

# **Case Study**

**The Brazilian Digital TV Market**

**May 2010**

**Farncombe Technology Ltd**

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# 1. Executive Summary

After choosing to adapt the Japanese ISDB-T standard for its own digital terrestrial television (DTT) system, the Brazilian government has invested significant effort promoting the standard inside and outside Brazil.

The choice of the transmission standard started in 1999/2000, when a technical group formed by SET/ABERT has compared the technical performance of the ATSC, DVB-T and ISDB-T systems. The tests have found that ISDB-T had better signal propagation, robustness and lower interference levels, and Brazil has chosen an adapted version of the Japanese system, baptized SBTVD (Brazilian Terrestrial Digital TV System in Portuguese).

DTT was switched-on in December 2007 in São Paulo, and has expanded since then: 29 of the largest metropolitan areas in the country have switched on at least one DTT channel, and the standard has also been selected by Chile, Argentina, Venezuela, Ecuador, Peru and Costa Rica. In addition, prices of DTT receivers have decreased significantly and many integrated TV sets and mobile TV handset models are available. The 5 major national broadcasters are now simulcasting their analogue channels in DTT, with many programmes in HD, in at least the 3 largest Brazilian cities. The first device with the Ginga middleware, a LG DTT set, was launched in the market last month, and broadcasters are planning to launch Ginga applications during the World Cup.

However the rollout has not gone entirely to plan. The implementation schedule is delayed, as DTT has not yet been launched in 5 Brazilian state capitals; Ginga-J's specifications were just published, with a delay of almost 2 years; set-top-boxes are difficult to find in retailers, and more expensive than the government had hoped for—the cheapest model found by Farncombe (a standard definition decoder) cost between US\$146-US\$190 depending on the store, and we could not yet find any external decoders in the market with Ginga installed. In addition, most of the cities covered by DTT only receive one or two digital channels.

Forum SBTVD, the entity responsible for managing the DTT transition, estimates that 2 million DTT devices have been sold. Many of these devices are portable TVs, USB pen drives and mobile handsets able to receive DTT, or large integrated TV sets—since January 2010 TVs with 32" screens and over are mandated to include digital tuners. As all private DTT channels broadcast in HD, there is widespread confusion between DTT and high-definition—in the last visit conducted by Farncombe, most retailers were using "Digital TV" and HD interchangeably.

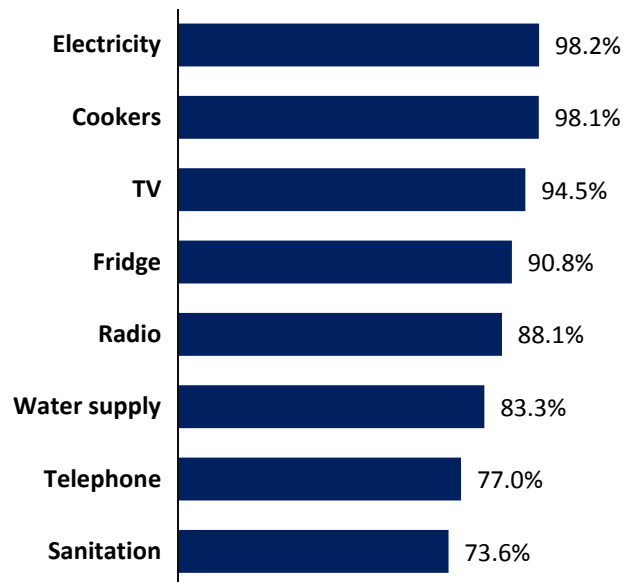
Farncombe estimates that approximately 2% of Brazilian TV households have a fixed DTT receiver, many of them large integrated TV sets. Given the expected overlap between ownership of large screen TVs and pay TV subscription i.e. high-income households, it is likely that many of these TVs are used mainly to watch pay-TV (cable or satellite).

Farncombe believes that careful planning to ensure the platform's attractiveness to viewers is more important than the choice of transmission standard (ISDB-T, ISDB-TB, DVB-T or DVB-T2), which can have very similar end-user functionality depending on the network configuration. We consider that the incentives to make available mobile TV handsets can create an interesting additional market for Brazilian broadcasters in the medium to long term, as it can create an additional audience to free-to-air services. However, we believe that the major challenge to the Brazilian DTT service is the current lack of differentiated content compared to analogue TV, and that the lack of affordable set-top boxes creates an important barrier to the widespread adoption of the service.

## 2. Overview of the Brazilian Broadcasting Market

Television is one of the most widely available consumer goods in Brazil. There are an estimated 53 million TV households in the country, a penetration of approximately 94.5% of total households as shown in Figure 1.

**Figure 1: Household Penetration of consumer goods and infrastructure in Brazil.**



Source: IBGE PNAD 2007

Brazilian terrestrial broadcasters have developed competing transmitter networks through their own or franchised (or “affiliated”) networks. This has led to replication of infrastructure, and different coverage areas by service.

### 2.1 Free-to-air

There are 5 major national Brazilian free-to air (FTA) networks (TV Globo, Sistema Brasileiro de Televisão (SBT), TV Record, RedeTV and Bandeirantes), each one assigned with one analogue and one digital 6MHz multiplex. By the end of 2009, there were a total of 498 main TV transmitters and 10,208 repeating towers in Brazil.

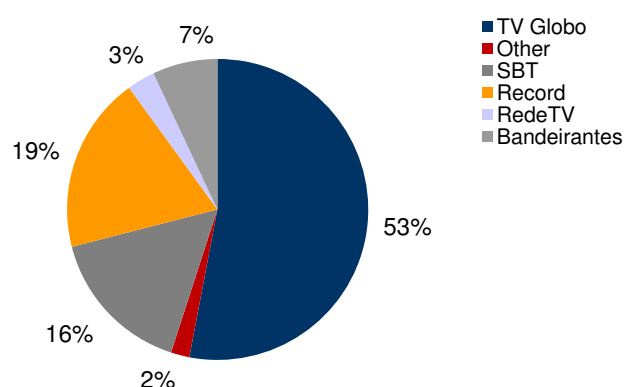
**TV Globo** and its affiliates form the largest broadcasting network, with 122 main transmitters and covering practically all TV households in the country with analogue TV. TV Globo has more than half of the total TV audience and received approximately 70% of advertising revenues in 2009, according to Projeto Inter-Meios. Globo is controlled by the Marinho family which owns 100% of the company shares, and also has a stake on the largest pay TV cable operator Net TV.

**Figure 2: Coverage of major broadcasting networks**

TV network	TV households covered
<b>Globo</b>	99.6%
<b>SBT</b>	95.5%
<b>Record</b>	93.2%
<b>Bandeirantes</b>	87.9%
<b>RedeTV !</b>	80.8%
<b>Gazeta</b>	25.9%
<b>CNT</b>	35.6%
<b>MTV</b>	60.5%

Source: Grupo de Midia/ Midia Dados 2009

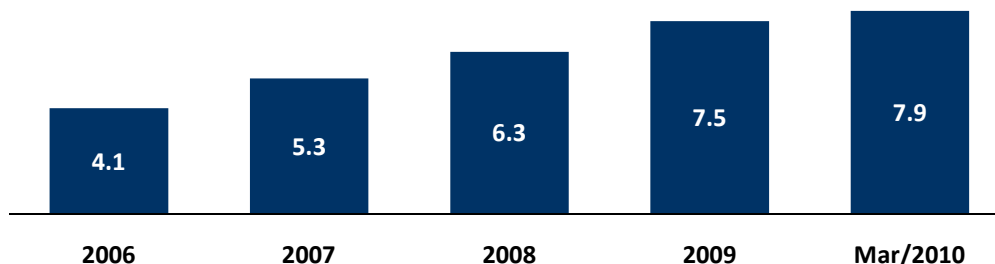
There are also several regional channels and national public broadcasting channels (e.g. TV Brasil, TV Senado, TV Câmara) which have a very low share of total audience.

**Figure 3: Brazil Share of Free-to-Air TV Audience 2009**

Source: Ibope PNT April 2009

## 2.2 Pay TV

There are approximately 8 million pay TV subscribers in Brazil, what represents a penetration of approximately 15% of Brazilian TV households.

**Figure 4: Brazilian pay TV subscribers***Million subscribers**Source: Anatel*

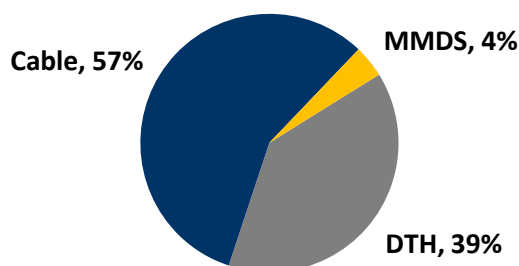
- **The main pay TV provider is Net Serviços.** Net is owned by Embratel (Telmex) and Globo. By the end of 2009 it had 3.7 million subscribers. Net operates in 44 Brazil's cities, including Sao Paulo, Rio de Janeiro, Belo Horizonte and Porto Alegre.
- **Sky Brazil** is the largest satellite operator, with approximately 1.8 million subscribers. It is jointly owned by Globo (28%) and Newscorp's DirectTV (72%).
- **TVA**, controlled by Grupo Abril, provides MMDS and cable PayTV to approximately 400,000 subscribers, and since 2006 it has a partnership with Telefónica .
- **Telecom operators Oi , Telefonica and Embratel** launched DTH in 2008/2009. Oi has approximately 240,000 users, Embratel 500,000, and Telefonica 470,000.

Approximately 80% of high-income households have pay TV, according to research institute PayTV Survey. The high penetration of PayTV satellite and cable services in high-income households limits the potential for DTT penetration in this stratum.

Cable is still the dominant technology in Brazil, but the share of satellite is gradually increasing after Telefonica, Oi and Embratel launched DTH services.

Traditionally, the strength of the cable sector has been based on the existence of large apartment blocks in the key metropolitan areas, restrictions to the installation of individual satellite dishes or antennas, and the high-price of satellite subscriptions- which has changed in the last year as the new entrants have offered lower-price entry packages.

The Northern region of Brazil, poorly served by cable services, was the region with the highest increase of Pay TV subscription in 2009.

**Figure 5: Pay TV Subscribers by technology (March 2010)***Source: Anatel*

## 3. Overview of the Brazilian DTT Process

### 3.1 Background of the SBTVD

The Brazilian government announced in June 2006 that it would use an adapted version of the Japanese ISDB-T standard as the basis for digital terrestrial broadcasting. The ISDB-T choice was justified by tests conducted by SET/ABERT in 1999/2000, which compared the technical performance of ATSC, DVB-T and ISDB-T and concluded that ISDB-T had superior signal propagation, robustness and lower interference levels.

The new modified standard was called ISDB-T<sub>B</sub> or SBTVD-T, (Sistema Brasileiro de Televisão Digital Terrestre) and incorporated innovations which are illustrated in the table below.

**Figure 6: Key differences between ISDB-T (Japan) and SBTVD-T (Brazil)**

Feature	ISDB-T	SBTVD-T	Comment
<b>Terrestrial transmission</b>	470 – 770MHz (UHF)	174 – 216MHz (VHF), 470 – 806MHz (UHF)	Minor adaptations on Spectrum Emission Mask in order to cope with the Brazilian allotment plan for DTT channels
<b>Audio/ video compression</b>	MPEG-2	ITU-T H.264 (MPEG-4 AVC) & ISO/IEC 14496-3 (MPEG-4 AAC)	SBTVD-T requires higher processing power. Software and hardware modifications are required.
<b>Portable service</b>	Frame rate limited to 15 fps	Frame rate limited to 30 fps	Used for 1seg service. Both systems adopt H.264 (MPEG-4 AVC)
<b>Middleware</b>	(Presentation Engine base, Application execution engine base)	Ginga	Ginga NCL specifications are available. Ginga Java specifications prepared by Sun Microsystems have been approved on April 2010 by ABNT

Source: DiBEG, Farncombe research

The SBTVD Forum and ABNT have developed a set of specification documents as listed in Figure 7. The compliance with Ginga (ABNT NBR 15606) and return path (clause 15 of ABNT NBR 15604 and ABNT NBR 15607) specifications are not mandatory.

### 3.2 Ginga middleware

The Brazilian government has shown strong concerns about payments of royalties to foreign institutions, and has sponsored the work on a new open middleware standard, Ginga, which was based on GEM (Global Executable MHP). Ginga<sup>1</sup> development has started in 2005, and was specified by SBTVD as the interactive Brazilian standard. It sets interactivity requirements, time-space media objects synchronism, adaptability and fixed and portable multiple device support for the Brazilian system.

<sup>1</sup> <http://www.ginga.org.br>

**Figure 7: ABNT specifications documents for DTT in Brazil**

Document	Summary specification
ABNT NBR 15601	Transmission system
ABNT NBR 15602	Video coding, audio coding and multiplexing <ul style="list-style-type: none"> <li>• Part 1: Video coding</li> <li>• Part 2: Audio coding</li> <li>• Part 3: Signal multiplexing systems</li> </ul>
ABNT NBR 15603	Multiplexing and service information (SI) <ul style="list-style-type: none"> <li>• Part 1: SI for digital broadcasting systems</li> <li>• Part 2: Data structure and definitions of basic information of SI</li> <li>• Part 3: Syntaxes and definitions of extension information of SI</li> </ul>
ABNT NBR 15604	Receivers
ABNT NBR 15605	Security issues: <ul style="list-style-type: none"> <li>• Part 1: Copy control, and Security issues</li> <li>• Part 2: Security mechanisms for applications</li> </ul>
ABNT NBR 15606	Data coding and transmission specification for digital broadcasting: <ul style="list-style-type: none"> <li>• Part 1: Data coding specification;</li> <li>• Part 2: Ginga-NCL for fixed and mobile receivers – XML application language for application coding;</li> <li>• Part 3: Data transmission specification;</li> <li>• Part 4: Ginga-J, Data coding and transmission specification</li> <li>• Part 5: Ginga-NCL for portable receivers – XML application language for application coding</li> </ul>
ABNT NBR 15607	Interactive channel <ul style="list-style-type: none"> <li>• Part 1: Protocols, physical interfaces and software interfaces</li> <li>• Part 2: External devices</li> <li>• Part 3: Configuration interface for the access technologies</li> </ul>
ABNT NBR 15608	Operational guideline

Source: ABNT, Farncombe research

Ginga consists of two sub-systems:

- **Ginga-NCL** (also called Ginga 1.0, Ginga NCL-LUA) was developed by the PUC-RIO University. It is a declarative engine, focused on media objects synchronization. Instead of using instructions or procedures to define the interactive content, the NCL language defines the content as reactions to different events (timely, user interaction response, media action, etc). It allows different types of content (video, audio, images, text) to synchronise creating interactive content. The Ginga-NCL allows BML, DVB-HTML and ACAP/OCAP XHTML players to be added, enabling it to work in different countries, with varying systems (including via broadcast).
- **Ginga-J** (also called Ginga-Java) was initially developed by UFPB (Universidade Federal da Paraíba). It is a procedural engine, allowing interactive content or applications to be developed in Java. SBTVD has partnered with Sun Microsystems for the development of Ginga-J.

The government has set-up an open source developer forum on order to allow the developer community to interact. It can be accessed via the site:

<http://www.softwarepublico.gov.br>.

Ginga-NCL specifications were published in 2008. Some of the initial set-top boxes launched in the market in 2008 had Ginga logos<sup>2</sup> and claimed to be Ginga-NCL compliant despite the lack of any certification process or recognition by the Forum SBTVD.

<sup>2</sup> Example was ZBT-620 manufactured by Neo Security with integrated "Mopa".



## Ginga –Java

On May 2009 the Forum SBTVD has decided to fully base Ginga-J on what it considers is a royalty-free version of Java DTV, developed in conjunction with Sun Microsystems to replace the GEM / MHP APIs Havi and Davic which would be subject to copyright issues. Among the new APIs developed are the LWUIT APIs.

Sun still charges for the use of the Java Virtual Machine (JVM) which enables application development in Java. According to an interview with the Forum SBTVD president Frederico Nogueira, the Forum has negotiated a 15% discount for the use of the JVM – press reports estimate that the negotiated price is now R\$0.76 per unit of equipment using JVM in Brazil and other Latin American countries that have adopted the Brazilian standard, but the Forum does not comment on the negotiated value.

Ginga-J specifications were approved by the Forum in early 2010, and approved by ABNT in the end of April 2010.

As of May 2010, there were no Ginga-compliant set-top-boxes for sale in the major electro electronic chains, and LG was the first provider to launch a Ginga TV set model in April 2010. The major commercial Ginga middleware provider is TQTV, who has integrated its Astro Ginga-based middleware with the following chipsets:

- ST Microeletronics 71xx
- Intel CE2110
- Broadcom BCM 7405
- NXP STB 236/225

Smaller application providers, many of them aided by public grants are also developing specific Ginga applications, which have been tested by broadcasters and public banks.

The Forum SBTVD is planning to implement a test and conformance process for Ginga-enabled equipment in 2010, and has registered the trademark DTVi , as the Ginga trademark is still subject to disputes.

## 3.3 Digital TV Groups/Organisations

Several Ministries are involved in the approval of DTT standards– although the Ministry of Communications is the government body nominally responsible for publishing broadcasting-related regulation. SBTVD, which is now the organisation responsible for DTT communication and standards' development, was created by a government decree in November 2003 (decree 231/03).

### SBTVD (Sistema Brasileiro de TV Digital) Forum

The SBTVD Forum is the main organisation influencing Brazilian DTT's specifications. It is responsible for analysing and recommending DTT standards, which are then submitted to ABNT and a government committee composed of:

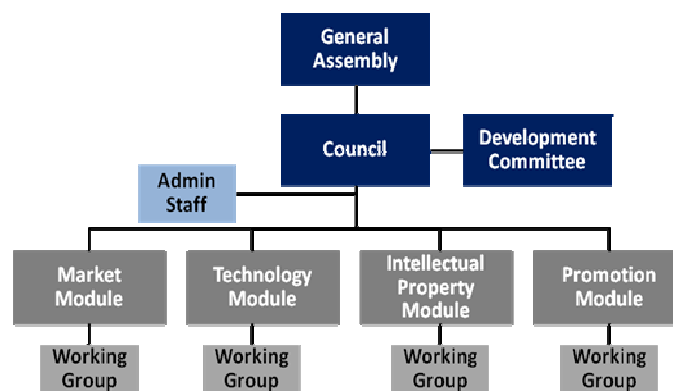
- Casa Civil da Presidência da República;
- Communications Ministry;
- Science and Technology Ministry;
- Culture Ministry;
- Foreign Trade Development and Industry Ministry;
- Treasury Ministry;
- Foreign Relations Ministry;
- Budget Planning Ministry;

- Secretary of Communications and Strategic Management of the Presidency.

SBTVD members include representatives of broadcasters, receiver manufacturers, universities, and software providers. Mr. Frederico Nogueira, vice-president of Bandeirantes is the current president of SBTVD. The SBTVD Forum has four modules:

- **Market:** Identify consumer demands and opportunities, develops feasibility analysis and suggests features to the other modules;
- **Technology:** Coordinates technical specifications' and research and development activities;
- **Promotion and communication:** develop marketing and communication campaigns to clarify and educate the market (including consumers and installers) on digital TV;
- **Intellectual property:** coordinate legal activities, the code of conduct for SBTVD and the negotiation of royalties.

Figure 8: Organisation chart: SBTVD



Source: SBTVD

### Sociedade Brasileira de Engenharia de Televisão (SET)

SET is the Brazilian television engineering society, a non-profit organisation with the mission to distribute and study technical and operational aspects of TV, telecommunications, radio and multimedia.

Together with the broadcasters' association ABERT, SET was responsible for conducting the technical tests between 1999 and 2000 which recommended ISDB-T as Brazil's transmission standard.

## 4. DTT Implementation and Adoption

SBTV D was launched on the 2<sup>nd</sup> of December 2007 in São Paulo. The original government timeline was:

- By the end of December 2009 all state capitals to switch-on DTT;
- By December 2013 all remaining municipalities to switch-on DTT;
- National analogue switch-off scheduled for 2016.

However, this timeline is delayed, and the government has already declared that it is possible that analogue switch-off will have to be postponed. Although a few non-capital cities are already covered by DTT, as of May 2010 5 state capitals are not yet covered by any digital services (Maceió, Rio Branco, Macapá, Boa Vista e Porto Velho).

In addition, the deadline for all broadcasters to submit requests of DTT frequency assignment had to be postponed from March 2009 to December 2010. According to the local press, broadcasters are reluctant to request the frequencies as this triggers their schedule for DTT deployment. BNDES, the Brazilian development bank has created a credit line of R\$ 1 billion (approximately US\$ 500 million) to fund broadcasters' transition to DTT.

### Equipment Quotas

In 2009 the government established goals for TV sets and mobile handsets that should incorporate DTT tuners.

- All flat screen TVs over 32" must have a DTT tuner from January 2010
- All flat screen TVs over 26" must have a DTT tuner from January 2011
- All TVs (including cathode ray tube) must have a DTT tuner from 2012

The government also tried to mandate a quota of 5% of mobile handsets with DTT but that was contested by manufacturers and not yet implemented.

### HD and interactivity

The regulatory framework created for digital transition was focused on enabling high-definition broadcasting and in avoiding the payment of royalties. With these objectives, the Ministry of Communications has banned private providers from offering "multiprogramming" (i.e. to use the frequencies they were allocated to provide multiple content services). Therefore the **content available in the digital TV platform is currently a simulcast of the analogue services, but in high-definition (1080i)**, and there are no private channels in DTT that are not available in analogue.

Forum SBTVD estimates that 29 metropolitan areas, with total population of approximately 65 million (~35% of population) are already covered by Digital TV. However, most of the areas are only covered by 1 or 2 digital services as shown in Figure 9.

Broadcasters have tested interactive applications such as additional information with scores of the Olympics and soccer statistics, and Globo has declared in early 2010 that it will start broadcasting interactive services in Ginga-J this year. Applications are expected to be launched during the World Cup.

**Figure 9: Metropolitan areas with commercial Digital TV operations**

Area	Broadcasters/ channels
São Paulo	TV Globo, SBT, TV Record, RedeTV, Bandeirantes, CBI, MTV, Rede 21, TV Cultura (regional PSB), TV Gazeta, TV ALESP/Senado/Camara
Belo Horizonte	TV Globo, TV Record, Rede Bandeirantes, Rede TV and TV Alterosa (SBT affiliate )
Rio de Janeiro	TV Globo, TV Record, RedeTV, Bandeirantes, TV Brasil, TV Ideal SD and SBT
Goiânia	Rede Anhanguera (TV Globo affiliate), TV Record
Curitiba	Rede RPC (TV Globo affiliate)
Porto Alegre	Rede RBS (TV Globo affiliate), TV Record
Salvador	TV Bahia (TV Globo affiliate) and TV Aratu (SBT affiliate)
Campinas	EPTV (TV Globo affiliate)
Cuiaba	TV Centro Americo (Globo affiliate) and TV Cidade Verde (Bandeirantes affiliate)
Florianópolis	Rede RBS (TV Globo affiliate)
Vitória	TV Gazeta do ES (Globo affiliate), TV Vitória (Record affiliate)
Uberlândia	Rede Integração (Rede Globo affiliate)
São José do Rio Preto	Rede Vida
Teresina	TV Cidade Verde (SBT affiliate) , TV Antena 10 (Record)
Santos	TV Tribuna (TV Globo affiliate)
Aracaju	TV Atalaia (TV Record affiliate)
Brasília	TV Brasil and TV Justiça (public channels) and TV Globo
Campo Grande	TV Morena (Globo affiliate) , TV MS Record
Fortaleza	TV Verdes Mares (Globo affiliate)
Recife	TV Globo and TV Jornal (SBT affiliate)
João Pessoa	TV Cabo Branco (Globo affiliate)
Sorocaba	Televisão Sorocaba Ltda (SBT) and TV TEM (Globo)
Manaus	TV Amazonas (Globo affiliate), TV A Critica (Record affiliate)
Belém	TV RBA (Bandeirantes), TV Liberal (Globo) and Rede Record
Ribeirão Preto	EPTV (Globo)
Joinville	RBS TV Joinville (Globo affiliate)
São Luiz	Televisão Mirante (Globo affiliate)
Londrina	TV Taroba (Bandeirantes), RPCTV Corados (Globo affiliate)
Natal	Televisão Cabugi (Globo affiliate)

Source: Forum SBTVD as per information from broadcasters on May 26 2010.

## DTT adoption

Detailed information on DTT adoption is difficult to obtain in Brazil- in the end of 2008, the Forum SBTVD has estimated that 300,000 DTT devices had been sold, half of them mobile/portable devices. In the end of 2009, it estimated that 2 million DTT devices had been sold in Brazil, but did not publish the breakdown of devices between STBs and integrated TVs, nor provided more detail on the source and methodology of this estimate.

Research consultancy GfK, which counts the sales of TV sets, estimates that in 2009 482,000 integrated TV sets were sold, representing 17% of flat screen TVs sold in the period.

From 2010 onwards, all TVs with 32" screens and over are mandated to include a DTT tuner, so it is likely that integrated DTT TV sales will increase significantly. Forum SBTVD expects that a total 6 million DTT devices will be sold in 2010.

Assuming the estimates of Forum SBTVD, and that the distribution between fixed and mobile DTT devices was maintained in 2009, **it could be extrapolated that approximately 2% of Brazilian TV households have transitioned to DTT by the end of 2009.** However, it is important to caveat that considering the importance of sales of large flat screen TVs over total DTT devices, it is likely that a significant share of households with a fixed DTT device are also pay TV subscribers, and therefore do not watch terrestrial television on their main TV set.

## Availability of receivers

After the launch of DTT in 2007, several set-top-box manufacturers have launched external receiver models for ISDB-Tb. However, most manufacturers have claimed the demand was disappointing, and have suspended or decreased their scale of production.

- Positivo has suspended its production in 2008 claiming it could only sell 25,000 of the 40,000 units assembled in Brazil;
- Proview, also one of the largest manufacturers has declared that the lower than expected demand has caused it to limit production to 25,000 STBs/ month, despite having a capacity to manufacture 100,000/month;
- Comsat has left the market in 2009 after selling only 2,000 STBs

By the end of March 2010, Forum SBTVD declared that the following DTT receiving devices were available for sale in Brazil:

- 5 models of DTT set-top-boxes
- 55 models of integrated TVs
- 7 models of mobile handsets
- 6 models of USB pendrives

Farncombe has conducted a survey on May 2010 in large retail chains in Brazil<sup>3</sup>, all of which had DTT decoders for sale in 2008. However, 8 out of the 11 retailers surveyed had no set-top-boxes in stock. From the models available, no set-top-boxes had PVR functionality or Ginga middleware; and the only decoder under US\$200 was standard resolution.

<sup>3</sup> Lojas Colombo, Magazine Luiza, Submarino, Ponto Frio, Carrefour, FNAC, Kalunga, Americanas, Extra, Casas Bahia, Wal Mart.

**Integrated digital TV** sets are more widely available than set-top-boxes, driven by mandated inclusion of DTT tuners on TV sets larger than 32" from 2010 and the decrease in the price difference between analogue and digital models:

- Samsung claims 38 of the 43 models to be launched in 2010 will be digital TV sets, compared to 28 of the 40 models launched in 2009;
- LG claims that 25 of its 45 TV set models are integrated TV sets;
- GfK estimates that 16.5% of flat screen TVs sold in 2009 were integrated TV sets;

Both Samsung and LG claim that the price difference between analogue and digital TV sets fell from R\$400 (US\$218) in 2008 to R\$200 (US\$109) by the end of 2009.

### **DTT Receiver Prices**

The average price of the set-top box models that Farncombe found for sale was R\$439 (US\$ 239), as shown in Figure 10:

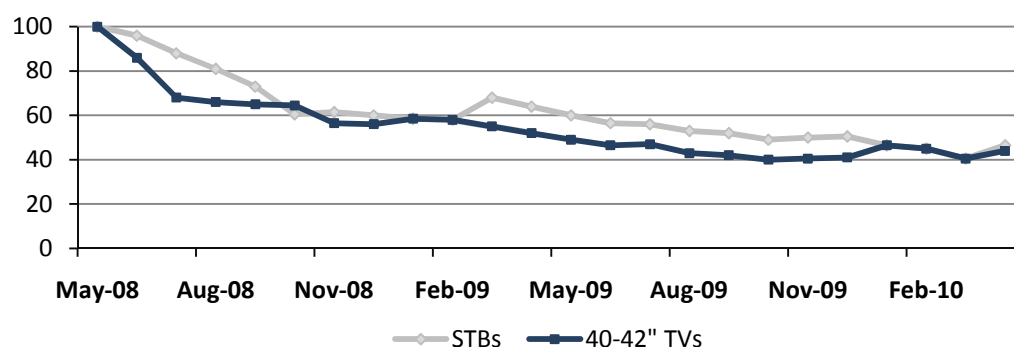
**Figure 10: Set-top-Box models found for Sale –May 2010**

Model	Average Price <sup>4</sup>	Comments
Semp Toshiba DC2008H	R\$538 (US\$ 294)	HD decoder with USB port
Semp Toshiba DC2007M	R\$309 (US\$ 169)	Standard resolution decoder with USB port
Cromus CHD10	R\$369 (US\$ 201)	HD decoder with USB port and Ethernet
Audiovision HD031i	R\$499 (US\$ 273)	HD decoder with HDMI connection, USB port

Source: Farncombe survey, May 2010

Forum SBTVD estimates that set-top-box and integrated TV prices have fallen by approximately 60% in the last 2 years, as shown in Figure 11.

**Figure 11: Evolution of STB and DTT TV set prices in Brazil (May/08=100)**



Source: Forum SBTVD

Research consultancy GfK estimates from July 2009 are in line with the Forum's –according to GfK, integrated TV set prices have decreased by 30% between July 2008 and July 2009. GfK also estimates that on December 2009 a 32" screen LCD digital TV set cost in average R\$2,400 (US\$1,311) compared to an average R\$1,900 (US\$1,038) for a conventional 32" LCD TV set.

<sup>4</sup> Exchange rate of May 26, 2010, 1US\$=R\$ 1.83

The Forum's estimate provided to Farncombe does not separate between standard and high-definition decoders and does not analyse the impact of the lack of availability of many of the STB models that were in the market in 2008.

It is important to put into context that although Gfk estimates that the prices of DTT sets have decreased faster than non-DTT sets, TV equipment prices in general have decreased significantly in the last two years in Brazil. According to GfK, LCD sets in general have decreased 53% since 2007, and 21% between July 2008 and July 2009.

## 5. Lessons from the Brazilian Case

The Brazilian government has been a strong advocate of digital TV. Despite strong government commitment through the funding, tax incentives, regulated quotas, and sponsorship of the Ginga middleware, Farncombe believes that a large portion of the DTT adoption so far has been driven by natural replacement of TV sets and by the increasing offer of mobile TV handsets.

The key lessons that can be learned from the Brazilian case are:

- **It is important to know what users want and can afford.** The attraction of high-definition as a driver to DTT adoption can be limited by the fact that high income- and advanced TV users that own high-definition TV sets are more likely to subscribe to pay-TV. The major driver for adoption of DTT around the world is the increase in the number of services, which has not yet taken place in Brazil.
- **Government incentives are crucial, but not enough.** The rapid implementation of manufacturing incentives and mandatory inclusion of DTT tuners have helped adoption and limited the build-up of legacy devices which would hinder switch-off. However, the cheapest decoder available still cost around USD\$150, despite many government declarations in 2008 and 2009 that set-top-boxes would soon reach the US\$50 level.
- **Optional specifications risk being ignored.** As manufacturers compete for prices and time-to-market they are more likely to avoid implementing additional features. As a result, the base of devices with middleware and return paths to receive advanced interactive services is fragmented and may not provide the minimum addressable market for broadcasters to offer new services economically.
- **Clarity of communication is fundamental.** Despite multiple marketing campaigns and official statements, consumer confusion is widespread in Brazil. Clarity regarding the benefits of DTT, the availability of content and co-ordination between broadcasters, government and manufacturers is essential.

Farncombe believes that careful planning to ensure the platform's attractiveness to viewers is more important than the choice of transmission standard (ISDB-T, ISDB-TB, DVB-T or DVB-T2), which can have very similar end-user functionality depending on the network configuration. It is important that the DTT transition plan takes into consideration technical performance and technology evolution scenarios, but a thorough understanding of consumers' preferences, adoption drivers and inhibitors is essential to increase the chances of the platform success.

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