on technical aspects related to DTT roll-out such as SFN or MFN?
Spectrum allocation	• Should all spectrum currently available be allocated for DTT? • How should the new digital licences be structured by channel or by multiplex (6MHz) • How should concessions be structured to account for different requirements at national vs. regional level? • How should Spectrum be allocated among players?
License duration and obligations	• How long should the digital licenses be granted for? • Are reach obligations required to guarantee widespread coverage and avoid digital divide? • Are obligations required to guarantee a minimum FTA offering to all Chileans? • Are obligations required to guarantee increase of channel offering? • Are obligations required to guarantee the development of specific programming such as regional or thematic content?
Business Models	• Should pay models be introduced for DTT and should they be subject to ad hoc regulation?
Industry Structure	• Is there scope for separation of transmission vs. broadcasting licenses?

•Definition of technology standard for DTT transmission (e.g. DVB vs. ATSC vs. ISDB) is beyond the scope of this project and as such will not be covered

Is there a need for regulatory intervention on technical aspects related to DTT roll-out such as compression standards or STBs*?

Preferred option

Background	Options	Benefits / Drawbacks
• Different **compression / modulation technical decisions** will influence: - the amount / quality of channels that can be broadcasted within a single multiplex - the initial consumer price of Set Top Boxes (bearing in mind that pricing is likely to drop significantly over time as international scale is built) • The **STB** could become a **means** for specific operators **to restrict competition** for a pay TV offer	• **Ensure basic entry level STB availability** through regulation imposing low compression standards	• Availability of low price STBs is a key success factor for DTT and low compression standard STBs bear the lowest prices • Imposing low compression standards, however, seems inefficient as future developments may require consumers to bear cost of upgrades • Low compression standard may alienate TV industry interested in HDTV
	• **Impose advanced technology standard** (e.g. mpeg4 for pay TV in France)	• Ensures support of TV industry • In the short run is likely to be more expensive in terms of STBs for the consumer but prices of are bound to fall over time • May require support through subsidies
	• **Recommend adoption of a common standard but leave full flexibility to broadcasters** in choice of technology	• Avoids risk of regulation restricting instead of fostering technological developments • Is in line with expectation of TV industry (key to support DTT) but… • May drive extra cost to consumer (prices of mpeg 4 STBs are higher, but bound to fall over time) • Imposes burden of alignment on standards to industry
	• Impose **unique standards for pay TV STBs** (where applicable)	• Obligations of technical nature may be needed to ensure STB does not become a barrier to competition (e.g. consumers could not easily switch / opt for several pay TV offerings)

* The definition of the technology standard for DTT (DVB vs. ATSC vs. ISDB) is beyond the scope of this project and as such will not be addressed

Is there a need for regulatory intervention on technical aspects related to DTT roll-out such as SFN or MFN?

Preferred option

Background	Options	Benefits / Drawbacks
• **SFN** broadcasting is approximately double as efficient as **MFN** broadcasting • **SFN is an ideal end-state objective** but most countries have not imposed this in the early stages of DTT roll-out • **MFN** is required **for regional/ local channels**	• **Leave** SFN vs. MFN **decision to broadcasters**, but incentivise SFN adoption	• SFN implementation would impose higher implementation costs and complexity to broadcasters and may require government incentives (e.g. opportunity to keep spectrum gains) • If spectrum constraints are not a key issue, band efficiency considerations may be a second level priority • SFN broadcasting may be set as a priority criterium in awarding future spectrum
	• **Mandate SFN**	• Would ensure maximum efficiency of spectrum usage in particular for "capacity hungry" services to ensure enough spectrum is allocated to other services but is complex/costly and an imposition would alienate the TV industry • Has not been imposed in benchmark countries (except for in Spain) • MFN required for regional / local channels

Should all spectrum currently available be allocated for DTT?

Preferred option

Background	Options	Benefits / Drawbacks
• **UHF band** is almost **fully available** for possible allocation of ~30x6Mhz MUXs (channels 21-52) • Due to current **MFN transmission**, however, this translates into lower **effective capacity** (approximately 2:1 efficiency ratio) • **A number of channels** (52 and above) has been earmarked **for Mobile TV and Wimax** • Following **analogue switch-off further VHF frequency** will become available (~7 MUXs) • **Band allocation** to DTT needs to **address requirements** for: - FTA and (possible) pay services - SDTV minimum offer and HDTV - Interactive and convergent services	• **Earmark full UHF spectrum available for DTT** assigning all available UHF spectrum ***Example:*** *• 5 Muxs (1 for each national analogue player)* *• 3 MUXs for regional channels* *• 8 further MUXs to be allocated on beauty contest basis:* *- for new players (subject to conditions)* *- for existing players subject to objectives* ***Note**: MFN usage will require incremental capacity to ensure above allocation*	• Allows simulcasting of minimum current standard TV offering but incentivises broadcasters by providing opportunities for increased service offering (e.g. HDTV or pay) in order to obtain TV industry support
	• **Require incumbents to return analogue VHF frequency post ASO** and freeze for later usage	• Incremental spectrum freed up and made available for the regulator for future usage
	• **Freeze part of UHF spectrum for alternative usage (not DTT)**	• Provides regulator greater flexibility to steer future usage / market developments but runs risk of being lost opportunity to ensure full support to DTT roll-out

How should the new digital licences be structured by channel or by multiplex (6MHz)?

Preferred option

Background	Options	Benefits / Drawbacks
• **Current concessions** relate to "broadcasting 1 FTA analogue signal in a specific area" • **Digital technology allows to broadcast multiple signals using the amount of band required by an analogue signal** • This drives the **need to choose whether to structure a concession "by signal"** (equivalent to one consumer TV channel) **or by "multiplex"** (allowing the broadcaster to transmit more than one TV channel within its multiplex)	• **Allocate licenses by multiplex where possible** (6MHZ bundles): - Entire multiplex allocated to each broadcaster - Use of spectrum within multiplex may be subject to public policy obligations	• Has been among success factors of DTT roll-out in the UK and Italy, as the system carries the benefit of ensuring strong support by incumbent broadcasters • Enables broadcaster to manage entire multiplex without need for creation of a new entity (multiplex operator) • May lead to "waste" of spectrum or usages not necessarily in line with public policy objectives (e.g. use of full MUX for HDTV broadcasting) but this can be addressed by imposing public policy restrictions
	• **Allocate licenses on channel basis** ***For regional channels:*** • *Assignment of full MUX is likely to be inefficient* • *Requires possible assignment of spectrum by channel and creation of multiplex operator*	• Enables regulator to maintain more control on frequency utilisation • May be preferred in systems where frequency is significantly constrained • Limits flexibility for broadcasters to transmit multiple channels either in SDTV or HDTV, potentially hampering broadcaster support to country digitalisation • Allocation by channel imposes the creation of a new entity (multiplex operator) adding a layer of complexity

* Spain will move to allocation by MUX as spectrum becomes available following ASO

How should concessions be structured to account for different requirements at national vs. regional level?

Preferred option

Background	Options	Benefits / Drawbacks
• There is **no current distinction between national and regional** licenses with national service resulting from a "collection" of area-specific concessions • The **only reference to regional broadcasting in current regulation is provided by CNTV**: regional broadcasters are those having a maximum of 3 transmitters within 1 administrative region or 2 adjacent regions • The objective of **developing regional / local content** is considered to be a key **success factor**	• **Distinguish between national and regional** licenses • Option requires **definition of national vs. regional licensing**: - CNTV definition - Usage of reach market share (e.g. for coverage of >80% of population requirement for national license) - May require specific regulation to define the "Santiago" regional broadcasters given high population concentration	• Enables a special framework (with dedicated spectrum) for regional broadcasters (both support or obligations in line with public policy objectives) to develop regional players / offering
	• **Maintain unique concession** • **Oblige MUX license holders to provide spectrum to regional / local players** (e.g. in Italy 40% of spectrum needs to be sold to 3rd party players)	• Risk of not delivering on public objective

* Possible options to favour development of regional channels covered further on in the document

How should Spectrum be allocated among players?

Preferred option

Background	Options	Benefits / Drawbacks
• Currently **allocation of licenses occurs by tower** (specific area) following approval of technical plan • **Spectrum allocation for digital may occur**: - by direct assignment - by beauty contest - by auction • **Allocation system needs to address**: - requirement by analogue channels having to manage transition to DTT - possible demand from new entrants - public policy objectives: . regional / local programming . offer diversity . reach objectives - requirements for possible pay TV services	• Allocate spectrum on MUX basis for FTA service to incumbent analogue TV channels for free (1 for each) by **direct allocation** (may be subject to obligations) • Make available further MUXs (for national or regional programming) on **beauty contest basis**: - Needs clear definition of transparent criteria for beauty contest	• Gains support of incumbent broadcasters • Provides scope to recover analogue licenses following ASO • Allows market opportunity for new entrants (both at national and regional level) and to attach conditions (for public policy objective achievement) to allocation of license
	• **Allocate all available MUXs** (e.g. 2 each) **to incumbent players (free direct allocation) setting obligations to sell a portion** to 3rd party players (e.g. as in Italy)	• Provides industry support, but opens opportunities for "small" new entrants • Ensures that no incremental towers are built • Needs provisions to define 3rd party players that may acquire spectrum to ensure alignment to public policy objectives
	• **Allocate 1 MUX to incumbents and offer incremental spectrum on auction basis**	• Would provide funding to support digital transition • Would not enable to support public objectives unless dedicated funding is allocated to support them • Seems not appropriate given ample spectrum availability and economic environment (cost for incumbents)

How long should the digital licenses be granted for?

Preferred option

Background	Options	Benefits / Drawbacks
• **Licenses currently granted either on "in perpetuity" or "for 25 years"**, limiting negotiation power of regulator vs. TV industry • This compares to **more limited periods of time (5-15 years) for TV concessions in some of the benchmark countries**, providing the regulator with the opportunity to make the renewal of licenses dependent on specific conditions (public policy)	• **Grant new licenses for unlimited period of time** as per current analogue regulation, maintaining Chilean exceptionality compared to benchmark countries	• Would limit regulators ability to intervene to correct possible market distorsions • Provides certainty for TV industry business plans / return on investment
	• **Allocate new licenses for finite period of time taking into account international benchmarks and Chilean context (10-25 years)** - Requires upfront definition of transparent rules on renewal criteria	• Seems acceptable compromise providing reasonable certainty for TV industry business plans / return on investment and flexibility to regulator • Is closer to benchmark countries and accounts for perceived risk factor (e.g. negative experience of Venezuelan regime revoking concessions)
	• **Grant new licenses for period of time of 5-10 years**	• Would create strong tension with TV industry hampering support to DTT

Are reach obligations required to guarantee widespread coverage and avoid digital divide?

Preferred option

Background	Options	Benefits / Drawbacks
• Currently **analogue services cover ~80% of households** • Upgrade of networks to digital requires investment in new infrastructure with **significant investment for broadcasters to reach similar coverage** to analogue TV • Considering that a key pillar of digital transition is providing FTA TV for all, the **regulator may make digital license concession dependent on coverage targets** (to be achieved over time) • **Regulators have lately relaxed initial stringent target setting for CSBs** proven to be unrealistic	• **Leave coverage roll-out to broadcasters**	• Considering the high concentration of the Chilean population it is not economically advantageous for broadcasters to invest in coverage of the population in more remote areas of the country
	• **Impose minimum coverage targets** as condition for license awarding. E.g. - 50% after 2 years - 80% after 4 years • Objective should be that of **reaching full coverage by ASO target date** • **Targets should not be excessively stringent in the short term** but should be managed over relatively long period of time • Base for targets should be **consideration of current analogue coverage**	• Avoids risk of digital divide between Santiago / high population density areas and the rest of the country • Target coverages have been imposed by major regulators in the benchmark countries and have contributed to the successful growth of DTT
	• In a multiplatform environment, full coverage of DTT may not be required with **satellite possibly to be considered in providing coverage to those areas** (e.g. last 10% of population) **not receiving DTT** as ASO target date approaches	• This would address the fact that the cost of providing DTT coverage to the last 10-15% of the population is disproportionately high • Regional programming, however, would be an issue (DTH broadcasts one signal to all) ***Option to be evaluated***

Are obligations required to guarantee a minimum FTA offering to all Chileans?

Preferred option

Background	Options	Benefits / Drawbacks
• **FTA digital TV for all is a key pillar** of digital TV roll-out • The **most successful international experiences** in digital roll-out have been **related to FTA models**, following the failure of a number of pay-only models (Ondigital / ITV digital in the UK, Quiero in Spain) • There is a **trend** underway **towards allowing hybrid models** subject to a main FTA offering • TV **broadcasters** may be **tempted to utilise frequency for frequency-heavy applications** or leave capacity idle	• Mandate that **spectrum awarded directly is mainly used for FTA** • **Impose simulcasting in SDTV** for current analogue channel offering • Allow **flexibility on use of remaining spectrum**: - HDTV or - Pay offering (possibly subject to obligations)	• Provides continuity of current offering guaranteeing that all Chileans will be able to access at least current offering of FTA TV through digital • Allows minimum FTA channel offering • Offers equal opportunity to all to provide possible pay offering *Minimum FTA channel requirement definition requires further analysis*
	• Leave **full flexibility on business model choice** to broadcaster	• May hamper development of diverse offering, FTA digital TV for all and DTT take-up • May lead to failures like initial UK and Spain models

Are obligations required to guarantee increase of channel offering?

Preferred option

Background	Options	Benefits / Drawbacks
• **Increase of number of channels** is a **key success factor** for the DTT launch • A **conflict of interest** may arise whereby **incumbent TV players** may **dedicate extra frequency to HD broadcasting** as opposed to increasing channel offering • The **regulator may therefore mandate the number of channels** that needs to be broadcast • The regulator may also **mandate that a minimum number of channels is made available on FTA basis to ensure minimum free offering to all**	• **No obligation on number of channels** • **Mandate hand-back of frequency if not utilised** within defined time-frame	• Risk of no/limited increase of number of channels (could be all HDTV)
	• **Mandate transmission of at least 1 FTA channel** (simulcasting) per MUX on SDTV (same channel offered in analogue) • Other than this, **leave flexibility to broadcasters** on number of channels to broadcast and on choice of allocation of capacity to SDTV vs. HDTV • **Support new channel development** through: - **Earmarking of multiplexes for regional / local programming** (allocation via beauty contest) - **Earmarking of multiplexes for new entrants** (allocation via beauty contest) - **Central funding for content** (e.g. niche or thematic) • **Mandate hand-back of frequency if not utilised** within defined time-frame ("Use it or lose it")	• Ensures minimum offer of FTA channels open to all population • Favours support by TV industry (focus on HDTV) • Increase of channel offering addressed by specific regulation (e.g. dedicated multiplexes) without imposing excessive burden on commercial broadcasters • Economics of TV industry seem not to allow much space for launch of new channels (risk of reducing quality) *Minimum channel requirement definition requires further analysis*
	• **Mandate transmission of at least 1 FTA channel** (simulcasting) per MUX on SDTV • **Impose sale of fixed percentage of MUX** to independent FTA channel players (e.g. Italy example)	• Risks alienating TV industry as limits HDTV opportunity • Assures multiplication of channels but bears risk of entrance of unappealing channels

Are obligations required to guarantee the development of specific programming such as regional or thematic content?

Preferred option

Background	Options	Benefits / Drawbacks
• In most of the benchmark countries **specific public service needs are set as public remit for Public Service Broadcasters** as a condition to access state funding (license fee) • **Most of the benchmark countries impose content conditions** to their TV licenses such as **quotas for national production** • The **national TV in Chile does not receive public funding** and is operated via a commercial TV business model so it is **more difficult to impose content requirements** • **Analogue TV licenses** bear the obligation of a **40% local production quota**	• **Leave development of genre / regional diversity to market forces**	• Avoids imposition of genres to broadcasters in delicate DTT transition period • Misses out on key public policy objectives
	• Impose **obligations in terms of development of specific / thematic content**	• Would ensure development of such content • Seems to be an excessively invasive measure on broadcasters' business
	• Support **thematic content through central funding**	• Supports development of thematic content without risk of geopardising broadcater business • Some specific content genres are unlikely to develop by market forces (rationale for PSBs)
	• Maintain **quotas for national production** • As part of the specific regulation linked to regional TV licenses **impose quotas for relevant local content and local production:** - Requires separation of national vs. regional licenses	• Ensure development of regional / local content • Supports development of regional / local TV industry (own production centres, …)

Issues to be addressed in developing plans to promote regional/local channels

Spanish example

FOR DICUSSION

Define target regional model	Define spectrum reservation model	Define license allocation method to regional players	Define transmission model
• Define objectives of regional/local channel development (e.g. relevant groupings, target number of channels, …) • Define desired degree of independence of local operations	1 • Reserve full MUXs for regional programming	A • Assign local licenses by programmes/channels (content providers) • MUX operator license assigned to 3rd party	i • Transmission to be managed by regional consortium through investment in owned towers
		B • Favour development of regional consortiums that would apply directly for a MUX operator license	ii • Contract transmission to 3rd parties (new or incumbent network operators)
		C • Assign MUX to major regional player but allow entry to new players within region (space to be made available on MUX)	
	2 • Allocate extra MUX(s) to existing national players (PSB?) to be made available to regional players	• Assign regional/local licenses by channel • MUX operator license to be provided to existing national players (with obligations to provide spectrum usage to regional/local players)	• Transmission to be carried out by incumbent as part of public remit

Should pay models be introduced for DTT and should they be subject to ad hoc regulation?

Preferred option

Background	Options	Benefits / Drawbacks
• **Pay-centred models developed in the UK and Spain have not been successful** and take-off of **DTT** services has been **driven by** the launch of a significant **FTA** offering • **Hybrid models with a pay TV element, however, seem to be an interesting opportunity for incumbent analogue broadcasters** and may represent an incentive to further support DTT roll-out	• The **regulator mandates that a minimum number of channels is made available on FTA** basis but leaves choice of business model to broadcasters that may dedicated specific frequencies for pay • **The pay TV option is embedded in the license**, although some limitations may be included	• Guarantees minimum FTA offering but leaves broadcaster the flexibility to start a pay business • Pay models are a key opportunity for terrestrial broadcasters to push DTT • Profitability of pay models (e.g. Italy), however, still needs to be proven
	• **Dedicate separate MUX for pay business and regulate on ad hoc basis**	• Enables to manage development of pay services under tighter control • Allows development of consistent standards for pay TV services (e.g. standard STBs for all pay services) • Requires joint management of pay TV service transmission and increases system complexity
	• **Pay licenses may be allocated on auction basis**	• Enables to generate “treasure chest” to support digital transission: - Subsidies for STBs - Funding for content • Profitability of pay models (e.g. Italy) still needs to be proven (especially in light of strong competition from alternative platforms)

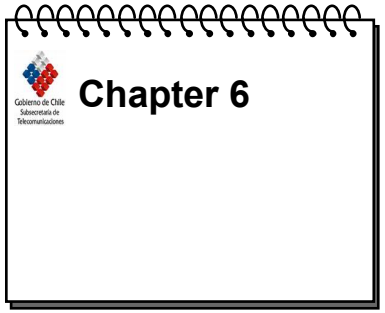
Is there scope for separation of transmission vs. broadcasting licenses?

Preferred option

Background	Options	Benefits / Drawbacks
• In most of the countries surveyed **licenses for content providers are separated from licenses for transmission service providers** (in some cases, there is a **further separation between content providers and MUX operators**) • **In Australia the separation** of of licenses **has facilitated industry shift away from vertical integration** • **In Italy** the **regulator has recently imposed the above split forcing vertically integrated players to separate transmission operations from a Legal Entity point of view** to facilitate access to transmission by third parties	• **Separate transmission concession from content provider** concession • **Allow incumbents to sell transmission services** • Possibly mandate legal entity separation of transmission operations (to be evaluated)	• Separation: - Provides new revenue opportunities for incumbents - Provides support to new entrants (reducing barriers to entry) - Facilitates possible decision by broadcasters to share transmission towers • May lead to system benefits: - Cost level (e.g. in Italy broadcasters are considering to spin-off their transmission infrastructure to create a unique broadcasting infrastructure jointly managed) - Environmental impact • Imposes burden on TV industry
	• **Maintain unique license**	• Is against general trend observed in benchmark countries • Requires new entrants or regional players to set-up their own transmission equipment, which may limit number of channels (barrier to entry)

Contents

About this section – Recommendations



- **This chapter draws the overall conclusions incorporating the understanding of the local context with the lessons learnt from the international benchmarks. A number of recommendations are made (principles and guidelines) to guide the development of the future regulatory framework**

  - Summary of key conclusions by framework element

  - Indication of immediate next steps

Recommendations:
Regulation on technical aspects*

Lessons Learnt from benchmark

- Regulators have mainly followed a technology neutral policy minimising intervention
- The SFN objective has generally been considered but subordinated to other priorities (e.g. MFN required to support regional channel offering)
- Interactivity seems to suffer from limited consumer interest (despite MHP standard imposition)
- Common standards imposed for Pay TV offering (but selection of standard left to the industry)

Chilean ingoing situation

- Ample spectrum availability
- MFN may be important for regional coverage
- Possible trade-offs between:
  - Need to ensure affordable STBs
  - Need to ensure multiple channel offering
  - Objective of efficient use of spectrum
  - Minimisation of conflicts with established TV players
  - Requirement to develop interactive services

Recommended guidelines for framework

- **Limited intervention** recommended on compression standard:
  - Encourage **common compression standard** but leave definition of compression standard to industry
  - **Avoid forcing lower technology** standard for **STB** cost considerations
- Set **common standard for Pay TV** to avoid STBs becoming barrier to competition, but leave choice of standard to the industry
- Maintain SFN as a future objective but **allow MFN** given complexity and cost impact of SFN transition and public policy objective of regional/local channel development
  - possibly define **incentive mechanism** for national broadcasters to implement **SFN** (e.g. additional spectrum, criteria for awarding extra frequencies)
- Leave **interactive service development** opportunity **to the market**, if having to face tradeoffs
  - Possibly consider public funding to incentivise service development

* Choice of DTT standard (DVB/ATSC/ISDB) out of project scope

Recommendations: Spectrum allocation

Lessons Learnt from benchmark

- Allocation of full MUXs where spectrum available
- Preference granted to incumbents
- MUXs reserved to regional channels where regional/local content is key policy objective
- Spectrum allocation through direct award or beauty contest

Chilean ingoing situation

- Ample spectrum availability
- Need to pursue “win-win” solutions to involve TV industry in driving DTT, also in light of limited funding available to support DTT
- Requirement to support and develop regional channel offering

Recommended guidelines for framework

- **Allocate all available UHF spectrum** (except for frequencies already earmarked for Mobile TV and WiMAX) to facilitate the DTT transition
- **Directly assign full MUX to national incumbents** (e.g. players with >80% coverage)
- **Reserve MUXs for regional channels**
  - Allocation will require detailed **definition of a comprehensive model for regional / local channels in Chile,** including:
    - definitions (national vs. regional, analogue vs. cable)
    - possible distinction between regional and local
    - specific licenses (channel vs. MUX operator licenses)
    - related obligations
    - access to spectrum (e.g. by channel within reserved MUX)
    - access to transmission (e.g. own transmission or via third party service providers)
    - possible supporting measures
- **No specific MUXs** for **Pay TV or HDTV**
- Make available **incremental MUXs on beauty contest basis** subject to public policy criteria
- **Digital dividend** to be **handed back and reserved for future allocation** (not necessarily DTT)

Recommendations:
License duration and obligations

Lessons Learnt from benchmark

- Licenses mainly awarded by player not by tower
- Separation of licenses/authorisations between content providers and transmission service providers
- Specific regional/local licenses where the promotion of regional/local channels is an objective
- No licenses granted in perpetuity
- Reach targets set (more ambitious for PSBs)
- Simulcast of analogue channels mandated
- Obligation to utilise assigned frequencies
- Quotas for both national and regional (where regional channel development is key) content
- Limited genre obligations (other than PSB remit)

Chilean ingoing situation

- Current analogue licenses allocated “by tower”
- Unique analogue TV licenses without separation between national or regional
- Vertical integration
- Strong push on HDTV by established players
- Chilean PSB receives no public funding
- Current quotas for national production not for regional

Recommended guidelines for framework

- **Review licensing system to account for need to separate digital licenses** between:
  - Regional and National
  - Content providers, MUX operators and Transmission service providers
- **Grant licenses for finite period of time (10-25 years)** defining transparent renewal policy
- **Mandate minimum FTA SDTV offering per MUX** (e.g. simulcast of existing analogue channel)
- **Allow flexibility to license holders** on HDTV, interactivity or Pay offers
- **Mandate usage of frequencies to avoid “waste” of spectrum** (“Use it or lose it” regulation)
- **Impose coverage obligations** to be achieved over time (no distinction between PSBs and CSBs, unless specific incremental funding provided)
- **Maintain current quotas for national production**
- Impose specific **content / production obligations for regional channels**

Recommendations: Business models

Lessons Learnt from benchmark

- Mainly FTA models with recent (European) trend toward hybrid
- Solid FTA offering is key success factor for DTT take-up with Pay TV attractive only where channels are able to compete with cable / satellite on content
- Incremental government funding to support DTT
- Public funding to PSBs up to 1/3 of total TV advertising revenues in some markets

Chilean ingoing situation

- Key objective of granting free DTT for all
- Limited incremental funding available to support DTT
- Need to pursue “win-win” solutions to involve TV industry in driving DTT
- Central “content support budget” is only 1% of TV market revenues

Recommended guidelines for framework

- **Focus on FTA offering** but **possibly allow pay option (flexible licenses)** to incentivise TV industry
- Mandate **minimum number of FTA SD channels by MUX**
- **No** specific requirement for **specific pay license or dedicated MUX**
- **Possibly allocate incremental government funding**:
  - **Mainly to support content** (e.g. regional or public service) through **central fund available to all**
  - **Possibly** to support:
    . marketing
    . Infrastructure costs (national or regional)
    . purchases of STBs (last resource possibly to be considered as country approaches ASO date and if market does not react as desired)

Recommendations:
Impact on industry structure

Lessons Learnt from benchmark

- Regulators have facilitated value chain optimisation through license separation between content providers, MUX operators and transmission service providers
- Infrastructure efficiency allows channel focus on content

Chilean ingoing situation

- Vertical integration leading to possible inefficient infrastructure investments

Recommended guidelines for framework

- **Separate licenses between content provider licenses and network operator** licenses to **facilitate possible creation of independent / separate players** dedicated to transmission
- **Allow transmission service provisions** to third parties
- **Consider possible benefits of facilitating legal entity separation of transmission networks** to facilitate creation of transmission service providers (recommended only if fair price competition is an issue)

Recommendations:
ASO planning / Competition protection measures

Lessons Learnt from benchmark

- Specific dates for ASO defined (5-10 year transition period)
- Adoption of regional approach to ASO
- Further specific measures to support DTT including:
  - creation of industry-wide consortiums
  - imposition of iDTV sets
  - DTH as means to complement DTT coverage for remote areas
  - support to established players through must-carry agreements imposed to cable / DTH channels
- Specific measures in place to protect competition

Chilean ingoing situation

- 1 license only allowed per service area (strong limitation to market power)
- Strong concern about possible industry concentration (e.g. radio example)

Recommended guidelines for framework

- Set **ASO target 6-10 years** post DTT launch
- **ASO** to be managed on **region-by-region basis**
- Facilitate creation of **dedicated cross-player body** (e.g. Digital UK)
- **Evaluate opportunity to complement DTT coverage with DTH** for last 5%-10% of population but initially focus on achieving maximum DTT coverage
- **Must-carry rights recommended** until ASO on cable
- In any case **explicit permission should be required to broadcasters to retransmit programming in order to protect IP**
- Define plan for **imposing deadlines to retailers for "digital ready" sets**
- Allow players to own >1 license but **define alternative measures to minimise concentration risk**.
  Examples may include:
  - Limitation to number of channels owned
  - Impose sale of percentage of capacity to 3rd parties

Attachments

Country regulatory framework comparison: Technology Standards

	UK	Spain	Italy	France	Australia	New Zealand	US
Technology standard	• DVB	• DVB	• DVB	• DVB	• DVB	• DVB	• ATSC
Compression standard used	• MPEG 2 • Update to MPEG 4 highly likely	• MPEG 2	• MPEG 2	• MPEG 2 for FTA • MPEG 4 for PayTV	• MPEG 2	• MPEG 4	• MPEG 2
Imposed technology standards	• MPEG 2	• MHP	• MHP • Common access for PayTV	• MPEG-2 for FTA • MPEG-4 for PayTV • MHP	• MPEG 2 • MHP	• None	• None
SFN / MFN	• MFN • SFN plans post ASO	• SFN • Some regional MFN	• MFN • SFN plans post ASO	• MFN	• MFN	• MFN	• N/A
Bandwidth per MUX	• 8	• 8	• 8	• 8	• 7	• 8	• 6

Country regulatory framework comparison: Spectrum Availability and Allocation

	UK	Spain	Italy	France	Australia	New Zealand	US
Multiplexes allocated to DTT	• 6	• 5 national • 1 regional	• 7 • RAI (PSB) has 1 MUX dedicated to regional programming	• 6 • 1 regional MUX for Paris only	• 5	• 3 currently allocated • 1 reserved for future allocation	• N/A
Awarding method	• Direct award (1 MUX to BBC) + Beauty contest (for others) • Digital dividend will be assigned either by auction or by beauty contest	• Direct award to established players + Beauty contest for new entrants	• PSB awarded incremental MUX • No incremental frequency assigned to CSBs • Broadcasters allowed to purchase frequency from local players to build MUXs for digital	• Direct award to PSBs • Beauty contest for others	• Direct award	• Direct award	• One MUX assigned to each broadcaster to replace analogue frequency • All new licenses are auctioned
Frequency allocation (by channel or by MUX)	• MUX	• Channel pre DSO • MUX post DSO	• MUX	• Channel	• MUX	• MUX	• MUX
Analogue frequencies post ASO	• To be handed back to regulator and reassigned (auction or beauty contest) for multiple purposes (not only DTT)	• Already allocated to broadcasters for DTT	• To be handed back to regulator and frozen	• To be handed back to regulator and reassigned to DTT	• To be handed back to government (no allocation plans yet decided)	• To be handed back to government (no allocation plans yet decided)	• To be handed back to government and auctioned to use for multiple purposes (communications services, advanced wireless services, regional state and local public safety agencies uses)

Country regulatory framework comparison: Licensing and Obligations

	UK	Spain	Italy	France	Australia	New Zealand	US
Digital license duration	• 12 years	• 10 years, automatically renewed at end of term	• 12 years	• 10 years, renewable once for a period of 5 years. Further 5 years granted subject to coverage target achievement	• 5 years, automatically renewed	• 20 years	• 8 years
Separate licenses for regional broadcasting	• No	• Yes	• No	• Yes	• Yes	• No	• No such thing as a national license; all licenses are for a DMA, a region/service area
Separate licenses for frequency usage vs. transmission	• Yes	• Yes	• Legislation mandates separation between content provider and transmission license • Legal Entity separation mandated: broadcasters need to create separate LE for tower business	• Yes	• Yes	• No	• No
Coverage obligations	• 90.5% for all 6 MUX by 2012. 98.5% for 3 PSB by 2012	• Year 1: 80% for established players and 25% for new entrants • Year 2: 80% for new entrants • Year 4: 90% • Year 6: 95% for CSBs and 98% for PSBs	• 70% for RAI after 3 years • 50% for others after 3 years • Maximum coverage obligation 80% • Government funding to PSB to extend to 98%	• Originally 85%, but changed to 95% by 2011 • Coverage obligation expressed in terms of number of transmission sites to be used for DTT • License renewal subject to achievement of coverage objectives	• Same coverage obligation as analogue: - Metropolitan area by 2008 - Regions by 2011	• Digital plans and coverage targets in NZ involve both DTH and DTT • Full coverage to be achieved through both platforms (DTT is expected to have 75% coverage but no reach targets)	• 85% in each DMA before ASO

Country regulatory framework comparison: Licensing and Obligations (cont.)

	UK	Spain	Italy	France	Australia	New Zealand	US
Channel related obligations	• Simulcasting FTA • 2 MUXs (ITV and ITV/Channel 4) have obligations in terms of spectrum usage (to be reserved for ITV, Channel 4, Channel 5 and S4C Wales programming) • BBC broadcasts BBC only channels • Spectrum needs to be fully used	• Simulcasting FTA • 4 channels per MUX recommended"	• Simulcasting FTA of existing analogue channels in SD	• Simulcasting FTA	• Each broadcaster must simulcast its analogue channel in SD • Limitations on new channels • 1 incremental HD channel allowed as of 2007 • 1 incremental SD channel allowed as of 2009 for CSB • No limitations as of ASO	• Under consideration	• Simulcasting FTA of existing analogue channels
Content obligations	• Quotas for national and independent production	• Quotas for local production	• Quotas for local production	. National players must dedicate 16% of their revenues to French productions . Local channels must air 3-4 hours of regional/local production a day . Paris incorporates both these conditions	• 55% Australian content	• No specifications yet	• None

Country regulatory framework comparison: Licensing and Obligations (cont.)

	UK	Spain	Italy	France	Australia	New Zealand	US
License trading obligations	• MUX operator licenses cannot be traded	• Can be freely traded, subject only to limits on concentration	• Limitations to avoid concentration	• Yes	• Licenses can be freely traded (subject to awarding conditions)	• Licenses can be freely traded	• Licenses must be reviewed by FCC before trading
Specific regulation for regional	• No	• 1 dedicated MUX • Channels: 50% state and 50% private ownership • 4 hours of local programming per day • Obligation not to syndicate more than 25% of programming • Own studios • In Catalunya 50% of content in Catalán	• Target end state spectrum allocation 60% national / 40% regional • Plan for possible allocation of 6 regional MUXs	• Specific local quotas	• 1 channel reserved for regional content	• None	• Some quotas in place at local level to promote local content
Other obligations	• Not >10% of MUX capacity may be used for content other than TV	• Not >20% of MUX capacity may be used for content other than TV		• Genre diversification has been a criterium for awarding incremental channels			• Other obligations

Country regulatory framework comparison: Business Models

	UK	Spain	Italy	France	Australia	New Zealand	US
Business Model	• Hybrid: • FTA mainly • Pay TV	• Licenses are mainly FTA • May allow for some Pay TV, limiting the time per day that is Pay TV	• Hybrid - FTA - Pay (Pay per view)	• Hybrid - Specific channels reserved for FTA and PayTV	• FTA	• FTA	• FTA
Separate licenses for PayTV	• No	• Authorisation probable in the near future	• No • Pay TV model allowed within digital license concession	• Yes	• No, FTA only	• No, FTA only	• No, FTA only
Government subsidies	• Increase in license fee partially dedicated to DTT transition	• Limited: - At end of 2005, Spanish government had invested €10m manly focusing on marketing - In 2007, they allocated another €20m to help DTT implementation	• Significant subsidies for STB take-up: - Funding for purchase of STB (€300m cumulative) - Tax breaks - 25% of proceeds from privatisation of PSB network may contribute to DTT development	• Funding for mainly directed to Network Operators	• US$1bn allocated over 10 years to help ABC and SBS convert to digital (not specific to transmission or content) • Specific funding for regional commercial broadcasters	• Subsidies given: - US$50 million for PSB to develop content - US$17 million for Freeview (Free DTH platform complementing DTT coverage) to offset simulcast costs	• Significant specific funding made available to manage DTT take-up: US$ 1.5bn government subsidy program for purchase of digital STB

Country regulatory framework comparison: Impact on Industry Structure

	UK	Spain	Italy	France	Australia	New Zealand	US
Industry structure	• Transmission carried out by 2 separate service providers (NGW and Arqiva) • Arqiva's acquisition of NGW subject to competition commission approval	• Transmission towers managed by Abertis	• Vertically integrated but legislation has imposed separation of transmission towers	• Transmission carried out by TDF, Antalis, Towercast (independent network operators)	• Vertically integrated 10 years ago, then changed to create network operators serving multiple channels (2 main players)	• Mix of vertically integrated and independent providers of transmission services	• Mix of vertical integration and independent transmission service providers - not all networks own and operate their own towers

Country regulatory framework comparison: Other

	UK	Spain	Italy	France	Australia	New Zealand	US
Initial legislation on DTT	1996	2000	2001	2005	2001	2006	1997
Start of current DTT rollout	2002	2005	2004	2005	2001	2008	1997
ASO target date	2012	2010	2012	2011	2010-12	2015	2009
Regional approach to ASO	• Yes	• Yes	• Yes	• Yes	• Currently being reviewed by Digital Australia	• Not yet been considered	• No
Measures to avoid concentration	• MUX operator licenses cannot be traded	• Limitations to 1 MUX per type of license in an area (e.g. National, regional and local)	• Ceiling for advertising sales (45%). • Broadcasters to sell 40% of frequency to independent players • Limits on how many television licenses a broadcaster can own	• A company can possess no more than 6 channels	• No restriction on share of advertising sales. Print, Radio and TV consolidation accepted but a minimum of 5 independent voices needs to be maintained in metropolitan areas	• None	• Multiple ownership rule apply: limitations to number of channels that can be owned in a DMA
DTH as means to complement coverage	• Partially, Freesat (BBC led)	• Unlikely, pushing for maximum DTT coverage including Government support if necessary	• Possibly being considered	• Yes, satellite to cover remaining 5%	• No	• Yes	• Yes

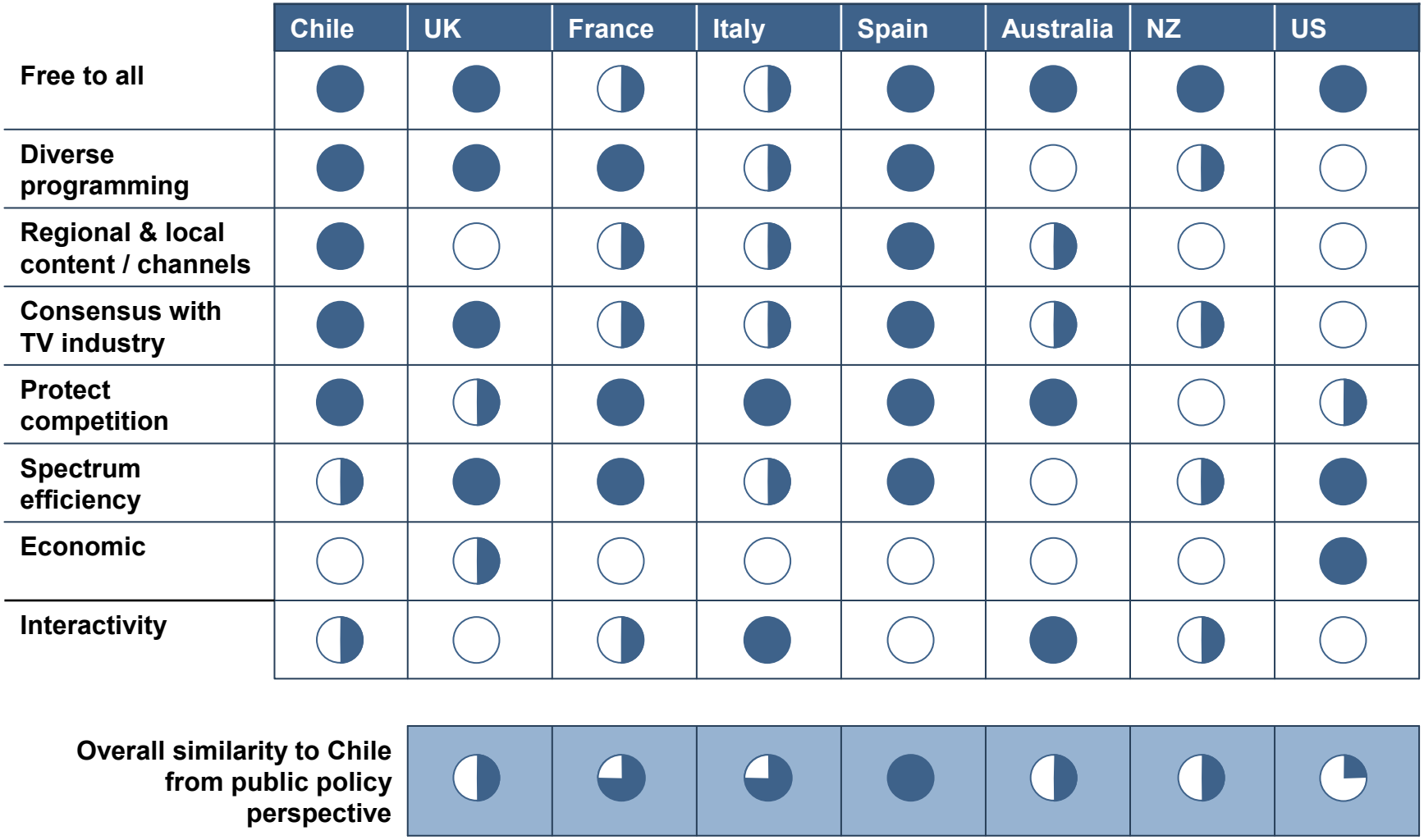
Country regulatory framework comparison: Other (cont.)

	UK	Spain	Italy	France	Australia	New Zealand	US
Must carry agreements	• PSBs must offer their channels to all main distribution platforms on FTA basis	• Must carry for the "established" analogue channels on cable network only until ASO	• No	• Distribution networks must broadcast the state owned TV channels, parliament channels and TV5 free of charge • FTA DTT channels have must carry right on cable for 5 years	• None	• No must-carry agreements currently in place	• Must-carry rights differ between cable and satellite - All broadcasters have a right to be carried on cable free of charge - Satellite must carry all broadcasters in a DMA if it carries at least one broadcaster
Other measuers to support DTT	• Marketing • Support to Digital UK consortium	• Marketing	• Distributors obliged to sell only iDTVs as of June 2009 • Industry wide consortiums created for joint management of process (DGTVi, Sistema Digitale)	• Distributors obliged to sell iDTV with DTT tuner as of March 2008	• Digital Australia consortium created to manage transition to digital	• Possible creation of Digital NZ	• Distributors obliged to sell only HDTV iDTVs from 2007
HDTV offering in DTT	• Trials	• Allowed in MUX subject to future Government guidelines (not explicit as yet)	• No (only tests underway)	• As of 2008, specific reserved MUX	• Yes: 20 hours/week of HDTV mandated by regulator	• There are plans for HD content, but no regulations yet in place	• Yes

From a pure public policy standpoint Spain seems to be the most relevant market followed by Italy and France

High priority
Medium priority
Lower priority

QUALITATIVE



Source: Interviews with country stakeholders, Spectrum analysis

Market forces alone may not be sufficient to drive DTT development requiring additional funding to be made available by the government

FOR DISCUSSION

Background

- The development of **DTT** networks involves **substantial switching costs** (both for broadcasters and consumers)
- Over and above **regulatory intervention to support broadcasters** such as:
  - Free award of spectrum
  - Must carry agreements on cable (e.g. France)
  - …
- …in many surveyed countries **further public financing** has played an important role in developing DTT

Sources of funding

- Increase in **end-user license fees***
- Earmarking of **country** fiscal year **budget**
- **Network sale**: in Italy, part of the proceeds of the privatisation of the PSB network (RAIway) will contribute towards DTT development

Destination of funding

Supply side funding
- Funding to broadcasters to support transition costs
- Funding to network operators
- Central funds made generally available to support specific content development
- Funding for creation of industry-wide bodies (e.g. Digital UK / Digital Australia) to support consensus management of the transition

Demand side funding
- Direct funding of marketing costs
- Support to consumers in purchase fo set-top boxes (e.g. Italy):
  - Direct contribution to purchase price of decoders
  - Tax breaks

Italy demand side funding:
- *$200m invested over 2004 and 2005 to fund consumer purchase of STBs*
- *20% fiscal detractions of the price of a purchase of a digitally enabled TV set (up to 1000 Euro and subject to payment of license fee) for all of 2007*

* In contrast to most countries surveyed the Chilean PSB is not supported by public funding (no TV license fee)

Further measures could involve supporting take-up of digital TV through natural equipment turn-over

FOR DISCUSSION

Imposing sale of digital TV sets only

- Further measures may include **defining a roadmap to stop sale of TV sets that are not "ready for digital"** (incorporated decoder) as of a specific date to manage take-up of DTT through natural TV re-purchase
- **Requires timely joint planning with HW manufacturers / distributors** to minimise industry impact

Italian case study

- **Italy has also imposed:**
  - Labelling of all analogue TV sets not ready for digital as of May 2008
  - TV set producers stop delivering analogue only TV sets to distributors by end 2008
  - No sale of analogue TV sets post June 2009

Acronyms used throughout the document

Acronym	Definition
ASO	Analogue Switch-Off
DSO	Digital Switch-Over
Digital Dividend	Frequencies previously used for analogue channels, which will become vacant once ASO occurs
PSB	Public Service Broadcaster
CSB	Commercial Service Broadcaster
DMA	Designated Market Area (US service areas)
FTA	Free-to-air
HH	Households
SFN	Single Frequency Network
MFN	Multiple Frequency Network
MHP	Multimedia Home Platform, standard for digital supplementary services (interactive services)
MPEG2 / MPEG4	Compression standards
MUX	Multiplex, group of digital TV channels or frequencies (6-8MHz blocks)
STB	Set Top Box
iDTV	Integrated Digital Television, television set with a built in digital tuner
EPG	Electronic Programme Guide

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