Television Production, Postproduction, Distribution and Consumption in 2013

Von Johnson & Associates, Inc.

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Abstract

Von Johnson & Associates, Inc. (VJA) is an independent consultancy focused on the media and entertainment industry. This paper discusses how technology disruptions have impacted television content creation, postproduction, distribution, consumption and labor over the past several years.

Approach

The information in this report is sourced from cited published works, surveys and personal interviews with studio executives, producers and postproduction engineers. Whereas the published works are cited, we have deliberately disguised the identities of the interviewees and their companies, correctly expecting this approach to yield unfiltered responses. We would especially like to thank those executives who took time from their busy schedules to provide us with the wealth of information contained in this paper.

Content

"The key for CBS and for all the major media companies (is) continue to produce A-quality premiere content, and you will get paid. You'll get paid differently than you do today, but you'll always get paid. Content wins."[1]

"Content is King"[2]

It's doubtful that Bill Gates knew how explosively and profoundly true this statement would prove to be. If it weren't true, then Roku wouldn't have 700 content channels (adding an average of one per day), ESPN wouldn't garnish the heftiest household sub-fees in all of U.S. cable (estimated at $5/sub), *American Idol* wouldn't be locally formatted in 42 countries, and YouTube's *Annoying Orange* wouldn't have hit a billion views last January.

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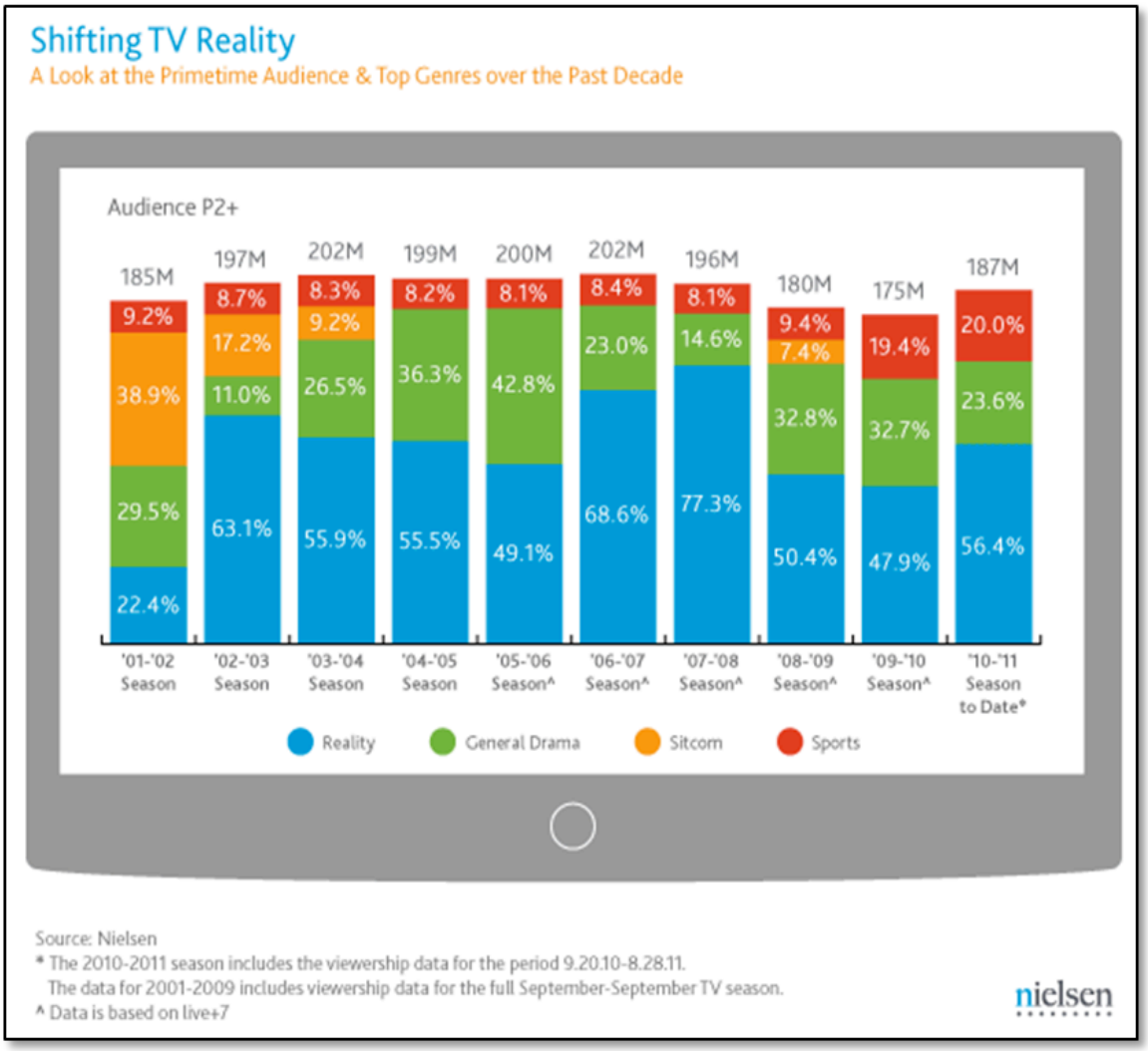
[1] Leslie Moonves, President and CBS CEO, CNBC Interview, 2013
[2] Bill Gates, from a paper of the same name, 1996.

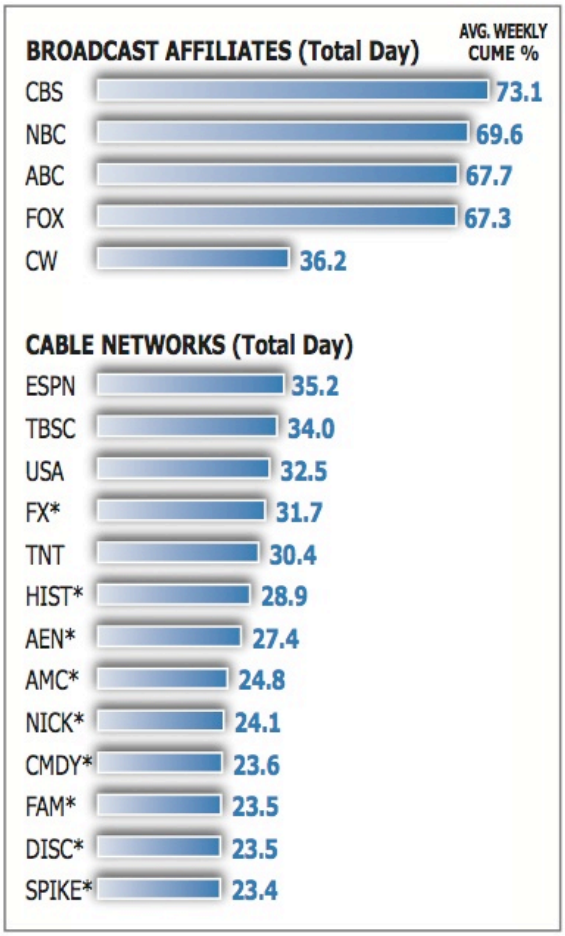
The latter spawned a video game, a series on Cartoon Network, a range of toys and a clothing line in the span of four years.

Reality/scripted drama/sports and sitcoms today vs. 5 years ago

The chart below reveals the top ten prime time program types on the broadcast networks from 2001 to 2011. Note this analysis does not include programming outside the top ten programs, nor does it consider cable networks or platforms. Taking that handicap into consideration, the chart is useful to sense a number of interesting trends.



- Reality television has consistently captured the largest percentage of the audience watching the top 10 broadcast programs since 2003.



Source: The Nielsen Company
Television Activity Report
NHI 4th Qtr'11
Estimates include Live+7 days

*Cable networks did not telecast during the entire daypart.

- 8% of the top ten programs in primetime 2003 were sporting events, growing to 19.4 percent in the 2010 and beyond.

- The audience for scripted drama peaked at 43% during 2005-2006 and dropped to 21.6 percent by 2010. Still, scripted drama is a consistent presence in broadcast television's top 10, and since Nielsen did not include cable or Over-the-Top content (OTT) networks in the analysis, they may have missed an insightful migration statistic.

- Sitcoms are in short supply among the broadcast top ten. Again, audiences may be getting their laughs elsewhere. *Big Bang Theory*, and *Two and a Half Men* are notable exceptions.

The adjacent chart demonstrates the reliability of traditional broadcast networks to reach a large audience. Note that the most popular cable-based network is ESPN.

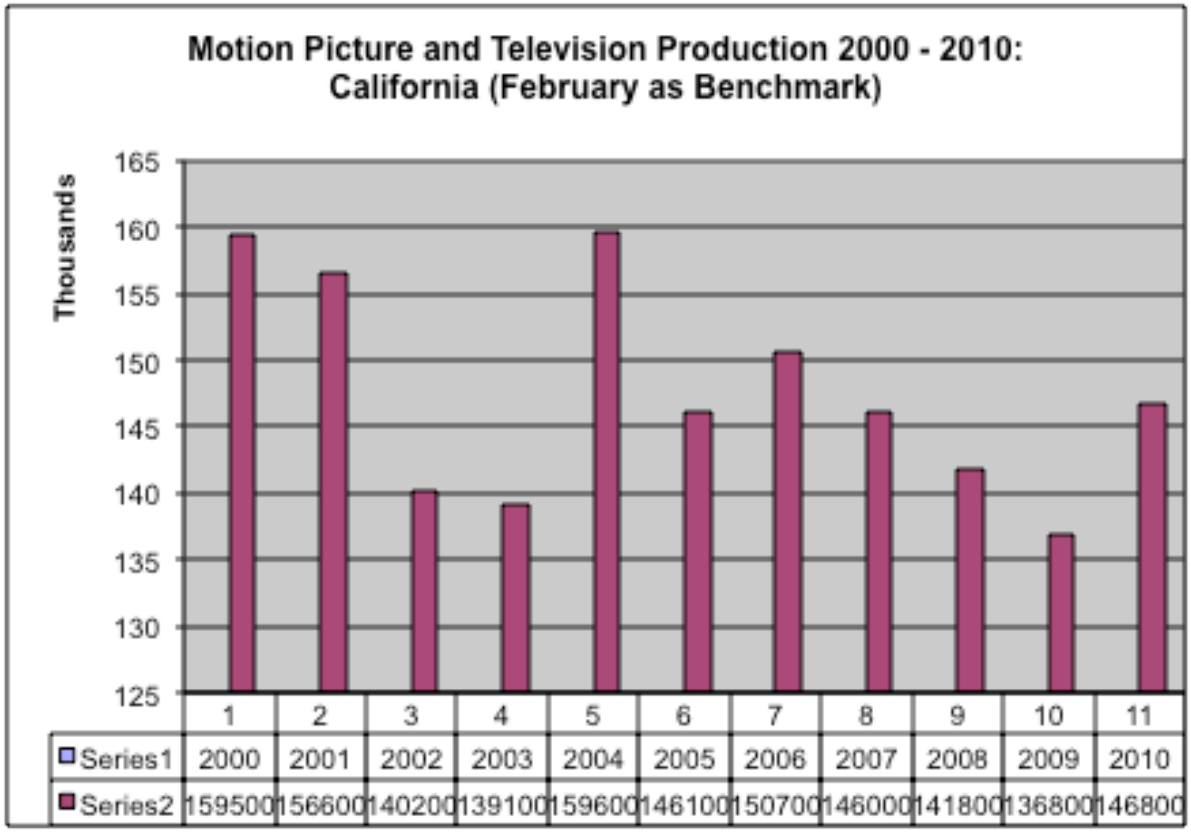
New TV networks and growth in TV production

New niche networks continue to capture an increasingly fragmented audience. News Corp. recently announced the launch of a third FX-branded channel, for example. FX will continue to cater to 18-49 viewers and FXM is expanding its core movie service to include original programming designed

to capture adults 25-54. The new network, FXX, will target adults 18-34. FX president John Landgraf recently mentioned plans to achieve original programming parity with ABC, NBC, FOX and CBS over the next few years.

Not all niche networks are successful, however, and News Corp. has made its share of blunders. Recent reboots include the former Speed network becoming Fox Sports 1, Fox Soccer will be the new FXX network in September ’13, and Fox Reality became National Geographic Wild late last year.

There are other new channels popping up that have endemic advertisers, which are specific to the topic. An example is O’Neill surf equipment tied to Xtreme sports. These advertisers can afford to get involved because of the low cost of entry and the efficiency of the ad-spend to reach a specific, targeted audience. These new networks are very vertical and deeply engaged with that target.



Re-emergence of big idea, big budget branded series and mini-series

Over 30 U.S. broadcast and cable networks are commissioning original scripted programming. Expensive story-driven television production is attractive because it mirrors feature tent poles, attracts advertisers, attracts international broadcasters, creates subscriber 'stickiness' and places all these entities in a space traditionally reserved for pay television.

Mini series like *The Bible* and *The Vikings* are perfect for cable budgets because they are essentially document-dramas with very little dialog, rich production values, international in scope with stories driven through narration.

Netflix entered the arena with a $100M investment in *House Of Cards* with Kevin Spacey, a non-commercial serial that's squarely aimed at the $8/month streaming subscriber who may be attracted to an alternative to HBO. Commercial cable network AMC hit a grand slam with *Walking Dead* and *Mad Men,* products that ultimately land on Netflix or Amazon as commercial free versions.

The traditional networks are looking at mini-series as a way to mitigate live TV events and sports and shore up a slightly eroding reality base. "A lot has changed in the media landscape, and the notion of creating an event that is on for a shorter period of time that really demands attention is exciting," says Fox Senior VP - Event Series Shana C. Waterman.[3]

Moreover, studios continue to lean towards big budget, franchise tent pole theatrical releases and away from adult dramas in the $50-100 million range in an effort to mitigate risk. This creates an opportunity for producers to close that gap on television. "With the kind of movies being made right now, there are a lot of people who have adult drama stories that are harder to get made," said Gina Balian of FX in a recent interview. "Television has become a really attractive place."[4]

Some of the new programming is already underway, including an adaptation of Joel and Ethan Coen's *Fargo*; *Grand Hotel* from Sam Mendes, about a fictional terrorist plot in Paris; *Sutton* from Alexander Payne and Michael de Luca, about the infamous U.S. bank robber Willie Sutton; *Mad Dogs* from

[3] The Hollywood Reporter, May 3, 2013, Lesley Goldberg
[4] The Hollywood Reporter, May 3, 2013, Lesley Goldberg

Shawn Ryan, a black comedy originally seen on British television; and *Mayflower* from Paul Giamatti and Gil Netter, about the Puritan expedition to the New World.

The top 15 television programs viewed live on cable during the week ending March 31, 2013[5] were:

Rank	Title	Network	Day	Live Viewers
1	*Walking Dead*	AMC	Sun	12,419
2	*The Bible*	HIST	Sun	11,745
3	*Duck Dynasty*	A&E	Wed	8,497
4	*TBS NCAA*	TBSC	Fri	6,739
5	*TBS NCAA*	TBSC	Fri	6,463
6	*Duck Dynasty*	A&E	Wed	5,282
7	*TBS NCAA*	TBSC	Fri	5,233
8	*Walking Dead*	AMC	Sun	5,128
9	*The Vikings*	HIST	Sun	4,741
10	*WWE*	USA	Mon	4,685
11	*TBS NCAA*	TBSC	Thu	4,653
12	*WWE*	USA	Mon	4,584
13	*WWE*	USA	Mon	4,584
14	*Swamp People*	HIST	Thu	4,557
15	*Game of Thrones*	HBO	Sun	4.366

[5] Source: Nielson Ratings

Speaking of Amazon, the company is producing 14 pilot programs through their new Amazon Studios division and letting viewers help decide which programs get the final green light. "We think there is an opportunity to reinvent the process of developing original films and TV shows by getting lots of feedback and input from our customers much earlier in the development process," says Bill Carr, the company's vice president of music and video.[6]

Roy Price, Amazon Studios division head and former Disney executive agrees, adding ''Why follow the guru method when you don't have to anymore? The audience is out there, and the audience is interested. We might as well make them a partner in the process.''[7]

Resurgence of serial storytelling

Methods of storytelling are directly tied to methods of consumption and monetization models. In the heyday of network television, producers told encapsulated stories with recurring characters in half-hour or one-hour time slots (and they still do). Typical "real" runtimes in these formats are 22 and 48 minutes, respectively, allowing for local and national advertising slots. Serialized storytelling has been largely reserved for daytime soap operas.

Cable began as a paid re-transmission service and evolved to feature "content aggregators" featuring movies (e.g., HBO) and ad-supported cable "networks" (e.g., AMC). Pay-TV's initial program offering was re-runs of classic and recent motion pictures, and cable networks initially featured re-run television programming or reality-based documentaries (e.g., Discovery, NatGeo and History).

Monetization models for the cable operator are subscriber based while revenue for Pay-TV includes a piece of every household fee PLUS subscription fees paid directly to the service. Cable networks likewise receive a piece of every household fee PLUS ad revenue, although the total amount of advertising time per hour is reduced from 10-12 minutes to 3-6 minutes (the difference is covered by promo or other interstitial). Cable gets higher fees per CPM for less coverage.

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[6] BusinessWeek, March 27, 2013, Brad Stone
[7] Associated Press, April 18, 2013, Ryan Nakashima

It's important to note that cable operators now enjoy greater revenue from broadband offerings than programming, and that cable generally offers the highest available consumer bandwidth available in the United States today[8]. Cable exploits time shifting by integrating DVR technology into their HD-generation set-top boxes. All of this aside, cable is plagued with rudimentary user interfaces and archaic transmission infrastructure. This equates to the "perfect storm" for the disruptive entry of OTT connected devices and televisions – searching is better, the viewing experience is comparable, and viewers are free to consume as they please.

Networks learned long ago that soap operas and other serialized stories don't work very well in re-runs or syndication, but new platforms are perfectly suited for them. This is because connected devices, DVRs and over-the-top platforms have enabled audiences to consume serialized episodes in a collapsed period of time. This so-called "binge viewing" would not be possible without the technologies and platforms to support it (e.g. Netflix). Netflix and Hulu are the leaders in binge-viewing precisely because they "think' like Internet content providers rather than linear broadcast networks. Indeed, linear broadcast networks may begin to experiment with vertical programming concepts in the not too distant future precisely because consumers are doing it elsewhere.

Writer/producer Tim Kring (creator of *Heroes* and *Touch*) recently observed that the type of programming, "… capturing the zeitgeist right now are these shows that have these serialized stories that can be consumed over a weekend. (Technology) has really changed the way that television is being consumed."[9]

It's interesting to note the generational underpinnings of this phenomenon. Traditional network and cable viewing spanned three generations of Baby Boomers, Generation X and Generation Y where audiences made a date to consume linear programming as broadcasters scheduled them. The DVR really changed this habit and helped audiences break free of the schedule, but Generation Y is truly "digital native", embracing and mastering the Internet and mobile communication technologies that existed at the time of birth. Consequently, GenY demands instant gratification and control over their consumption of content, both long and short form.

"As trailblazers and as producers in this business we have a responsibility,

[8] Verizon Fios and Google fiber exceed 30Mbps but are only available in select areas of the U.S.
[9] NATPE presentation, 2013

creatively, to make sure that we protect television," observes Anthony Zuiker (creator of the *CSI* franchise and *Cybergeddon*). "And that's by embracing technology and telling stories on all these devices and making sure we evolve entertainment going forward to *not* ignore technology and devices."

Rise of TV's cache among feature talent

Big budget dramas and serials are also attractive to high tier talent because the international exposure raises audience awareness among a broad base of viewers and creates the opportunity to participate in a potential cultural phenomenon.

Talent "packaging" is nothing new in Hollywood's television or feature production business. It has flourished since the early 1960's during the rise of the agency system when domestic networks and studio producers would match their IP to star talent through agency partners for a fee.

Today, independent producers acquire intellectual property separate from studios and networks, develop the story and package the concept directly to agency partners. The source of the IP may be a game, a book, a comic or an original story that the producer has acquired directly from the author, publisher or copyright holder, and producers will develop a sense of the actors, directors and writers they need to enhance the creative vision of the project.

Independent producers may choose to partner with one agency or another in exchange for waiving or lowering the packaging fee; a practice that basically circumvents a network/studio model that some industry observers opine is somewhat broken.

Transmedia and world-building

"Transmedia storytelling is the art of world making: consumers chase bits of the story across different media channels and collectively put the pieces together to have a richer entertainment experience."[10]

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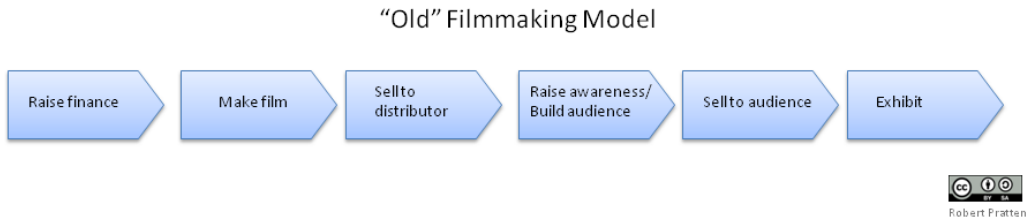
[10] [5] USC Professor Henry Jenkins in his book 'Convergence Culture, Where Old and New Media Collide'

In his book *Convergence Culture, Where Old and New Media Collide* Henry Jenkins offers *The Matrix* franchise as an example of transmedia storytelling that he describes as being 'a new aesthetic born in response to media convergence. Media convergence being the 'flow of content across multiple media platforms; the cooperation between multiple media industries and the migratory behavior of media audiences who are no longer passive.' Or, as the Producers Guild of America defines the term: 'A Transmedia Narrative project or franchise must consist of three (or more) narrative storylines existing within the same fictional universe on [multiple] platforms.'

In practical terms, this means a greater interaction between new media (websites, internet trailers/teasers, tweeting) and old media (print advertising, television advertising, newspaper articles); and most importantly, an interaction between the filmmaker and his/her audience, as well as between the audience members themselves. This suggests a new way of looking at the television and feature financing and content model.

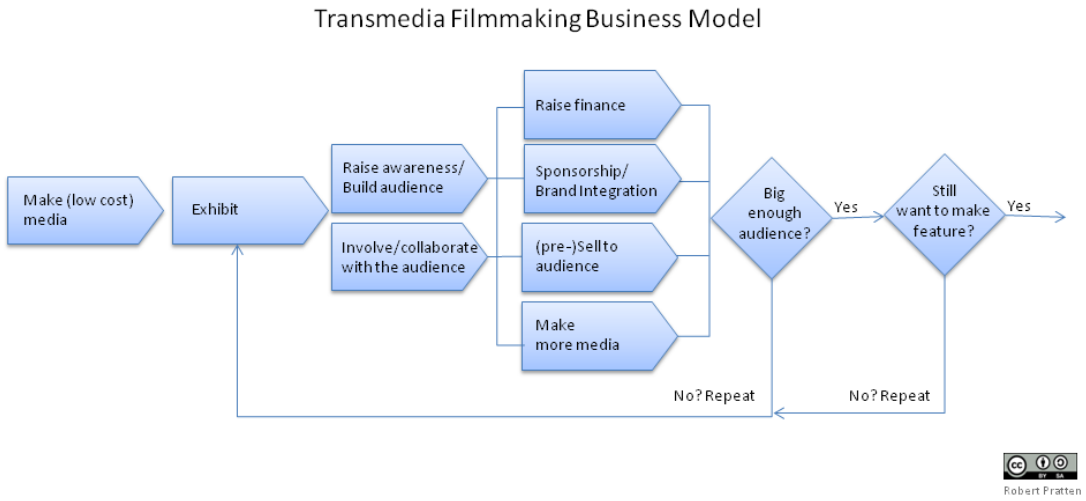
The traditional model demanded little more than raising sufficient funds to finance and market the project. Devoid of lightning speed, Internet-based market research, it was easier to persuade investors because it could not be proven that the project would fail. In other words, there were no concrete means of measuring potential audience interest and so, no way of predicting success or failure at the box office or on television.



With the arrival Facebook, Twitter, YouTube and so on, it is possible to garner a feel for the public's enthusiasm, or not, for a project. Now, the investors, wishing to protect their investment, have a more concrete means of testing the water and building an audience on a global scale.

This new model has a number of key features:

- The audience is enthusiastic about the project, generating a feeling of anticipation
- This anticipation is used to attract investors and partners
- The value of free exhibition of the film as a marketing tool is not lost on producers and it is expected that there will be some 'freebies' as part of the marketing strategy



Evolving audience behavior supports this strategy, specifically, GenY's approach to the use of social and mobile media. As avid consumers of a variety of media platforms, GenY has a comfort-level with social media and gadgets that surpasses that of any generation before them, so it is only logical that producers use these tools to reach audiences and develop a greater presence in the general consciousness. Transmedia storytelling and marketing is an attempt to adapt to the new needs and expectations from the audience. Overall, the message seems to be that if producers don't learn to exploit the tools and social technology, they'll have no one to blame but themselves when eyeballs don't watch.

Online content moving to TV and vice versa

Popular content that started as a videogame is also making its way to TV screens and vice versa. A case in point is ScyFy Networks $40 million dollar

series Defiance that bowed day and date with a $60 million dollar MMO[11] that features the same characters and environments from the series and takes the story in different directions. The success of one doesn't necessarily guarantee success for the other.

On the other hand, Content Media's *Halo 4: Forward Unto Dawn* began as a short form series on YouTube's Machinima network. The series was so successful online that the distributor packaged the episodes and sold them as a feature in DVD, subscriber-based TV and video-on-demand markets.

"This is a slightly new model. *Halo 4* is one of the first properties that we've taken out that first aired on a YouTube-funded channel," says Jonathan Ford, Content Media's executive vice president of television and digital. "This show, which is driven by a strong brand, has helped prove that there is an economic model for entertainment beyond the traditional TV windows."

Television Production

Budgets

The type of program, which platform ordered it, where it is shot, and the anticipated revenue from downstream sales (if any) will drive the budget for content. Given that formula, budgets for compelling content are essentially all over the map.

For instance, the market for $5M features destined for DVD is nearly completely gone but efforts like Machinima[12] are employing name talent for low cost productions (in the *hundreds* of dollars) destined for digital distribution. Netflix's *House of* Cards is a $100M investment, but this big budget figure is not uncommon for programming in this category. HBO spent $125-200 million each on *Band of Brothers* and *The Pacific,* for example.

Budgets for network-based serial or closed-end scripted dramas remain in the $2.5-3 million dollars per hour range because crew size is the same and Guild agreements govern annual increases. Above the line increases are between four and five percent while below the line are three to four percent.

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[11] Massively Multiplayer Online game

[12] *The word "Machinima"—a loose hybrid of "machine" and "cinema"—refers to the process of creating real-time animation by manipulating a video game's engine and assets.* (www.machinima.com/overview)

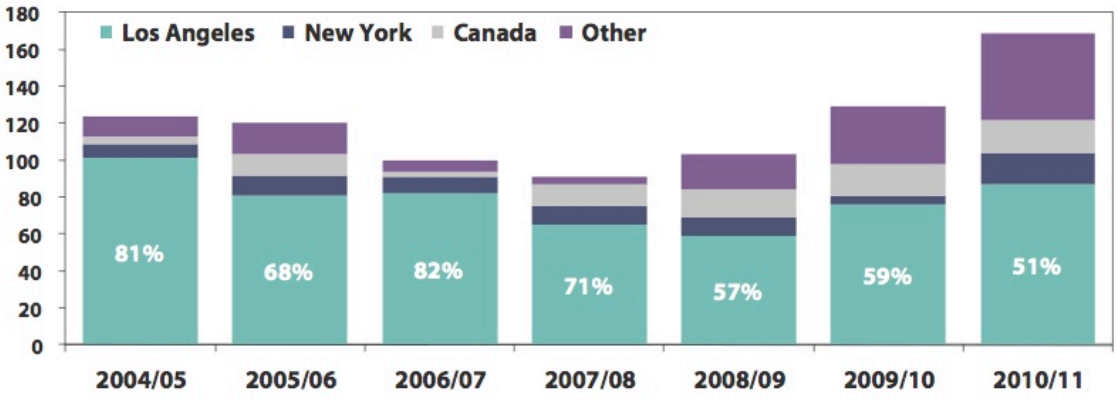
Above the line costs for a scripted pilot will increase if the network orders further episodes based on the pilot. It's simply a matter of talent agreements escalating when the network orders season one and additional increases when the series is a multi-season hit.

Typical reality budgets range from $300-500,000 per hour. This segment achieves real economies based on technology since crew sizes are smaller and Guild agreements for reality differ from scripted drama. Reality programming is an economical way to launch niche networks like Discovery, History and NatGeo with lower cost original programming that appeals to a very targeted demographic (and advertisers).

Tax incentives play a very important role in deciding where production will occur. NBC-Universal recently purchased the former Clairol manufacturing plant in Stamford, Connecticut, adding to the already significant production base in that location for programs like *The Jerry Springer Show*, *Tricia* and *Maury*. The new plant will ultimately house NBC-Universal sports. The decision came as a result of Connecticut's aggressive tax credit structure.

Figure 5. Number of U.S. TV pilots by filming location

2004–2005 to 2010–2011



Source: Film L.A.

One estimate places the additional cost of shooting scripted drama in Los Angeles at three to four hundred thousand dollars per episode.

Financing

The days where the network pays 100% of the production, and gives up

international rights, are over. Even the cable and OTT networks will retain international rights and shop product to the highest bidder. Every international distributor is going put in a bid because everyone is looking for U.S. network content whether it's cable or mainstream broadcast. Only the top distributors have the ability to produce, own and control the rights to big budget programming, so the independent market is incredibly competitive.

The traditional co-production model was primarily a funding scheme to gain access to international tax incentives or subsidies as well as qualify the product as "local" production to satisfy programming quotas. Having met the financial test and the creative hurdles that come with the financing, the product flows more naturally into international network licensing deals. Co-productions in this definition typically feature internationally recognized talent.

Today, the definition of co-production has evolved to resemble an "independent feature model for television" where independent producers and distributors are partnering on a creative and financial level to supply global broadcasters with high-end, expensive productions. AMC's *Walking Dead,* for example, is a joint venture of AMC, Fox International Channels and Entertainment 1 Television (UK). For *Hell on Wheels* E1 actually partnered Endemol (a competitor) to fund and distribute the program internationally.

Contemporary co-production partners are very aware of the distinct characteristics of GenY, who are more in tune with international trends than any previous generation. As digital natives, GenY never knew life without the Internet, mobile and social media; so cultural barriers are lower to them than their GenX or Baby Boomer parents. Stories that resonate across cultures can break through their initial genre to reach a much wider global audience that is naturally attracted to transcendent themes. Examples of this trend include *Hemlock Grove* and *Hannibal* from co-producers Gaumont and NBC for Netflix and NBC, respectively.

"When we have something that we feel is going to have equal relevance in multiple markets because of the show's setting or shared cultural history, that's probably when a co-production makes the most sense," says Showtime entertainment president David Nevins. "When you are doing a show that's intrinsically American set in an American city, there's no need for a co-production. We only do it when there's some defined financial advantage."[13]

Advertisers with strong brand identity have always been part of the financing picture, but brands have actually taken the concept of brand integration to a completely different level (e.g., NBC's *Fashion Star*). They find a show,

[13] NATPE Presentation, 2013

pay for it, manage the rights through distributing partners and essentially behave as executive producers. The trick is finding a balance between good storytelling and overt product placement. Anything less looks like an infomercial and eyeballs will go elsewhere.

In summary, all producers must think like distributors and all distributors must think like producers. International revenue, combined with creative co-production partners, is the rule. Producers who know exactly how products are sold will arguably be better producers. The quality of the content is the overriding ingredient. Good content with creative business models will prevail.

Impact of technology on television production in the past 3-5 years

Technology is empowering talent and de-mystifying the process of production and postproduction.

A revolution in lower cost, high quality production gear and software has dramatically changed the cost structure and processes associated with creating content. The transition from film and tape to digital capture is complete in television production (and nearly complete in feature film production). The overwhelming consensus is that digital photography is the single most dramatic change and advancement in production over the past several years.

Lighting equipment and audio gear have also shrunk in size and complexity. Wireless cameras have made shooting "on the run," or even in difficult spaces, much more fluid. One producer told us how actors are using smartphones for ADR (literally, “phoning it in”). Another mentioned using an iPhone to capture images where a proper camera placement is inaccessible. Wireless quad helicopters with GoPro cameras are giving small budget productions flying camera and interesting jib shots for a very small cost.

Directors are using two or more cameras on prime time drama where a single camera once sufficed and are now able to achieve atmospheric and production value levels equivalent to feature production. Shooting ratios of 15:1 are typical with four to five hours of dailies for the pilot and two hours per day thereafter.

What about the Crew?

Crew sizes for big-budget scripted dramas and mini-series are essentially unchanged from five years ago and, in some instances may be larger than before. This is because digital cameras have enabled greater set-up flexibility so directors are employing multiple cameras where one camera traditionally sufficed.

The opposite is true for reality programming where it appears that smaller gear has led to fewer second assistant editors, grips, electrical, lighting and focus pullers. There's even greater savings in electronic field reporting, where a wireless camera is simultaneously feeding editors in the newsroom as it captures the image on the scene.

Audio practices have shifted from boom operators to RF radio microphones with each actor isolated for maximum flexibility in the mix. One producer told us that actors like it because they can be more fluid on their marks.

Generally speaking, the roles of individuals on the crew are becoming more limber and adept. Crew work is taking on an IT flavor and individuals must be more digitally savvy with some tasks evolving while others are altogether new. An example of the former is the Script Supervisor who must now manage greater shooting ratios and notes, or the Clapper Loader that's altogether gone since directors are prone to let the digital camera run between takes. Guild restrictions remain in place, of course, but producers and studio executives are able to request more cross utilization than ever before (between grips and electrical, for instance).

New jobs include the Technical Interface Director (TID) or Digital Information Technician (DIT) who tracks original footage, copies, transfers, file names, etc. Some directors hire on-set transcoders to manufacture and post dailies for executives to view anywhere on the planet from secure shared websites. Other folks are responsible for scene, talent, and performance information. In addition to telling a story, the creative community on the set is making editing and metadata decisions that are delegated to others to implement.

Social media, marketing and promotion via Twitter, Facebook and branded websites have had a huge impact. Production teams are now an integrated group of traditional TV professionals alongside mobile, app development, social network, and gaming professionals. The integrated teams must create and sustain buzz, so the teams must be mindful of all distribution channels and platforms during and after production. Digital distribution concerns must be built into production activities. Short form content extracted from long form content must be planned for.

Where does production end and post begin?

Digital photography has permanently changed the relationship between the director of photography and the lab. Since film-based production has nearly disappeared, traditional workflows for dailies and color have morphed into complex and sophisticated workflows. Digital technology has remade how Hollywood operates, but it's somewhat chaotic since no one method or technology is static long enough to forge a true and lasting standard set of practices.

Continuous improvements in hardware and software cause directors to experiment with storytelling, and that has an enormous impact from camera, to distribution and archiving. Directors are using multiple professional cameras and they are enticed to incorporate consumer grade cameras (e.g., GoPro) because the images are very good for a very low cost. The practice is particularly true in reality-based television where low-budget, fast turnaround is the name of the game. But more cameras mean more footage, more audio, more *everything* - and that leads to real challenges.

A real marriage between production and post from an engineering standpoint has occurred because of data management and metadata tagging. Images are transferred from camera to hard drives in the field, and producers are making a protection backup of the data for themselves, just in case the other drive fails in post. Editorial can begin in the field if the director has access to AVID or Final Cut Pro hardware and software on a laptop, but the practice is risky because the rough-cut editorial bins may not find the required raw footage in the edit bay.

Dailies have seen a huge change because turn around from image capture to creative and executive review is practically instantaneous. Some production

companies employ transcoders who take a simultaneous feed from wireless cameras to post dailies on shared websites for group reviews and approvals.

Using the "cloud" for collaboration is tempting, but high-budget feature and television producers are rightfully skittish. One producer observed that the opportunity for piracy has never been higher because hard drives, thumb drives and data disks are portable and subject to misidentification, misplacement or theft - and the cloud is yet another pirate adventure. For this reason alone, greater coordination between production and post is critical since real money is always on the line.

Television and Feature Postproduction

How has postproduction changed in the past 3-5?

Data storage, customized workflows and speed appear to be the standout topics of change in the postproduction industry. One post executive mentioned that workflows differ from project to project because the tools enable experimentation and directors are stretching the boundaries. This "job shopping" is very different from the predictability of analog workflows and works counter to the traditional post environment of high margin, talent driven processes. It's difficult to put a price on customization.

To regain some of the margins lost to unpredictability and standardization, the bigger post houses are altering their business models to highlight services, like visual effects, that require high capital investment to replace those services that have been reduced to low cost software and hardware solutions.

What used to be a very oligarchic postproduction environment between several large companies is fragmenting into smaller houses with lower overhead. The capital investment required to complete a movie is no longer a barrier to entry given the dramatic improvements in low-cost hardware and software editorial and graphic solutions. By example, the company Black Magic reduced the complexity of the DaVinci color correction architecture from a hardware solution that was $250,000 to an affordable software kit for

a few thousand dollars. Black Magic has also developed a 4K camera that is expected to cost less than $6000.

Many of these new, smaller postproduction businesses specialize in film finishing for producers who are able to lock the feature editorially but lack the equipment for color timing, audio, main and end titles, key art, trailers and limited visual effects. Tunnel Post, Tri-Coast Studios and Plaster City are examples of suppliers who work with independent producers to provide deliverables to distributors. In some cases, the distributor will pay for finishing the project when the producer lacks the funds to do so, in exchange for a slightly higher distribution fee.

Other niche post houses include DP Post and Shed Media, who specialize in reality content. The latter is actually a very successful production company that is horizontally integrated from production to post to accelerate delivery and improve control. Rather than employing a third party post house, companies in this space sell excess capacity to third parties for project finishing and distribution deliverables, creating an adjunct revenue stream.

The de-mystification of the postproduction process has occurred because the tools are so much cheaper and accessible. Storytelling no longer depends on large pieces of expensive gear. Moreover, skilled individuals are able to extract much more from today's hardware and software than their predecessors could from the tools in their day. This means impressive results for a lower cost and more people with the skills to use them.

Impact of technology on postproduction in the past 3-5 years

Probably the biggest change to the post industry from a technology point of view is the sheer volume of data that must be tracked, catalogued and protected, plus the turnaround expectations of producers and distributors.

Audio is coming in via memory cards, smartphones and iPods. GoPro footage and lipstick cams are regular players in the field (but don't generate time code for editorial). Some productions are hybrid file-based and tape like DVCPro, so the tapes must be ingested then stored alongside row after row of hard drives. Producers opting to use tape are getting full utilization from legacy equipment investments while riding tape prices downward as tape demand gives way to file-based workflows.

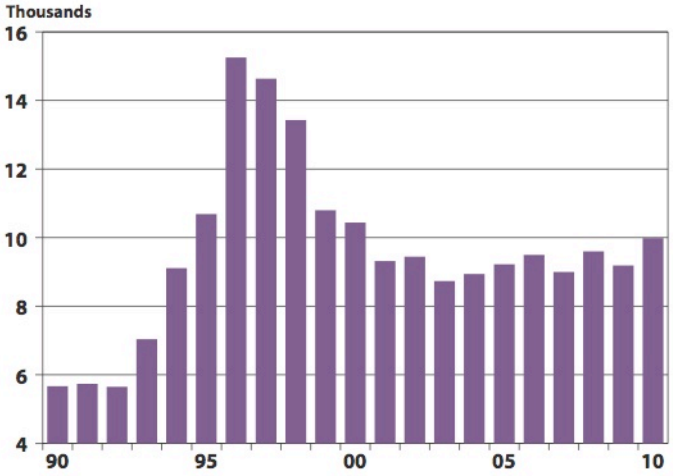
AVID no longer markets itself as a hardware or software company, but as a *workflow* company. Their products are still available of course, but they are more open to "interplay" with other hardware and software companies. The vision is that different tools play well together and as soon as the media hits a server, everybody can see it and manipulate it.

What's come and gone here?

Practically any job involving film has all but vanished and tape operators are an endangered species. Colorists remain the rock stars of the industry in the feature world, and the bigger post houses are still able to sell high priced services on the consistency of color from DCPs to MP4s.

Figure 3. Post-production employment in California

1990–2010



Source: California Economic Development Department.

Tools are cheaper so more people have access and know how to use them. This phenomenon increases the size of the talent pool so non-union post wages have gone downward. Conversely, the really high priced talent today is engineers who have more of an IT bent. Some of the larger post companies have sophisticated and proprietary software platforms and solutions developed in-house, driving a new category of "super engineer" who must equally understand commerce, creativity and technology perspectives to successfully express these forces in software.

The tendency is to accomplish more with less people under the belief that automation and outsourcing will fill the gap. Outsourced jobs include quality assurance, audio mixing, audio conforming, metadata, picture augmentation, subtitling and closed captioning.

Listing the "top" postproduction jobs in 2013 depends on who's answering the question. Regardless of the ranking, we achieved consensus on the

following list among the studio executives, post executives and producers we spoke with.

Digital Imaging Technician (DIT)[14] – also known as Digital Information Technician or "Data Wrangler", this position works in collaboration with a cinematographer on work flow, systemization, signal integrity and image manipulation to achieve the highest image quality and creative goals of cinematography in the digital realm[15].

Game Developer - a software developer business or individual that creates video games. A developer may specialize in a certain video game console (such as Nintendo's Wii U, Microsoft's Xbox 360, Sony's PlayStation 3), or may develop for a number of systems (including personal computers).[16]

Colorist - Over the past decade Color Grading has evolved from the very linear telecine process to the very flexible non-linear DI workflows of today. A skilled colorist will maintain continuity by matching shots, and also enhance the work of the cinematographer. But colorists also manipulate perception to stimulate emotions, focus attention and improve understanding of a project. [17]

Post Sound Supervisor - Sound Supervisors oversee the work of all Sound personnel on multi-camera productions. During live programs, they are responsible for mixing sound sources for immediate transmission. They monitor outputs, adjust levels and quality, for example by equalization (adding and subtracting various frequencies), cue effects or music, and troubleshoot where necessary. For programs recorded for later transmission, the sound is pre-mixed during recording by the Sound Supervisor. Additional effects and music may be added and mixed during recording, or dubbed later by Dubbing Mixers during the postproduction process. [18]

Visual Effects Supervisor – Are responsible for achieving the creative aims of the director and/or producers through the use of visual effects. While it is a creative role, most supervisors possess a strong technical background and are capable of making informed decisions about the most efficient and

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[14] This position may be either 'post' or 'production' related, depending on one's point of view.
[15] Adrian Pennington, September 2008, *4k - Bane or blessing? - The Role of the Digital Imaging Technician (DIT)*
[16] Wikipedia – *citation needed*
[17] International Colorist Academy
[18] www.creativeskillset.org

effective technique to employ to solve the problem at hand. Often a supervisor will work in tandem with a visual effects producer and CG (computer graphics) Supervisor.[19]

Feature Editor - With the advent of digital editing, film editors and their assistants have become responsible for many areas of filmmaking that used to be the responsibility of others. For instance, in past years, picture editors dealt only with just that—picture. Sound, music, and (more recently) visual effects editors dealt with the practicalities of other aspects of the editing process, usually under the direction of the picture editor and director. However, digital systems have increasingly put these responsibilities on the picture editor. It is common, especially on lower budget films, for the assistant editors or even the editor to cut in music, mock up visual effects, and add sound effects or other sound replacements. These temporary elements are usually replaced with more refined final elements by the sound, music, and visual effects teams hired to complete the picture.[20]

How does the cloud impact postproduction?

The larger postproduction companies have far flung investments in India, Europe and Asia where they conduct some of the less risky tasks from a piracy perspective. One idea expounded at the recent Hollywood Post Alliance conference came from Amazon Web Services.

The model calls for editorial, color and audio software as a service from cloud-based servers (SaaS), so the operator is actually using remotely managed software rather than locally installed tools (think Google Docs). The model further contemplates uploading original content to a secure cloud environment where it sits near the programs that manipulate it, but separate from a server perspective. This architecture enables quick access and transfer of the content between virtual security walls, and the scalability of the cloud reduces the need for local storage.

This model may be attractive to prosumer level producers and even professionals in low risk programming spaces, but it's unlikely that big budget productions will move anywhere near this idea for now.

[19] Wikipedia
[20] Wikipedia

Distribution

Digital distribution of fully finished content for television and digital exhibition has exploded in the past several years resulting from a combination of the 2011 tsunami in Japan, expanding digital markets, declining Blu-Ray sales and a rapid conversion to digital workflows from post to exhibition.

The end of tape is within sight.

The tsunami destroyed Sony's only-source manufacturing plant for HDCAM-SR tape, based in Sendai. The closure sent the television and motion picture industry reeling as shortages rapidly and negatively impacted the industry's ability to fulfill licensing contracts. Distributors reacted by erasing HD protection copies of unsold content and the inevitable black market sent HDCAM-SR stock prices soaring.

Coincidental to this is the declining sales of Blu-Ray disks and the rise of "over-the-top" consumption discussed elsewhere in this paper. Although Netflix began streaming content to desktop and laptop computers as early as 2007, the game-changer came in 2011 when connected devices like the Xbox, Blu-Ray players and Roku enabled quality streaming to the television display.

Shrinking exhibition windows also played a role in the digital revolution because release markets need language and other versions faster than ever before. Since theatrical production has become more digital than film-based, it is only logical that every downstream task and process gets a digital re-fresh or eliminated altogether.

Taken altogether, these change drivers caused the major filmed entertainment studios to accelerate digital distribution more rapidly than one may have expected just five years ago. In 2009, the majority of product shipped to broadcasters, cable and networks was contained on tape (e.g., HDCAM) and standard definition was still a stubborn holdout in pockets of the globe.

This reality has completely flip-flopped in the past few years. The industry has achieved a 60 - 80% fulfillment rate using file-based distribution and the end of tape is in sight. The take rate would be higher if global broad

bandwidth was ubiquitous, but the Middle East, Africa and LATAM continue to struggle with this aspect.

Mezzanine files, transcoding and delivery.

Archive file formats aside for the moment; the industry appears to have settled on ProRes, J2k or XDCAM as the mezzanine[21] level file standard for HD content. J2K as a mezzanine file originally presented processing obstacles due to size, but those problems no longer exist because of hardware and software improvements. MPEG 2 is still used by some for SD but use of the standard appears to be dwindling in favor of ProRes SD.

The six major studios are generating an aggregated estimate of 50 - 60,000 files per week for licensees using a combination of in-house facilities and external suppliers. Technicolor and Deluxe each claim to be generating 3000–5000 files per day to meet customer requirements and this number includes non-studio distributors and other entities. Obviously, the enormous amount of encoding/transcoding and delivery horsepower has caused a complete re-think on workflow management and equipment requirements. Consequently, there are racks and racks of un-used Digital Betacam and HDCAM machines at post facilities throughout the system.

We compared three transcoding and fulfillment scenarios to spot an emerging trend, if any.

ORDER TYPE	DISTRIBUTOR A	DISTRIBUTOR B	DISTRIBUTOR C
Straight File Copy And Deliver	1%	65%	17%
Simple Transcode And Deliver	60%	5%	25%
Complex Transcode And Deliver	40%	30%	58%

Table 1 – The percentage of all transcoded and delivered product subjected to various levels of complexity.

One distributor claimed that "simple transcode and audio configuration" transcodes represent 60% of all work with 40% dedicated to "more complex

[21] Mezzanine files are lightly compressed masters used for transcoding to licensee specifications. The 'mezz' file is taken from DPX, J2K or other higher resolution file formats and is specifically created for distribution purposes, behaving much like a tape master.

transcoding profiles". Another claimed a 25/58% split between these definitions with the balance going to "straight file copy and deliver" jobs. Still another claimed that 65% of all file-based distribution was "straight file copy and deliver" jobs.

One possible explanation is that Distributor A, for example, may rigidly enforce a standard suite of transcoding profiles the licensee must choose from and bake that selection into the licensing agreement. In that instance, any customized transcoding would trigger additional fees that may be passed onto the licensee depending on the contract. Another explanation may be tied to the volume of titles licensed to broadcast platforms over digital platforms.

Each studio is in the process of becoming more self-sufficient in the storage, transcoding and delivery of licensed files using internal resources. However, nearly every studio requires some external horsepower for portions of the supply chain. The amount of automation involved (vs. human intervention) is unclear, but it appears that a significant amount of internal resource is involved in on-boarding[22], asset and title research, and purchasing services. Some studios outsource on-boarding to the supplier. In cases where the licensee is paying for materials, some studios point the licensee to a specific supplier to transcode and supply the content from mezz files the supplier accesses from the studio.

Several studios have invested significant treasure in applications that manage the storage, transcoding and delivery of mezz-level files for distribution purposes. None of these applications appear to interface with sales, contracts or rights management systems, however, but do interface with title management, order entry and other inventory systems.

Studios appear to be evenly split on the advantages and disadvantages of 'push or pull' fulfillment models. Studios or their suppliers either 'push' content to licensee-designated servers, or grant licensees secure access to content folders on studio-controlled servers where the licensee can 'pull' the content inward. Some studios operate with a degree of both models.

It's unlikely that studios are saving copies of transcoded files used for delivery as a means to cut transcoding costs. One studio executive cited an internal cost/benefit analysis that concluded the cost to store these files was not offset by the benefit of re-using them. It isn't clear if the other studios have come to a similar conclusion. It would seem that the cost structure of people, technology and storage would warrant an annual re-visit to this analysis to learn if the conclusion has changed.

[22] In this context, "on-boarding" refers to preparing metadata and file structures in advance of file creation and ingestion into a company's digital asset management system.

From an archive perspective, each studio has offsite disaster recovery sites for their digital archives. Executives mentioned Las Vegas, Colorado and Wyoming along with Virginia and other sites "east of the Rocky Mountains". Data migration and integrity is a constant, cost-intensive activity.

Each studio views file archival and file distribution as separate issues. This thinking may be a holdover from analog practices where photochemical and oxide-based materials suffered different but known measures of deterioration. In the digital world, where content is measured in ones and zeros and varying file sizes and formats, the approach to archives and distribution libraries may ultimately blend together.

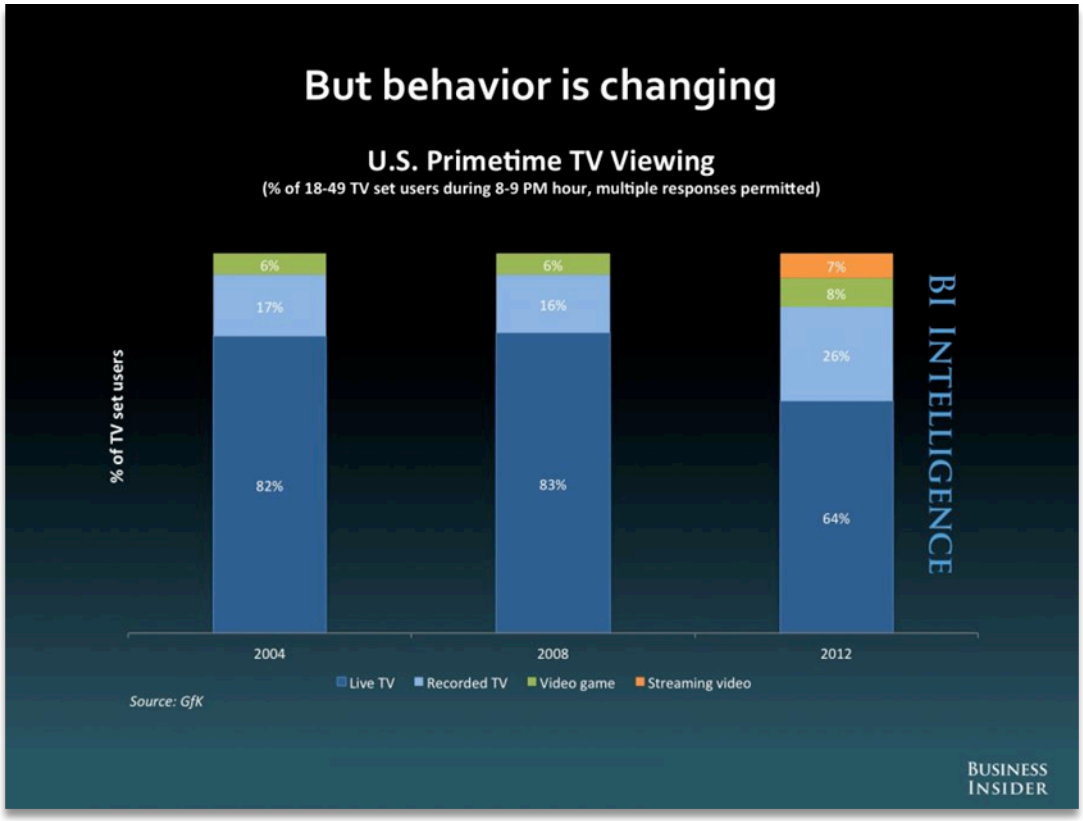
Consumption

Mobile, streaming and "cord-cutting"

"Digital is developing exactly the same way as cable television developed. If we look at the evolution of cable we see exact parallels with what's happening in digital, and if we extrapolate into the future we can make some assumptions about what's going to happen next."[23]

The very essence of "broadcasting" is mass consumption of a linear viewing experience in real time as programmed. The "mass" part is still technically intact, but making a date with a television set has become less relevant and replaceable with VOD, on-demand viewing via DVR, over-the-top or on mobile devices.

[23] Larry Tanz, CEO Vuguru, NATPE presentation 2013



The slide above shows the dramatic decline of linear television consumption compared to alternatives. Of particular interest is the growth of over-the-top streaming consumption from zero in 2008 to 6% in 2012, driven largely by big-budget serialized productions that audiences consume ala carte or through "binge viewing" – the act of consecutively consuming every episode over a short period of time (such as a weekend).

The top 10 "binged" TV series in 2012[24] were:

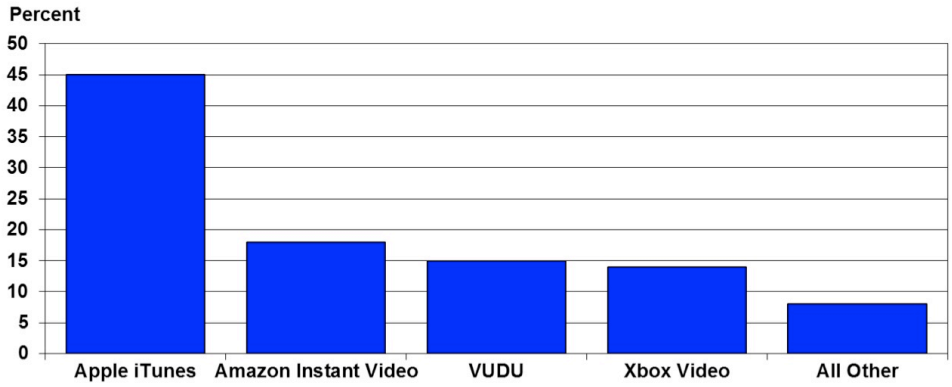
Rank	Show Title
1	*Prison Break*
2	*Charmed*
3	*That 70's Show*
4	*How I Met Your Mother*
5	*Gossip Girl*
6	*Supernatural*
7	*Scrubs*
8	*Heroes*
9	*24*
10	*One Tree Hill*

It's clear that technology is enabling consumers to find the content they want, when they want, where they want and interact with it like never before. Notable movers in OTT hardware delivery are Apple, Roku, Microsoft (Xbox) and Boxee. Amazon recently announced a Kindle-like TV set-top box device that will be available in late 2013 and further Amazon's ambition to grow their SVOD and streaming Amazon Instant services.

Likewise, most new televisions from Sony, Samsung, LG and others are equipped with wireless transceivers and feature their own user interfaces and content apps. OTT networks like YouTube, Vudu, Amazon, Hulu and Netflix appear as apps on most so-called Smart TVs ('smart' because they are connected devices). Earlier this year, Coinstar and Verizon formed Redbox Instant by Verizon. The monthly $8 subscription fee (similar to Netflix) provides access to 5,000 to 6,000 movies and up to four DVD kiosk rentals.

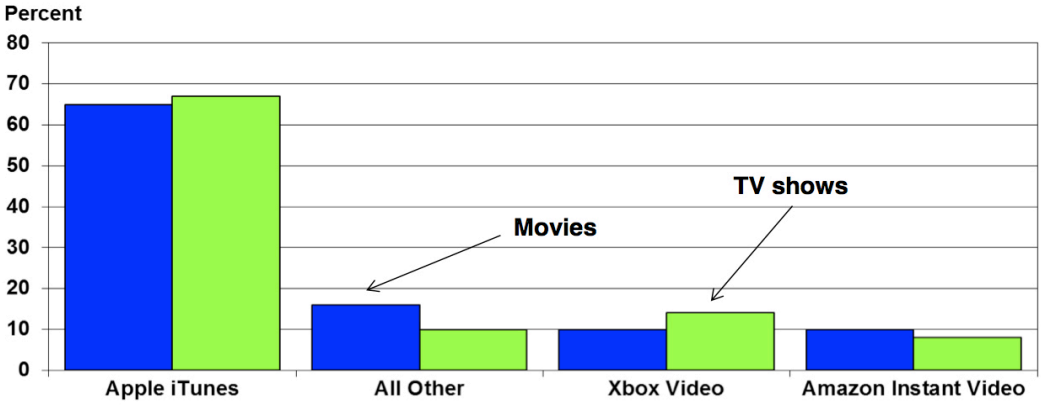
[24] Source NPD Group

The chart below displays the percentage of control over paid Internet-based VOD held by Apple, Amazon, VUDU, Xbox and others.



Source: NPD Group.

The chart below displays the percentage of OTT television programming and movie sales controlled by Apple, Amazon, Xbox and others.



Source: NPD Group.

At some point, televisions and artificial intelligence will ultimately merge. The next generation of televisions will feature new user interfaces that are source agnostic and totally content driven. The TV will remember what you've been watching and present these "likes" at the onset, so the consumer is effectively feeding the device content preferences through choices. Manufacturers will integrate voice recognition to enable contextual searches. For instance, a user may be watching a baseball game and ask the television to find other baseball games. The television will display the options and the sources of that programming from which the user can choose. Ultimately, televisions will become aware of the user's presence or absence and adjust its tasks accordingly. This is definitely going to involve

detecting the user's smart phone when it enters the room, but another method may involve the built-in camera we expect in the next generation.

The combination of Smart TVs, OTT devices, ubiquitous apps, mobile devices, and the willingness by some players to gamble on original programming is worrisome to traditional cable and satellite programmers. Will GenY disconnect in favor of OTT consumption?

The case for "cord cutting" cable and satellite program subscriptions is growing. Whoever said "there's 500-channels and nothing on" was likely talking about their cable or satellite subscription. According to Nielsen, U.S. households statistically view only 15 channels (or 3%) of the hundreds of channels available to them from the typical pay television provider. This means that most households ignore 97% of the channels they pay $100 or more for per month. So, the case for cord cutting may be summarized thus:

- Subscribers have long begrudged the monopolistic disparity between cost and entertainment value, but alternatives were nowhere in sight until the Internet and OTT technology companies created them.
- Cable and satellite user interfaces make it impossible to search, discover and consume content in any manner that's even remotely similar to the Internet experience.
- Robust interactivity is challenged by the legacy architecture of most cable plants; and satellite interactivity is a technical non-starter.
- Major cable networks, both Pay and ad-supported have circumvented the cable and satellite platforms with mobile apps that extend their subs and viewers to other devices. Notable examples are HBOgo, MaxGo and CNBC. Likewise for sport leagues (MLB Pro and Lite) and broadcast networks (ABC, NBC, CBS, PBS and FOX all have apps).
- The business model of "bundling" sports, movies and premium cable networks into tiered pricing plans for limited price guarantees is still practiced, of course, but the model is shaky.

"If you believe that 80% of subscribers would reject the sports content if they were offered it at wholesale prices… then, in fact, you have an unsustainable model that exists purely because of the competitive posture of the business," observed John Malone in a recent CNBC interview[25].

[25] CNBC, April 12, 2013

Mr. Malone's comments refer to the high cost of sports programming that's baked into the subscription fees of the cable of DBS subscriber who seek to receive sports content. Coupled with multi-year, multi-billion-dollar carriage fees and affiliate fees, these costs are "unsustainable" if viewers receive an OTT alternative directly from the NFL, MLB, NBA or the teams themselves.

As to cord cutting, Malone added "it's gonna happen" and reflected on the idea that OTT programmers will effectively compete with traditional pay television and premium cable channels without the burden of an expensive sports layer that drives up subscription costs.

"…. eventually this stuff (bundled programming) is just getting too expensive for just too many households. …I can conceive of [Netflix] coming to the cable industry and saying 'why don't we have a wholesale/retail relationship as opposed to being adversaries?' All of sudden, cable is distributing and promoting stuff that doesn't have a lot of sports on it."

Future cable and satellite bundles, according to Malone, may include broadband mixed with OTT channels and traditional networks. Indeed, viewers of smart TVs are beginning to land on navigation screens that blur and merge the traditional networks with OTT networks and programming. Brand loyalty seems to be shifting from networks to programs, and apps only tend to support this idea since an app can be an aggregator (ABC.com) or program specific (America Idol).

But what about "live" television viewing on mobile devices? Barry Diller believes there is a demand for linear viewing on tablets and smart phones and has staked his money and reputation on Aereo to deliver. Aereo offers broadcast content over the Internet to mobile devices for $8 to $12 a month, using a tiny antenna device that Aereo invented. The controversial approach triggered a number of lawsuits with networks such as News Corp.'s Fox and CBS over whether it has the right to retransmit their content for a subscriber fee. So far, the courts have agreed with Aereo.

"You can say that fee is analogous to Radio Shack selling you a DTV antenna. If the law is changed to say that antenna providers have to pay retransmissions, we'll pay it. Until you get Radio Shack to do it, we're not going to volunteer," said Diller in a recent CNBC interview[26].

[26] CNBC, May 13, 2013

Likewise, Time Warner cable recently announced that they would join Comcast and DirectTV to offer live streaming television on tablets and smart phones. The premium channel owners (e.g., HBO) and the pay television operators have adopted a "TV Everywhere" detente to enable premium channels to expand their reach to mobile devices but protect subscription revenues by requiring authentication.

The TV Everywhere movement is driving changes throughout the industry. Charlie Ergen's Dish Network recently made a $25.5 billion bid for Sprint/Nextel on the premise that consumers want the same TV-viewing experience inside and outside of the house. Estimates are that TV Everywhere could add $1.7 billion a year of revenue to pay-TV operators by allowing them to leverage mobile TV to increase subscriber fees.

On May 12 of this year, Disney-owned ABC Television announced live streaming to iPad, iPhone and Kindle devices through their "Watch ABC" app. The service will be available to subscribers of cable and satellite services that have a re-transmission agreement with ABC. The Watch ABC app requires an authentication code to grant users access to the programming.

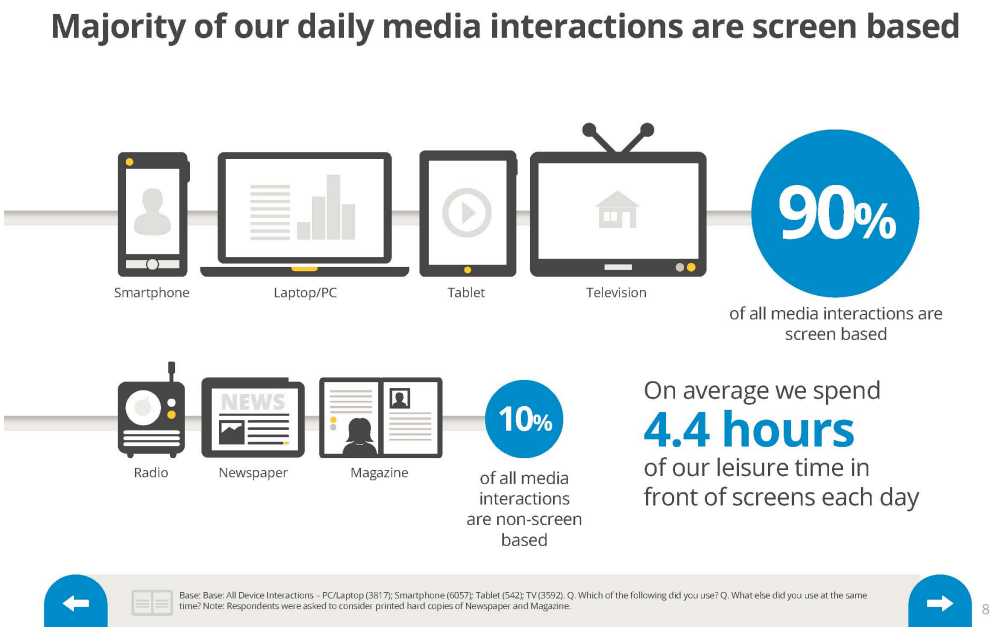
Not everyone agrees with this approach, however. Jeff Binder, general partner at the private investment firm Genovation Capital, believes the model will eventually break down. "Today you need a Pay TV subscription to get access to that content," said Binder. "The TV Everywhere model was a temporary fix to a problem that did not have a solution."[27]

[27] Videonet, April 24, 2013, John Moulding

Social media, second screen and interactivity

"If Content is King, Multiscreen is the Queen"[28]

An August 2012 report from Google, along with market analysts Ipsos and Sterling Brands, examined trends in digital media consumption through television, smart phones, tablets and computers[29]. The report concluded that 90% of all media consumption (roughly 4.4 hours per day) occurs across



all four screens.

Although consumers spend the vast majority of their time with television, nearly 77% of that time is shared with another device.

When measured as time per session, television ranks number 1 at 43 minutes, PCs at 39 minutes, tablets at 30 and smart phones at 17. The reports highlights the tendency to "onboard" digital tasks on one device and pass the task to another device, typically starting with the phone. An

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[28] Ingrid Lunden, August 29, 2012, *If Content is King, Multiscreen Is the Queen, Says New Google Study*

[29] *The New Multiscreen World: Understanding Cross-platform Consumer Behavior*, Google, August, 2012

example of this “sequential digital consumption” is beginning a shopping session on a phone and finishing it on a tablet or PC.

What cable and terrestrial broadcasting lacked to make Interactive TV happen was a robust and simple architecture to make it happen at scale. The Internet and broadband were the answer to this problem because they are the plumbing needed to distribute content anywhere at anytime. Today, tens of millions of consumers hold the devices that enable Interactive TV in their hands.

Social media and interactivity are so intertwined that a clear definition of each, as they affect television, is somewhat fuzzy. This is partly why social and interactive are both huge opportunities, yet challenging to monetize. The cost of producing second screen content can be expensive and units are rarely able to engage in the creation of that content during the shoot, so entire departments are formed to handle it. Advertisers, producers and distributors are struggling to get it right, and the next couple of years will likely clarify the road ahead.

On the one hand, social media for television consumption appears to be geared towards connecting viewers with show information, products and experiences that shift the viewer from a media grazer to a loyal fan, then drive discussions between members of that fan-base. On the other hand, interactivity appears to be about converting the fan into a buyer of associated products or a participant in the game or story.

For example, Shazam began as an app for identifying music; instantaneously answering the age-old question, ‘what is that song?’ In 2012, Shazam evolved to include television and advertiser recognition in the app. On the television side, Shazam presents the user with “get more” information on the characters, the stories, the cast, the crew and so on. For advertising, Shazam connects users to coupons, other special offers and more product information. The idea is to drive the consumer to buy the product on their couch.

“The big revenue stream for us (in television) is not from the networks or the users,” says David Jones, EVP of Marketing for Shazam. “The brands are paying us to Shazam enable their television ad campaigns. Which for the longest time have not been interactive. But enough people now can punch a button and engage with a TV ad, so the brands are paying us six figures per

campaign, times 200 campaigns to date, and we're already in the double-digit millions in terms of revenue run rate from television advertising."[30]

Scalability sits alongside efficiency in this space. Traditional advertising methods required re-designing or re-purposing campaigns for each traditional platform – television, magazines, newspapers, radio etc. Some companies, like TVplus and WatchWith for example, see the future of advertising as a single message that's automatically syndicated via their PaaS[31] solution. "You can't just build a solution that works for a single platform," say Ajay Shah, co-Founder and CEO of TVplus. "If you're gonna achieve the scale that you need in order for this industry to realize its potential, you're gonna have to be everywhere."[32]

Another view of second screen stems from the TV Everywhere initiative where broadcast networks, cable and pay television networks are rolling out mobile apps for specific programs and aggregation apps for multiple content. The FOX networks app is intended for viewing FOX programming on second screen whereas the *American Idol* app enables more interactivity (e.g., voting, contestant profiles, etc.).

"Consumers haven't figured out that any of this stuff exists in any meaningful numbers," says Hardy Tankersley, VP Digital Platforms for FOX Broadcasting. "Our biggest problem is just marketing to the viewers what the second screen is. You can't explain it in a ten second bumper."[33]

Until a proven, significant number of viewers is using second screen in a meaningful way, the budgets for second screen content on television programming will remain low and the task of creating the content will come later in the development and production cycle. When participation numbers reach a tipping point of interest, the creative community will naturally want to control the experience more, and the budgets should be there to allow that.

[30] NATPE presentation 2013
[31] PasS - Platform as a Service
[32] NATPE presentation 2013
[33] NATPE presentation 2013

The Final Word

Every industry touched by digital technology and the Internet has been permanently transformed and the entertainment industry is demonstrably subject to this fact.

Since the release of *The Technology Disruption Conundrum* in 2006, VJA has promoted a belief that disruptions to the entertainment industry's business model stemming from technology advancements are no longer cyclical or temporary but constant. This is partly because the technologies that enabled Hollywood professionals to produce and distribute content are within reach of practically everyone on the planet. The tools that once separated the pro from non-pro have evolved to a level of astounding technical wizardry at very affordable prices. Many of the same companies that brought you the tools to create content are enabling the tools to distribute and consume content.

Consumers are more mobile than ever before and choose to create and connect to content in a manner that is fluid rather than static. Content can come from anywhere and be enjoyed everywhere on many devices at nearly any time. Big budgets guarantee nothing and the next big thing may spring from no budget whatsoever.

Since *Content is King*, Hollywood must continually remind itself that telling good stories is what really matters. Equipment, methods, and the workforce will continually evolve and we must manage these things as prudently as possible. As a business that relies entirely on creative storytelling, however, let's just remember that no spreadsheet formula can replace talent or predict the outcome of inspiration or vision.

We set out to examine how technology has altered television production, postproduction, distribution, consumption, and labor. We intended to give the reader a broad overview of the television industry and provide some context for the career-minded reader to consider. If the paper has challenged the reader to become better acquainted with the environmental forces that are shaping their careers so they may judiciously prepare for more amazing things to come, then we've succeeded with our objective.

About the Author

Von Johnson is a C-level executive with experience in distribution, technical services and project management at Universal Television Distribution, The Walt Disney Studios, Disney Channel, Walt Disney Imagineering, Turner Entertainment Co. and DIVA Systems (a video-on-demand technology pioneer in Menlo Park, CA). Mr. Johnson is co-founder of White Ash Broadcasting, Inc., licensee for central California's NPR affiliate, KVPR-FM, Valley Public Radio.

Johnson is co-inventor of "Method and apparatus for transmission of full frequency digital audio" (U.S. patent 5,544,228) and served on the Board of Governors for the Society of Motion Picture and Television Engineers (SMPTE). Mr. Johnson is a southern California native and holds a Bachelor Degree in Mass Communications from California State University, Fresno and an MBA from Woodbury University in Burbank, California. Mr. Johnson is an adjunct instructor at UCLA Extension and Woodbury University.

Since 2003, **Von Johnson & Associates, Inc. (VJA)** has assisted multinational and local companies with media asset valuations, postproduction and distribution management and marketing strategies for entertainment technology solutions. Clientele include Michael Eisner's Tornante Animation, NBC-Universal, Warner Bros., Dreamworks SKG, MGM, Lionsgate, Vuguru, Astro Entertainment, Technicolor, AMPAS, Scheper Kim and Harris LLP, FM Global, World Content Pole SA, MCFTech, Dreamer Corporation, T-Mobile, SDI Media, AT&T and Media Broadcast GmbH.