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The Future of HEVC Consumer Electronics Market

The new kid on the block in MPEG video standards, High Efficiency Video Coding (HEVC) also known as H.265, is making a big splash in the consumer electronics market led by its widespread adoption in mobile handsets. With adoption projected to ramp up across all video playback devices, DTC expects more than 440 million HEVC devices to ship into the marketplace by the end of 2015.

Although there is much excitement behind HEVC because of its enabling of 4K/UHD video capability, HEVC also provides greater efficiency for transmitting HD or SD content. HEVC promises to eventually yield bandwidth savings of up to 50% compared to its predecessor AVC/H.264. The early HEVC consumer electronics market has been led by the Internet-connected devices designed for video playback; however mass-market adoption of the technology is anticipated in the near future.

In 2014, DTC estimated that 14.6% of video playback mobile handsets were HEVC-compatible, and DTC estimates that will grow to 86.8% by the end of 2019. The tablet market is expected to be the second largest to support HEVC decoding. Media streamers, although expected to remain a niche market, are expected to include HEVC to accommodate content encoded in both UHD and standard HD and come to the mass market in significant quantities starting in 2015.

Digital TV receiving devices and other traditional consumer electronics will also play important roles in the development and growth of HEVC adoption. To date HEVC equipped digital TVs are focused at the high-end of the market and the technology is only available on the top of the line Systems on a Chip (SoC), but DTC expects that mid-tier and lower sets will include the ability to decode HEVC in the near future and estimates that nearly 60% of digital TV sets will natively decode HEVC by 2019. In the case of STBs, DTC expects that pay TV operators will future proof high-end STBs by adding HEVC decoding capability ahead of any HEVC broadcast deployments. And when decoding SoCs drop in price significantly, HEVC STBs will begin to rapidly penetrate the marketplace.

DTC forecasts that the PC industry will also have heavy adoption of HEVC. DTC estimates that in 2015 less than 1% of overall global PC shipments will include support for HEVC. However, by 2016 the penetration rises to 30%, largely in part to Windows 10 which is slated to natively include support for HEVC in the media player.

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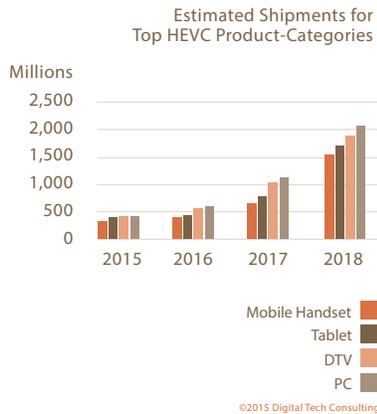
PUBLISHER

Myra Moore | President
Digital Tech Consulting
214.915.0930
dtcreports.com

 @DTCREPORTS

CONTRIBUTING ANALYSTS

Maya Jasmin
Myra Moore
Greg Scoblete
Jing Sui



BD players and video game systems will also have healthy adoption of HEVC, especially since a majority of these devices are being used as media hubs to stream Internet video content. Like in many other categories, initial applications will largely target bandwidth savings for HD content delivery, and expand throughout the forecast period to encompass 4K UHD delivery.

DTC fully anticipates that HEVC adoption will be as widespread as its ubiquitous predecessor AVC/H.264. Propelled by the handset market shipments of devices with HEVC decode capability are expected to easily reach the billion mark by 2017.

Is 2015 the Year of the Smart TV Operating System War?

In the land of consumer electronics, the operating system is king. Successfully embedding an operating system into the hands, and homes, of consumers is a prized strategic advantage for technology companies. The more users on a given OS platform, the more attractive that platform is for developers, which in turn means more apps and more opportunities to lock consumers into said platform for years to come.

The OS wars, as they're colloquially known, began as a contest among desktop computers and later spread to mobile devices. They have since engulfed the living room, piggybacking on media players like the Roku and Apple TV and game consoles like the Playstation and Xbox. While several TV vendors, notably Samsung, have been adding operating systems into their TVs for several years now, these efforts were not as robust as the set-top box or game console alternatives.

That's beginning to change in a big way.

At CES 2015, there was a flurry of activity around Smart TV operating systems, including some high profile pairings. Panasonic, for instance, showed off the first fruits of its partnership with Mozilla. A Panasonic 4K TV due in the spring will run a version of Mozilla's Firefox OS that will let consumers search video content across various online sources, and also deliver notifications from other "smart home" devices on a user's network. We suspect more Firefox-based TVs will follow later in the year.

Sony is embracing the new Android TV platform as its Smart TV OS of choice for 2015, sidelining an earlier attempt to develop a homegrown TV OS. Other vendors, such as Sharp and Philips, are expected to launch Android TVs this year as well. Samsung, the world's largest TV supplier, announced at the beginning of the year that it would shift its Smart TV OS to Tizen, an OS Samsung originally developed for its mobile devices.

TCL, Hisense and Best Buy's Insignia-branded televisions are all running Roku (TCL will be on its second generation of Roku-based Smart TVs). LG is also entering its second year with WebOS, a mobile operating system originally developed by Palm (remember it?).

For TV makers, the emergence of an OS war would actually be welcome news. While TV shipments have softened over the past two years, TV prices have fallen more dramatically, damaging the bottom lines of most TV divisions, some, like Sony, still in the throes of restructuring. Having a compelling operating system transforms what would be an otherwise dumb monitor into an intelligent device.

Smart TVs have also been crucial at delivering still-scarce 4K content. While pay TV providers and media players will begin to deliver more 4K in 2015, Smart TVs have enjoyed an early lead in delivering 4K streaming from services like Netflix and Amazon.

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The maturation of Smart TVs begs two important questions. First, will they cannibalize the still growing market for over-the-top media players like the Roku and Apple TV? DTC estimates global TV sales to hit 230 million in 2015 - whereas streaming media players will grow to 16.8 million units this year. Media players will continue to appeal to consumers with older TVs, but may face a gloomier long-term picture if the new wave of Smart TV software can satisfy users over the lifetime of their TV ownership. Roku's push to integrate with TV vendors may be a good indication of which way they see the market heading.

The second, and more interesting question, is whether the Smart TV push will force other companies with a stake in video, like Apple and Amazon, into making TVs of their own. Amazon took its first step into the TV hardware market last year with the Fire TV set-top box and HDMI dongle. Perhaps the failure of Amazon's other major 2014 hardware play, the Fire smartphone, will stay the company's hand for a more ambitious launch, but a TV may be the next logical step for the company if media player sales start to wither.

As for Apple, its long-rumored iTV seems to be hung up less on the technology and more on the business model of delivering a robust video service to compliment the hardware. Meanwhile, its Apple TV set-top box enters its second year without a major update. Apple has famously called TV its "hobby" but many are wondering if "after thought" is a more appropriate moniker. Apple already trails Google in the mobile OS war (at least in terms of sheer unit volume) and it risks ceding ground in the budding TV OS war without a forceful move in 2015.

The Next High-Finance Trend: Digital Tech Intangibles

The increasing integration of digital technology into consumers' lives is well established and documented. Some might say over documented. But the extent to which it is now being used as a financial tool suggests an even deeper impact on high finance and the economy at large.

"High tech" is too general a descriptor to name it as an emerging asset class, but there are elements within high tech that are transforming into a new asset class. **We first wrote about this trend** where high-tech patents/assets are available to investors in the form of hedge funds, index funds, and other vestiges of the world's financial markets. Now, governments are getting in the business too with state-sponsored IP fund activity and high-stakes radio spectrum auctions.

The relationship between high tech, and the macro economy and the financial industry are becoming more and more evident. Here are a few examples:

The venerable Wall Street Journal recently changed the name of its Marketplace section (thus named for 27 years) to Business & Tech "reflecting that every business is a technology business and tech is permeating every industry."

The U.S. treasury is set to bring in more than \$40 billion onto its balance sheet after the recent auction of wireless spectrum (AWS-3 auction) to U.S. tech corporations that will control some of the most valuable "virtual estate" in the country.

China, Taiwan, France and other countries now have state-sponsored IP fund activity that is designed to develop IP as a foundational asset class to boost national economies and enable trade expansion into other countries. National priorities in these funds are tech based with semiconductors, software and clean-energy technology as stated priorities.

Members of a budding U.S.-based financial exchange for trading IP rights (think NADAQ for patents), IPXI, include Philips, Sony, JVC Kenwood, Panasonic, Fraunhofer, and ETRI. Rights are being traded for standards-based technologies such as OLED and 802.11n.

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NEW HEVC STUDY RESULTS AVAILABLE

DTC recently completed an in-depth forecast and analysis for HEVC/H.265. We are now offering customized consultations from the extensive study.

Highlights for the HEVC study:

- Forecasts and analysis for consumer electronic products -mobile handsets, tablets, STBs, TVs, media streamers, Blu ray players, video game systems and PCs (including software and graphic cards)
- Non-consumer HEVC applications - professional encoders / medical imaging equipment
- HEVC licensing landscape

DTC has been analyzing and quantifying the video compression market since 1996, making us one of the most experienced in the field. For more information on our customized consultations, contact Myra Moore at 214.915.0930 or myra@dtcreports.com.



The founders of the IPXI venture think that the IP that lies underneath tech products and services is undervalued. That is not withstanding the eye-popping valuations for specific patent portfolios such as that of Nortel that was sold to a consortium of high-tech heavy weights for about \$4.5 billion (The Rockstar consortium has since sold more than 4,000 of the 6,000 patents for \$900 million). That was a unique transaction that had a lot to do with new players bolstering their IP holdings for defensive and cross-licensing purposes.

And then there is the recent U.S. AWS-3 mobile spectrum auction with a pay day of \$40-plus billion for the use of "virtual estate" that isn't even regarded by many as beach-front property. Prognosticators forecasted a \$10-\$20 billion pay day for the 1,600 licenses in those select upper-parts of the band. An additional swath of broadcast TV spectrum that is considered beach-front property is scheduled to be auctioned next year.

The amount wireless providers and others are willing to pay points to the hunger for spectrum that allows providers to more effectively deliver video for which consumers have shown an insatiable appetite. There have been some cries of "gorging at the trough" for Dish Network – a big auction winner that doesn't currently have a cellular mobile service. The pay TV operator has been accused by some of gobbling up the spectrum to "sublet" to incumbent wireless service providers in order to cash in on its spectrum winnings. It's not clear Dish's ultimate intentions but it seems like an unlikely investment strategy as there are FCC rules in place for building out wireless services in a six-and 12-year time period.

Value for intangible assets whether for high-tech patents, radio airwaves, or for mortgage-backed securities and carbon credits has always been tough to quantify. The financial markets do their best to quantify them so they can squeeze out every drop of value. Now, the focus may be on the sky-high valuations of individual Silicon Valley companies (i.e. Snapchat at \$19 billion), but the tech economy is evolving into something larger and more foundational. Look for the overall market to place greater value on underlying assets like intellectual property, engineering know how, transmission infrastructure, and potential global consumer reach. And don't be surprised if more of these assets are securitized and traded on financial markets.