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*REPORT*

**REPORT FOR THE BBC TRUST ON  
THE MODEL TO ASSESS THE  
IMPACT OF CANVAS ON THE TV  
MARKET**

London, December 2009

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# Report on model to assess the impact of Canvas on the TV Market

## 1 Glossary of terms

**Canvas-enabled** – a set-top box or idTV that has Canvas technology built in, therefore providing the consumer with an option to consume IPVoD (provided they have a suitable broadband connection)

**Darwin** – Sky's anticipated IPVOD proposition

**DTH/DSAT** – Digital satellite

**DTT** – Digital Terrestrial Television

**Freesat** – free to air satellite television. Provided in the UK by FREESAT and Freesat from Sky (FsfS)

**FREESAT** – when written in all capital letters, FREESAT refers to the BBC's FREESAT platform, which launched in May 2008. It offers a satellite alternative to the digital terrestrial Freeview service.

**HD** – High Definition Television

**idTV** – Integrated Digital Television Set

**IPVoD** – Internet Protocol Video on Demand; video on demand delivered via a broadband connection

**IPVoD enabled** – a set-top box or idTV that is connected to an adequately high speed broadband connection to support an IPTV service, typically VOD.

**ISPs** – Internet Service Providers

**PPV** – Pay Per View services

**Pull-VoD** – content is stored on a server and streamed in real time to the viewer. VOD systems allow the customer to start viewing the content at any time as well as to pause and rewind the content

**Push-VoD** – the automatic recording of a selection of programming, (often transmitted in spare capacity overnight) onto the STB hard disk. Users can then watch the downloaded programming at times of their choosing. The downloaded content is usually automatically deleted after a period to make way for new programmes

**PVR** – Personal Video Recorder – facility to record television directly on to the hard drive of a set top box

**Service provider** – a company operating a service on a given platform; for example, Top Up TV is a service operator on the DTT platform

**STB** – Set top box

**VOD-enabled** – a Set Top Box or idTV through which users can consume IPVOD; this would include Canvas enabled sets, Sky's Darwin set, and the next generation of Freeview sets with DBook6 standards

Main Distribution Platform – primary television distribution platforms including Sky DTH, Virgin Cable, DTT, Freesat and Freesat from Sky.

## 2 Executive Summary

This report was commissioned by the BBC Trust to support the BBC Trust's assessment of the BBC's involvement in Project Canvas. The BBC Trust commissioned Value Partners to examine the potential market impact of Canvas on range of markets. This report sets out Value Partners' analysis of the impact of Canvas on the television market.

In developing this analysis Value Partners drew extensively on published views and forecasts of the market, the submissions (confidential and non-confidential) of specific stakeholders to the BBC Trust consultation process and additional industry consultation.

The analysis develops a view on what the market for television platforms and channels is likely to look like until 2015 without the launch of Canvas (the counterfactual). The counterfactual specifically models the take up of the closest potential alternatives to Canvas (such as next generation Freeview devices based on the DBook6 standard) in a world without Canvas. In the counterfactual, it is estimated that by 2015, there will be c.3.1m VOD enabled DTT devices.

The impact of Canvas is then calculated by comparing the counterfactual against three Canvas scenarios: a base case, a high case (in which ISPs actively support Canvas with the roll out of subsidised Canvas boxes) and a low case (in which Canvas remains a niche proposition). Demand for Canvas devices in all three scenarios is estimated based on assumptions on set top box pricing<sup>1</sup> and propensity to buy<sup>2</sup>.

These scenarios are summarised below

- **Canvas base case:** The base case assumes the major PSBs and commercial players adopt Canvas the platform offers a comprehensive content offering and is promoted extensively by the JV partners and retailers. On this basis, it becomes the most popular platform for accessing VOD content DTT.

The base case estimates that by 2015 there will be c.4m Canvas devices in the market, of which 2.5m will be installed on primary sets. This implies that 30 % of DTT homes will have Canvas as their primary TV device.

- **Canvas high case:** Canvas is assumed to become the standard which other platforms (notably adopt. ISPs are assumed to subsidise Canvas set top boxes to accelerate take up.

The high case estimates that by 2015, there will be c.8.3m Canvas devices in the market, accompanied by an additional 0.7m other VOD-enabled DTT devices. In total, the high case estimates that there will be c.9.1m VOD-enabled DTT devices in the market by 2015, which will imply that c.54% of primary DTT households will own a VOD enabled device. This is expected to be the upper bound for the uptake of VOD devices.

- **Canvas Low Case** – The low case assumes that Canvas is less successful and therefore assumed to achieve only a minority market share of DTT VOD-enabled devices.

The Low case estimates that there will be c.1.2m Canvas devices by 2015, accompanied by c.2.1m other DTT VOD-enabled devices. In this scenario, the total number of DTT VOD-enabled devices in the market by 2015 is 3.3m

The modelling provides a range of possible take up scenarios for Canvas. The base case represents the estimate of likely take up of Canvas based on the assumed price points. However, as modelled in the high

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<sup>1</sup> Based on discussions with stakeholders

<sup>2</sup> Based on results of market research commissioned by the BBC Trust

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case, the take up of Canvas could be accelerated by the active marketing and subsidisation of set top boxes by the ISPs. Based on discussions with ISPs, it is highly likely that there might be some form of subsidisation of Canvas boxes. Taking this into account, take up volumes for Canvas are likely to be between the base and the high case scenarios<sup>3</sup>.

The results of the analysis show the following impact on penetration of the main television distribution platforms and platform operators under the Canvas base case and high case (the Canvas low case does not impact platform penetration). Where relevant, possible and where a tangible negative impact is likely, we have endeavoured to quantify the outcome.

- DTT: Overall the effect of Canvas is to increase the attractiveness of the DTT proposition relative to other major pay TV distribution platforms. Under the counterfactual DTT penetration is expected to reach 10.3m homes in 2015. This rises to 10.8m in 2015 in the Canvas base case, and to 11.2m in the Canvas high case.
- Freeview: Under the counterfactual, c.9.3 m primary Freeview households are forecast by 2015 (includes primary households using next generation Freeview boxes; excludes primary BT Vision, TopUp TV and IP Vision households). In the Canvas base case, there will be a c.18% reduction in Freeview-only households compared to the counterfactual. The high case implies a 46% reduction in primary Freeview households whilst in the low case the reduction will be c.6%<sup>4</sup>.
- Sky: Under the counterfactual Sky penetration is expected to reach 10.8m homes in 2015. This is reduced by c.210,000 subscribers in the Canvas base case and by c.420,000 subscribers in the Canvas high case.

It is estimated that the NPV of Sky revenue lost due to Canvas ranges between £0m and £515m. On the basis of a blended ARPU<sup>5</sup> the 6 year NPV impact on Sky ranges between £257m in the base case and £515m in the high case. The NPV calculated using a blended ARPU is indicative of the total lost-revenue opportunity for Sky.

However, since Sky is likely to lose a greater proportion of basic tier subscribers rather than premium subscribers, a 6 year NPV impact assuming a basic tier ARPU<sup>6</sup> has also been estimated. Based on a basic tier ARPU, the NPV impact on Sky will range between £105m in the base case to £210m in the high case. This NPV calculation serves as a lower bound to the overall 6 year revenue impact on Sky. There is no revenue impact in the low case.

- Virgin: Under the counterfactual Virgin penetration is expected to mature at 4m TV homes in 2015. This is reduced by c.160,000 subscribers in the Canvas base case and by c.320,000 subscribers in the Canvas high case.

For Virgin the impact on revenues depends on whether Canvas users continue to use Virgin's broadband service or not. If we assume that Canvas only leads to a loss of TV revenues, then it is estimated that the NPV of lost Virgin Media revenues will be between £22m in the base case and £44m in the high case<sup>7</sup>. However, in order to reflect the approach taken for Sky (recognising that Virgin Media is also likely to lose more basic tier subscribers than premium subscribers), Canvas' revenue impact on Virgin has been estimated using a basic tier ARPU<sup>8</sup> to be between c.£152m in the base case and £305m in the high case.

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<sup>3</sup> Estimates for Canvas take up are comparable to forecasts from Analysts including Screendigest (c. 3.5m HH by 2014)

<sup>4</sup> It is estimated that there will be c.28m Freeview secondary sets in the counterfactual by 2015 (including Dbook6 secondary sets; excluding secondary sets of BT Vision, TopUp TV and new DTT entrants) Compared to the counterfactual, Canvas leads to a reduction of c. 5% of Freeview secondary sets in the base case, 2% in the low case and c.9% in the high case.

<sup>5</sup> Sky blended ARPU: c.£493 per annum in 2009, calculated by averaging Sky's consumer television, broadband, telephony as well as set top box revenues across its customer base

<sup>6</sup> Sky basic tier ARPU: c. £222 per annum or c. £18.50 per month per user, informed by pricing for Sky's basic package.

<sup>7</sup> Assuming that subscribers lost due to Canvas are split in a 50%:50% ratio between M and L TV packages

<sup>8</sup> Virgin Media basic tier ARPU: £412 per annum in 2009 (or c.34 per month) calculated by based on Virgin's broadband and telephony ARPUs.

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- Freesat: The model assumes that Freesat does not offer Canvas. Under the counterfactual Freesat is expected to reach 1.6m homes in 2015. This is reduced by c.70,000 subscribers in the Canvas base case and by c.120,000 subscribers in the Canvas high case. Freesat has been treated as a free platform and the revenue impact has thus not been estimated.
- BT Vision: The model assumes that BT Vision offers STBs based on the Canvas technical standard. Under the counterfactual BT Vision is expected to reach c.0.7m homes in 2015. This is increased by 30,000 subscribers in the Canvas base case and by c.700,000 subscribers in the Canvas high case in which BT subsidises the Canvas set top box.
- TopUp TV: TopUp TV's penetration (based on Value Partners' own estimates of unique subscribers who take one or more services) has been modelled broadly flat at c.300k subscribers in the period to 2015. Given that there is still uncertainty as to whether TopUp TV will develop its own UI or whether it would adopt the Canvas UI, it has been assumed in the Canvas scenarios that TopUp TV can market its proposition, including its premium subscription sport service (ESPN), to customers through Canvas enabled devices with the addition of a conditional access capability. In such a scenario, it is estimated that TopUp TV's base will increase by c.13,000 subscribers in the Canvas base case and by c.25,000 subscribers in the Canvas high case. Therefore this modelling approach is conservative and there is a possibility that that TopUp TV will grow its subscriber base by a greater amount, leveraging the existing sports proposition but more significantly the potential retail of Sky premium content if Ofcom's Pay-TV review leads to a 'must-carry' provision.

## 3 Background

This report was commissioned by the BBC Trust to support the BBC Trust's assessment of the BBC's involvement in Project Canvas.

The BBC Trust asked Value Partners to examine the potential market impact of Canvas on range of markets. This report sets out Value Partners' analysis of the impact of Canvas on the television market and is structured as follows:

- Model approach and structure
- Overview of scenarios
- Key assumptions
- Outputs of the model

In developing this analysis Value Partners drew extensively on published views and forecasts of the market, the submissions (confidential and non-confidential) of specific stakeholders to the BBC Trust consultation process and additional industry consultation. Any assumptions, projections, findings and conclusions represent our best professional judgement based on the information available to us during the project.

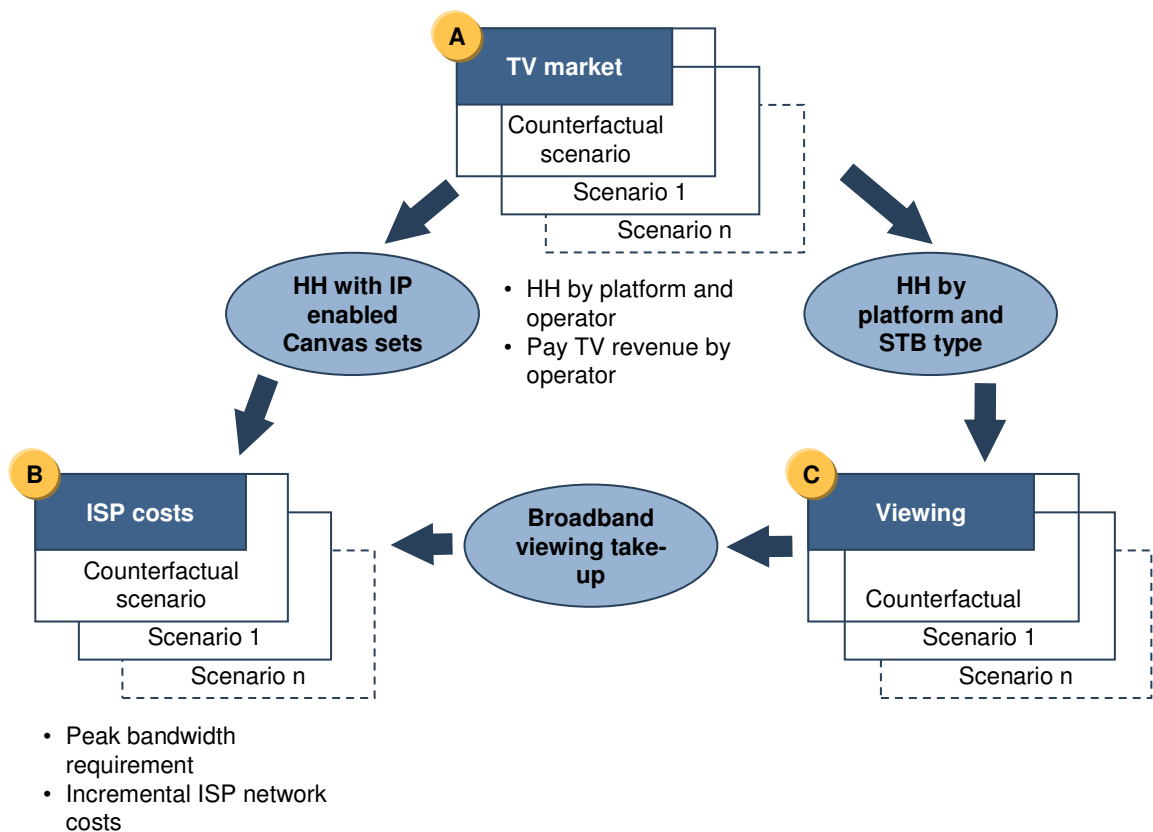
## 4 Methodology and model structure

### 4.1 Approach and structure

The market impact model was built to analyse the UK television market from 2008 to 2015, both with and without Canvas, under a number of dynamic scenarios. It was developed using desk research, discussions with stakeholders, and analysis of consumer research to ensure that the structure was rigorous and assumptions were validated.

The market impact model consists of three inter-linked models: a TV model, a viewing model and an ISP model. Each model is stand-alone, but can be run dynamically with the other models to assess the impact of Canvas under a specific scenario across all potential stakeholders. The TV model is the driving model; outputs from this are used to drive the ISP and viewing models:

**Exhibit 1: Relationship between the three models**



- The **TV model** looks at the penetration of the different television platforms (e.g. Freeview, Freesat from Sky (FsfS), FREESAT, Sky, Virgin, TopUp TV, BT Vision plus options for new entrants) in both primary and secondary sets. For each platform, the model looks at penetration by type of set top box (STB) (e.g. basic, PVR enabled, High Definition (HD), VOD enabled and Canvas enabled) as this impacts levels of linear and non-linear viewing. For pay operators, the model looks at take up by package type, level of subscription fees and revenues generated by bundled sale of pay TV, telephony and ISP services.
- The **viewing model** draws in the breakdown of households by service platform and set top box from the TV model and layers on assumptions about how viewing will change in each of these household types under the different scenarios.

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- The **ISP cost model** draws in the number of households using broadband VOD at any given one hour time slot from the viewing model, to assess the level of peak traffic on ISP networks. This model draws in the number of Canvas STBs in the market from the TV model, and determines the proportion of those that will be able to receive IPv6D.

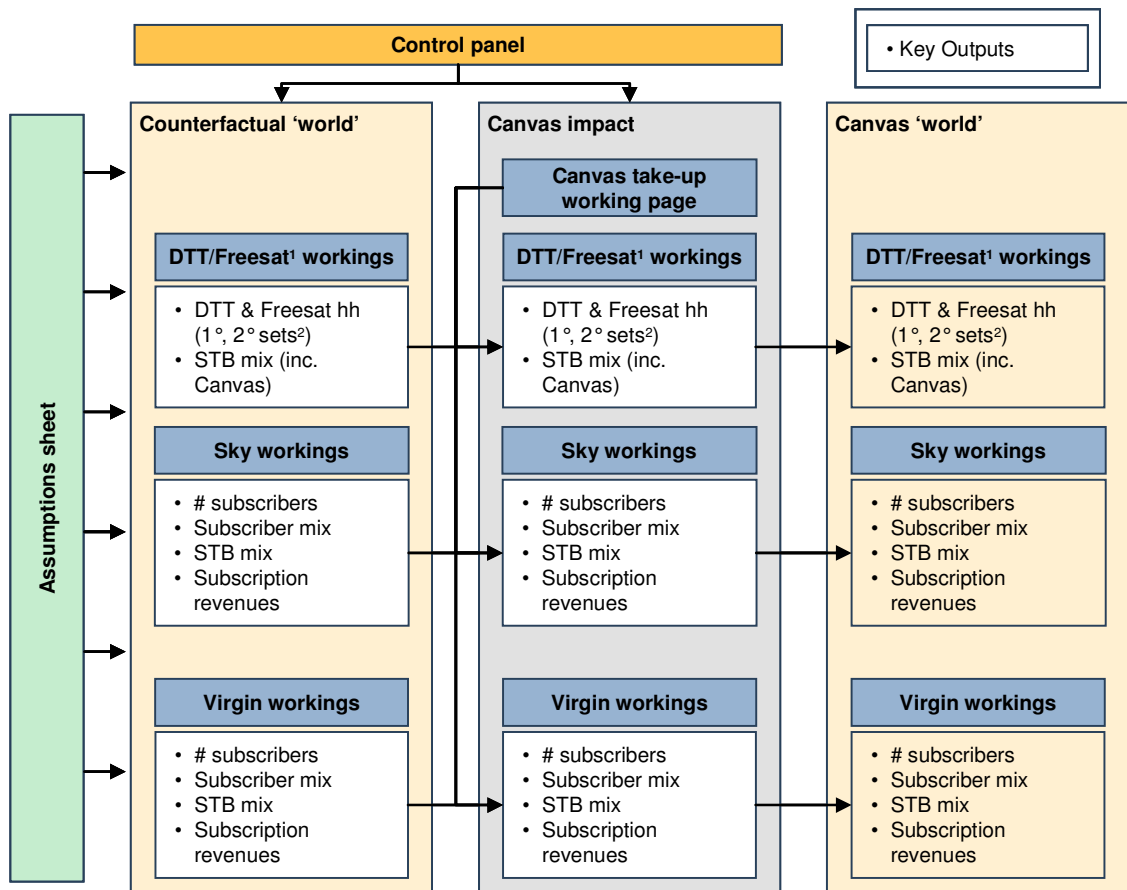
### 4.2 TV model

The TV model is structured into three sections:

- First, the Counterfactual 'world' is modelled.
- Second, the impact of Canvas under various scenarios is modelled, taking account of factors such as churn away from Sky and Virgin, and substitution of Canvas for non-Canvas VOD-enabled STB sales.
- Third, the Canvas 'world' is then deduced as the sum of the Counterfactual 'world' and the Canvas impact.

This is illustrated in the following TV model schematic:

Exhibit 2: TV market model schematic



Note: (1) Includes both FREESAT and Freesat from Sky (FSfs); these have been treated as distinct platforms

(2) Primary and secondary sets

# Report on model to assess the impact of Canvas on the TV Market

## 4.2.1 Modelling the Counterfactual

The Counterfactual models the TV market out to 2015 assuming that Canvas is not launched.

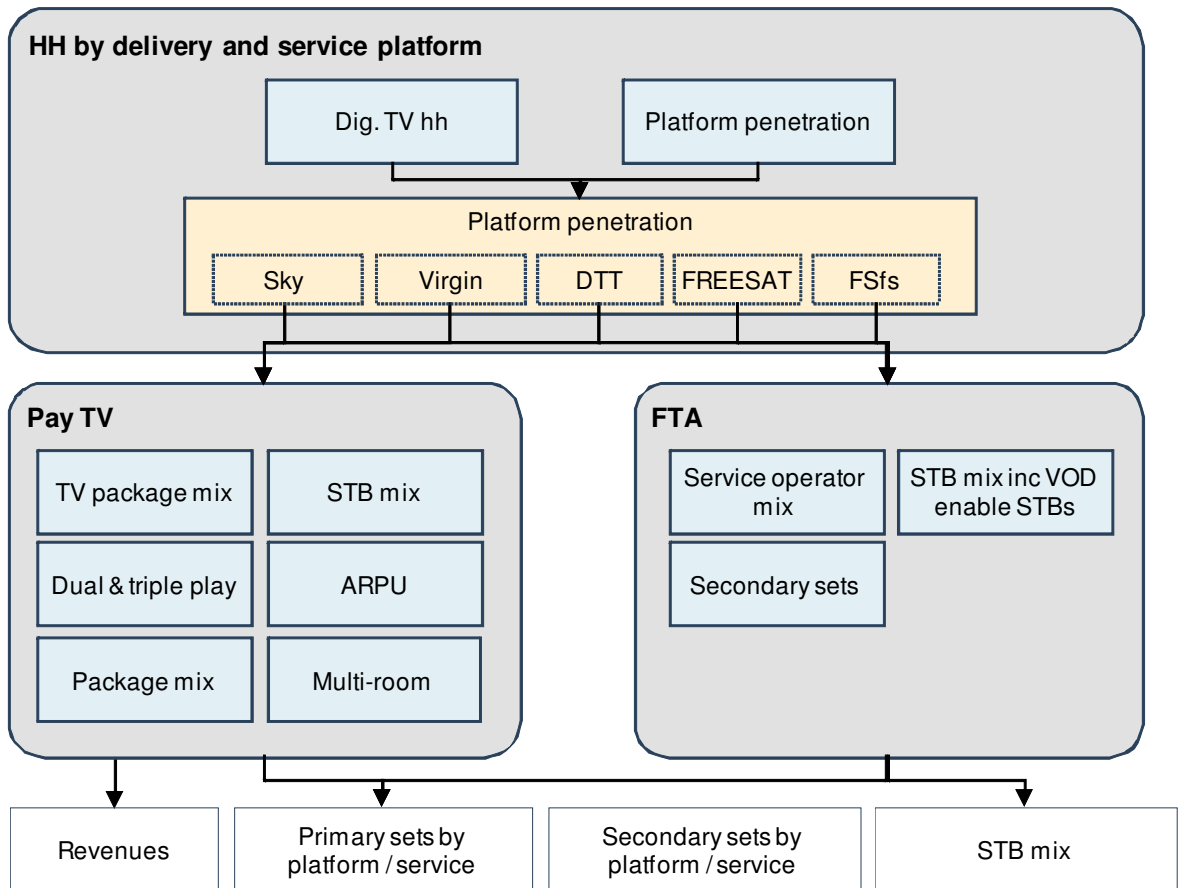
The Counterfactual is modelled on a top-down basis, based on assumptions around platform and service penetration, set top box mix by platform, etc.

The exception is the take-up of DTT / Freesat VOD-enabled STBs (DBook6 and other technologies) and VOD enabled idTV sets, which are modelled bottom-up. Hence, take-up of VOD-enabled STBs is driven by consumers opting to buy a VOD-enabled STB at the point of replacing their old STB or idTV. As such, the drivers of VOD-enabled STB take-up are:

- Replacement cycle of their STB
- Propensity to buy a VOD-enabled STB at the point of replacement at different price points

Take up of VOD enabled idTV sets is calculated by forecasting the number of idTV sets sold each year, making an assumption on the percentage of those sold which will be VOD enabled.

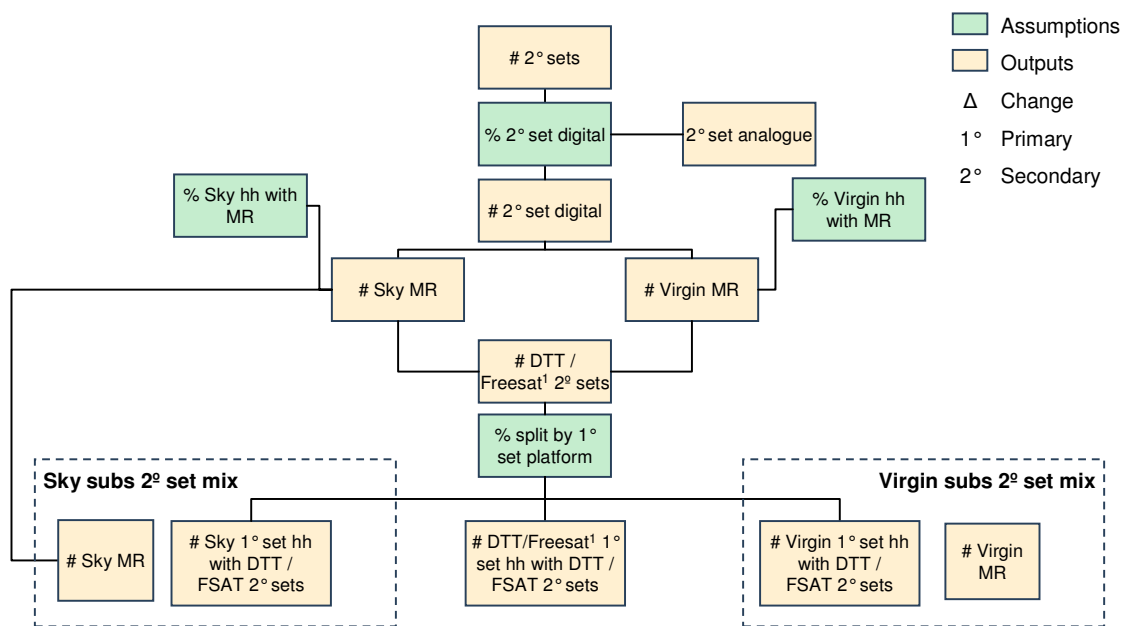
**Exhibit 3: Counterfactual TV model schematic**



The model also details the secondary sets in the market as shown in the exhibit below.

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Exhibit 4: Secondary set model structure



Note: (1) Includes both FREESAT and Freesat from Sky (FSFs); these have been treated as distinct platforms

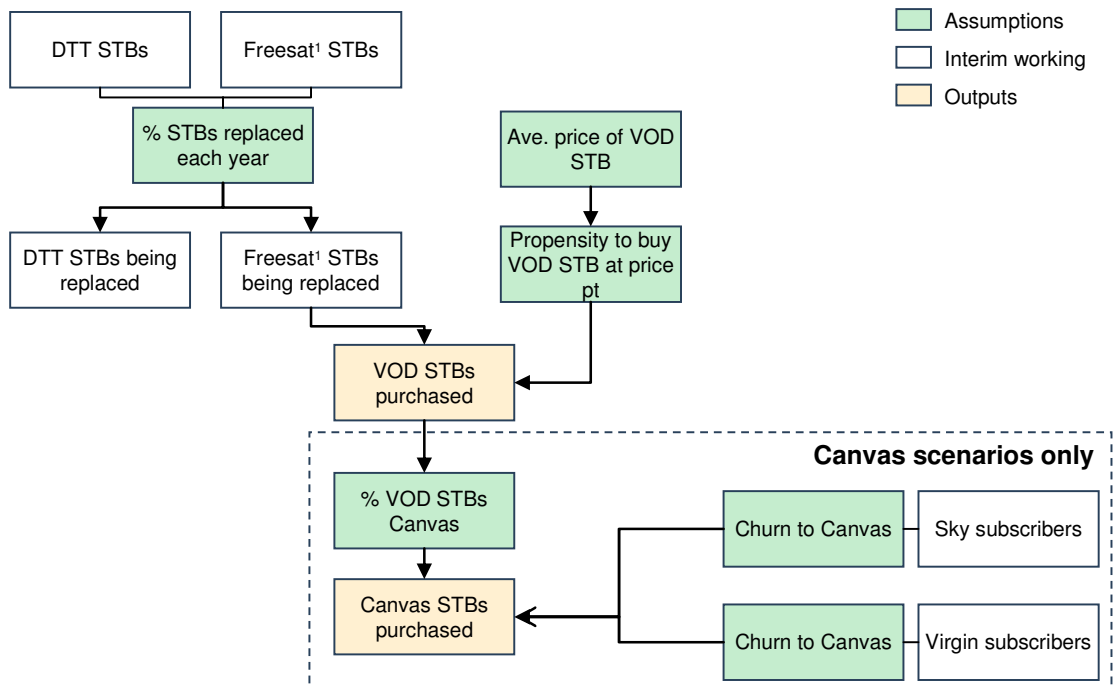
## 4.2.2 Modelling Canvas take-up

Canvas take-up is modelled in a similar way to the Counterfactual:

- Canvas and other VOD STB take up is based on the forecast replacement cycle and propensity to buy at different price points.
- Take-up through idTV sets is calculated by forecasting the number of idTV sets sold each year, making an assumption on the percentage of those sold which will be Canvas enabled; and assessing whether these will be in DTT homes (when Canvas will be used) or pay TV homes (where Canvas will not be used in primary sets but potentially in secondary sets).
- In the Canvas high case, the model assumes that some ISPs market a Canvas offer, e.g. a free Canvas box with a 24 month subscription, to DTT households capable of streaming Canvas content and a proportion of these take up the offer.

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**Exhibit 5: Modelling Canvas impact**



Note: (1) Includes both FREESAT and Freesat from Sky (FSfs); these have been treated as distinct platforms

The model assumes that existing DTT service providers offer a Canvas-enabled STB, but that FREESAT and new DTT entrants (such as IP Vision) do not offer Canvas-enabled STBs<sup>9</sup>.

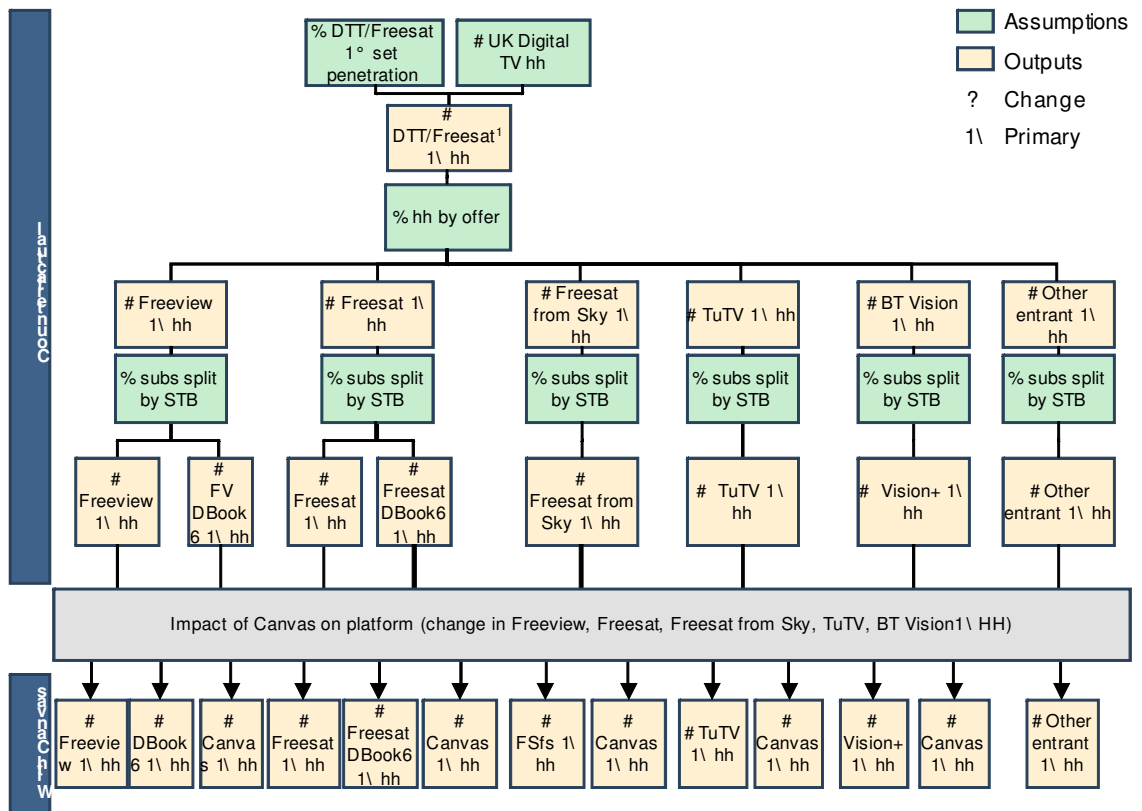
### 4.2.3 Impact on Platforms and platform operators

The model looks at the impact of Canvas on the penetration of different platforms and platform operators. For DTT and Freesat service providers (including Freeview, Freesat, Freesat from Sky, TUTV, BT Vision and other ISPs) the model examines the impact on total penetration levels and on STB mix. The model layers the Canvas impact on top of the Counterfactual.

<sup>9</sup> Although they are assumed to offer other types of VOD-enabled STB

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Exhibit 6: DTT / Freesat model structure – Counterfactual and Canvas

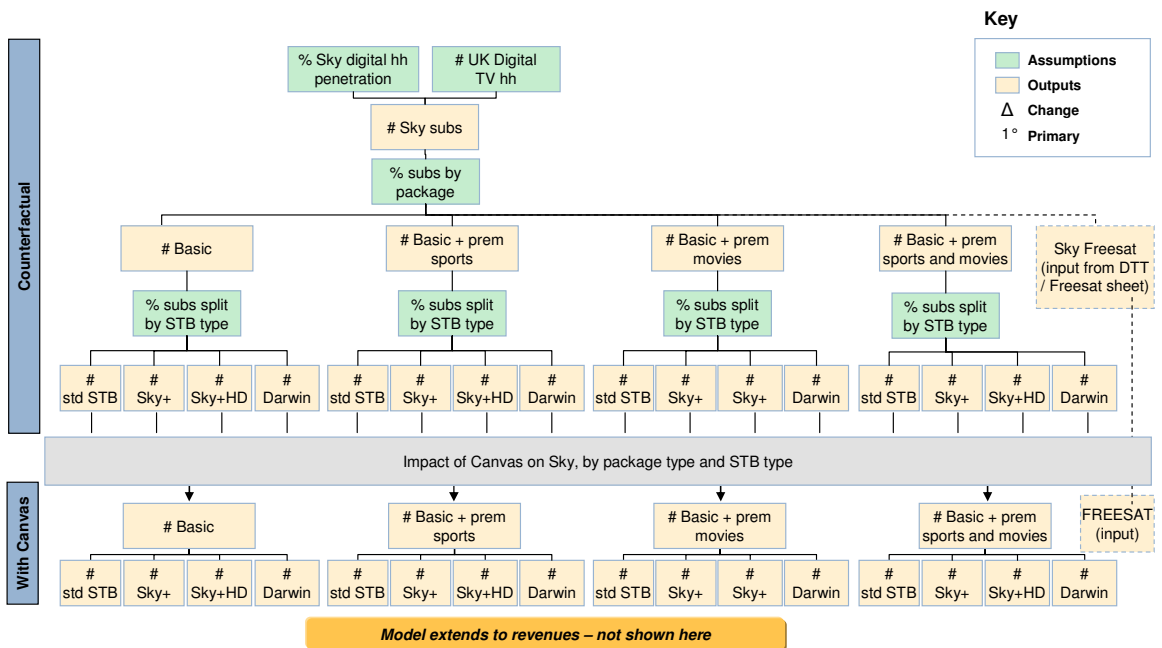


Note: (1) Includes both FREESAT and Freesat from Sky (FSfs); these have been treated as distinct platforms

For Sky and Virgin, the model also looks at the take up by type of subscription package enabling forecasts of subscriber numbers and subscription revenue. In the Canvas scenarios, Sky and Virgin are assumed not to have Canvas-enabled STBs and some customers migrate from Sky and Virgin to Canvas-enabled platforms (either existing subscribers churning from Sky or Virgin or new customers who would have migrated from DTT to Sky and Virgin under the counterfactual now not doing so). Propensity to churn varies by package and type of STB (with basic subscribers more likely to churn than premium subscribers).

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Exhibit 7: Canvas impact on Sky pay-DTH



## 4.2.4 Impact on secondary sets

The model forecasts the total number of secondary sets and how this is likely to rise over the period modelled. The model forecasts the uptake of primary set by platform and then, depending on the primary platform, assesses secondary sets by each platform (e.g. in Sky pay-DTH households, x% of secondary sets are DTT, y% are FREESAT, z% Freesat from Sky, n% are Sky via multiroom).

As with primary sets, the impact of Canvas is a function of net migration from platforms not offering Canvas.

## 4.3 Viewing model

The model forecasts viewing in terms of number of hours, channels watched and levels of linear and non-linear viewing by platform and type of STB for the counterfactual and how that will change with Canvas enabled television. Changes in viewing could impact:

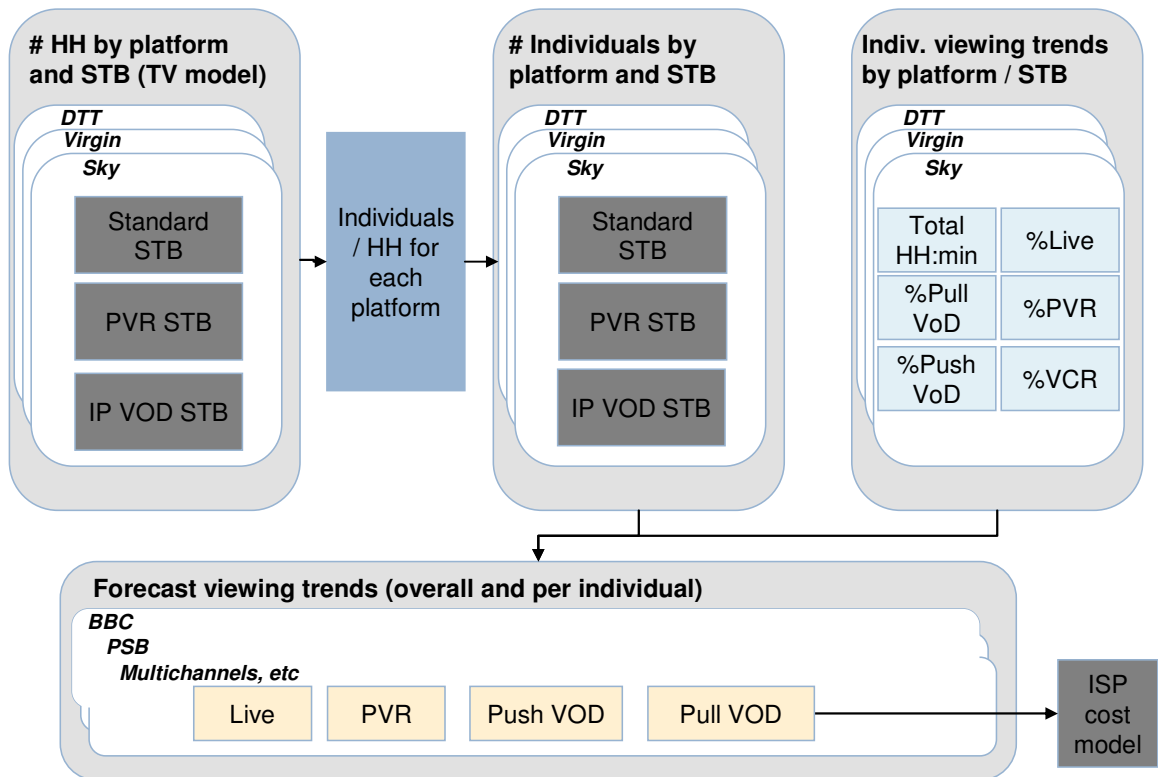
- viewing share of different channels
- advertising impacts and revenues for commercial channels
- the carriage fees pay-TV operators could charge channels for an EPG slot

The viewing model also calculates the number of Canvas sets that are simultaneously streaming IPVoD during the evening.

The following diagram shows how the viewing model is structured.

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Exhibit 8: Viewing model schematic



## 4.4 ISP model

The ISP model is outlined in detail in a separate report.

### 5 Description of Counterfactual and Canvas scenarios

To assess the market impact of Canvas, the model forecasts the evolution of the market in a world without Canvas (the Counterfactual) and under three Canvas scenarios:

- **Counterfactual** - assumes that the TV market evolves along the lines of public announcements by the various players and industry commentators. As part of this, various VOD to the TV technologies and services are rolled out, notably next generation VOD enabled STBs on the DTT and FREESAT platforms, Sky's Darwin, IPVision and other smaller operators.
- **Canvas Base Case** - Canvas is rolled out by Q4 2010.<sup>10</sup> Despite the other VOD to the TV propositions in the market, the strength of the Canvas proposition quickly propels it to be the most popular platform for VOD content to the TV on DTT, co-existing with other VOD to the TV propositions.
- **Canvas High Case** - Canvas is launched by Q4 2010; at launch it enters a nascent IP VOD market with other propositions; however Canvas grows to become the standard which other platforms (notably ISPs and idTV players) adopt in order to access the most comprehensive content offer. ISPs subsidise the box to accelerate take up. Canvas effectively supersedes other standards and with a clear market proposition drives further consumer demand.
- **Canvas Low Case** - Canvas is launched by Q4 2010. However, it is beset with operational issues and does not have the full co-operation of some consumer electronics players, retailers and ISPs. Canvas therefore shares the market with other VOD to the TV propositions achieving a minority market share of DTT VOD-enabled STBs.

The Counterfactual and Canvas scenarios are described in more detail in the following sub-sections.

#### 5.1 Counterfactual

The Counterfactual forecast a view of how the TV market would evolve in the period to 2015, amidst a rapidly changing market. This is based on publicly available information and takes into account feedback received from BBC stakeholders from two consultations.

The TV market is assumed to evolve along the lines of public announcements by Sky, Virgin, Freeview and FREESAT. A myriad of different players all begin to develop and market their VOD to the TV propositions.

Specifically, the following intentions relating to VOD to the TV are taken into account:

- Freeview launches its VOD to the TV offerings using the DBook6 standard in 2010, which enables audiences to access PSB and major commercial broadcaster content. Technical limitations around DBook6 (As detailed in Appendix 1: Technical comparison of Dbook6 and Canvas) means that the proposition provides a poorer quality of experience and breadth of content compared to Canvas
- FREESAT launches its own next generation STB incorporating catch up TV via IP, by Summer 2010
- Sky launches their new VOD propositions in April 2010; they have an existing installed base of STBs which can access their VOD proposition i.e. their HD STBs. Apart from Darwin, Sky is assumed to continue to offer a consumer proposition broadly in line with its current offering. Virgin grows its subscriber base on the back of its broadband capability and continues to develop its catch-up service, growing its catch-up content offer
- Nintendo, Sony and Microsoft continue to develop their console-based VOD propositions<sup>11</sup>

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<sup>10</sup> It was considered whether the impact of varying the launch date, should be modelled. It was assessed that whilst this might impact the rate of take up of Canvas in early years, it would not alter significantly projected take up levels by 2015

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- TV manufacturers continue to develop and sell idTVs with widget-based access to VOD content; this evolves into the incorporation of a range of VOD to the TV standards such as DBook6 into idTVs
- There are some 'DTT+VOD' new entrants in the market such as IP Vision. These alternative providers continue to grow in the market but their rate of growth is constrained by their relatively limited ability to invest in acquiring content rights, and in marketing and promoting the service
- Continued development in the computer industry with media centre PCs and Apple providing 'PC to the TV' solutions

It is assumed that, in the Counterfactual, the market does not develop a fully equivalent open standard to Canvas. As a result, without a single clear market leader content is assumed to be more fragmented across platforms and technical standards than under the Canvas scenarios: there is no single platform where all content is available<sup>12</sup>;

Based on discussions with stakeholders, the average price of VOD enabled STBs starts at £249 in 2010, and drops to £79 by 2015. Propensity to buy these VOD enabled STBs is lower than that found in the market research, due to the more restricted content proposition and range of functionality, as well as the lack of strong TV marketing campaigns. (See Appendix 1: Technical comparison of Dbook6 and Canvas for a more detailed description of the differences between the functionality enabled by the DBook6 and Canvas standards)

In addition, some TV manufacturers include VOD in their idTVs from mid-2011. This VOD functionality could be in the form of DBook6 or other standards.

On the demand side, existing sales trends in TV and set top box replacement cycles continue. idTV sales show some signs of slowing after a relatively recent step change increase in sales.

Viewing forecasts have been informed by historical trends in PVR households with non-linear viewing within a VOD enabled household increasing over time. There is also a substitution effect between VOD and PVR.

In the counterfactual, broadband penetration of households is predicted to grow from 66% in 2009 to 79% in 2015. This growth is driven by more aggressive marketing, product bundling and price competition, as well as supported government initiatives to drive broadband penetration such as Digital Britain. More detail including the market shares of major ISPs is set out in the market impact assessment on ISPs.

### 5.2 Canvas Base case

Canvas launches by Q4 2010; this is after the launch of other VOD to the TV propositions such as IP Vision, and next generation Freeview boxes with a catch up service. However, the strength of the Canvas proposition quickly propels it to be the most popular platform for VOD content to the TV on DTT, co-existing with other VOD to the TV propositions.

- Major PSBs and commercial players adopt the Canvas standard and the platform offers the most comprehensive content offering

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<sup>11</sup> As there have been no announcements to date stating the intention of offering consoles with Canvas, the model does not assess the impact of consoles on the market. However, Value Partner's preliminary view is that should games consoles offer Canvas; take up would be slow, given the relatively high levels of console penetration, that viewing levels on Consoles would be most analogous to that on secondary sets (as evidenced by the relative low usage of iplayer on games consoles to date (source: BBC consultation)) and that such take up and viewing would broadly substitute for take up and viewing on secondary sets, implying limited additional impact on the market.

<sup>12</sup> It is assumed that Sky's Darwin service will only be available to Sky HD customers

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- Canvas is promoted by the joint venture partners, through TV and online advertising; pre-launch marketing ensures that audiences know the product will be launched earlier in the year
- The swell of demand drummed up by marketing means retailers actively push Canvas STBs in their stores
- However, other VOD to the TV propositions continue to operate on DTT, competing with Canvas potentially on price, niche content or other features such as mini-pay.

Canvas STBs are initially retailed at an average price of £249; this decreases to £79 over five years. Consumer interest in buying Canvas STBs is in line with the demand indicated by the Opinion Leader market research commissioned by the Trust. Canvas competes with other VOD to the TV STBs on retailers' shelves, but as the platform aggregating the broadest range of content and with strong marketing, it captures 75% of customers buying such products. Some TV manufacturers include Canvas in their idTVs from mid-2011 to increase the attractiveness of their product; as the Canvas standard is widely recognised and understood. More idTVs are sold with VOD functionality than in the counterfactual.

Most households taking Canvas upgrade from a basic DTT proposition, rather than churning from Sky or Virgin, as Sky and Virgin have their own VOD offers with strong content offers and rich functionality.

Non linear viewing on Canvas STBs reaches 25% of viewing by 2015, a mixture of PVR and VOD; the strength of the proposition drives higher non linear viewing than on other VOD boxes.

Higher levels of VOD viewing increase peak bandwidth; however broadband wholesale pricing remains as in the counterfactual.

### 5.3 Canvas High case

Canvas launches by Q4 2010; at launch it enters a nascent IP VOD market with other propositions however Canvas grows to become the standard which other platforms or devices adopt in order to access the most comprehensive content offer.

- Canvas effectively supersedes other standards as STB manufacturers default to Canvas when including VOD functionality in their STBs for the UK market though some alternatives to Canvas remain in the market, they do not achieve scale relative to the counterfactual and are marketed less heavily so they remain niche players.
- Some ISPs offer their subscribers subsidised or free Canvas STBs as a customer retention tool, and launch 'Canvas broadband' with guaranteed quality of service to encourage migration to higher speed higher priced broadband subscriptions.
- Although Sky rolls out Darwin by Summer 2010, and Virgin continues to enhance its VOD service, the attractiveness of the Canvas proposition takes some of Sky and Virgin's market share growth as would-be basic tier subscribers who might have chosen Sky or Virgin, opt for Canvas via their ISP instead.

Strong marketing, a well-received proposition propagated through word of mouth, and competitive pricing drives consumer demand for Canvas, increasing propensity to buy Canvas when upgrading the STB. Prices of VOD enabled STBs start at £199, and drop fairly rapidly to £49 due to technology evolution and the high demand for Canvas STBs. Canvas is by far the most attractive VOD to the TV proposition across DTT in the market; as such Canvas captures 90% of this demand.

Non-linear viewing patterns are as the base case; the higher take-up of Canvas grows the overall level of VOD viewing and hence peak bandwidth demand. Broadband pricing remains as in the counterfactual.

# Report on model to assess the impact of Canvas on the TV Market

## 5.4 Canvas Low case

Canvas is launched by Q4 2010. However, it is beset with operational issues and remains a niche player targeting those in need of accessibility features. . Canvas therefore does not have sufficient impact to grow the overall market for VOD enabled STBs, but instead just shares the market with other VOD to the TV propositions, achieving a 33% market share of DTT VOD-enabled STBs.

- Content providers see value in supporting other platforms to maximise reach, as these other platforms have a critical mass of audience
- Retailers do not give particular prominence to Canvas enabled STBs on their shelves, as Canvas take up is slow and they have other competing (and potentially higher margin) products.

VOD enabled STB prices start at £249 and drop to £99 in the period to 2015, as in the Counterfactual. Consumer propensity to buy VOD enabled boxes / Canvas enabled boxes is the same as in the Counterfactual, as Canvas is just another offering in the market and does not affect overall consumer demand for VOD.

## 6 Assumptions

The model is driven by two types of assumptions:

- **Consistent assumptions** which remain constant across the Counterfactual and Canvas
- **Scenario assumptions**, the key drivers which vary across the Counterfactual and Canvas scenarios.

The major assumptions are detailed below.

### 6.1 Consistent assumptions

There are four categories of consistent assumptions: those relating to the TV landscape, competitor (Sky / Virgin) actions, viewing trends and ISP wholesale pricing.

Exhibit 9: Consistent assumptions

	TV landscape	Sky / Virgin actions re VOD	TV Viewing
Counterfactual	<ul style="list-style-type: none"> <li>• As per public announcements / forecasts</li> <li>• DSO in 2012</li> <li>• Natural replacement of STBs and TVs</li> <li>• Multiple players start offering VOD to the TV</li> </ul>	<ul style="list-style-type: none"> <li>• Sky launches Darwin when in 2010, in accordance with public announcements</li> <li>• Virgin continues to develop its VOD proposition</li> </ul>	<ul style="list-style-type: none"> <li>• In period to 2015, HH with VOD functionality move to watch more non-linear content</li> <li>• Varies by service depending on richness of proposition</li> <li>• Canvas leads to a greater movement towards non linear viewing than DBook6, others</li> </ul>
Canvas – High case			
Canvas – base case			
Canvas – low case			

#### 6.1.1 TV landscape

##### a) Television households

TV households are derived as a function of TV HH penetration and total households.

- Television penetration rose from 98.9% in 2006 to 99.4% in 2008; the model assumes television penetration reaches 99.8% in 2009 and remains constant to 2015<sup>13</sup>

<sup>13</sup> Source: Screendigest, Enders, EIU, Value Partners analysis

## Report on model to assess the impact of Canvas on the TV Market

- Growth in households is based on EIU forecasts; this is the key driver of TV HH growth.

### Exhibit 10: Television penetration

	2008	2009	2010	2011	2012	2013	2014	2015
TV penetration (%)	99.4%	99.8%	99.8%	99.8%	99.8%	99.8%	99.8%	99.8%
TV households (m)	25.8	26.1	26.3	26.4	26.6	26.8	26.9	27.0

### b) Digital TV penetration

Digital penetration draws on Ofcom and Digital UK forecasts and assumes the published switch-over timetable is met.

### Exhibit 11: Digital penetration

	2008	2009	2010	2011	2012	2013	2014	2015
Digital penetration (%)	88.80%	93.00%	95.20%	97.00%	100.00%	100.00%	100.00%	100.00%
Digital television households (m)	22.9	24.3	25.0	25.7	26.6	26.8	26.9	27.0

### c) Television sets in the market

The number of TV sets in the market is based on a combination of current data (Ofcom), industry forecasts and Value Partners forecasts

- EIU forecasts on the total number of TV sets are used; these forecasts go up to 2013
- Information from Ofcom's UK Digital TV update is used to check the current / baseline position; it is not materially different
- Value Partners extrapolated out the growth in TV sets to 2015, cross checking this for reasonableness by considering the total sets per household

### Exhibit 12: Television sets in the market

	2008	2009	2010	2011	2012	2013	2014	2015
Total TV sets (m)	61.35	62.35	63.49	64.71	65.99	67.47	68.41	69.38
<i>Cross check: sets per HH</i>	2.38	2.39	2.42	2.45	2.48	2.52	2.54	2.57

### d) TV set replacement cycle

Forecasts for the TV set replacement cycle are based on trends on historic replacement cycles, Value Partners makes assumptions on how this will evolve going forward.

- Ofcom collected and published data on TV sets sold per year in the UK; this was 6m in 2004, rising to 8.7m in 2007. This implies that on average up to 24% of HH acquired a new set (whether primary or secondary) in 2004, rising to 35% in 2007
- It is assumed that this rise is due to the roll out of flat-screen plasma and LCD TVs, which is generally acknowledged to be the main driver of TV sales, more so than other technology advances such as HD

## Report on model to assess the impact of Canvas on the TV Market

- Based on discussions with stakeholders, it is assumed that the rate of TV purchases by HHs remains constant at 33% of HH acquiring a new set each year; this implies an average TV replacement cycle of 7 – 8 years until 2015
  - Where analogue TV technology was subject to very little innovation, innovation in digital TV technology is expected to continue, creating more incentive for HHs to upgrade their TVs
  - Culturally, consumers are growing accustomed and conditioned to a more rapid refresh of consumer technology by the fast pace of change in mobile phone, MP3 and other handheld technologies, often driven by design as well as functionality
- Ofcom historical data on idTV sales is used to inform the proportion of new sets that are idTVs; these rise from 84% in 2009 to 100% by 2012.

**Exhibit 13: TV sets sold each year**

	2008	2009	2010	2011	2012	2013	2014	2015
As % of hh	33%	33%	33%	33%	33%	33%	33%	33%
TV sets sold	8.5	8.6	8.7	8.7	8.8	8.8	8.9	8.9
Total TV sets	61.4	62.4	63.5	64.7	66.0	67.5	68.4	69.4
Implied replacement cycle (years)	7.2	7.2	7.3	7.4	7.5	7.6	7.7	7.8
% TV sets sold which are idTVs	75%	84%	92%	96%	100%	100%	100%	100%

### e) STB replacement cycle

Replacement cycles are assumed to be different for primary and secondary sets.

For primary sets, the model assumes 20% of STBs are replaced each year i.e. STBs have a typical life of 5 years. This is benchmarked against historic data.

- In the year to March 2009, there were 4.2m DTT STB sales in the UK and 18.8m STBs as at March 2008, implying 23% of sets were replaced (or added)<sup>14</sup>; in the previous year 5.5m DTT STBs were sold.
- As the market matures it is likely that replacement rates will reduce to the levels assumed in the model.

For secondary sets, replacement cycles are assumed to be 25% lower than primary sets, i.e. 15% replaced each year.

- It is assumed that secondary sets are replaced less frequently, as households are more price sensitive about secondary sets and have less need for the latest functionality in these sets
- In addition, secondary sets often inherit the old STB when the primary set STB is upgraded, particularly in DTT households. It is noted however that Sky and Virgin HH who do not use multiroom would purchase a second set STB rather than a STB across from the primary set.

### f) Sky, Virgin, DTT, Freesat and Freesat from Sky penetration

The model examines market share of Sky (pay DTH) and Virgin Media (DCATV), DTT<sup>15</sup>, FREESAT and Freesat from Sky as platforms for primary sets. These assumptions are used in the Counterfactual, and as a baseline for the Canvas scenarios.

<sup>14</sup> Ofcom Digital TV update Q1 09, 29 June 2009, p 17

## Report on model to assess the impact of Canvas on the TV Market

- Value Partners assumptions for Sky and Virgin draw on a consensus of analyst forecasts, and are then extrapolated out to 2015. It is assumed that analysts have taken account of all information in the public domain about plans for next generation VOD enabled STBs on the Freeview and FREESAT platforms and so the effect of these on Sky and Virgin are implicit in these forecasts
- The forecasts assume that Sky continues to grow and to promote services such as HD and Darwin aggressively
- Virgin Media is assumed to maintain its customer base, in the face of competition from Sky and a rich DTT / Freesat multichannel proposition; it is also assumed to continue to develop its VOD proposition
- Freesat forecasts reflect input from stakeholders
- The figure for DTT is the balance of the rest of the market, and show some erosion as Sky extends its subscriber base.

**Exhibit 14: Sky, Virgin, DTT ,FREESAT and Freesat from Sky market share (of digital TV HH, primary sets)**

	2009	2010	2011	2012	2013	2014	2015
DTT	43%	42%	41%	40%	40%	39%	38%
Freesat	2%	3%	4%	4%	5%	6%	6%
Freesat from Sky	2%	2%	2%	1%	1%	1%	1%
Sky	37%	38%	38%	39%	39%	39%	40%
Virgin	15%	15%	15%	15%	15%	15%	15%

In the Canvas scenarios, all market shares / subscriber numbers are affected by Canvas; the assumptions driving this change in market shares and subscriber base are discussed in section 5.2.

### i) Sky

These assumptions imply that Sky is the primary pay-TV provider in the UK, with 10.8 m subscribers by 2015.

Although recent trends suggest that Sky is growing its basic tier base faster than its premium base, the model is conservative and assumes that the current subscriber mix across different channel packages is static over the period modelled. ARPU growth driven by subscribers upgrading to the HD offer, and a small increase in multiroom penetration.

- The proportion of Sky customers subscribing to HD services is forecast to grow over the period in line with historic trends, from 14%<sup>16</sup> of Sky subscribers at June 2009 to 45% by 2015<sup>17</sup>
- Take up of multiroom is forecast to grow from 19% at June 2009<sup>18</sup> to 25% by 2015<sup>19</sup>

Sky's retail offer and price points are assumed to remain the same in real terms over the period modelled.

Annualised consumer<sup>20</sup> ARPU is forecast to grow from £493 in 2009<sup>21</sup> to £564 in 2015.

<sup>15</sup> DTT is made up of Freeview and other platform operators like BT Vision and TopUp TV

<sup>16</sup> Sky Full financial year results 2009

<sup>17</sup> The majority of these HD subscribers will also have access to Darwin

<sup>18</sup> Sky Full Year results 2009

<sup>19</sup> In line with current growth trends

<sup>20</sup> Includes all consumer revenues: TV subscriptions, set top box sales and installation, phone and broadband

<sup>21</sup> Note these ARPUs are for the calendar year to December, not Sky's financial year to June

## Report on model to assess the impact of Canvas on the TV Market

Recent trends in the upgrading of the set top box mix by Sky households are predicted to continue. The proportion of basic only boxes is forecast to fall from approximately 50% to 5% by 2015 (for primary sets), replaced by Sky+, Sky+HD and Darwin boxes. Sky+ penetration is assumed to reach 50% by 2015, as a result of the dual effect of subscribers moving to Sky+HD and Darwin (together, reaching 45% subscriber penetration), as well as subscribers with basic boxes moving to Sky+.

### ii) *Virgin*

In our counterfactual Value Partners assume that Virgin will grow from 3.7m homes in 2008 to approximately 4m homes by 2015. This is based on the following assumptions:

- That there is no significant increase in new build for the cable network<sup>22</sup>
- That Virgin continues to actively market its VOD service and enhances its content proposition by improving the interface and functionality<sup>23</sup>
- Although Virgin does not currently retail Sky HD channels it is assumed that there is agreement to retail these channels by 2011 and that therefore lack of access to these channels does not generate significant churn from Virgin to Sky.<sup>24</sup>

Virgin customers are expected to continue to migrate to high specification set top boxes. The model assumes that the V+ box penetration of households increases from 15% in 2008 to 80% by 2015.

Annual consumer ARPU per subscriber is projected to grow in real terms from £528 pa in 2009 to £598 pa by 2015<sup>25</sup>.

### iii) *DTT*

Households using the DTT platform for their primary set are broken down by service (i.e. Freeview, TopUpTV, BT Vision and Others).

- 2008 is used as a baseline, with numbers reconciled to company information<sup>26</sup> and analyst reports
- 'Other entrants' include all new VOD to the TV services, such as IP Vision. This is modelled dynamically and varies between the counterfactual and the Canvas scenarios – see section 5.2 for more detail
- Share of the remaining DTT services are determined based on the assumption that each service provider evolves in accordance with publicly stated announcements, and that there are no other fundamental changes to these service platforms<sup>27</sup>
  - TopUp TV grows slightly having replaced Setanta premium channels with ESPN channels
  - In submissions made to the BBC Trust, TopUp TV has taken a view that the presence of multiple UIs in the market would be a key driver of growth for DTT VOD to the TV propositions. We have considered their inputs but, instead, take a view that a single UI proposition, backed up by a strong, consistent marketing campaign (as envisaged under Canvas) will drive growth of DTT VOD to the TV propositions

<sup>22</sup> The network expansion is assumed to be limited to pass no more than 50k households each year.

<sup>23</sup> Virgin Media validated in its discussions with the BBC Trust in November that it was making substantial investments in its user interface.

<sup>24</sup> If no such agreement is reached then Virgin Media is at risk of churn from its premium content subscribers to Sky. However, this is not a Canvas specific issue so we have not modelled it here.

<sup>25</sup> ARPU's have been calculated by averaging Virgin Media's consumer revenues (from television, broadband, telephony and set top box sales) over forecasts for Virgin Media's subscriber base

<sup>26</sup> Publicly available information as well as information provided confidentially to the BBC Trust for the purposes of this project

<sup>27</sup> Specifically, the potential impact of Sky being required to wholesale its premium channels is not taken into consideration as this is still under review

## Report on model to assess the impact of Canvas on the TV Market

- Due to the uncertainty regarding whether TopUp TV will develop its own UI or whether it would adopt the Canvas UI, it has been assumed in the Canvas scenarios that TopUp TV can market its proposition, including its premium subscription sport service (ESPN) to customers through Canvas enabled devices with the addition of a conditional access capability. In such a scenario, it sees an uplift to its subscriber base. If TopUp TV began retailing Sky sport content on its platform, it will have a bigger opportunity to grow its market share, either through its own devices or through Canvas devices
- BT Vision continues to grow in line with historic trends
- BT Vision is part of the Canvas JV, and makes its next generation of set top boxes in accordance with the Canvas standards. It therefore sees an uplift on its subscriber base relative to the counterfactual. However, it is assumed that it does not actively swap out its installed base of set top boxes due to cost issues.

### iv) *FREESAT & Freesat from Sky*

Households using free satellite services have the choice of two services: FREESAT and Freesat from Sky. These services are assumed to evolve as follows:

- FREESAT grows share with its expanded HD offer and planned catch up TV STB. FREESAT does not include Canvas in its future generations of STBs and therefore does not benefit from any uplift from Canvas
- Sky does not actively market Freesat from Sky, instead aiming to upsell its Freesat from Sky base into its basic tier. Freesat from Sky does not include Canvas in its future generations of STBs and therefore does not benefit from any uplift from Canvas

### g) Service provider – Set top box mix

The model forecasts Sky and Virgin STB mix by platform to 2015 using a consensus of analyst forecasts (where available) for the first three to four years and then extrapolated to 2015. The extrapolation assumes growing uptake of the PVR / HD boxes over time, driven by consumer appetite for PVR and HD. It is noted that consumer interest in the ability to record programmes is high, evidenced by the level of VCR take-up, which peaked at 87% in 2004.

Additionally, it is assumed that Sky rolls out Darwin by the summer of 2010. Sky has indicated that their HD boxes can be upgraded remotely to support their Darwin service. Thus, our assumptions around the take-up of Darwin represent the proportion of Sky HD customers who have internet connections with actual speeds fast enough to be able to use the Darwin functionality.

For other service providers, the STB mix varies by scenario as Canvas and VOD enabled STBs enter the mix. However, broadly it is assumed that there is a growing uptake of PVR / HD boxes across all service providers, with varying levels of VOD / Canvas enabled STBs depending on the scenario.

**Exhibit 15: Set top box mix (primary sets) by service provider**

	2008	2009	2010	2011	2012	2013	2014	2015
<b>Sky</b>								
Basic	50%	38%	30%	23%	17%	12%	7%	5%
Sky+	42%	43%	44%	46%	47%	48%	49%	50%
Sky+ HD	8%	19%	16%	14%	14%	13%	13%	11%
Sky Darwin	0%	0%	10%	17%	22%	27%	30%	34%

## Report on model to assess the impact of Canvas on the TV Market

	2008	2009	2010	2011	2012	2013	2014	2015
<b>Virgin Media</b>								
V-box	85%	76%	67%	57%	48%	39%	29%	20%
V+ box	15%	18%	33%	43%	52%	61%	71%	80%
<b>Freeview<sup>28</sup></b>								
Freeview	95%	84%	74%	63%	52%	41%	31%	20%
Freeview +	5%	16%	26%	37%	48%	59%	69%	80%

The STB mix for secondary sets is assumed to lag that of the primary set by two years, based on HH upgrading their primary set STB and moving their old STB to the secondary set.

### h) Television platforms – Pay TV package mix

The model uses broker reports, published data and data provided confidentially from Virgin Media, to determine current package mix and ARPUs. These are triangulated with subscriber numbers to enable cross checking with broker subscription revenue forecasts.

- For **Sky**, the model assumes there are five subscriber groups: Basic, Basic + 1 sports/movie channel, Basic + all sports or movies, Sky World (all channels). In addition, some subscribers use PPV.
- For **Virgin Media**, there are three packages based on the number of channels that are subscribed to: M, L, and XL. In addition, some subscribers take Sky premium channels (Sky Sports, Sky Movies) and/or PPV.

It is assumed that a growing proportion of Sky's subscriber mix is in the basic tier, in line with historic trends.

### 6.1.2 VOD to the TV offers

It is assumed across the Counterfactual and all Canvas scenarios that multiple players start to roll out VOD enabled STBs backed up by a VOD content proposition. This is based on feedback from the industry and public announcements. In particular, it is assumed that Freeview launches a new STB based on PSB functionality using DBook6 standards in 2010, and FREESAT launches a new STB with VOD functionality, such as access to BBC iPlayer. Other entrants such as IP Vision are also assumed to offer VOD-based propositions.

The level of consumer demand and rate of market growth varies by scenario and is covered in section 5.2.

### 6.1.3 Sky / Virgin actions regarding VOD

The model assumes that Sky and Virgin continue with their plans for VOD:

- Sky launches its Darwin service, using its Sky HD box enhanced by a software upgrade, as announced. It is assumed that Sky launches this by summer 2010
- Virgin continues to market VOD as a driver of its TV platform, enhancing the content proposition and improving the interface and functionality
- Virgin have also shared plans to develop a new proposition, supported by its generation of STBs, which would enable Virgin to provide customers with a fully integrated TV product, such that they would be able to watch content on any screen in the home, not just the traditional TV

<sup>28</sup> Excludes BT Vision and TopUp TV

## Report on model to assess the impact of Canvas on the TV Market

It is assumed that the launch of Sky and FREESAT VOD boxes and IP Vision are implicit in the counterfactual assumptions around the penetration of Sky and Virgin in the market.

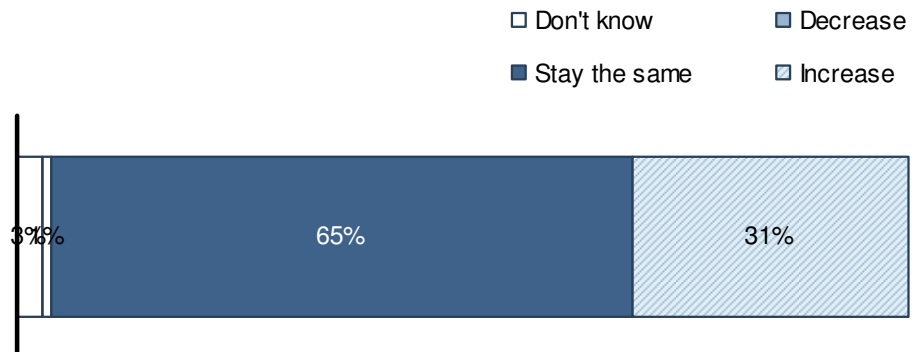
### 6.1.4 TV Viewing

#### a) Amount of TV viewing by platform and STB type

The model makes assumptions around the total amount of TV individuals watch, which varies by the platform (DTT, DTH, Cable, analogue) and by the functionality they have (PVR, VOD). This drives changes in the overall amount of TV viewing in both the counterfactual and the Canvas scenarios. The critical assumption is that improved and increased functionality which gives audiences greater control and choice over what they watch, improves their TV viewing experience and therefore drives higher levels of viewing.

- Research around Sky households pre- and post- obtaining Sky+ shows that PVRs result in higher levels of TV viewing. Analysis of the viewing habits of the Skyview panel of 6,000 PVR households shows that, after obtaining a Sky+ box, viewers watched 14% more television than when they did not have PVR functionality<sup>29,30</sup>
- VOD boxes are assumed to attract more viewing than PVR boxes due to additional functionality and better control over viewing. This is backed up by Opinion Leader research where 31% of respondents indicated that they thought having VOD functionality would increase the amount of TV viewing
- This dynamic is also validated by BBC research that shows that total viewing of TV content is higher amongst active users of iPlayer

**Exhibit 16: Opinion Leader: Expected impact of VOD on TV usage**



Question: What impact, if any would this new product have on your overall TV viewing?

- Additionally, it is assumed that viewers who are unable to stream VOD (DTT push VOD HHs), and therefore have a less compelling on demand experience, watch marginally less television than those who have full VOD functionality (DTT IPVOD HHs, DTH VOD HHs)
- The model assumes that viewing on standard STBs remains flat; this is broadly in line with historic BARB data

<sup>29</sup> Thinkbox, Starcom

<sup>30</sup> It should be noted that historic data from BARB indicates that individuals with PVRs tend to watch less television than individuals without PVRs. However, this is often attributed to the demographic of PVR owners, who tend to be early adopters who tend to watch less television

## Report on model to assess the impact of Canvas on the TV Market

- Implicit in these assumptions is that the quality and choice of content would remain strong and compelling.

Therefore, it is assumed that viewing habits vary by the type of distribution platform and set top box being used. This is due to the fact that historic data highlight different patterns of viewing.

### b) PSB v multichannel viewing

In thinking about share of viewing the model looks at two distinct groups of channels.

- The first are the existing analogue PSB channels (BBC, ITV, Channel 4 and Five) including their digital portfolios (e.g. BBC1, BBC2, BBC3, BBC4, CBBC, CBeebies, BBC News etc, Channel 4, E4, Film 4, E4 plus 1 etc), referred to as PSB channel groups
- The second are all other channels, referred to as Multichannels

The proportion of viewing of PSB channel groups varies by major platform and set top box. 2008 BARB data has been used as a baseline; the model forecasts forward on a platform and STB level based on the following principles:

- Across all STBs, it is assumed that there would not be any further erosion of PSB channel group with limited launch of new quality channels on DTT.
- It is assumed that on a given platform, based on 2008 actual data, the share of PSB group viewing is the same on PVR HH as standard households. This is evidenced by examining the BARB Sky and Sky+ viewing, which shows that PSB channel group viewing does not differ between households with standard boxes and those with PVRs (i.e. is constant at 57% of total viewing)

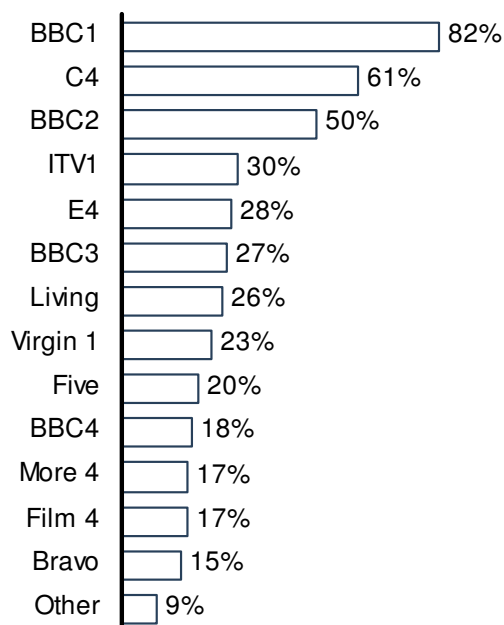
It is assumed that the “catch up” capability of Canvas will stimulate a small increase in PSB viewing due to the fact that the “catch up” capability will enable greater access to PSB content. This is not unique to Canvas and other IPTV propositions are assumed to have a similar effect.

These assumptions are validated by research from Continental Research which shows that the most watched VOD channels are the PSB channel groups.

# Report on model to assess the impact of Canvas on the TV Market

**Exhibit 17: Most watched VOD channels**

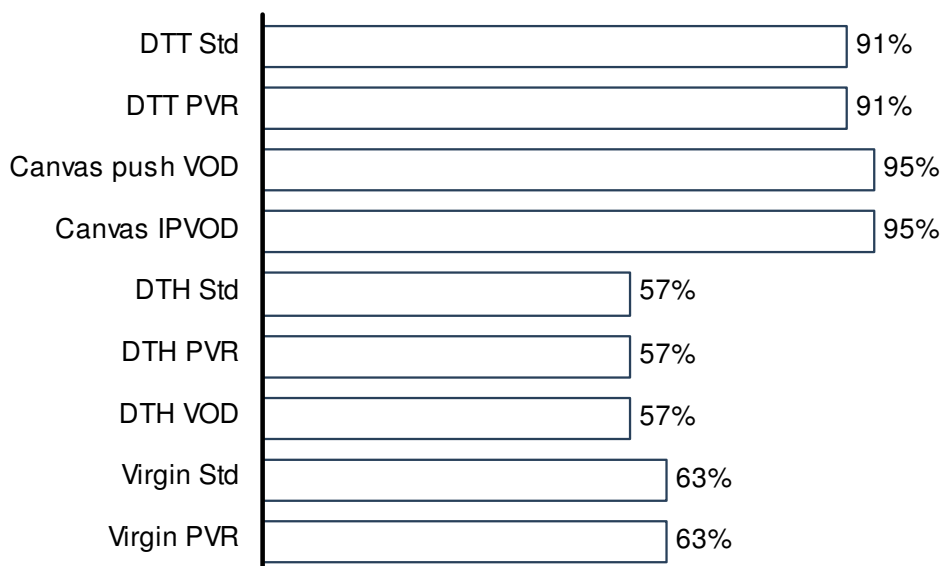
*“Which TV channels do the VOD programmes you watch come from?” [PROMPTED]*



Note: ITV1 numbers inconsistent since ITV catch-up was only available on Virgin from Jan 09, ie not at the time of survey  
 Base: All ever used cable VOD: 1,014  
 Source: Continental Research Sept 2008

It is assumed that the proportion of PSB channel group viewing varies for the different platforms and STB: these are shown below in exhibit 19:

**Exhibit 18: Proportion of PSB channel group viewing, by STB type**



Source: Value Partners assumptions

## Report on model to assess the impact of Canvas on the TV Market

### c) Non-linear viewing

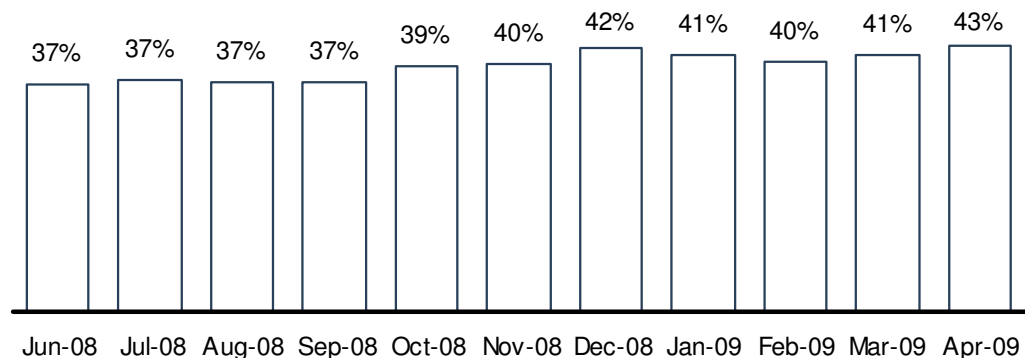
Non linear viewing includes PVR viewing and VOD viewing. The growth in the overall amount of non-linear viewing over time is driven by two factors:

- Growth in the number of boxes which enable non-linear viewing (VOD enabled boxes and PVR boxes)
- A behavioural shift towards non-linear viewing, as audiences get accustomed to VOD and PVR functionality, and the VOD content proposition improves.

The model assumes that the level of non-linear viewing would vary depending on the functionality enabled by the STB. Assumptions are baselined against 2008 BARB data on time-shifted viewing. Forecasts are based on the following:

- Greater choice and flexibility will stimulate use of VOD. For example, Canvas boxes with PVR, and full VOD functionality will have a greater level of non-linear viewing than PVR boxes or Canvas boxes which have a more restricted range of VOD content (content pushed to their STB rather than delivered over the internet)
- Non-linear on PVR boxes will grow slightly from current levels, as people get increasingly accustomed to using it<sup>31</sup>
- The level of time-shifting on VOD STBs will increase over time, as service providers enhance VOD propositions and audiences become more familiar with the functionality; this is broadly corroborated by the recent increase in the amount of Virgin Media TV iPlayer usage (both in terms of HH and views), shown in the exhibits below.

**Exhibit 19: Growing proportion of Virgin Media HH using TV iPlayer**

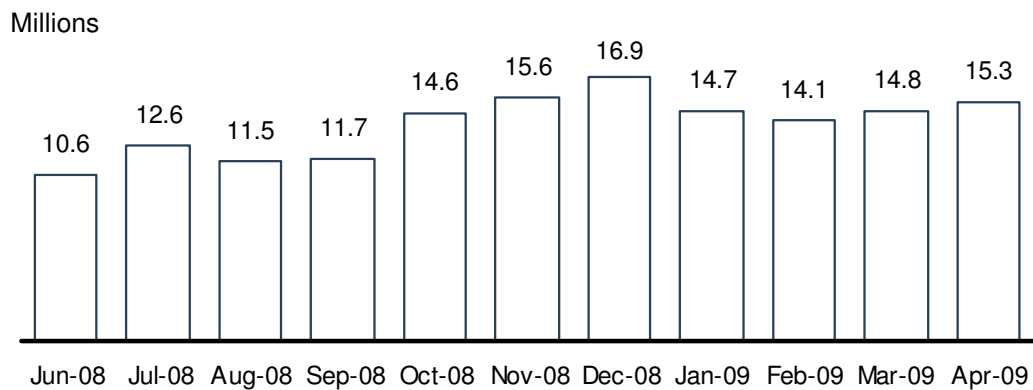


Source: Virgin Media Return Path Data

<sup>31</sup> This is backed up by data collected from the Skyview panel, which showed that PVR viewing is a habit that grows over time; homes which had a PVR for longer, timeshifted more viewing than homes which had more recently acquired a PVR

## Report on model to assess the impact of Canvas on the TV Market

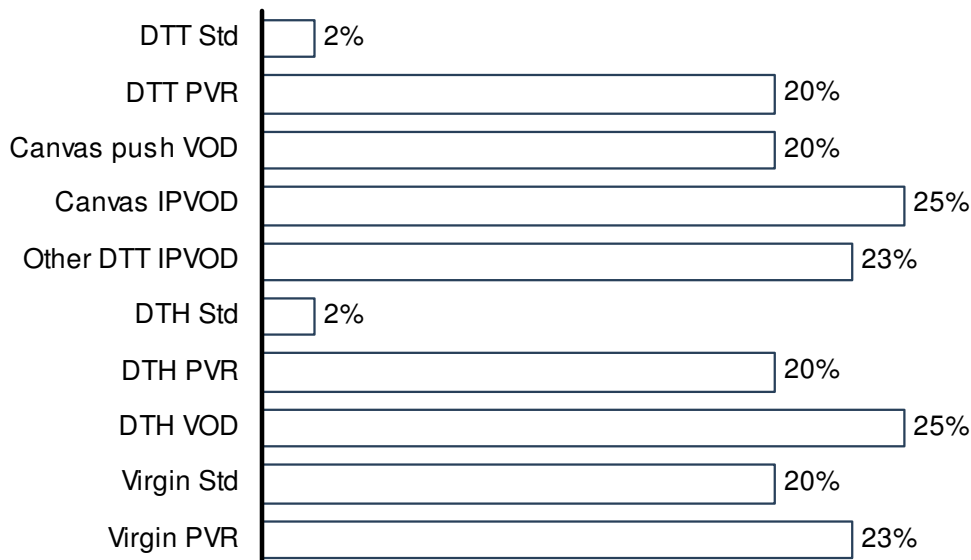
**Exhibit 20: TV iPlayer views per month through Virgin Media**



Source: Virgin Media Return Path Data

These principles underpin the assumptions around the level of non-linear viewing. The level of non-linear viewing is assumed to differ depending on the platform (DTT, DTH, Virgin) and the type of box (standard, PVR, VOD). The assumptions around the proportion of non-linear viewing by platform and STB type are shown in the graph below.

**Exhibit 21: Proportion of non-linear viewing, by platform and type of STB, 2015**



Source: Value Partners assumptions

### d) Type of non-linear viewing

The model distinguishes between three types of non-linear viewing: PVR viewing, push VOD viewing and pull VOD viewing.

- PVR viewing is when a viewer sets their PVR to record specific shows, and plays them back
- Push VOD is the automatic recording of a selection of programming onto the hard disk of the STB, so that audiences can watch the content at a time of their choosing. The Executive has stated that they plan to deliver some VOD content using push VOD technology

## Report on model to assess the impact of Canvas on the TV Market

- Pull VOD is VOD content which is stored on a server and streamed in real time to the viewer on request
- It is likely that the viewer would not be able to tell whether content is being delivered via push VOD or pull VOD; however, the use of push VOD has implications for internet traffic

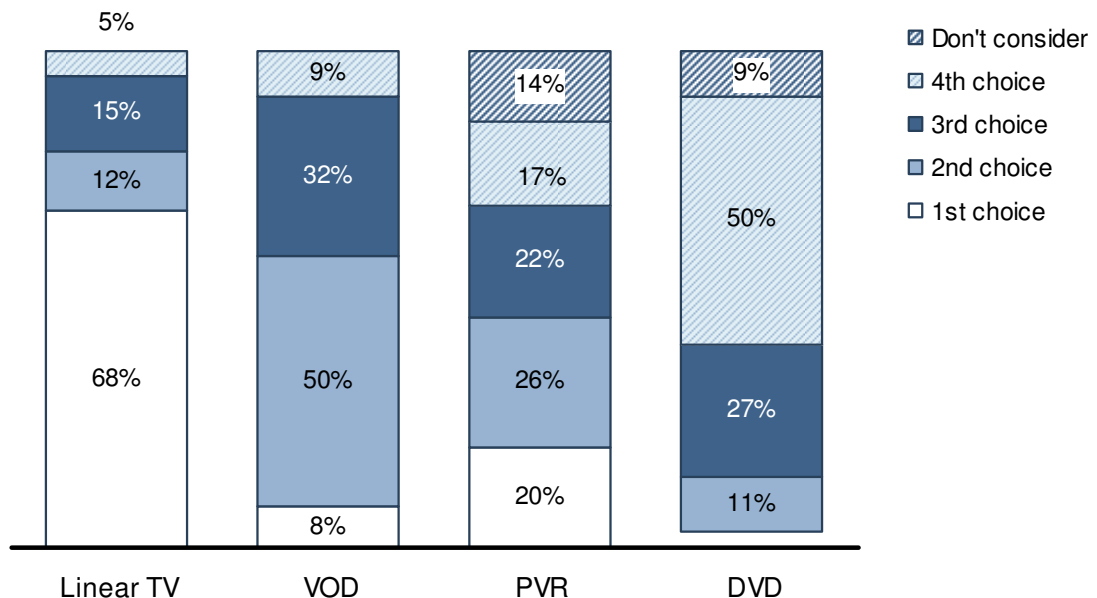
The model makes assumptions around the type of time-shifted viewing, varying these depending on the STB type. Due to the absence of benchmarks to validate these assumptions, the model uses generous assumptions around the amount of pull VOD so that impact on network demand and the impact on ISPs is not underestimated.

- In the absence of other data, the model assumes that on IP VOD enabled sets (Canvas and Darwin), two-thirds of non linear viewing is through VOD
- For push VOD only STBs, it is assumed that 50% of non linear viewing is through the PVR
- Of VOD viewing, it is assumed that one-third is delivered using push VOD technology.

In arriving at these assumptions, research by Continental research on Virgin Media subscribers was considered; this showed a strong interest in VOD and also showed that VOD was the most popular second choice after linear, ahead of PVR.

### Exhibit 22: Preferences for linear / non linear viewing

*“Thinking about when you want to watch something on TV – rank the following in order of what you normally watch”*



Source: Continental Research 2008

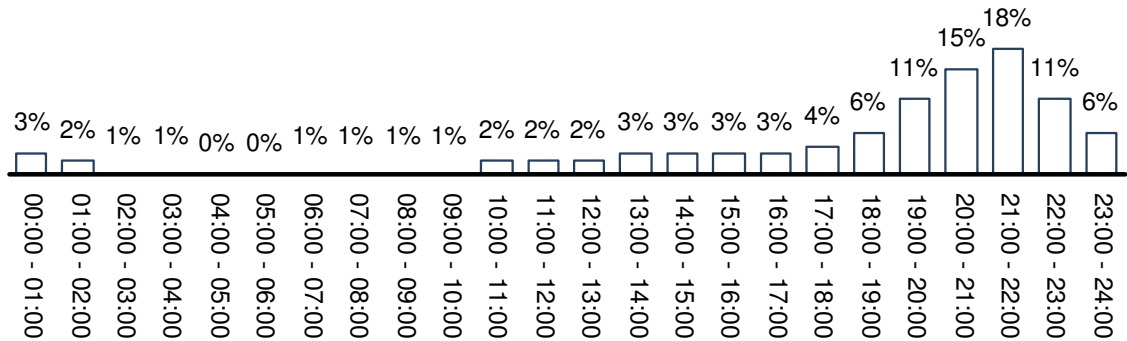
### e) Time of day

The TV model shapes the pull-VOD viewing by time of day. This is done solely to drive the level of broadband traffic resulting from TV VOD, for the ISP model.

Data from BARB, Virgin Media and Continental Research indicates that the peak hour for timeshifted viewing is typically between 9pm and 10pm. This data is shown in the following three exhibits.

# Report on model to assess the impact of Canvas on the TV Market

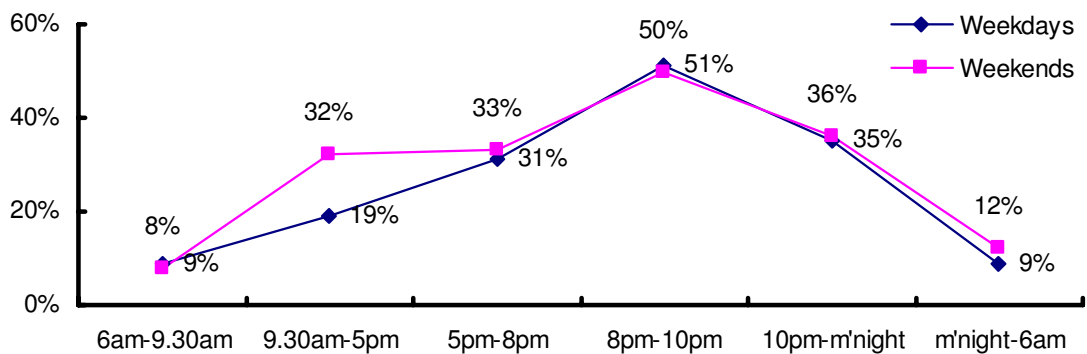
**Exhibit 23: Timeshifted viewing by time of day, 2008**



Source: BARB

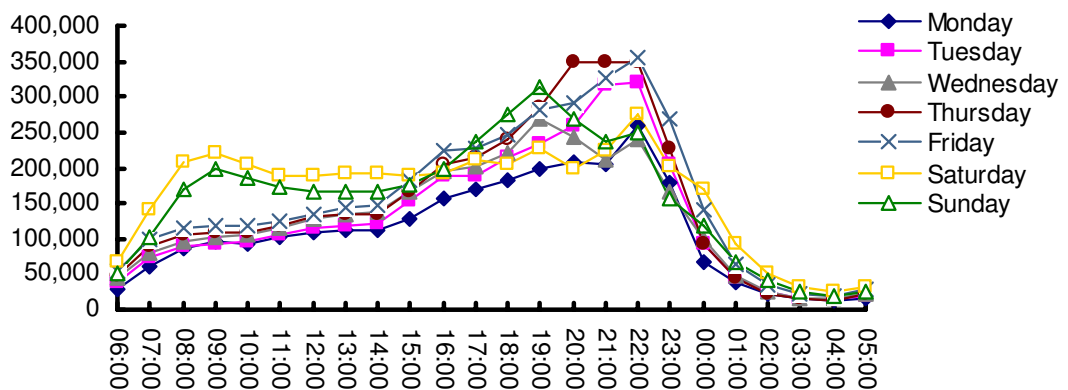
**Exhibit 24: Time of day when TV VOD is used**

*“Which times of day would you normally use VOD?”*



Base: All ever used cable VOD: 1,014  
Source: Continental Research Sept 2008

**Exhibit 25: Requests to view TV iPlayer content by time of day**



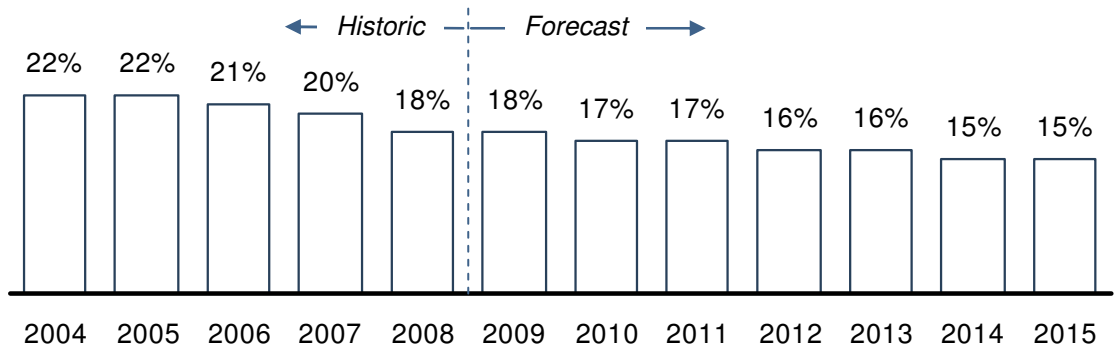
Source: Virgin Media Return Path Data

## Report on model to assess the impact of Canvas on the TV Market

Furthermore, analysis of historic trend data shows that peak hour (9pm – 10pm) time-shifted viewing reduced over time; in 2004, 22% of timeshifted viewing was between 9pm and 10pm, compared to 18% in 2008. This reflects how audiences are becoming increasingly 'freed' from viewing in traditional peak hours with use of PVRs (and in the future VOD). As such, the model assumes that this trend continues over the forecast period, as shown in the exhibit below.

**Exhibit 26: Peak hour share of time-shifted viewing**

% of time shifted viewing carried out in peak hour (9pm – 10pm)



Source: BARB, Value Partners assumption

### 6.2 Scenario drivers

Canvas scenarios are driven by a number of key drivers which vary by scenario. These are summarised in the exhibit below.

## Report on model to assess the impact of Canvas on the TV Market

Exhibit 27: Canvas scenario drivers

	Consumer demand VOD	DTT VOD STB price <sup>1</sup>	iDTVs include VOD (2015)	DTT VOD landscape	Pay TV churn Canvas	ISPs subsidise Canvas STB
<b>Counterfactual</b>	• Low to moderate	• £249 ? £79 in five years	• 5% of primary, 2% of secondary set iDTVs sold	• DBook6, fragmented other services • No Canvas	• N/A	• N/A
<b>Canvas – High case</b>	• High	• £199 ? £49 in five years	• 15% of primary, 8% of secondary set iDTVs sold	• Canvas launches in Q4 2010 • Supercedes all others (inc Dbook6); only one of scale • 90% of VOD STBs sold	• Sky 0.7% per annum • Virgin 1.4% per annum	• Yes
<b>Canvas – base case</b>	• Moderate	• £249 ? £79 in five years	• 15% of primary, 8% of secondary set iDTVs sold	• Canvas launches in Autumn 2010 • Co-exists with DBook6 and others, but is most popular • 75% of VOD STBs sold	• Sky 0.35% per annum • Virgin 0.7% per annum	• No
<b>Canvas – low case</b>	• Low to moderate	• £249 ? £99 in five years	• 10% of primary, 5% of secondary set iDTVs sold	• Canvas launches in Autumn 2010 • One of many VOD STBs on DTT • 33% of VOD STBs sold	• None	• No

Note: <sup>1</sup> Based on discussions with stakeholders

These are explained in further detail in the following paragraphs.

### a) Consumer demand for VOD

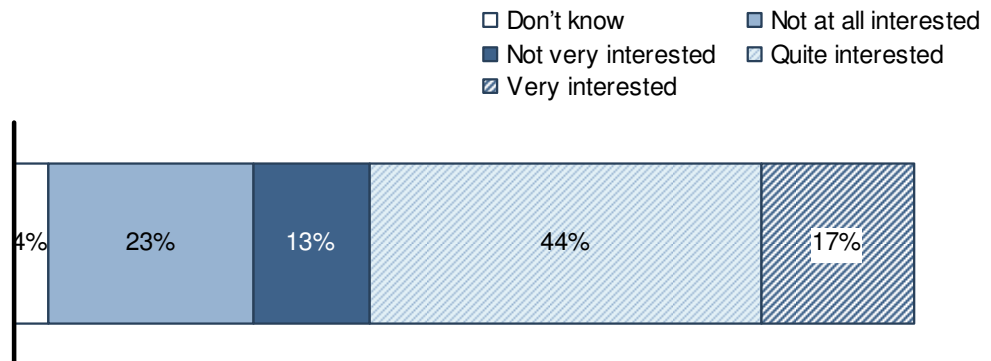
The levels of consumer demand for VOD to the TV vary by scenario. The driver for consumer demand in the model is the propensity to purchase a VOD-enabled STB when they are choosing a new STB. To arrive at this, there are two filters:

- Interest in VOD to the TV – “VOD acceptors”
- Willingness to pay for a VOD-enabled STB, at various price points

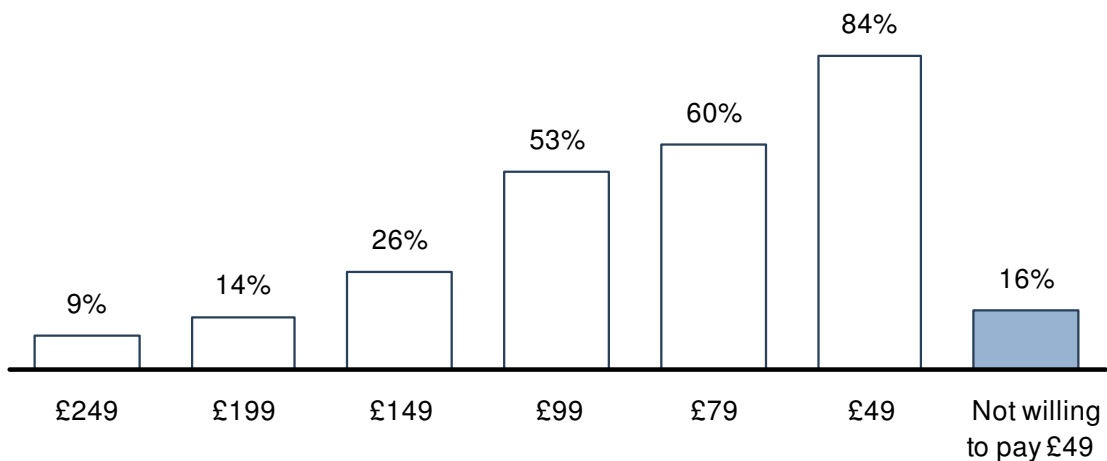
In the absence of firm price data from the BBC, Value Partners have used market research commissioned by the BBC Trust and conducted by Opinion Leader, to test interest in a VOD to the TV proposition at different price points. The results of this research were validated by interviews with stakeholders. It was found that 61% of respondents were VOD acceptors, and of these, just over half would consider paying over £99 for the STB.

# Report on model to assess the impact of Canvas on the TV Market

**Exhibit 28: Opinion Leader results: Interest in Canvas / VOD to TV**



**Exhibit 29: Opinion Leader results: Preparedness to pay**



It can be seen that consumers' preparedness to purchase increases as STB prices decline. For the base case Canvas take-up, the model assumes propensity to purchase at price points derived from the market research. The counterfactual down-weights these by 10%, based on the rationale that a less developed content proposition (consistent with our assessment in the annex to this report) and less functionality, with weaker marketing, would not be as attractive to consumers<sup>32</sup>.

The Canvas low case down-weights the market research by 8%, and the high case up-weight these values by 8% based on a highly successful Canvas gaining a very positive response from consumers.

<sup>32</sup> Market research commissioned by the BBC Executive shows that the propensity to buy a Dbook6-based STB, without features such as personalisation and internet access, would be lower by c.25%. This conjoint analysis was limited to a relatively small sample set, and comparison between Canvas and Dbook6 on a narrow set of features. As such, a down-weighting of 10% has been used to avoid underplaying the potential of non-Canvas VOD boxes. More details are available in the Opinion Leader market research report.

## Report on model to assess the impact of Canvas on the TV Market

**Exhibit 30: Propensity of VOD Acceptors to purchase VOD enabled at different price points, primary sets**

	£249	£199	£149	£99	£79	£49
Counterfactual	8%	13%	23%	48%	54%	76%
Low case	8%	13%	24%	49%	55%	77%
Base case	9%	14%	26%	53%	60%	84%
High case	10%	15%	28%	57%	65%	91%

Potential demand and price points were discussed with a number of stakeholders. Some stakeholders, whilst accepting that establishing demand for a new product had a high degree of uncertainty, argued that, based on experience, the critical price points were £149, £99 and £49, and that only when prices fell below these watermarks would there be significant shifts in demand. This view is consistent with the modelling approach we have undertaken.

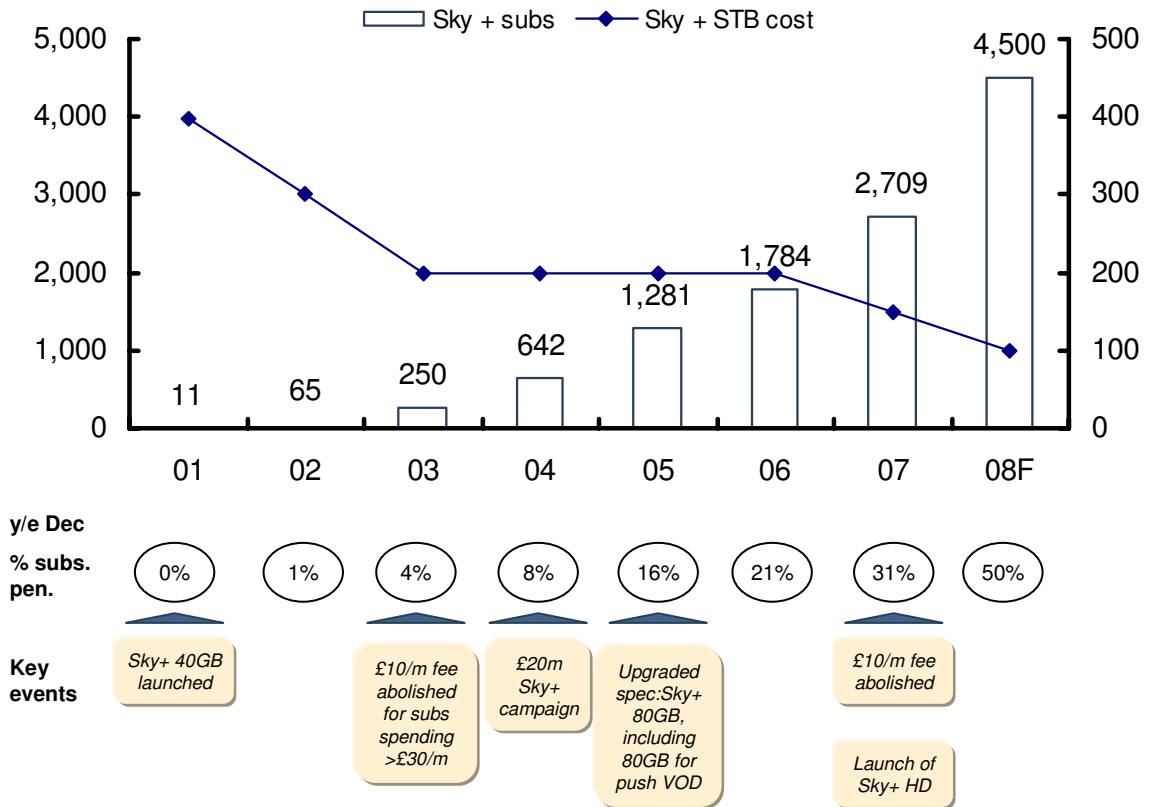
This growth trend has also been validated against take-up of Sky+ STBs. This shows a clear correlation between the price of the STB and take-up. It should be noted however that there were a number of other factors affecting take up of Sky+, namely:

- The 'word of mouth' effect of people experiencing the benefits of Sky+ then evangelising to their friends around it
- Set top box subsidies and various promotions
- Various marketing campaigns and specification changes.

However, it should also be considered that the initial introductory price was high at £400, and additionally there was a £10 monthly fee until 2007 which would have suppressed take up.

# Report on model to assess the impact of Canvas on the TV Market

**Exhibit 31: Sky+ subscribers and Sky+ price variation over time (m, £)**



Note: (1) Subscribers include Sky+ customers as primary set only, i.e. excludes Sky+ HD and secondary sets; prices are the headline price excluding special offers  
 Source: Value Partners analysis, Screen Digest, iDate, Press reports, UBS/Merrill Lynch reports

Propensity to buy VOD enabled STBs is assumed to be lower for secondary sets. As such, the model down-weights the propensity to buy for secondary sets by 60%.

## b) Average Canvas and other VOD set-top box price

There is likely to be a range of VOD-enabled STBs in the market at any one time, coming from different suppliers and with slightly different functionality or positioning. However, the model assumes an average VOD-enabled STB price; this together with the consumer preparedness to pay at various price points determines the sales of VOD boxes under the various scenarios.

It is assumed that VOD-enabled STBs are typically premium 'full bells and whistles' boxes including a PVR. The starting price and price curve going forward is based on discussions with the BBC Executive and a variety of manufacturers and is in line with their expectations.

It is assumed that in the counterfactual, base and low case, prices start at £249, this price is in line with prices indicated by discussions with the consumer electronics industry. By 2015, prices fall to £79 in the base case and the counterfactual; in the low case prices fall to £99. The high case reflects VOD-enabled STBs coming to market at a lower price of £199 and falling to £49 as a result of increased volumes.

## Report on model to assess the impact of Canvas on the TV Market

As shown above, the price points have a direct impact on propensity to take up VOD services. The price points below are linked into the propensity purchase assumptions and STB replacement cycle assumptions above. It is Value Partners' view that if the price of VOD boxes were to reduce more rapidly than has been estimated, while it would alter the shape of the take-up curve (bringing forward consumers' purchasing decisions) that overall take up would remain within the range of the proposed high case and low case as end price points are unlikely to be lower than envisaged in the Canvas high case.

**Exhibit 32: Canvas and Other VOD set-top box prices<sup>33</sup>**

	2010	2011	2012	2013	2014	2015
Counterfactual	£249	£199	£149	£149	£99	£79
Canvas - Low case	£249	£249	£199	£149	£99	£99
Canvas - Base case	£249	£199	£149	£149	£99	£79
Canvas - High Case	£199	£149	£99	£99	£49	£49

### c) Canvas and Other VOD-enabled idTVs

Over the last seven years, televisions have evolved to include flat-screen LCD and plasma technology, integrated DTT and DSAT and, in the last twelve months, internet connectivity. The importance of these new technologies is reflected in the changing attitude of consumers to television sets. In the last ten years, average replacement cycles have declined from 10 years (10% stock replacement) to 7.5 years (13% stock replacement) as demand for new styles and functionality has increased.

The model forecasts that the percentage of stock being replaced each year will begin to reduce very slightly in the forecast period; on the one hand, replacement will slow as old analogue stock is phased out, but on the other hand, rapid changes in digital TV technology and consumer attitudes to new technology will act to maintain the rate of replacement.

It is assumed that some idTVs will feature VOD functionality. The rationale for including VOD functionality is as follows:

- idTV manufacturers may seek to differentiate their products; some have developed widget-based access to internet video on their new idTV ranges
- Being VOD enabled could become 'de rigeur' in the same way as having a digital tuner.

However, there are also reasons why idTV manufacturers may not feature DBook6 / Canvas:

- Incorporating this functionality implies some additional cost
- The DBook6 / Canvas functionality may not be relevant to all customers – particularly Sky and Virgin customers who have separate STBs
- TV manufacturers often specify and manufacture ranges of TVs for multiple markets; this may reduce their incentive to incorporate it in their TVs if UK volumes are insufficient
- There are other VOD to the TV standards which the TV manufacturers can incorporate, including potentially their own proprietary standards.

<sup>33</sup> In the Counterfactual the figure is the average for DBook6 and other VOD set top boxes, for the Canvas scenarios the figures are the average for Canvas set top boxes.

## Report on model to assess the impact of Canvas on the TV Market

It is anticipated that there will be a growth in the proportion of Canvas and other VOD-enabled idTVs from 2012:

- Incorporation in idTVs is constrained by the Canvas standard requiring a PVR; currently hard disks are too unstable to include in idTVs as they have moving parts. One stakeholder argued that resolving this issue could take three years
- Using solid state flash memory is an alternative approach; this has the stability but are currently too expensive; incorporation of the Canvas standard into idTVs is contingent on reduction in prices of flash memory; it is estimated that these will become economically viable by 2012
- Discussions between the BBC Trust and consumer electronics manufacturers indicate that they are unlikely to incorporate Canvas into idTVs before 2012.

The proportion of idTVs incorporating VOD capability rises to 4% in the counterfactual, to 10% in the Canvas low case, and to 15% in the Canvas base and high cases. These figures are for primary set idTVs, the figure is halved for secondary set idTVs.

### d) Canvas share of the DTT VOD Market

The shares of different VOD to the TV services vary by scenario.

In the Counterfactual, Canvas is not launched; there are other VOD to the TV services, notably services from Freeview based on DBook6, IP Vision, and others yet to be announced.

In the Canvas High case, Canvas is assumed to 'win' and become the major VOD platform in the market; 90% of all STB sales are on the Canvas standard across the period.

In the Canvas Base Case, Canvas is one of a number of VOD to the TV standards co-existing in the market; it is the most successful and popular standard however, accounting for 75% of VOD-enabled STBs sold.

In the Canvas Low Case, Canvas is beset with operational issues and other VOD standards gain greater traction in the market; Canvas accounts for 33% of STBs sold.

In all the Canvas scenarios, Canvas is assumed to launch in Autumn 2010 as currently planned.

### e) Impact of Canvas on main pay TV platforms

As the success of Canvas varies under the different scenarios so does the migration of subscribers from platforms and services not offering Canvas.

The propensity of either Sky or Virgin subscribers to move to Canvas is limited due to the fact that there are significant aspects of the Sky or Virgin consumer proposition which, even post Canvas, DTT will struggle to replicate. In essence, Canvas elevates DTT to the next level of development but does not materially erode, over the period modelled, the competitive advantage of either Sky or Virgin. This is discussed in more detail below.

#### i) *Assessment of the Strengths and Weakness of Canvas vs. other platforms*

Consideration of the respective consumer propositions offered by main TV distribution platforms underpins an assessment that Canvas is unlikely to generate a step change in churn from these platforms. Some of the key features which lead us to that conclusion are set out in the following exhibit and discussed in the paragraphs below:

## Report on model to assess the impact of Canvas on the TV Market

**Exhibit 33: Comparison of features and functionality of Main TV Distribution Platforms, November 2009 (Source: BBC Trust, unless otherwise stated)**

	BskyB	Virgin	Freeview	Freesat from Sky	Freesat (BBC/ITV)	Canvas
Number of linear channels and capacity	<ul style="list-style-type: none"> <li>Approximately 385 pay and FTA channels depending on package taken.</li> </ul>	<ul style="list-style-type: none"> <li>Up to 160 pay and FTA channels, depending on package taken.</li> </ul>	<ul style="list-style-type: none"> <li>Maximum of 41 TV channels (including radio).</li> <li>Despite technology improvements no significant increase in capacity expected.</li> </ul>	<ul style="list-style-type: none"> <li>Approximately 200 channels.</li> </ul>	<ul style="list-style-type: none"> <li>81 TV channels. No current plans to increase capacity.</li> </ul>	<ul style="list-style-type: none"> <li>Canvas will be able to access all linear channels available on Freeview (41 channels)</li> </ul>
Non linear capability	<ul style="list-style-type: none"> <li>Sky offers the Anytime service and has extensive NVOD capability. Project Darwin will bring VOD capability to HD STBs.</li> </ul>	<ul style="list-style-type: none"> <li>Virgin has a well established VOD service including iPlayer available to all subscribers.</li> </ul>	<ul style="list-style-type: none"> <li>None at present.</li> </ul>	<ul style="list-style-type: none"> <li>None at present.</li> </ul>	<ul style="list-style-type: none"> <li>Planned launch of capability to access iPlayer through an Ethernet connection.</li> </ul>	<ul style="list-style-type: none"> <li>Capability to access non-linear content (including catch up and non PSB content) over a broadband internet connection</li> <li>Non linear content will be accessible through the Canvas device's advanced, flash-based user interface</li> <li>Non linear content can be accessed via streaming, progressive download, content pushed to PVR, etc.</li> </ul>

## Report on model to assess the impact of Canvas on the TV Market

	BSkyB	Virgin	Freeview	Freesat from Sky	Freesat (BBC/ITV)	Canvas
HD capability	<ul style="list-style-type: none"> <li>35 HD channels but ambition is to retail 40-50 HD channels</li> <li>Available for £10 pr month.</li> </ul>	<ul style="list-style-type: none"> <li>6 HD channels but a publically stated aim of retailing 20-30 HD channels by 2010<sup>34</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>Maximum of 4 HD channels expected.</li> </ul>	<ul style="list-style-type: none"> <li>Up to 5 HD channels but expect launch of 2 or 3 additional channels.</li> </ul>	<ul style="list-style-type: none"> <li>Freesat currently offers 2 HD channels (ITV HD and BBC HD).</li> </ul>	<ul style="list-style-type: none"> <li>HD capable Canvas boxes will be able to access HD channels on DTT as well as non-linear HD content.</li> </ul>
Set top box requirements and prices	<ul style="list-style-type: none"> <li>Set top boxes are purchased by consumers but at very competitive prices.</li> </ul>	<ul style="list-style-type: none"> <li>Set top boxes are rented by subscribers as part of the access package. V+ boxes with built in PVR cost an additional £49 with a monthly subscription of £4.99.</li> </ul>	<ul style="list-style-type: none"> <li>Freeview can be accessed through set top boxes or idTVs.</li> </ul>	<ul style="list-style-type: none"> <li>Set top box required either purchased or transferred from the subscription services.</li> </ul>	<ul style="list-style-type: none"> <li>Set top box required with prices ranging from £49 to £250.</li> <li>Freesat idTVs are also available but the range of products is limited compared to Freeview.</li> </ul>	<ul style="list-style-type: none"> <li>Canvas is a technical specification for consumer electronics (set top boxes and idTVs). Indicative pricing of Canvas STBs to be in the region of c.£200</li> </ul>
PVR penetration	<ul style="list-style-type: none"> <li>Built into Sky + boxes. Sky+ boxes currently retail at £49.</li> </ul>	<ul style="list-style-type: none"> <li>Built into V+ boxes which typically cost an additional £49.</li> </ul>	<ul style="list-style-type: none"> <li>Depends on selected set top box.</li> </ul>	<ul style="list-style-type: none"> <li>Sky + boxes can be purchased at £149 by existing Sky customers (£49 for new customers joining Sky).</li> </ul>	<ul style="list-style-type: none"> <li>PVR available for circa £250.</li> </ul>	<ul style="list-style-type: none"> <li>Canvas STBs are anticipated to have PVR capability.</li> </ul>
Telephony services	<ul style="list-style-type: none"> <li>Sky talk bundled with entry package.</li> </ul>	<ul style="list-style-type: none"> <li>Bundled discounts with all pay TV packages.</li> </ul>	<ul style="list-style-type: none"> <li>None at present</li> </ul>	<ul style="list-style-type: none"> <li>None.</li> </ul>	<ul style="list-style-type: none"> <li>None.</li> </ul>	<ul style="list-style-type: none"> <li>ISPs like BT and CPW are likely to bundle broadband with Canvas devices.</li> </ul>
Marketing and cross promotion	<ul style="list-style-type: none"> <li>Significant marketing spend at circa £900m<sup>35</sup> for financial year 2009</li> </ul>	<ul style="list-style-type: none"> <li>Marketing spend estimated at c. £130-180m in 2009<sup>36</sup>. Comparatively lesser</li> </ul>	<ul style="list-style-type: none"> <li>Freeview's marketing spend for 2009 is estimated at<sup>37</sup> c.5-10,m. In recent years</li> </ul>	<ul style="list-style-type: none"> <li>No significant marketing spend.</li> </ul>	<ul style="list-style-type: none"> <li>Marketing spend circa £5-6m per annum<sup>38</sup></li> </ul>	<ul style="list-style-type: none"> <li>Estimated Marketing spend for Canvas planned at c.£25m between 2011-15</li> </ul>

<sup>34</sup> BBC Trust, based on questions following Virgin Media's Q2 09 investor presentation

<sup>35</sup> Morgan Stanley, September 2009

<sup>36</sup> Includes Virgin Mobile marketing spend; Source: Morgan Stanley October 2009, BBC Trust

<sup>37</sup> VP estimate

<sup>38</sup> Value Partners' estimate

## Report on model to assess the impact of Canvas on the TV Market

	BSkyB	Virgin	Freeview	Freesat from Sky	Freesat (BBC/ITV)	Canvas
	<ul style="list-style-type: none"> <li>Cross promotion through portfolio of channels.</li> </ul>	ability to cross-promote Compared to Sky.	there has been significant additional voluntary contributions above this level			<ul style="list-style-type: none"> <li>Canvas marketing is expected to drive take up of Canvas products but also increase general awareness of VOD and its benefits</li> </ul>

### High definition content

- Market research has revealed strong consumer interest in HD content<sup>39</sup>. Stakeholder responses to the consultation argued that this demand would grow as more people experience HD, especially in relation to sport and movies<sup>40</sup>. Sales of HD receiving equipment are growing and Ofcom estimates that by Q1 2009 approximately 2.3m homes had installed HD receiving equipment<sup>41</sup>.
- The presence of HD content on various platforms varies significantly:
  - Sky's HD proposition, launched in April 2006, includes 35 linear HD channels covering key genres<sup>42</sup>. By the end of March 2009 over one million Sky homes had access to a Sky+HD service<sup>43</sup>. Virgin, on the other hand, currently offers seven linear HD channels, a hundred hours of on-demand content as well as some HD on demand movies. Virgin has plans to expand its service to over 30 HD channels including Sky Sports. By Q1 2009, over 600,000 Virgin subscribers were able to receive an HD service<sup>44</sup>
  - Freesat from the BBC and ITV currently offers two HD channels.
  - On DTT, Freeview plans to launch HD channels from December 2009 and the service will be available to approximately 50% of the population by June 2010<sup>45</sup>. The intention is to launch with HD services from BBC, ITV and Channel 4. Despite strong growth in the sale of HD-ready televisions, Freeview customers will have to purchase new receiving equipment to access the HD channels.<sup>46</sup>
- Although HD services are not available to all pay TV subscribers at the moment, it is likely that as HD propositions mature, the strength of the HD proposition will be a key differentiator for pay platforms, both helping to reduce churn and attracting new subscribers
- In terms of HD capability, the Freeview platform currently can not match the range of content available on either Sky or Virgin. More importantly, capacity constraints<sup>47</sup> mean that the number of HD channels on the platform is likely to be limited for the foreseeable future. Due to their superior HD propositions, Virgin and

<sup>39</sup> Opinion Leader market research

<sup>40</sup> Against this it is arguable that the popularity of HD has been on the back of some heavy marketing and that BARB data might suggest that many consumers may well be indifferent for many genres of television output. However, the consensus of opinion seems to be that once households shift their consumption to HD viewing they are unlikely to want to shift back to SD viewing.

<sup>41</sup> Ofcom Communications Market Report 2009, p74

<sup>42</sup> For example, BBC HD, Channel 4 HD, Discovery HD and Eurosport HD

<sup>43</sup> Sky Q3'09 presentation, April 2009

<sup>44</sup> Virgin Media's reported V+ base at the end of Q1 '09; source: Virgin Media investor presentation, May 2009

<sup>45</sup> Freeview website, as of December 15<sup>th</sup>, 2009; (<http://www.freeview.co.uk/freeview/Services/Freeview-HD>)

<sup>46</sup> The equipment will need to support MPEG-4 compression and DVB-T2 transmission.

<sup>47</sup> There is capacity for 5 HD channels on the HD multiplex. It is possible that capacity could grow through improvements in encoding and compression as well as the launch of another HD multiplex could be launched in 2012; however this is unlikely to expand HD capacity beyond a total of 10 – 12 channels

## Report on model to assess the impact of Canvas on the TV Market

Sky will continue to have a significant competitive advantage over the DTT platform for the foreseeable future

- Canvas boxes will be HD ready and hence able to support any future linear HD services. Whilst Canvas will not directly impact the number of linear channels available on the HD platform, in the longer term it is envisaged that Canvas users will be able to access streaming HD content over broadband connections<sup>48</sup>. Hence, it is possible that over time, additional HD content will become available via Canvas.

### PVR

- The introduction of PVRs has represented a step change in the ability of consumers to gain greater control over the viewing experience. Ofcom estimate that approximately 27% of UK consumers now use a PVR<sup>49</sup>
- The penetration of PVRs has increased rapidly across both pay TV and FTA platforms. Sky's Sky + accounts for c.5 million homes or over 60% of all PVRs sold<sup>50</sup>. Sky and Virgin are promoting their PVRs with price cuts for either purchase and/or installation of boxes. PVR penetration for FTA homes has also risen in the last two years<sup>51</sup>. Ofcom estimates that over 2.6million PVRs have been supplied under either the Freeview +, Freesat+ or Top Up TV brands, driven by reduced retail prices<sup>52</sup>
- It is likely that PVR penetration levels will converge over the next few years, especially if prices of FTA devices continue to fall
- The fact that Canvas boxes will include a PVR capability is unlikely to materially alter the competitive dynamics between the platforms other than in relation to the delivery of push VOD or catch up services.

### Non Linear content

- Market research suggests that there is particularly strong demand for the ability to control the viewing time for any particular content, including the use of catch up services. Canvas enable the delivery of catch up services and there is a stated intention that the EPG will enable easy navigation to that content
- Both Sky and Virgin have the technical capability to provide a comparable service:
  - Virgin already offers a highly popular catch up service to all its subscribers (which includes the BBC iPlayer) and has publicly announced plans to invest in next generation set top boxes with IPTV capability
  - Sky's Sky Anytime service already provides a range of catch up content based on the existing NVOD capability on its set top boxes. Sky has also announced that it will be ready to launch project Darwin, its IPTV service for Sky+ customers, by the summer of 2010.
- Furthermore, PSB content (which currently accounts for a significant portion of VOD catch up viewing) will be available on the Sky and Virgin platforms.
- Canvas, as an open platform, will provide access to a long tail of content. If this proves attractive, there is no structural reason why Virgin or Sky cannot launch equivalent services
- Arguably, consumers (in pay TV or FTA homes) are likely to increasingly demand catch up and IPTV services. If Canvas is perceived to be a superior proposition compared to entry level packages offered by pay TV operators, it is then likely that those operators will react by making such services more widely

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<sup>48</sup> Streaming of HD content will require greater bandwidth than SD content. The ability to stream HD content will be dependent on the characteristics of the broadband package purchased as well as network factors including distance from the exchange, etc

<sup>49</sup> Ofcom Communications Market Report 2009, p41

<sup>50</sup> Ofcom Communications Market Report 2009, p40. Ofcom estimate states that over nine million units have been sold but only seven million homes claim to use one.

<sup>51</sup> Ofcom: The Communications Market Report 2009, p.53

<sup>52</sup> The average price of Freeview PVRs had fallen to an average of £106 by the end of Q1 2009, Source: Ofcom Communications market Report 2009, p53

## Report on model to assess the impact of Canvas on the TV Market

available by either reducing or lowering the price points for access or through enhanced levels of functionality.

### Range of Linear Content

- Sky has the capacity to deliver, relatively cheaply, a greater number of broadcast channels (both basic and premium) than other platforms.
- Both Sky's and Virgin's retail packages offer more channels than Freeview. Even basic tier packages, with a smaller number of channels, include "must have" channels (such as Sky 1, Discovery or MTV) which are otherwise not available on Freeview. Research for the pay TV review highlighted that many subscribers who placed value on specific non-premium "must have" channels would not switch to Freeview if they lost access to those channels
- Canvas will not increase the range of linear channels available on DTT. Hence, Sky or Virgin subscribers who value specific channels that are unavailable on the DTT are likely to have a low propensity to switch to FTA (supported by market research commissioned by the BBC Trust). However, in the longer term, if Canvas can facilitate greater access to desired channels or key content, then the propensity to switch might be higher
- The propensity of customers to switch to DTT will also depend on the competitive response of pay TV operators to Canvas (in terms of how well they combine a rich content offering with other services at competitive prices).

### Premium content

- A key constraint on the potential impact of Canvas on Sky and Virgin is the proportion of pay TV subscribers who consume premium content. Ofcom acknowledges the critical role played by premium content bundles in influencing customers' choices of service providers
- 62%<sup>53</sup> of Sky customers subscribe to at least one premium service<sup>54</sup> whereas the equivalent figure on Virgin (which is not published) is believed to be significantly lower (in the region of 20-30%). None of this content is available on the DTT platform
- Canvas does not directly impact the availability of premium content on the DTT platform and therefore it is likely that subscribers of premium channels on either Sky or Virgin will continue have a very low propensity to churn from DTH to the DTT platform. Research undertaken by Opinion Leader also suggests that a proportion of pay TV subscribers would be willing to churn off the service to adopt Canvas but this proportion fell considerably if the pay TV operators could provide the same content or range of service available from Canvas<sup>55</sup>.

### Bundled proposition

- An increasing proportion of Pay TV customers are purchasing pay TV services as part of a bundle with telephony and broadband services. Ofcom estimates that 46% of households now subscribe to more than one communications service from the same provider<sup>56</sup>
- Both Sky and Virgin have aggressively pursued a strategy of offering bundled propositions

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<sup>53</sup> Analyst reports, Value Partners' analysis

<sup>54</sup> BSkyB's control and distribution of premium content is subject to detailed regulatory scrutiny by Ofcom in its Pay TV review. For the purposes of this document it is not necessary to consider in detail the analytical approach utilised by Ofcom in relation to market definition or market power. However, the main feature of the market which is relevant to the analysis is the fact that a significant of the BSkyB customer base subscribes to premium content not available on the DTT.

<sup>55</sup> Opinion Leader market research

<sup>56</sup> Ofcom Communications Market Review 2009, p58

## Report on model to assess the impact of Canvas on the TV Market

- Sky's marketing is now targeted at a triple play entry package of one basic tier of pay TV content, a 2mb/s broadband connection and telephony for £18.50 per month<sup>57</sup>. Circa 16% of BSkyB's subscribers were triple play by mid-year 2009<sup>58</sup>
- Virgin's commercial strategy follows the historic cable approach and is built around triple or quadruple play penetration of households. As of Q1 2009 over 57% of Virgin subscribers were triple play customers<sup>59</sup>.
- Not only does the marketing of bundled propositions present more opportunities to raise ARPU but it is a mechanism to reduce churn. Households are likely to be more reluctant to switch to another supplier when it involves disruption to more than one service
- Furthermore, pay TV users on bundled packages face additional switching costs when moving from the Pay TV services to an alternate service (such as Freeview). Due to bundled pricing, it is increasingly difficult for subscribers to apportion cost to one particular service, making it harder to estimate the cost or benefit of switching
- Hence, pay TV operators are able to develop a deeper and broader relationship with their customers than many ISPs who do not offer equivalent pay TV services. This will limit the ability of Canvas to attract pay TV in the short to medium term. In the longer term, Canvas might have some impact on the pay TV subscriber base as the range of content available increases and the non linear content becomes more popular.

### Marketing

- Sky deploys a marketing budget which dwarfs all competitors. For the financial year ending June 2009, over £900m was spent on marketing. Sky's marketing budget has been targeted at growing the subscriber base through an attractive triple play entry price but also the marketing of HD content and more recently faster broadband access.<sup>60</sup>
- In contrast, Virgin's marketing spend was c.£130-£180m<sup>61</sup> and Freeview's estimated marketing budget is c.£5-10m per annum (In recent years there has been significant additional voluntary contributions above this level)<sup>62</sup> Canvas' marketing spend is projected to be £25m between 2011 and 2015<sup>63</sup>.
- The Canvas joint venture will be able to draw upon the marketing budgets of its members. The ability to market around a common proposition should enable Canvas to obtain a profile not obtainable in the counterfactual. Nevertheless it is highly unlikely that the size and scope of the marketing budget available to the Canvas JV, even if account is taken of the ability to cross promote the service from existing PSB channels, will be able to match that deployed by Sky at current levels.

### ii) *Assumptions made*

In summary, it is not expected that Canvas would have a significant impact on Sky and Virgin's subscriber base for the following reasons:

- It is assumed that both Sky and Virgin launch / continue to develop their VOD to the TV propositions
- Both Sky and Virgin will have greater capacity to provide expanded HD and channel propositions relative to DTT

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<sup>57</sup> Sky website, November 2009

<sup>58</sup> Sky full financial year 2009 investor presentation

<sup>59</sup> Virgin Media investor presentation, May 2009

<sup>60</sup> A 20 m/b/s package is currently being offered for an additional £10 per month.

<sup>61</sup> Includes Virgin Mobile marketing spend

<sup>62</sup> BBC Trust, based on inputs from Freeview

<sup>63</sup> BBC Trust

## Report on model to assess the impact of Canvas on the TV Market

- Sky's subscriber base is attracted to Sky by exclusive premium sport and movies, which the Canvas platform is unlikely to provide
- Virgin with its higher capacity cable networks will be able to deliver higher quality, guaranteed service than DSL for broadband customers generally and VOD services in particular.

It is assumed that the majority of the reduction in subscribers as a result of the Canvas proposition comes from basic tier subscribers with the lowest ARPU.

Ofcom's Pay TV review could require Sky to offer premium sports and movie channels on a wholesale basis to competitors at a regulated price, which arguably could increase the effectiveness of DTT as a competitor to Sky's premium customers. However this is an industry issue and not an impact of Canvas and is consequently not assessed in this document.

### Exhibit 34: Primary set subscribers choosing Canvas over Sky or Virgin per annum (as % of respective subscriber base in the counterfactual)

	2010	2015
<b>Sky pay-DTH</b>		
Canvas - Low case	0%	
Canvas - Base case	0.35%	
Canvas - High Case	0.7%	
<b>Virgin DCATV</b>		
Canvas - Low case	0%	
Canvas - Base case	0.7%	
Canvas - High Case	1.4%	

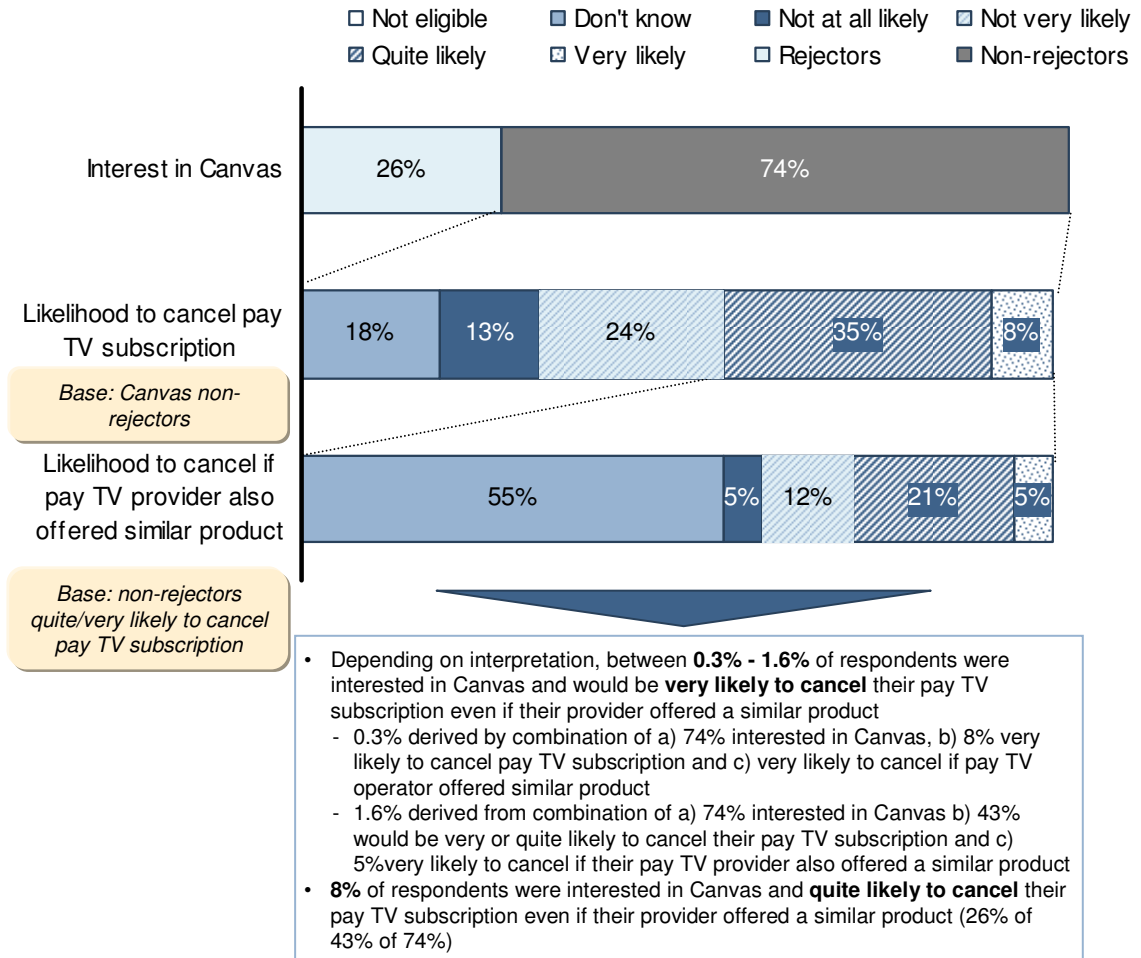
These assumptions have been broadly validated by the market research conducted by Opinion Leader.

- Opinion Leader indicates that 0.3% - 1.6% of respondents were interested in Canvas and said they would be very likely to cancel their pay TV subscription in favour of Canvas; 8% were quite likely to.
- Base case assumptions would imply Sky reduction in subscribers relative to the counterfactual (from loss of growth and churn) of 1.75% (0.35% each year for five years); in the high case this would be 3.5%. The impact is less than for Virgin due to the strength of Sky's premium proposition.
- For Virgin, the base case would imply a reduction in subscribers relative to the counterfactual of 3.5% in the base case and 7% in the high case over five years.

The likely response of Sky and Virgin to the introduction of Canvas, as discussed above, together with the market research, suggests these assumptions are likely to be conservative (in that they imply the most adverse impact on Sky and Virgin).

## Report on model to assess the impact of Canvas on the TV Market

**Exhibit 35: Opinion Leader: Likelihood of Pay TV subscribers to cancel their subscription if Canvas was available**



### f) ISPs subsidising Canvas-enabled STBs

For ISPs, Canvas will both be a catalyst to demand for higher speed broadband and will also stimulate usage of their network and consequent costs.

Only in the Canvas high case are ISP's assumed to subsidise Canvas set top boxes. In the Canvas high case, it is assumed that selected ISPs (BT, Carphone Warehouse, Orange, O2 – specifically, excluding Sky and Virgin) will run promotional campaigns, providing subsidised Canvas enabled STB with certain higher-bandwidth broadband packages or "Canvas ready" packages, or for customers signing longer contracts (e.g. 24 months). The aim would be to differentiate, drive gross additions and decrease churn. ISPs already use similar promotions (e.g. 3UK offers a free laptop to customers signing 18 or 24 month contracts<sup>64</sup>, BT has offered free iTunes downloads to drive broadband take-up<sup>65</sup>).

<sup>64</sup> <http://threestore.three.co.uk/broadband/?1184&Broadband>

<sup>65</sup> <http://www.brandrepublic.com/News/490143/BT-embarks-iTunes-promotion-boost-broadband-take-up/>

## Report on model to assess the impact of Canvas on the TV Market

It is assumed that BT Vision benefits from providing subsidised boxes, which would in effect be the next generation of Canvas-compliant BT Vision boxes; it would see an uplift in its subscriber base in line with its relative broadband market share (excluding Sky and Virgin).

## 7 Model findings

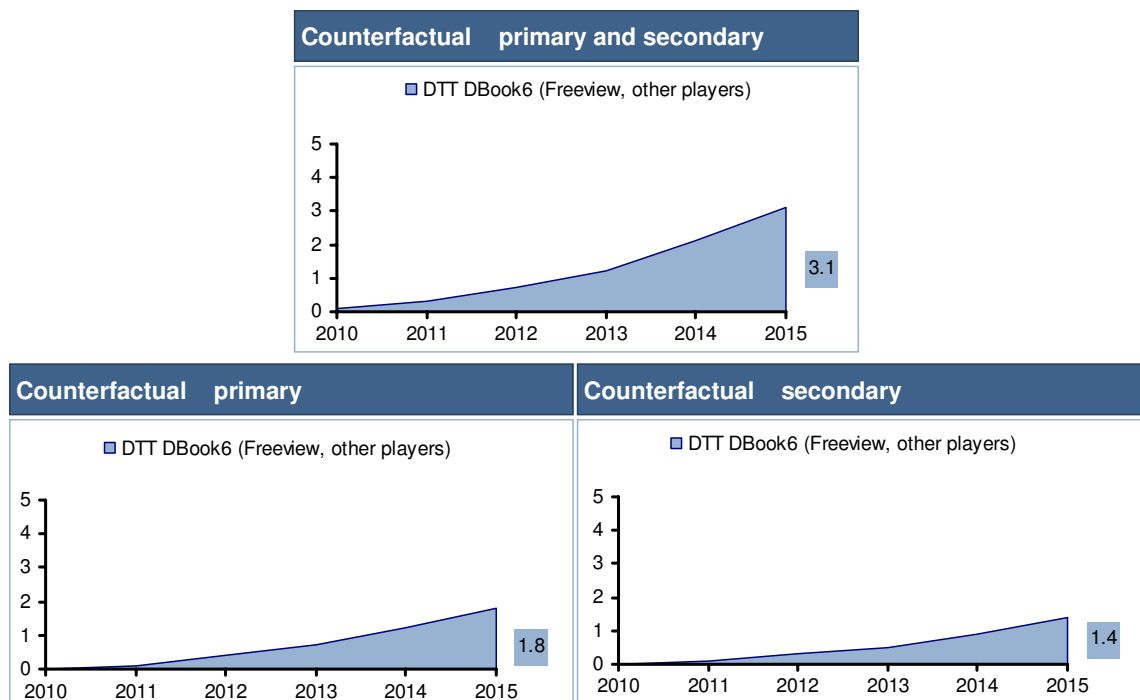
This section sets of the key outputs of the TV model. It is arranged in four parts:

- Description of the Counterfactual
- Take-up and usage of Canvas STBs
- Impact of Canvas on other platforms
- Impact of Canvas on viewing

### 7.1 Description of the Counterfactual

In the Counterfactual, the model forecasts that 3.1m VOD boxes would have been sold by 2015. Of these, 1.8m would be used as primary sets and 1.4m would be used as secondary sets<sup>66</sup>.

**Exhibit 36: Counterfactual: VOD-enabled DTT STB uptake, primary and secondary sets**



Note: Excludes Sky Darwin STBs as it is assumed that these are Sky HD STBs remotely upgraded rather than bought by subscribers

### 7.2 Take-up and usage of Canvas STBs

#### 7.2.1 Take-up of VOD and Canvas-enabled STBs/idTVs

The model indicates that in the base case there will be 4.0m Canvas enabled sets (via STBs or idTVs) by 2015 in a market of 5.2m DTT VOD enabled sets. This compares to a counterfactual where there would be 3.1m DTT VOD enabled sets. Canvas penetration increases to 8.3m in a market of 9.1m in the high case

<sup>66</sup> These exclude Sky Darwin boxes as these are expected to be over-the-air upgrades of the Sky+HD boxes, rather than specifically purchased.

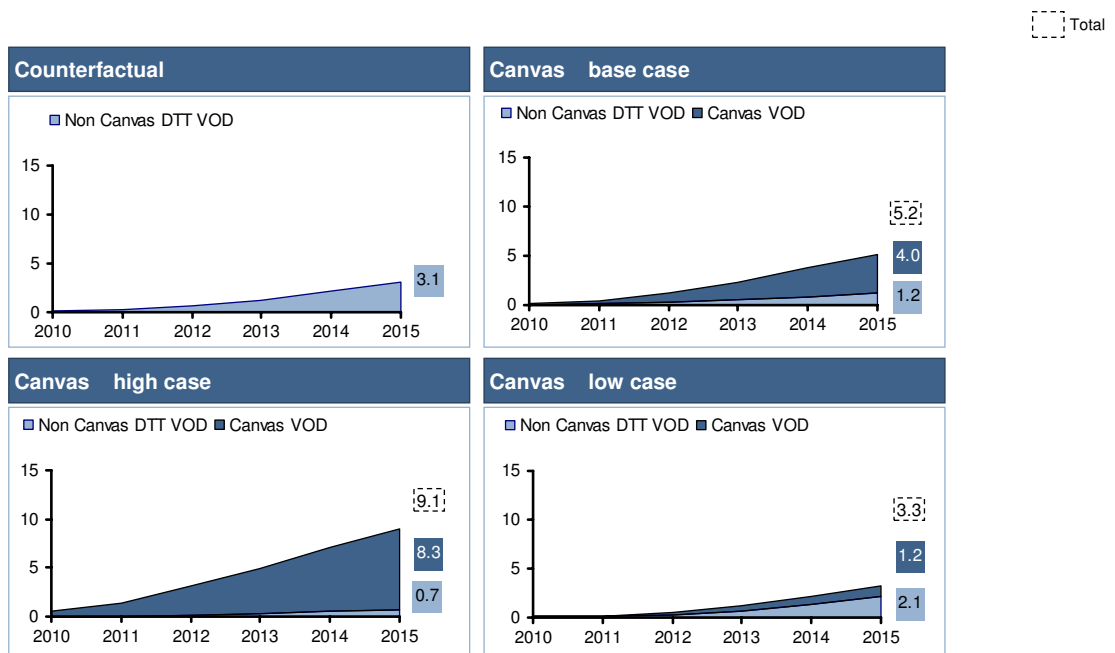
## Report on model to assess the impact of Canvas on the TV Market

(when Canvas take up is accelerated by active involvement from ISPs) and declines to 1.2m in a market of 3.3m in the low case (where Canvas remains a niche proposition).<sup>67</sup> These results have been validated against expectations within the industry<sup>68</sup>.

In this scenario, 54% of primary DTT households are expected to own a VOD enabled device. We expect this to be an upper bound for the number of VOD adopters and it is unlikely that Canvas would achieve penetration in excess of the high case by 2015, due to several reasons:

- A portion of the DTT base is comprised of low-end TV users, who are expected to have a low level of interest in investing in an enhanced DTT proposition like Canvas. For instance, there were over 5 million analogue households in the UK TV market, c.4 years after the launch of Freeview. This group of households (c. 46% of DTT HH in the high case) represents a rump of individuals who are unlikely to adopt VOD propositions.
- Furthermore, it is estimated that by 2015, c.21% of households will not take up a broadband connection. Whilst it is likely that some Canvas devices may be purchased by households without broadband, it is also reasonable to expect that the overall attractiveness of a DTT VOD to the TV proposition for these households will be low

**Exhibit 37: Take-up of DTT VOD and Canvas enabled equipment, primary and secondary sets**



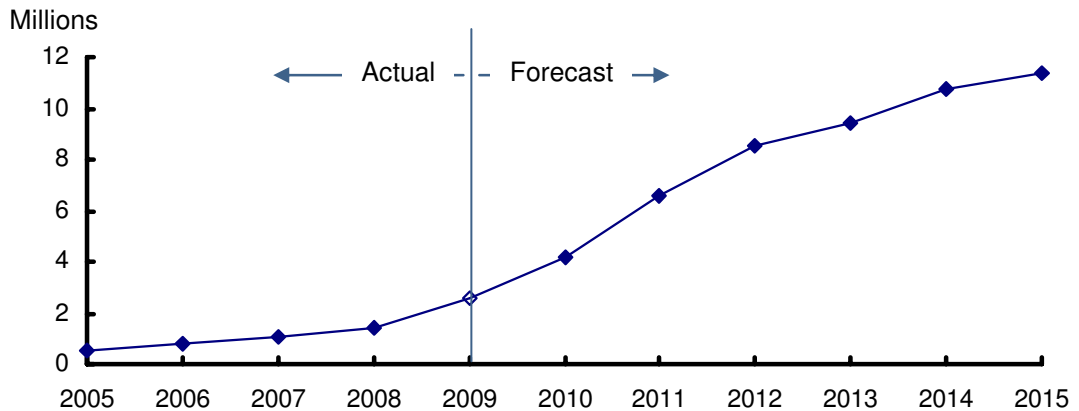
In all the Canvas scenarios, there is a substitution effect between Canvas STBs and other VOD-enabled STBs. In the base case, by 2015, the introduction of Canvas could reduce the number of non-Canvas VOD enabled sets in the market by between 1m and 2.4m sets.

<sup>67</sup> Note that all the market figures exclude Sky Darwin boxes as these are expected to be over-the-air upgrades of the Sky+HD boxes, rather than specifically purchased.  
<sup>68</sup> Screen Digest in their presentation The Connected Environment, 14<sup>th</sup> October, 2009 forecast that by 2014 3.5m households will be Canvas enabled

## Report on model to assess the impact of Canvas on the TV Market

This rate of take-up has been sense-checked against the take-up of other premium boxes. Take-up of DTT and FREESAT PVRs currently stands at 2.6m (across Freeview, BT Vision, Top upTV and FREESAT), approximately 5 years after being introduced. This is lower than the forecasts of VOD enabled boxes. However we note that Freeview PVRs have not been widely marketed, unlike the plans for Canvas, and indeed have not been marketed as Freeview+ until recently.

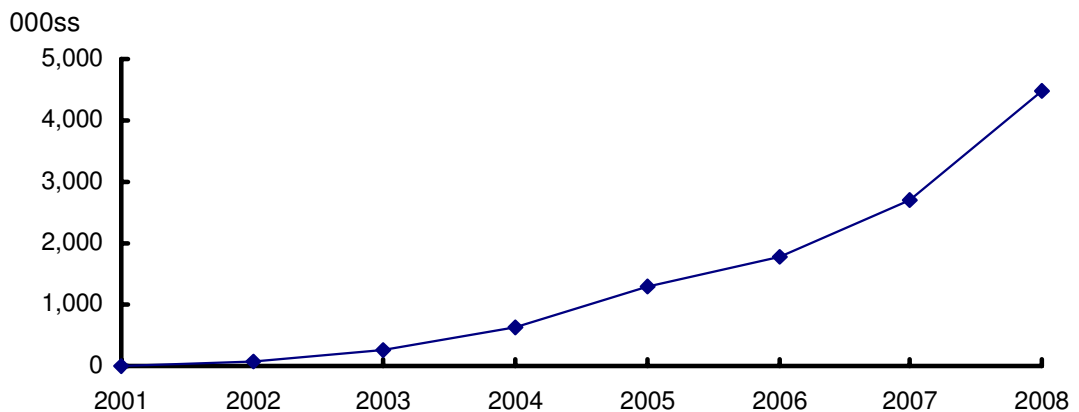
**Exhibit 38: Growth of DTT and FREESAT PVRs in the market**



Source: Enders Digital TV market to 2018, March 2009, Value Partner analysis

Consideration has also been given to the take up of Sky+, which reached 1.8m HH in its first five years with a similar take-up curve (further details can be found in section 5.2). Again, however, take-up would have been suppressed by the high initial price point of £400, and the monthly charge which was only removed 7 years after launch in 2007.

**Exhibit 39: Growth in Sky+ take up**



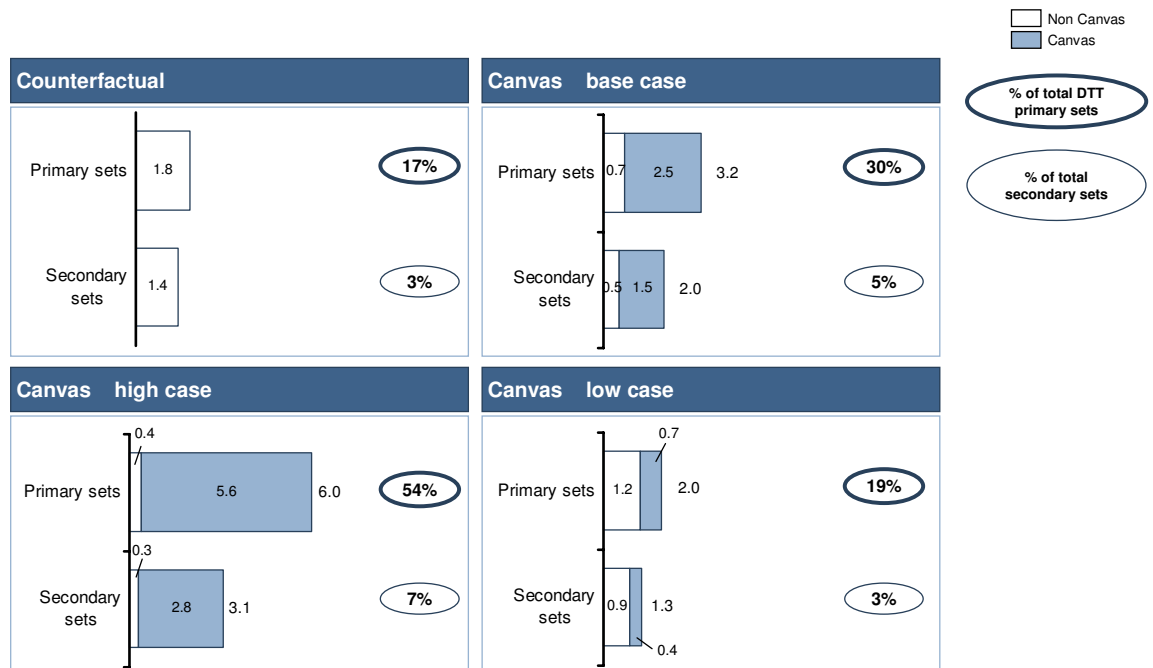
Source: Sky brokers and annual reports

The Canvas base case indicates that by 2015, 3.2m primary sets would be VOD-enabled, representing 30% of DTT primary HHs. Of these, 2.5m would be Canvas, i.e. taking 78% of the market. This would compare to an expected 45% of Sky sets being Sky HD, and 80% of Virgin Media sets being V+ boxes, both these products having been in the market for some 2-3 years longer than VOD enabled boxes.

## Report on model to assess the impact of Canvas on the TV Market

In the Canvas high case, by 2015, 6.0 primary sets are VOD-enabled, a 54% penetration of DTT primary sets. In the Canvas low case, only 2.0m primary sets would be VOD-enabled by 2015, a penetration of 19% of primary DTT sets. Canvas would in this low case take up just 7% of the market for primary DTT sets. The modelling provides a range of possible take up scenarios for Canvas, although take up volumes are likely to be between the base and the high case scenarios<sup>69</sup>

**Exhibit 40: 2015 DTT VOD and Canvas enabled equipment, by primary and secondary sets**



Note: Excludes Sky Darwin STBs

### 7.3 Sensitivity analysis

Sensitivity analysis has been carried out to assess how sensitive the number of VOD enabled and Canvas enabled equipment is to a number of key drivers.

The key drivers assessed are:

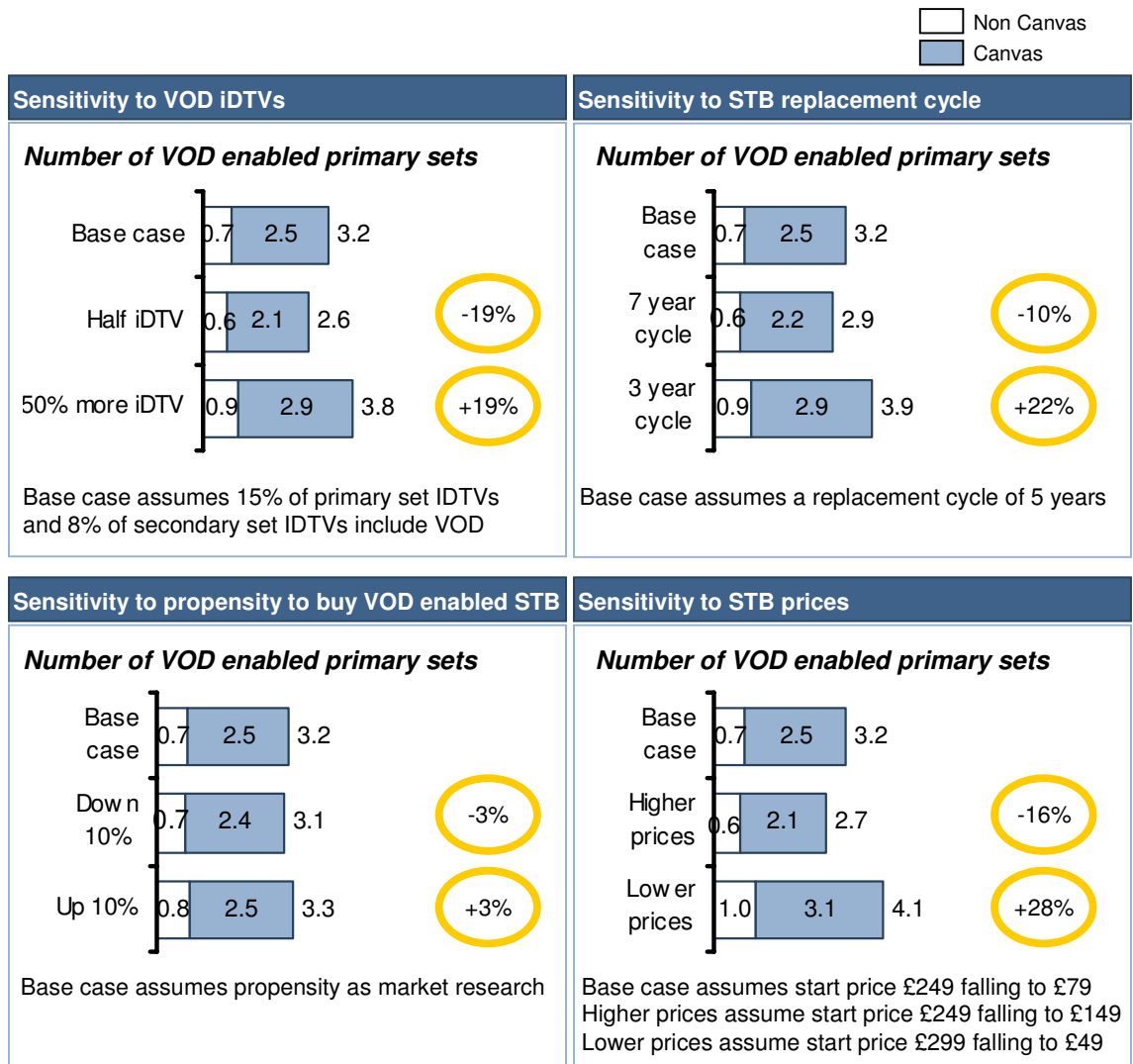
- Proportion of idTVs sold with VOD / Canvas
- STB replacement cycle
- Propensity to buy VOD enabled sets
- STB prices

This analysis indicates that the number of VOD enabled primary sets in the market is fairly sensitive to the proportion of idTVs sold with VOD capability, set top box prices and STB replacement cycle; it is least sensitive to up-weighting and down-weighting the propensity to buy VOD enabled sets.

<sup>69</sup> Estimates for Canvas take up are comparable to forecasts from Analysts including Screendigest (c. 3.5m HH by 2014)

# Report on model to assess the impact of Canvas on the TV Market

Exhibit 41: Sensitivity analysis of base case to key drivers



## 7.3.1 IPVoD enabled sets

Not all VOD-enabled STBs purchased by customers will be capable of streaming VOD via IP. Some will be restricted to push VOD functionality only due to the broadband speed available to the customer, due to the distance they are from local exchanges. Hence, the model forecasts the number of VOD-enabled television sets (Canvas and non-Canvas) connected to a broadband connection with sufficient bandwidth to stream IPVoD. Calculations to arrive at IPVoD sets are carried out in the ISP model.

In the Counterfactual, it is expected that there would be 6.9m IPVoD enabled boxes in the market. These include 4.4m Sky Darwin boxes. If Canvas were to be introduced, by 2015 it is forecast that there will be between 7.1m and 12.5m IPVoD-enabled sets, of which between 1.1m – 7.7m would be Canvas-enabled sets.

# Report on model to assess the impact of Canvas on the TV Market

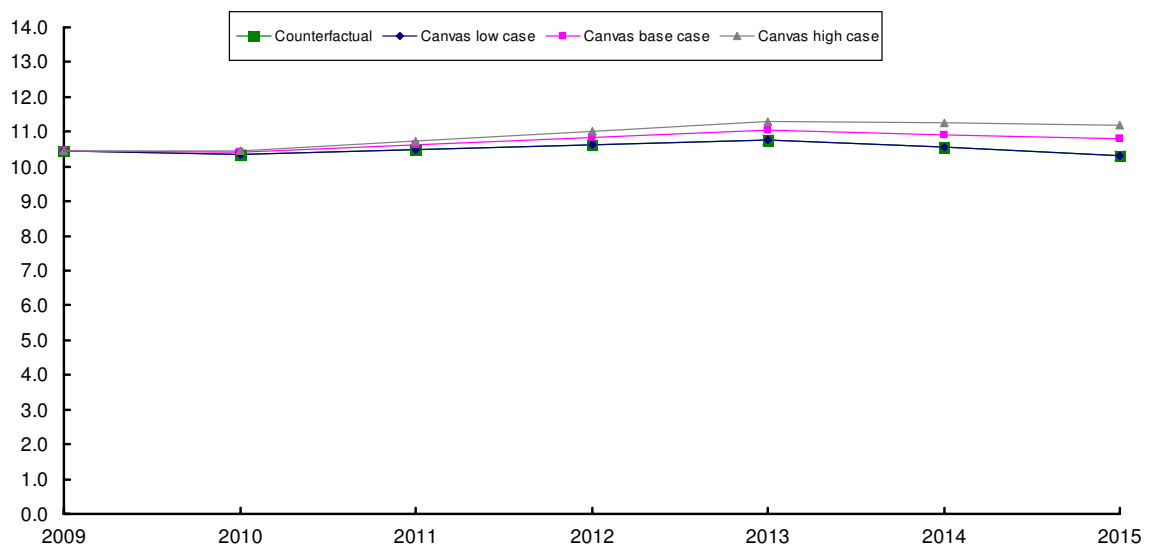
## 7.4 Impact of Canvas on platforms and operators

### 7.4.1 DTT

In the counterfactual, the number of homes with DTT as their primary set is forecast to drop from 10.5m in 2009 to 10.3m in 2015, as pay operators gain share.

If Canvas is introduced, in the base case DTT homes grow to 10.8m in 2015. In the high case, Canvas helps the DTT platform to grow to 11.2m; in the low case there is no impact on the platform

Exhibit 42: DTT primary TV set households (m)



### 7.4.2 Freeview

The modelling estimates that in the counterfactual, there will be c.9.3 m primary Freeview households by 2015 (includes primary households using next generation Freeview boxes based on the DBook6 standard; excludes primary BT Vision, TopUp TV and IP Vision households). If Canvas becomes the primary platform in 2.5m homes in the base case This will lead to an 18% reduction in Freeview-only households compared to the counterfactual. In the high case, 5.0m Canvas primary households will imply a 46% reduction in primary Freeview households and in the low case, 0.7m Canvas primary households will lead to a 6% reduction in primary Freeview households<sup>70</sup>.

### 7.4.3 FREESAT

In the counterfactual, the number of homes with FREESAT as their primary set is forecast to grow from 0.5m in 2009 to 1.6m in 2015, as they develop their platform offering to include a wider HD offering (ahead of DTT) and additional functionality such as iPlayer to the TV.

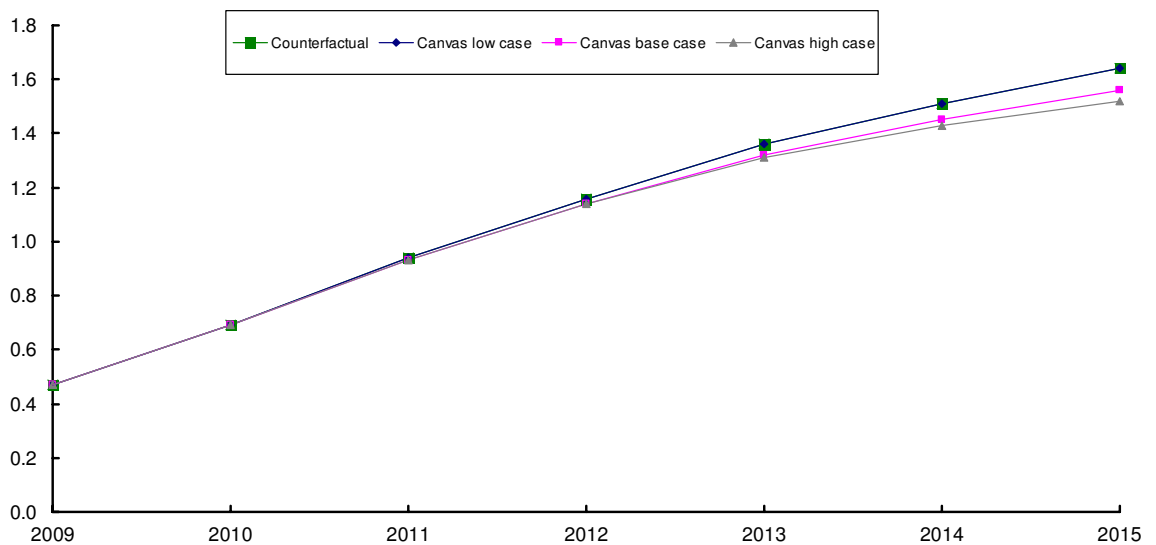
<sup>70</sup> It is estimated that there will be c.28m Freeview secondary sets in the counterfactual by 2015 (including Dbook6 secondary sets; excluding secondary sets of BT Vision, TopUp TV and new DTT entrants) Compared to the counterfactual, Canvas leads to a reduction of c. 5% of Freeview secondary sets in the base case, 2% in the low case and c.9% in the high case.

## Report on model to assess the impact of Canvas on the TV Market

This model assumes that FREESAT does not offer Canvas. As such, the introduction of Canvas reduces the rate of growth of FREESAT. At first the effect is negligible, when set top box prices remain high, but as prices fall, it is assumed that more households actively choose Canvas on DTT; this may result in some switching away from FREESAT. Additionally as DTT coverage improves, some households who previously could not receive DTT are now able to choose to move to DTT.

We have assumed that in the base case, Canvas results in reduced FREESAT platform growth of c.70,000 primary homes by 2015. In the low case there is no impact on the number of subscribers and in the high case it is a reduction of c.120,000 subscribers.

**Exhibit 43: FREESAT primary set households (m)**



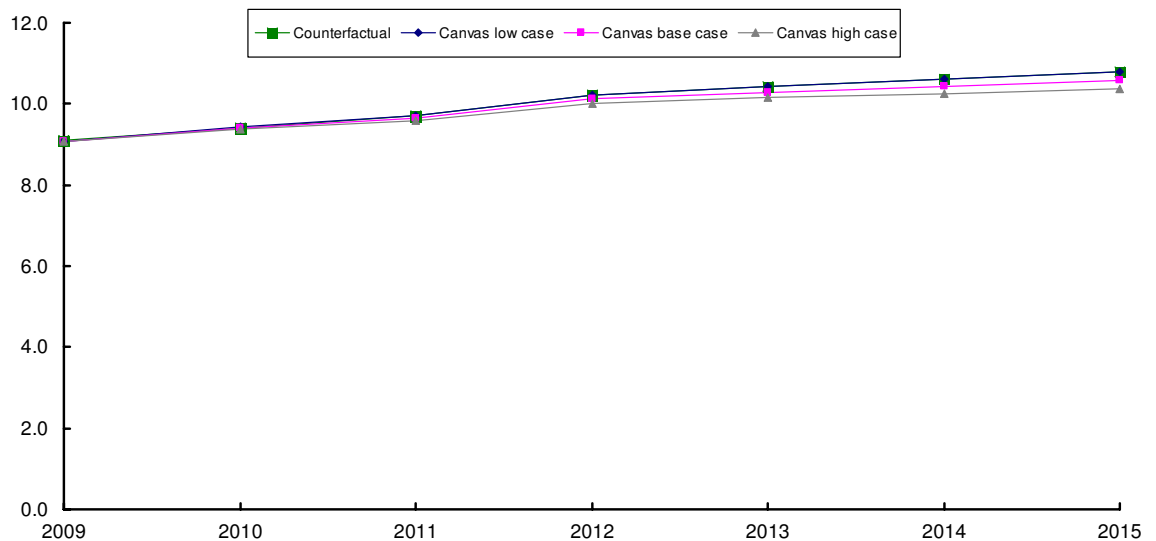
### 7.4.4 Sky

In the counterfactual, Sky is forecast to grow its UK subscriber base from 9.1m in 2009 to 10.8m in 2015. This continues their historic growth trend, and assumes continued platform innovation and strong premium content offers. It also takes into consideration that Sky aims to reach 10m subscribers in 2010.

Canvas would reduce the projected growth of the Sky platform; some subscribers may migrate from Sky to Canvas, and some DTT primary sets households who would have migrated to Sky now do not do so. However, the impact is expected to be limited as Sky continues to develop its content and own IPVoD offering, through Darwin. The base case forecasts that Canvas reduces growth by c. 210,000 subscribers (2%) and the high cast forecasts reduced growth of c. 420,000 subscribers (4%). In the low case, there is no impact on the size of Sky's subscriber base.

# Report on model to assess the impact of Canvas on the TV Market

Exhibit 44: Sky DTH pay TV households



Note: Excludes Freesat from Sky

Sky also offer a free satellite service, Freesat from Sky. Canvas is not expected to have any significant effect on the number of households using this service.

The 6 year NPVs of revenues lost by Sky as a result of Canvas are detailed in section 7.5

## 7.4.5 Virgin Media

In the Counterfactual, Virgin Media is expected to grow its TV subscriber base from 3.7m subscribers in 2009 to 4m subscribers in 2015.

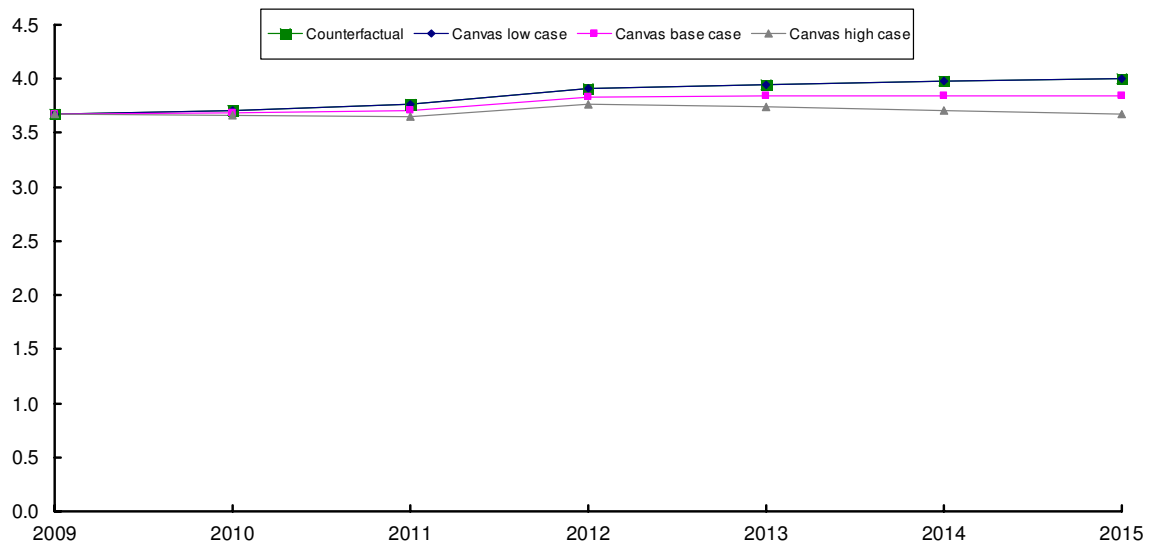
The introduction of Canvas is forecast to reduce this level of growth such that Virgin Media reaches 3.8m TV subscribers in the base case, a reduction in growth of c.160,000 subscribers (4%). In the high case, Virgin Media reaches 3.7m subscribers in 2015, a reduction of c.320,000 (8%) subscribers and in the low case Canvas has no impact, and the platform reaches 4m subscribers as in the counterfactual.

The impact is low as it is assumed that Virgin Media will continue to develop its on-demand propositions and will have a competitive advantage in its high speed cable broadband network which will limit churn of its bundled TV and broadband subscribers. In percentage terms however, it is higher than Sky as Sky has the strong advantage of holding premium content rights to keep subscribers on its platform.

It should also be noted that whilst Virgin Media is forecast to lose some television subscribers due to Canvas, its competitive advantage in broadband may help it grow its broadband subscriber base as the most effective network for Canvas delivery. As this model focuses on the impact on the TV business, this has not been explicitly modelled.

## Report on model to assess the impact of Canvas on the TV Market

Exhibit 45: Virgin Media DCATV primary sets (m)



The overall business, as (unlike Sky) TV is not Virgin Media's primary product; hence it is not expected that the loss of a TV subscriber would necessarily result in a loss of the customer altogether.

Sensitivity analysis has been carried to assess the maximum potential impact of Canvas on Virgin. If the reduction in growth in number of subscribers is double that shown in our high case, i.e. it reaches 3.5m subscribers rather than the 4m in the counterfactual, this represents a contraction in the subscriber base.

The 6 year NPVs of revenues lost by Virgin Media as a result of Canvas are detailed in section 7.5

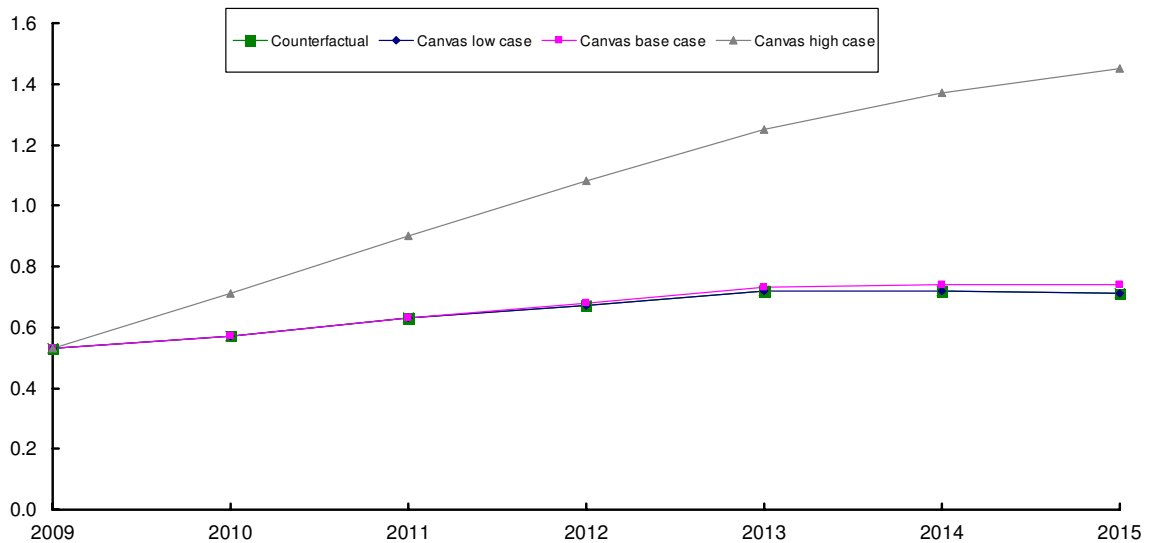
### 7.4.6 BT Vision

In the Counterfactual, BT Vision is expected to grow its TV subscriber base from 0.5m subscribers in 2009 to 0.7m subscribers in 2015.

In the Canvas scenarios, it is assumed that BT Vision offers STBs based on the Canvas technical standard. The introduction of Canvas is forecast to slightly increase this level of growth as BT Vision benefits from subscribers choosing Canvas over Sky or Virgin. In the base case, the subscriber base grows by an additional 30,000 subscribers. In the high case, BT offers Canvas STB subsidies to its broadband subscribers, subsidising Canvas compliant BT Vision boxes in order to reduce churn / attract new subscribers. This grows their subscriber base to 1.4m HH.

## Report on model to assess the impact of Canvas on the TV Market

Exhibit 46: BT Vision subscriber base



### 7.4.7 TopUp TV

- TopUp TV: TopUp TV's penetration (based on Value Partners' own estimates of unique subscribers who take one or more services) has been modelled broadly flat at c.300k subscribers in the period to 2015. Given that there is still uncertainty as to whether TopUp TV will develop its own UI or whether it would adopt the Canvas UI, it has been assumed in the Canvas scenarios that TopUp TV can market its proposition, including its premium subscription sport service (ESPN), to customers through Canvas enabled devices with the addition of a conditional access capability. In such a scenario, it is estimated that TopUp TV's base will increase by c.13,000 subscribers in the Canvas base case and by c.25,000 subscribers in the Canvas high case. Therefore this modelling approach is conservative and there is a possibility that that TopUp TV will grow its subscriber base by a greater amount, leveraging the existing sports proposition but more significantly the potential retail of Sky premium content if Ofcom's Pay-TV review leads to a 'must-carry' provision.

## 7.5 NPV impact on Sky and Virgin Media

In assessing the potential impact of Canvas on the Net Present Value of television platforms Value Partners has taken the following approach:

- Looked at the revenue impact
- In terms of ARPUs (drawing on publically available data) to try and indicate the range of possible impacts.
- Looked at the five year forecast period and discounted at a rate of 10%. We have assumed no terminal value.
- The analysis focuses on the NPV impact of Sky and Virgin Media. There is no impact Freesat or Freesat from Sky revenues as these are free services.

### 7.5.1 NPV impact on Sky

Value Partners estimate that the total revenue impact of Sky subscribers lost due to Canvas ranges between £0m and £515m.

## Report on model to assess the impact of Canvas on the TV Market

Three methods were used to estimate NPVs:

- Method 1 – NPV impact using blended ARPU:** A blended ARPU (c. £493 per annum in 2009) was calculated by averaging Sky's forecast revenues from television, broadband, telephony services and set top box sales over our forecasts for Sky's overall subscriber base<sup>71</sup>. This calculation represents the total potential, lost-revenue opportunity for Sky under the Canvas scenarios. It serves as a conservative, upper bound estimate of the overall NPV revenue impact on Sky.
- Method 2 – NPV impact using basic tier ARPU:** The Value Partners analysis suggests that the subscribers who are likely to churn off Sky as a result of Canvas are unlikely to be premium subscribers as the Canvas proposition does not compete with premium sports or movie propositions. To reflect this, method 2 looks at the revenue impact if all the subscribers who churn to Canvas are basic tier subscribers only (generating an ARPU of c. £222 per annum in 2009 or c. £18.50 per month; assumed constant going forward). This NPV estimate serves as a lower bound
- Method 3 – Weighted average NPV impact:** A weighted average NPV impact has been calculated assuming a 70:30 weighting between basic-tier and blended average NPVs as a proxy for Value Partners view on the most likely mix of subscribers who churn.

The table below summarises these 6 year NPV impacts. There is no adverse revenue impact on Sky in the Canvas low case as no churn is assumed in this scenario.

**Exhibit 47: NPVs of Sky revenues lost YOY due to churn (£m)**

ARPU used	Canvas scenario		
	Canvas Low Case	Canvas Base Case	Canvas High Case
<b>Method 1: NPV impact based on blended average ARPU</b>	0.0	257	515
<b>Method 2: NPV impact based on Basic Tier ARPU</b>	0.0	105	210
<b>Method 3: Weighted Average NPV impact (70% basic, 30% blended)</b>	0.0	151	301

### 7.5.2 NPV impact on Virgin Media

Value Partners estimate that the total revenue impact (across TV, broadband and telephony) of Virgin Media's subscribers lost due to Canvas ranges between £0m and £426m.

- Method 1 - TV-only revenue NPV Impact:** The impact on Virgin will depend on what proportion of subscribers who adopt Canvas will also take up or retain Virgin's broadband service. If we assume that Virgin is able to retain or provide broadband service to Canvas customers then the potential loss of revenues (TV revenues only) will be small.

The impact of lost TV revenues on Virgin Media is estimated by using Value Partners' assumption that 50% the subscribers lost would be those subscribing to the M package (generating c.£0 in terms of

<sup>71</sup> Value Partners forecast subscriber and revenue assumptions for Sky have been benchmarked against brokers forecasts and adjusted to exclude both revenues and subscribers from Ireland.

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subscription ARPU) and the remaining 50% subscribing to the L package (generating c.£10 in terms of subscription ARPU)<sup>72</sup>.

However, given that Virgin has informed the Trust that it would not seek to actively support Canvas, it is prudent to consider the potential loss of Virgin Media's revenues in terms of its bundled services. This is especially relevant where other ISPs may seek to attract Virgin Media's subscribers with the use of a set top box subsidy. The following methods were used to estimate NPV impact:

- **Method 2 – NPV impact using High ARPU:** A blended ARPU (£528 per annum in 2009 or c. £43 per month) was calculated by averaging revenues from television, broadband, telephony services and set top box sales over Value Partners' forecasts for Virgin Media's overall subscriber base<sup>73</sup>. This calculation represents the total potential, lost-revenue opportunity for Virgin (assuming subscribers who churn from Virgin to Canvas churn from all services).
- **Method 3 – NPV impact using basic tier ARPU:** The Value Partners analysis suggests that the subscribers who are likely to churn off Virgin Media as a result of Canvas are unlikely to be premium subscribers as the Canvas proposition does not compete with Virgin Media's full service range such as high speed broadband. To reflect this, method 2 looks only at a basic tier ARPU for Virgin Media (c. £412 per annum), based on its broadband and telephony ARPUs only.
- **Method 4 – Weighted average NPV impact:** A weighted average NPV impact has been calculated assuming a 70:30 weighting between basic-tier and blended average NPVs as a proxy for Value Partners view on the most likely mix of subscribers who churn.

The NPV impact estimate using a high ARPU serves as a theoretical and conservative, upper bound to the overall lost revenue opportunity for Virgin Media. In reality, the NPV impacts estimated based on TV-only revenues (Method 1) and basic tier ARPU (Method 3) are probably more indicative of the actual range of expected impacts on Virgin Media

The table below summarises these 6 year NPV impacts. There is no adverse revenue impact on Virgin Media in the Canvas low case as no churn is assumed in this scenario.

**Exhibit 48: NPVs of revenues lost YOY due to churn (£m)**

ARPU used	Canvas scenario		
	Canvas Low Case	Canvas Base Case	Canvas High Case
<b>Method 1: TV-only NPV impact (50% tier M, 50% tier L)</b>	0.0	22	44
<b>Method 2: NPV impact based on blended average ARPU</b>	0.0	213	426
<b>Method 3: NPV impact based on Basic Tier ARPU</b>	0.0	152	305
<b>Method 4: Weighted Average NPV impact (70% basic, 30% blended)</b>	0.0	171	341

<sup>72</sup> In line with consultation submissions received from Virgin Media

<sup>73</sup> Value Partners forecast subscriber and revenue assumptions for Virgin Media have been benchmarked against brokers forecasts.

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## 7.6 Impact of Canvas on viewing

### 7.6.1 Total viewing

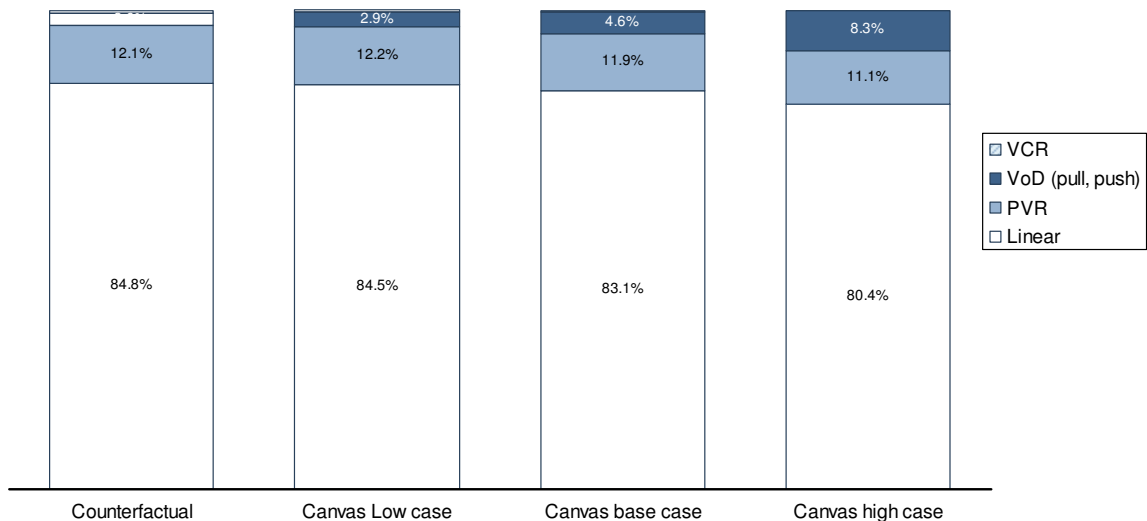
In the counterfactual, the increased take-up of PVRs and VOD results in an increasing amount of viewing.

Canvas would act to grow the amount of viewing per individual, as it accelerates the take-up of STBs with VOD functionality which improves the viewing experience and hence increases the amount of time people spend watching television.

### 7.6.2 Non-linear viewing

The model predicts that Canvas grows the market for VOD enabled sets and therefore increases the amount of non-linear viewing via DTT. It should be noted that the shift to VOD enabled sets also occurs in the counterfactual; Canvas just acts to accelerate this shift and therefore accelerate the overall shift to non linear. In the base case, the share of non linear to total viewing increases by 1.8%; VOD viewing contributes a 2.0% increase but this is set against the fact that PVR / VCR viewing decreases by 0.3%. In the low case, there is just 0.3% net increase in the share of non linear viewing, with a 0.3% increase in VOD viewing and a 0.02% increase in PVR/VCR viewing. In the high case, share of non linear viewing grows by 4.4%, with a 5.7% increase in VOD viewing and a 1.3% drop in PVR / VCR viewing.

Exhibit 49: Mode of viewing over DTT (2015)

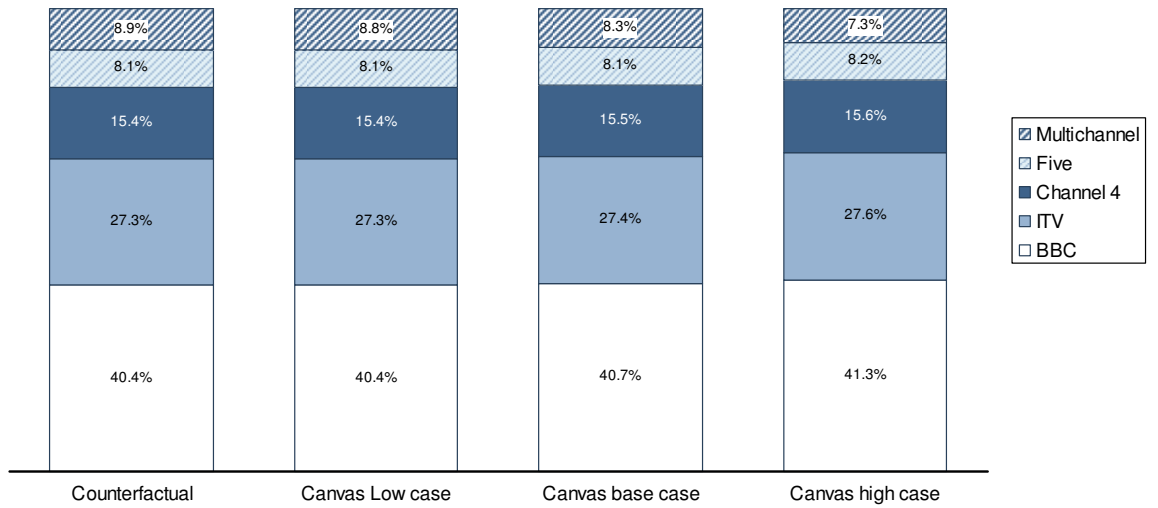


### 7.6.3 Channel viewing

Canvas grows the market for VOD enabled sets, on which it is assumed that there is a higher proportion of PSB channel group viewing. However, on an aggregate level across all viewing the impact of Canvas is relatively small. In the base case, the share of multichannels (meaning all channels outside the PSB family groups) reduces by 0.6%. In the low case, share of multichannel viewing reduces by 0.1% and in the high case, the share of multichannel viewing reduces by 1.6%.

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Exhibit 50: Share of DTT viewing by channel



Note: BBC, ITV, Channel 5 and Five include all their associated multichannels such as BBC3, ITV2, E4, Fiver, etc. Multichannels are assumed to comprise the rest of the channels

## 8 Appendix 1: Technical comparison of Dbook6 and Canvas

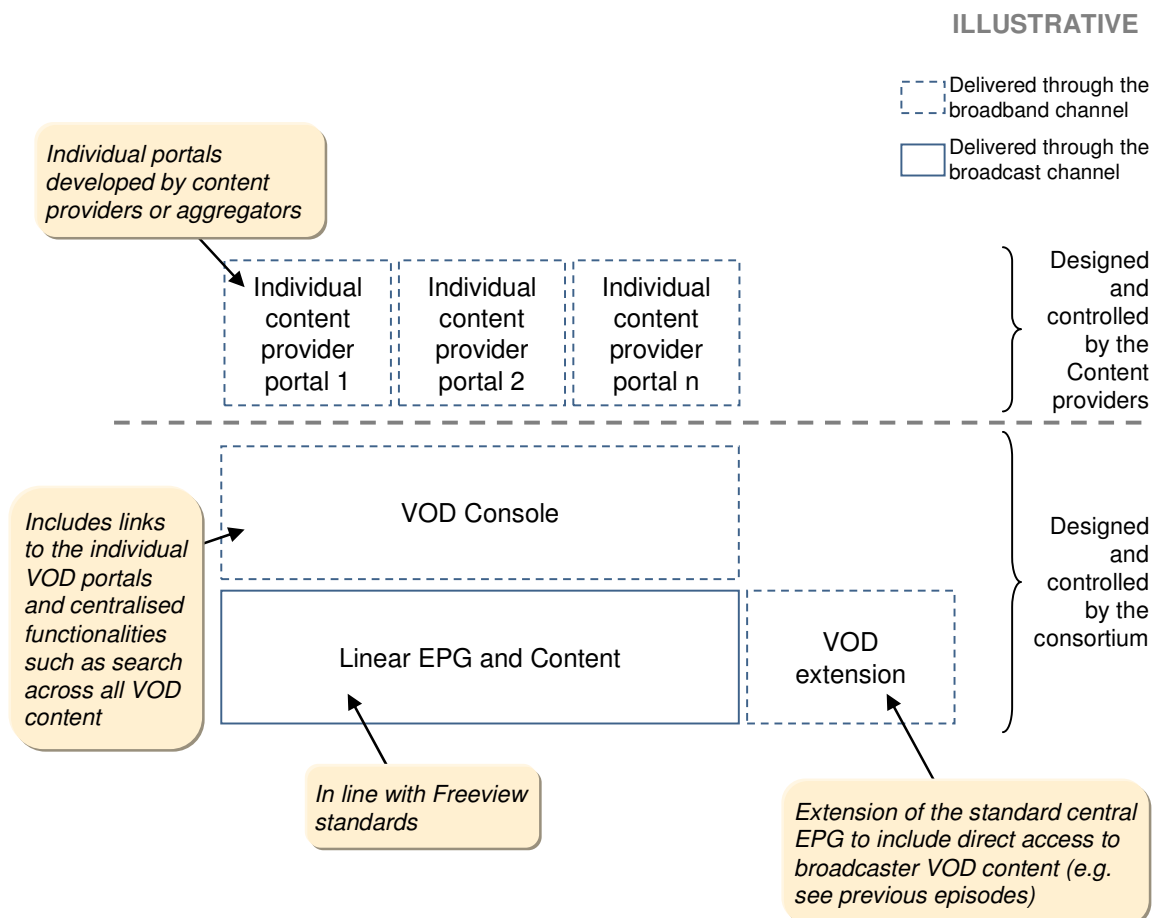
All information contained in this section was completed as part of work commissioned by the BBC Trust, which was submitted in August 2009 and has not been updated since. All Information included in this section is obtained from publicly available sources.

### 8.1 Summary of the key Canvas functionalities

The Canvas platform will be composed of 3 main logical elements:

- **The linear EPG** will be populated through the broadcast channel and integrated with some VOD content through the broadband channel
- **The video-on-demand (VOD) console** will enable access to the central VOD functionalities such as the centralised search and contain the links to the individual content provider portals
- **The content provider (CP) portals** will be designed and controlled by the CPs and give access to all VOD content provided by the individual content provider

Exhibit 51: Summary of the key Canvas components



Source: Value Partners, inputs from BBC Executive

# Report on model to assess the impact of Canvas on the TV Market

## 8.2 Key technical advantages of the Canvas platform compared to DBook6

This section describes the key functionalities of Canvas and the main advantages of this platform in comparison to the alternative standards available or being launched in the market. In the absence of an official technical specification document, the analysis of Canvas is based on interviews and submissions from the BBC.

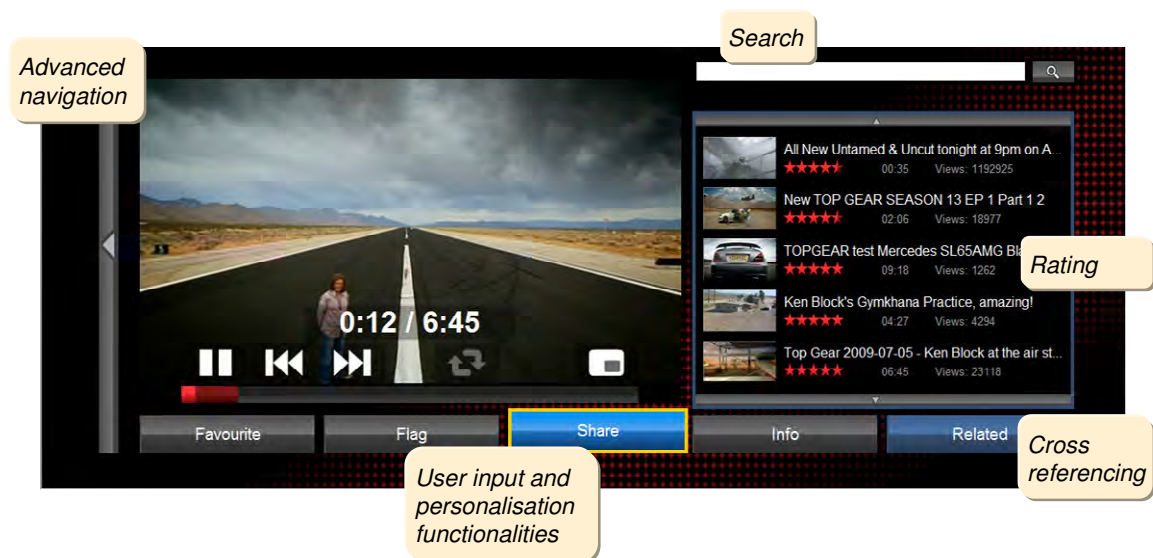
The main technical advantages of the Canvas platform when compared to alternative standards are:

- The selection of “internet” technologies and development languages by the consortium for the frontend and
- The use of a consistent and proportionate backend, in terms of programmability and elaboration capacity, to support this advanced and innovative frontend.

The use of “internet” technologies for the development of the front end assures four key advantages when compared to DBook6:

- **The Canvas platform will support a more advanced, flexible and user friendly graphical user interface enabled by the use of HTML JavaScript and Flash for the front end.**  
These coding languages support more advanced and complex graphical user interfaces compared to the MHEG coding language used in DBook6 and this advantage is clearly visible when graphical complexity (multiple images & objects, scrolling menus, etc) and functionality of flash based web sites is compared to MHEG based EPGs available in Freeview or Freesat StBs today. This is even more important when we consider the growing complexity of user navigation in a VOD enabled world where instead of the c.40 fixed schedule channels we could have thousands of distinct pieces of content all accessible at anytime

Exhibit 52: Example of a flash based user interface



- **Canvas will enable the delivery of a wider range of content based on its ability to fully support the delivery of VOD content provided by non broadcast players.**

The DBook6 platform was developed mainly to support the distribution of VOD content from the existing broadcast players (application instructions are transmitted over broadcaster channels). Canvas, on the other hand is being developed to support the delivery of content from a much wider range of sources including broadcast players as well as online-only players (the latter play a fundamental part in the delivery of VOD services around the world)

## Report on model to assess the impact of Canvas on the TV Market

Moreover the Canvas platform will support the delivery of interactive internet services such as Flickr or Facebook that will not be supported by Dbook6

- **Canvas, like DBook6, will support individual VOD applications such as the iPlayer but it will also include a purpose-built and integrated central EPG, VOD console that will enable:**
  - **Fully transparent and integrated access to both the linear broadcast and VOD broadband signals** within the central EPG (e.g. “watch a previous episode of” functionalities within the EPG) compared to the DBook6 platform which only enables individual applications to run separately (e.g. push the red button and launch the MHEG iPlayer)
  - **Cross application functionalities, such as search or navigation across the content of different providers**, for which DBook6 will not have an in built support
- **Enabled by its in-built support for HTML/JavaScript and Flash, Canvas simplifies the transcoding processes and offers:**
  - **Reduced complexity:** Existing VOD services are delivered nearly exclusively through the Internet channel and developed with Internet technologies (HTML JavaScript and Flash being two of the most common). This means that moving to the Canvas platform, in most cases, would require only adaptations of the source code where as transcoding to MHEG will require a full re-write of the applications used to deliver video. Even in the cases where a full re-write is necessary for Canvas, it is expected to be a significantly easier compared to MHEG.
  - **Lower costs and better resource availability:** Individuals with internet technology expertise (Flash, JavaScript ...) are significantly more common in the market and have lower costs when compared to similar individuals who are experts on MHEG. This is especially important for non broadcast players that have rapid access to Flash or JavaScript developers but limited or no expertise in the development of MHEG based applications and would have difficulties accessing resources with required skills in the job market.

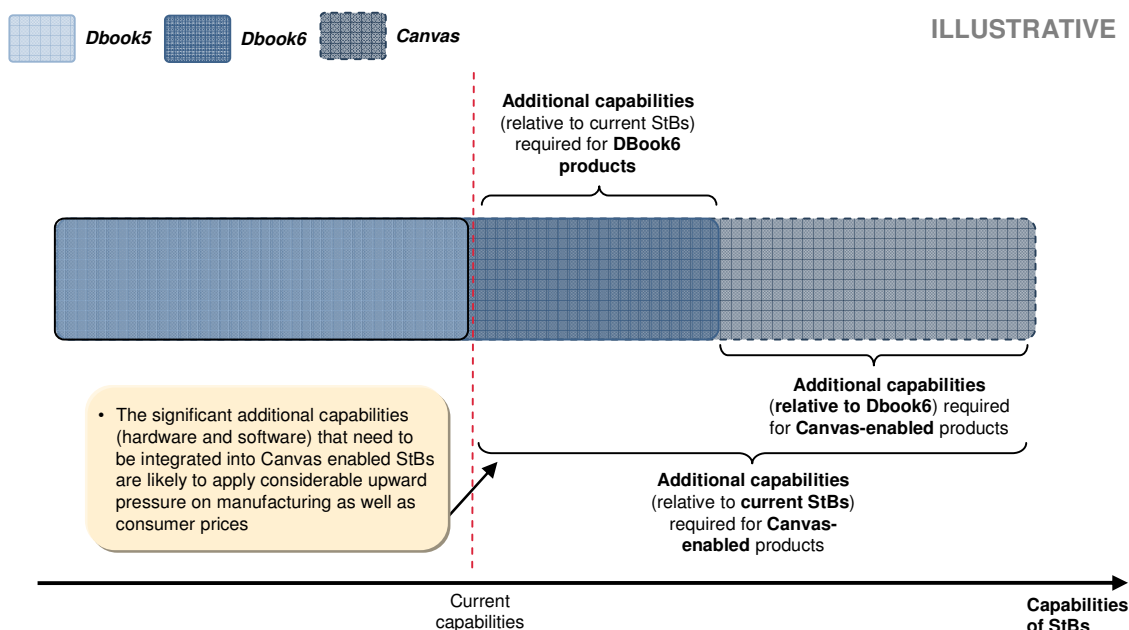
### 8.3 Canvas vs. Dbook6 functionality comparison

Canvas aims to be fully retro-compatible with DBook6 and its previous versions including key functionalities such as:

- DTT HD capability that will be optional but supported on both platforms
- PVR functionalities that will be supported by both platforms but probably mandated by Canvas and optional in DBook6

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Exhibit 53: Illustrative view of additional Canvas capabilities and overlap with Dbook



In addition to all the features of Dbook6, Canvas aims to include further functionalities especially in the space of VOD and user interface. The detailed comparison of the platforms is summarised in the table below:

Exhibit 54: BBC: Differences between Canvas and DBook6 capabilities

Area	Dbook6 capability	Canvas capability
<b>Freeview functionalities</b>	<ul style="list-style-type: none"> <li>Full Freeview compatibility (broadcast signal and other services such as EPG, red button services, ...)</li> <li>Full HD Freeview compatibility</li> <li>Linear broadcast content and EPG will be delivered through the broadcast channel</li> </ul>	<ul style="list-style-type: none"> <li>Full Freeview compatibility (broadcast signal and other services such as EPG, red button services, ...)</li> <li>Full HD Freeview compatibility</li> <li>Linear broadcast content and EPG will be delivered through the broadcast channel</li> </ul>
<b>EPG/User interface</b>	<ul style="list-style-type: none"> <li>No dedicated VOD EPG</li> <li>Individual broadcaster applications only with limited or no cross source integration (e.g. iPlayer, ...)</li> <li>Limited graphical user interface based on MHEG applications</li> </ul>	<ul style="list-style-type: none"> <li>Fully integrated linear and VOD interface</li> <li>Dedicated VOD console (with cross source functionalities such as search)</li> <li>Individual and independently designed content provider portals</li> <li>Advanced graphical user interface based on internet standards</li> </ul>
<b>VOD delivery methods</b>	<ul style="list-style-type: none"> <li>Streaming</li> </ul>	<ul style="list-style-type: none"> <li>Adaptive streaming (including the use of multi-bit resolution)</li> <li>Progressive download</li> </ul>

## Report on model to assess the impact of Canvas on the TV Market

Area	Dbook6 capability	Canvas capability
		<ul style="list-style-type: none"> <li>• Download to local storage</li> <li>• Live uni-cast</li> <li>• In the future, multicast delivery using IPv6</li> </ul>
<b>Resolution and format of the supported video feeds</b>	<ul style="list-style-type: none"> <li>• H.264for Video</li> <li>• AAC for Audio</li> <li>• SD video expected at 2Mbps</li> </ul>	<ul style="list-style-type: none"> <li>• H.264for Video</li> <li>• AAC for Audio</li> <li>• SD video expected at 2Mbps</li> </ul>
<b>Compatibility with internet standards</b>	<ul style="list-style-type: none"> <li>• No compatibility with traditional “internet” standards</li> </ul>	<ul style="list-style-type: none"> <li>• Compatibility with HTML/JavaScript and Flash for frontend development</li> <li>• Access to non VOD interactive services (e.g. Flickr, Facebook, ...)</li> </ul>
<b>Use of proprietary software</b>	<ul style="list-style-type: none"> <li>• No proprietary solutions</li> </ul>	<ul style="list-style-type: none"> <li>• Use of proprietary solutions both owned by the consortium (e.g. EPG source code) and by third parties (e.g. Flash)</li> </ul>
<b>Complexity of transcoding from traditional VOD formats</b>	<ul style="list-style-type: none"> <li>• Necessity of a total transcoding of all internet services to MHEG</li> <li>• High transcoding cost due to complexity and limited availability of specialised resources</li> </ul>	<ul style="list-style-type: none"> <li>• Limited transcoding from original “Internet” services especially if developed with flash and HTML</li> <li>• Limited transcoding costs due to reduced complexity and high availability of low cost specialised resources</li> </ul>
<b>Conditional access and DRM functionalities</b>	<ul style="list-style-type: none"> <li>• No specific DRM solution mandated</li> <li>• Conditional access choices left to individual StB manufacturers</li> </ul>	<ul style="list-style-type: none"> <li>• DRM will be mandated but specific solution no yet identified</li> <li>• Conditional access choices left to individual StB manufacturers</li> </ul>
<b>Scalability</b>	<ul style="list-style-type: none"> <li>• Full remote updates available</li> <li>• Remote management features left to individual StB manufacturers</li> </ul>	<ul style="list-style-type: none"> <li>• Full remote updates available</li> <li>• Remote management features left to individual StB manufacturers</li> </ul>
<b>StB software specification</b>	<ul style="list-style-type: none"> <li>• Limited software requirements: <ul style="list-style-type: none"> <li>. MHEG5 middleware</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Detailed software requirements: <ul style="list-style-type: none"> <li>. Embedded Linux OS (with specific minimum kernel version)</li> <li>. DirectFB to expose hardware acceleration for graphics rendering</li> <li>. SaWMan for window management</li> <li>. D-bus for IPC messaging</li> <li>. libCURL for http communication</li> <li>. OpenSSL for TSL and SSL</li> <li>. MHEG5 middleware</li> <li>. Flash and HTML JavaScript for the frontend (currently under consideration)</li> </ul> </li> </ul>
<b>StB hardware specification</b>	<ul style="list-style-type: none"> <li>• Medium processor capabilities with key requirements would be related to: <ul style="list-style-type: none"> <li>. HD decoding capabilities</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• High-end processors with key requirements would be related to: <ul style="list-style-type: none"> <li>. hardware AV codec</li> <li>. hardware decryption (AES-128)</li> <li>. hardware graphics acceleration (functionality and performance)</li> </ul> </li> </ul>

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Area	Dbook6 capability	Canvas capability
	<ul style="list-style-type: none"><li>• Local storage optional</li><li>• HD capabilities optional</li></ul>	<ul style="list-style-type: none"><li>• Local storage mandated</li><li>• HD capabilities optional</li></ul>

# Report on model to assess the impact of Canvas on the TV Market

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