

intertrust®

Smart TV support for converged security—Upping the game for DVB broadcasters

Part 1

Market forces shaping an essential role for smart TVs in broadcaster strategies



Contents

Introduction	2
Forces driving hybrid DVB service strategies	3
Intensifying competition from OTT providers	3
DVB broadcasters' growing role in OTT services	5
Smart TV-Linchpin to next-gen hybrid broadcasting	6
The ascendancy of smart TVs	7
Expanding monetization options for smart TVs	7
Opening a path for HDR and premium programming services	8
The dynamic advertising opportunity	8
Standards initiatives backing broadcaster strategies	10
DVB market standards	10
HbbTV	10
DVB-I	10
DVB-TA	11
A hybrid broadcast standard for the U.S.	11
Conclusion	17

Introduction

As smart TVs become the linchpin of DVB TV broadcasters' new hybrid service strategies, smart TV OEMs have an opportunity to drive sales by supporting a radically simplified approach to content protection that eliminates the need for traditional conditional access systems (CAS).

Broadcasters in Europe and other DVB markets are promoting their own direct-to-smart-TV ("direct-to-TV") OTT services as a complement or alternative to their legacy TV offerings. This is bringing into play the need to provide rigorous protection across both domains. In cases where both types of services are encrypted for viewing on internet-connected smart TVs, broadcasters need to support separate DRM (digital rights management) and CAS protection modes unless they can find a way to avoid the two-silo approach.

These issues are mitigated somewhat by the fact that systems-on-chips (SoCs) now execute core processing in smart TVs and recent set-top-box (STB) models support CAS protection without the use of smartcards and, to some extent, dedicated hardware security. But the cost and hassle of supporting traditional CAS remain.

This paper begins a two-part discussion looking at DVB broadcaster market trends and converged security solutions with a focus on the opportunities broadcasters and OEMs have to work together in shaping smart TV users' viewing experiences to maximum mutual advantage. As shall be seen, opportunities arise from market forces driving broadcasters in DVB markets to adopt aggressive hybrid service strategies. They seek to leverage the smart TV platform to deliver legacy and new direct-to-consumer broadcast TV programming through a unified user experience.

Following our exploration of those market forces as revealed by researchers and other sources, we look at the emergence of the smart TV as a viable mass market target for DVB broadcasters' initiatives. This includes an assessment of how smart TVs can be employed to enrich and monetize the hybrid service user experience by facilitating delivery of 4K UHD and other advanced services and by creating opportunities for addressable advertising.

Part 1 concludes with a review of the DVB market's progress on standards, including HbbTV, DVB-I and DVT-TA, which are designed to facilitate creation of a standards-based marketplace for developing and monetizing converged broadcast TV and OTT streaming services. We also reference U.S. broadcasters' moves toward leveraging the new ATSC 3.0 standard as a key indicator that the smart TV role in broadcasters' strategies is not limited to DVB markets.

Part 2 offers an in-depth exploration of security issues and opportunities to consolidate CAS and DRM protection in the smart TV domain, including the benefits that can be uniquely attained through converged protection offered by Intertrust's cloud-based ExpressPlay XCA platform. Currently, these capabilities have been activated in tandem with DVB market trends, but the flexibility intrinsic to ExpressPlay XCA ensures that the benefits of converged security without requiring legacy CAS support can be extended to other markets, including the U.S., as broadcasters come together on use of next-gen standards like ATSC 3.0 to meet hybrid service goals in the U.S.



Forces driving hybrid DVB service strategies

Amid unprecedented challenges to their core businesses, television broadcasters in Europe and other markets that rely on DVB-based technology are hoping to turn internet-driven change to their advantage. Not all have announced their plans, but it's clear that the fragmentation of audiences and monetization spawned by the emergence of OTT services has set a new course for a vast number of broadcasters across the DVB footprint in Europe, Russia, the Middle East, India, Indonesia, Australia, and much of Africa.

Intensifying competition from OTT providers

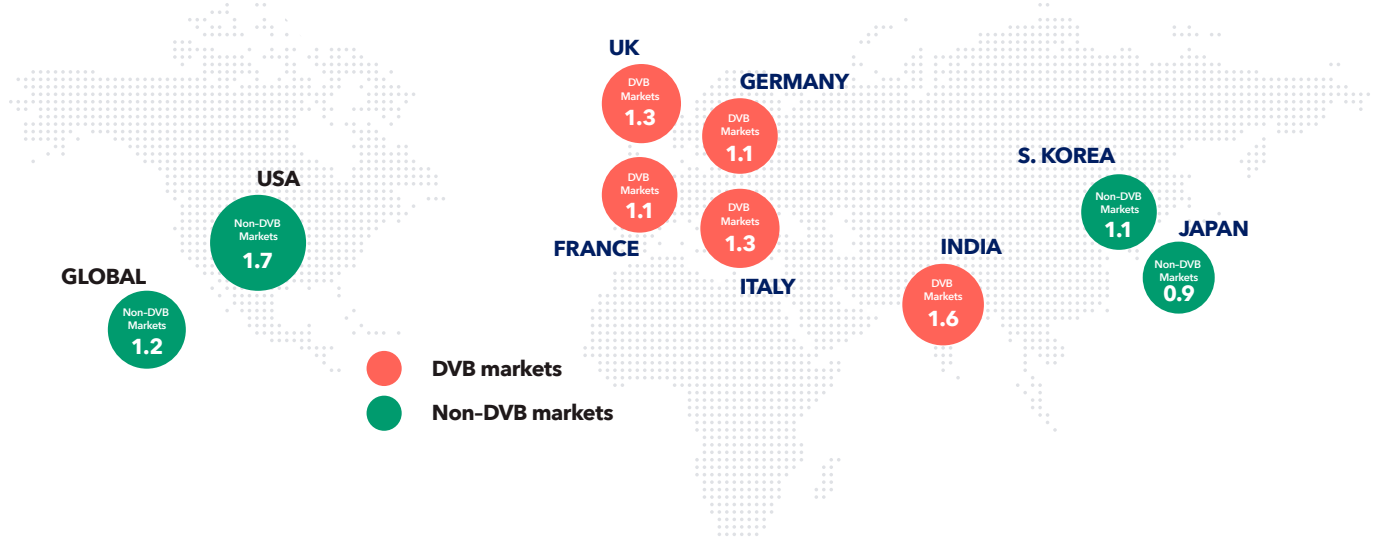
With a new wave of OTT services like Disney+, AT&T's HBO Max, Apple TV+, and Comcast's Peacock entering the market from the U.S. and many others sprouting up across the globe, there's broad consensus among researchers and investment analysts that OTT revenue totals and viewing metrics will continue to surge for some time to come. Digital TV Research, in a projection typical of many, says global OTT revenues will reach \$159 billion by 2024, more than doubling the 2019 tally.¹

Going into 2020, the researcher said there were 461 million subscribers signed up for 714 million OTT service subscriptions worldwide, marking an increase of 86.6 million subscriptions and 37.1 million subscribers over the previous year. By 2024 it projects there will be 531.5 million subscribers accounting for 947.5 million subscriptions, representing an average of 1.78 subscriptions per subscribing household.

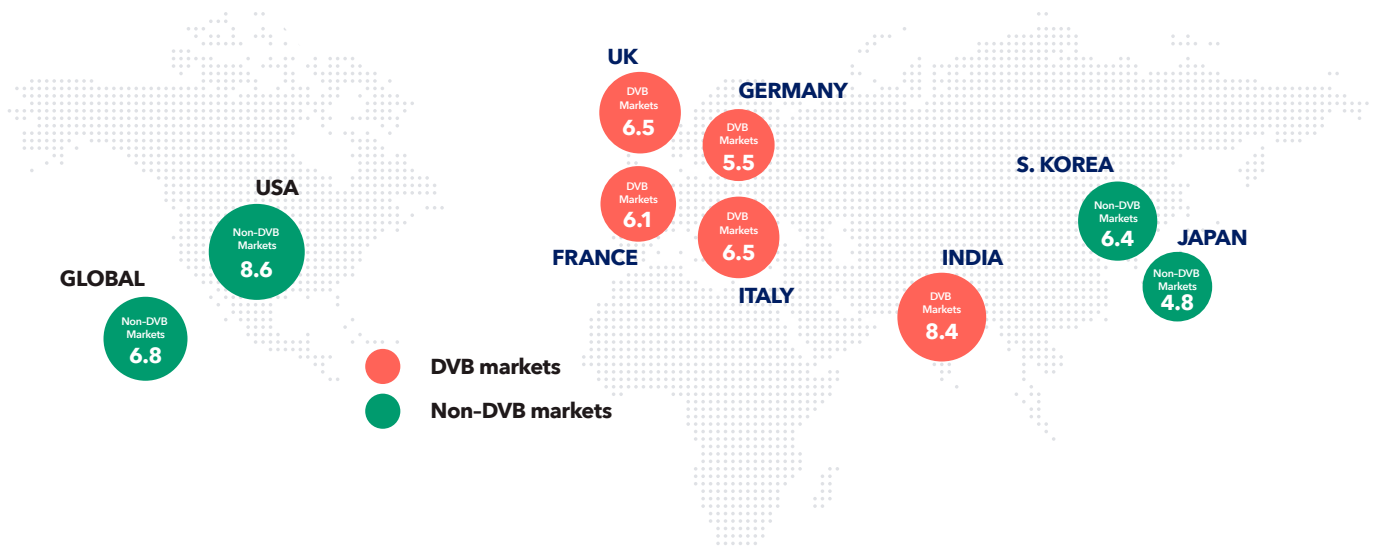
In DVB markets, OTT service subscriber counts measured in Q1 2019 were up over Q3 2018 nearly everywhere, including Europe. Even though European regulators have imposed a 30% European content requirement on OTT services, providers like Netflix and Amazon are doubling down on commitments to the market with acquisitions of European content producers and generation of new content in-house.²

One recent research report predicts the OTT video subscription count will reach 197 million in Western Europe by 2025, doubling the year-end 2019 total.³ Other metrics showing how the OTT trend in some DVB regions compare to trends in non-DVB regions and the overall global trend are summarized in Figure 1.

Figure 1.
Broadband household average
OTT service subscriptions



Average hours/week spent viewing OTT video



DVB broadcasters' growing role in OTT services

With all that's at stake for DVB broadcasters, the industry is pursuing the shift to direct-to-TV services with increasing urgency but also with growing confidence in the upside. To the extent broadcasters can capitalize on advertising trends in the OTT market, they have the opportunity to more than compensate for the falloff in legacy TV advertising by leveraging what can be accomplished operating online, unfettered by the limitations of one-way broadcast distribution.

So far, broadcasters' OTT strategies have revolved around two approaches. On one track, individual broadcasters are offering online VOD, also known as Broadcaster

VOD (BVOD) services, many of which are going beyond providing time-shift options for their DTT content to include ever more original programming. Ad-supported BVOD platforms like ITV Hub, All4 and My5 in the U.K., SVT Play and TV4 Play in Sweden, France Télévisions' France.tv, Mediaset Play in Italy, Freeview in Australia, and myriad of others are ideal launch pads for more aggressive direct-to-TV strategies.

On the other path to direct-to-TV, there's been a spate of full-blown OTT service launches in DVB markets driven by broadcasters, often in partnership with international programmers or other entities. Examples of some of the more prominent partnerships are listed in Figure 2.

Fig. 2
Prominent OTT partnerships
involving DVB broadcasters

	Participating broadcasters	OTT Service	Monthly prices
UK	ITV, BBC, Channel 4, Channel 5	BritBox	£5.99
France	France Télévisions, TF1, M6	Salto	€6.99-€12.99
Italy	Mediaset	Infinity	€7.99
Germany	ProSiebenSat.1	Joyn	Free
		Joyn PLUS	€6.99
Spain	Mediaset Espana	Mitele Plus	€3.00-€35.00
	RTVE, Atresmedia, Mediaset Espana	Lovestv	Free
India	Sun Group	Sun NXT	50 Rupees(\$33.50)
Indonesia	FTA: RCTI, MNCTV, GTV, iNews	RCTI+	Free
		Vidio	Free
	SCTV, Indosiar, O Channel	Vidio Premier	50,000 Rupiah(\$3.55)
Australia	Nine Entertainment	Stan	AUS \$10-\$17

Source: Limelight Networks⁴

Smart TV-Linchpin to next-gen hybrid broadcasting

Now, as the direct-to-TV movement among broadcasters gains momentum, strategists are focusing on the connected TV as the key to building viewership and driving ad revenue, whether through direct-to-TV services that are offered as alternatives to the legacy services or as supplemental services like the previously cited BVOD options.

It's easy to understand why smart TVs and other TVs connected to the internet (connected TVs or CTV) would now be the fulcrum to new direct-to-TV strategies, as opposed to past efforts targeted to mobile and other devices not traditionally associated with watching TV.

CTVs have reached mass penetration levels worldwide, now rivaling the other connected device categories in terms of how much time is spent viewing video of all types, from short clips to movies, as shown in Figure 3. In markets where broadcasters are offering BVOD, 80% of that content is viewed on a TV screen, while only 14% is watched on a mobile device, according to research conducted by GroupM's advertising data firm Finecast.⁵

Fig. 3
Global averages of video viewing time per device category

	2017	2018	2019
Computer	33%	30%	26%
Smartphone	27%	27%	28%
Tablet	16%	15%	15%
Smart TV/connected TV device	17%	21%	23%
Other device	6%	7%	8%

Source: Limelight Networks⁴

The ascendancy of smart TVs

Looking at the most advanced European TV markets, the CTV market base tops 50% of households in three countries out of five surveyed by Statista on behalf of SpotX⁶ (Figure 4). In all five, well over 75% of CTV viewers are using smart TVs, which have reached a per-household penetration rate of 1.38 across all five countries, reflecting a high level of multiple smart TV households that balances out those who don't own any.

The level of smart TV usage in these markets is not out of the ordinary in much of the rest of Europe or, for that matter, worldwide. According to another Statista study, the percentages of viewers watching TV programming on smart TVs in Denmark, Sweden, Norway and Finland are even higher, ranging from 66% to 76%.⁷

Strategy Analytics estimates smart TV penetration reached 600 million households worldwide in 2019, representing a 40% penetration of the world's television households.⁸ This squares with projections from Dataxis, which predicted global smart TV penetration would hit 43% by year end 2019.⁹

Expanding monetization options for smart TVs

All of this is great news for DVB broadcasters. Smart TVs are especially well suited to supporting their new service strategies for many reasons, starting with the fact that the platform allows broadcasters to give viewers a choice of whatever legacy and direct-to-TV options are in play without needing external devices.

Now, as broadcasters expand their commitments to direct-to-TV services, they are able to position themselves in line with today's viewing habits where consumers want many choices with the convenience to search for and choose what they want with the click of the remote. Utilizing broadband distribution, broadcasters are not restricted by traditional broadcast spectrum limitations when it comes to adding new content and features.

Fig. 4
Connected TV use in Europe's
5 largest countries

	% of viewers using CTVs	% of CTV viewers using smart TVs	% of all viewers using smart TVs
UK	60%	78%	47%
Italy	60%	88%	53%
Spain	56%	88%	49%
Germany	43%	83%	36%
France	25%	83%	21%

Source: SpotX/Statista



Opening a path for HDR and premium programming services

This is vital to broadcasters' ability to offer services in 4K UHD with HDR (High Dynamic Range) enhancements, which, for any given codec, consume about 4-5 times the bandwidth used by HD services, depending on techniques applied in the encoding process. DVB broadcasters' difficulties to offer UHD services over their limited broadcast spectrum allocations is putting them at increasing disadvantage against OTT competitors.

For example, nearly all original content produced by Netflix and Amazon is offered in UHD, much of it enhanced with HDR. Such providers are capitalizing on the fact that, with smart TVs reaching penetration levels as depicted in Figure 4, a vast base of consumers across the DVB footprint is looking for content matched to the capabilities of UHD 4K displays.

In fact, they want UHD 4K content to the point of being willing to pay extra for it. As of mid-2018, Netflix said 30% of its subscribers worldwide had opted for its higher priced 4K/HDR service tier.¹⁰ Other global OTT providers of 4K and HDR-enhanced 4K content include Disney+, Hulu, Apple TV Plus, UltraFlix, FuboTV, Fandango Now, VUDU, and YouTube.

With OTT delivery broadcasters will be able to meet these challenges and stay ahead of the curve as even more advanced and bandwidth-intensive formats like virtual reality and 8K come into play. And, from now on, they can leverage archives as well as spending on new content creation to develop programming for local niche and mass audiences that further differentiates them from OTT competitors.

The dynamic advertising opportunity

As market developments fragment broadcasters' traditional viewing audiences, they are fragmenting the legacy TV advertising market as well. The impact on broadcast TV revenues in DVB markets was distorted by the pandemic in 2020, likely to continue well into 2021. Goldman Sachs predicted the European broadcast TV advertising total would drop 18% in 2020 from \$38 billion in 2019 and grow by just 6% in 2021.¹¹

Overall, European broadcasting is tracking the global trend in legacy TV advertising. Ad agency Zenith projected close to no growth through 2022 in a report issued just before the pandemic hit¹² while growth in Europe would top out at 2.8% in 2022.

Ever more broadcasting advertising dollars are flowing into the OTT domain as ad-supported services gain momentum (labeled AVOD even though they may now include linear services). In a 2018 survey of more than 200 advertisers and agencies worldwide, FreeWheel found that 52% of agencies would be buying from online TV as well as traditional TV inventory in 2019 and 91% planned to do so by 2021.¹³

Direct-to-TV delivery expands broadcasters' ability to leverage advertisers' growing reliance on dynamic ad placements in unicast OTT streams based on viewers' interests, demographic profiles, and locations. Addressable advertising in the OTT domain is a fast-growing subset of the TV advertising market's surging shift to addressability, as reflected in a recent Rethink Research report calculating the global addressable ad spend reached \$15.6 billion in 2019.¹⁴

So far, this spending has been focused on dynamic ad insertion (DAI) with legacy VOD and linear TV delivered through set-tops equipped to store multiple ad options. However, the much larger role to be played by addressability in OTT video services delivered to

smart TVs and other CTVs is reflected in the researchers' projection that the addressable outlays will jump to \$85.5 billion by 2025, which doesn't count sums paid for targeted ads in TV programming consumed on mobile devices or PCs.

The move to addressability online is outpacing the growth rate in conventional TV advertising by large margins, according to FreeWheel's Q1 2019 report. In Europe addressable ad buying accounted for 25% of streamed TV ad campaigns that quarter, marking a 56% year-to-year increase in targeted campaigns. The addressability potential isn't solely dependent on targeting using personal profiles, which must conform with stringent privacy regulations. Localized advertising, enabling small businesses to apply TV messaging, is "low-hanging fruit" with no privacy issues at stake, as amply demonstrated by DVB satellite broadcasting giant Sky, a unit of Comcast. Since 2014, Sky UK has relied on STB-based storage and insertions to mount the largest addressable advertising operation in Europe. Over the first five years, Sky's support for highly localized advertising had attracted a thousand businesses that had never used TV before.¹⁵



Standards initiatives backing broadcaster strategies

DVB market standards

DVB broadcasters are well positioned to pursue aggressive next-generation hybrid service strategies with all the supply-chain benefits that come with standardized support. Not only do they have the Hybrid Broadcast Broadband TV (HbbTV) template to work with; they can look forward to additional benefits emerging with the new DVB-I (Internet) and DVB-TA (Targeted Advertising) standards.

HbbTV

DVB broadcasters' ability to leverage opportunities in the internet domain has long been supported by the HbbTV standard. Now deployed in 37 countries, HbbTV is integrated with most smart TVs sold in DVB markets, enabling delivery of hybrid services without reliance on HbbTV-enhanced STBs.

HbbTV provides a common application execution environment that allows a DVB operator to enrich their program offerings with additional services seamlessly delivered via broadband. It not only supports access to on-demand and live video streamed over the internet; it enables a uniform approach to personalizing OTT service elements and delivering interactive features like game playing and voting.

With release of a new set of specifications in early 2020, the HbbTV Association has set the stage for a common approach to targeted ad placements on OTT-delivered content. Thus, DVB broadcasters now have a widely deployed platform for delivering a new generation of feature-rich, ad-supported direct-to-TV services to smart TVs that go well beyond broadcasters' initial use of OTT as a means of adding a VOD component to their regular broadcast TV services.

DVB-I

DVB broadcasters' strategic focus on direct-to-TV and the opportunities related to smart TV penetration has been further strengthened by the DVB Project's recent approval of the DVB-I standard. DVB-I, prompted in part by regulators' desire to recapture broadcast spectrum for 5G use, is an open platform that supports delivery of all content in IP mode over the broadband and broadcast connections with assurance that broadcast-caliber performance will be maintained with online access.

DVB-I spells out how DVB broadcasters can deliver content to connected devices that don't have broadcast/RF tuners. The new specifications also include DVB adaptations of widely used internet mechanisms supporting low latency and multicast streaming.



Also, they embody DVB-developed specifications supporting advanced discovery. Utilizing a uniform approach to cataloguing services in DVB-I Service Lists, the discovery component enables connected devices to find sets of linear TV services a broadcaster delivers via both broadband and legacy broadcast. Also it allows broadcasters to insert their own EPG data for consumer access on smart TVs and other device interfaces.

DVB-I, which has been closely coordinated with HbbTV under the auspices of the HbbTV & DVB-I Interoperability group, is seen as a next-gen complement to HbbTV with a focus on the delivery mechanisms that enable an IP-based hybrid service offering vs. one that retains legacy DVB formatting for one-way broadcast. This brings into play IP-enabled features like interactive content guides and ad and content targeting while retaining support for “lean-back” program selection.

It will be some time before DVB-I is widely deployed, but it will be there to support broadcasters’ full switchover to all-IP services whenever they’re ready. Meanwhile, they can proceed full steam ahead with the next-gen hybrid services enabled by the latest iterations of HbbTV.

DVB-TA

Another development facilitating broadcasters’ reliance on smart TVs as the linchpin to new service strategies is the DVB Project’s development of DVB-TA specifications and approval for standardization by ETSI. They adopt the SCTE 104 and 35 signaling mechanisms for triggering DAI and indicating the start and end boundaries of placement opportunities for targeted ads. Also, they set parameters for server-side delivery of targeted ads, or downloads to smart TVs and other devices that would allow client-side DAI with no interference from ad blockers.

A hybrid broadcast standard for the U.S.

In the U.S., broadcasters’ hybrid service strategies are only beginning to take shape following a long period of testing the capabilities brought into play by the new ATSC 3.0 standard. But there remains a steep climb to commercial implementation of ATSC 3.0, insofar as it is not backward compatible with existing ATSC transmitters, off-air receivers, and TV tuners.

The good news for broadcasters is their demonstration of commitment to the standard has triggered development of the essential supply chain. Notably, after holding back through the early phase of ATSC 3.0 testing, smart TV OEMs have begun to introduce models supporting the new standard.

Like DVB-I, ATSC 3.0 is designed to support IP-based transport for all services. The shift to IP envisioned by these standards will make the case described in Part 2 of this series for eliminating legacy CA protection with broadcast services delivered to smart TVs even stronger.

Conclusion

The emergence of the smart TV as a mainstream viewing platform in DVB markets has provided broadcasters the ideal environment for delivering combinations of legacy and internet-delivered programming and features that consumers can't get anywhere else.

The timing couldn't be better, given the impact OTT video services have had on broadcast TV viewership and advertising. Now, with support of smart TV user interfaces that present the full scope of traditional TV and OTT offerings for easy signup and ongoing access, broadcasters will be better equipped to convey what people are missing when they choose not to spend their viewing time with that content.

Utilizing high-capacity broadband access to deliver direct-to-TV services for viewing on smart TVs, broadcasters free themselves from broadcast spectrum restrictions to expand their content portfolios with introduction of 4K UHD-formatted content, new programming targeting significant niche interests and a wealth of features, including personalized enhancements to user experiences with legacy content. And they position themselves to capitalize on forthcoming opportunities tied to VR and other extended-reality technologies.

Equally important, the smart TV is an ideal platform for broadcasters' participation in the tide of advertising spot placements flowing into the OTT market, including the surging share devoted to targeted advertising.

With smart TV penetration approaching saturation levels, broadcasters can proceed with confidence that, when they want to make the move to all-IP TV operations, they'll have the big-screen reach they need to facilitate that transition.

The HbbTV standard has smoothed the way for DVB broadcasters to take advantage of the OTT opportunity, including in the smart TV space where the protocol is widely supported by OEMs. The new DVB-I specifications provide further assurance of a smooth migration path to IP, while DVB-TA is laying the groundwork for a systematic approach to targeted advertising.

Now the question to be answered is how best to secure all the premium content broadcasters deliver to smart TVs. Part 2 will address this issue and explore options around converged security on smart TV core hardware. Broadcasters and OEMs alike will learn how they can achieve converged security while avoiding the cost and inconvenience of relying on legacy conditional access systems through a modern content protection platform, as demonstrated by Intertrust ExpressPlay XCA.

Sources

- 1 [Media Post, Global SVOD Subs Racing Toward 1B](#), September 2019
- 2 [Variety, Apple TV Plus, Disney Plus Will Enter Europe, Playing Catch-Up to Netflix, Amazon](#), September 2019
- 3 [ResearchandMarkets, Western Europe OTT TV and Video Market Forecasts 2020-2025](#), July 2020
- 4 [Rapid TV News, UK, France Witness Binge Watching Surge as Global Streaming Steams On](#), October 2019
- 5 [IAB Europe, The IAB Europe Guide to Connected TV](#), June 2020
- 6 [SpotX, CTV Is for Everyone](#), July 2020
- 7 [Statista, Access to a Smart TV in Households Worldwide](#), September 2020
- 8 [Ooyala, State of the Broadcast Industry 2019](#), January 2019
- 9 [SlidePlayer, Smart TV: Rising Penetration Globally](#), April 2019
- 10 [Multichannel News, 30% of Netflix Customers Subscribe to Premium Tier](#), July 2018
- 11 [CNBC, Coronavirus Ad Shift from TV to Digital Will Speed Up, Says Goldman](#), June 2020
- 12 [Digital TV Europe, Zenith: TV to See Zero Ad Revenue Growth in Next Three Years](#), December 2019
- 13 [FreeWheel, Video Marketplace Report, Q4 2018](#)
- 14 [Rethink Research, Addressable Advertising Boom across all Regions & Platforms](#), November 2019
- 15 [Comcast, AdSmart: 5 Years and Forward](#), August 2019

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