ADVERTISING OVERVIEW

Issues, Challenges and Opportunities

Susan Athey

Agenda

1. **The Role of Advertising**
2. The Evolution of Advertising Channels
3. Evolving Monetization for Publishers
4. Measurement and Attribution
5. Competition Issues

The Economic and Societal Benefits of Advertising

For Advertisers

- Introduce new products
- Help retailers merchandize products and draw consumers to stores

For Consumers of End-Products

- Information facilitates competition
- Low prices enabled when firms achieve scale economies through increased demand

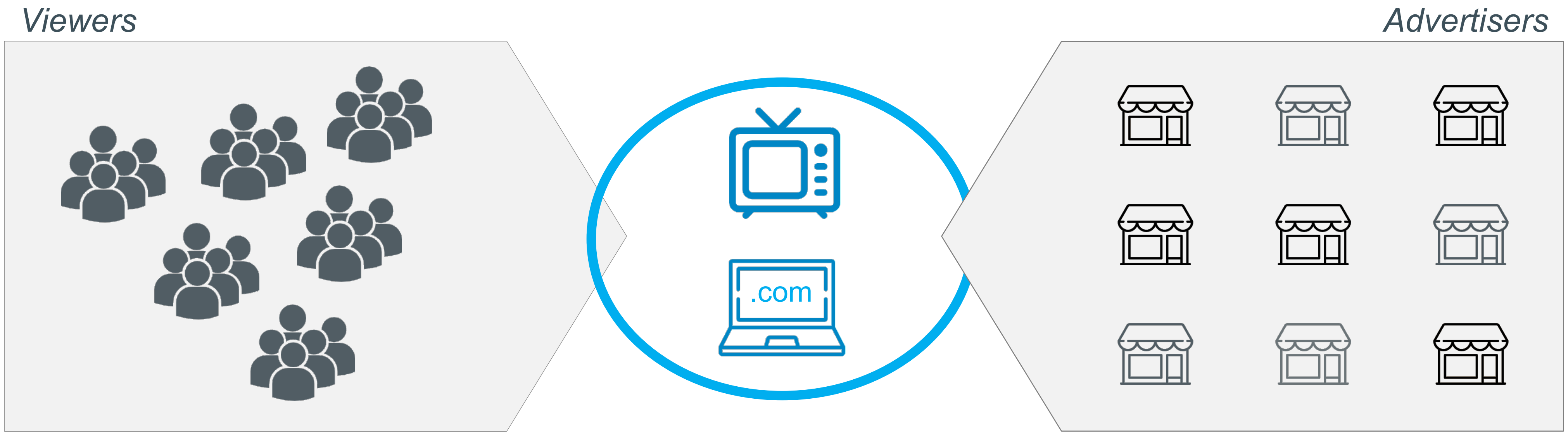
For Content Producers

- Revenue from advertisers
- Content is more widely available in ad-supported models, versus subscription or other pay models

For Consumers of Content

- Free music radio; free TV programming and movie subsidies
- Subsidized news
- Internet Content:
  - Google, Facebook, Yahoo!
  - Free video; Free educational content; Free news and financial information
  - Free product search (cars, financials)
  - Free apps

Advertising Platforms: Traditional View of Two-Sided Market Matching Viewers and Advertisers



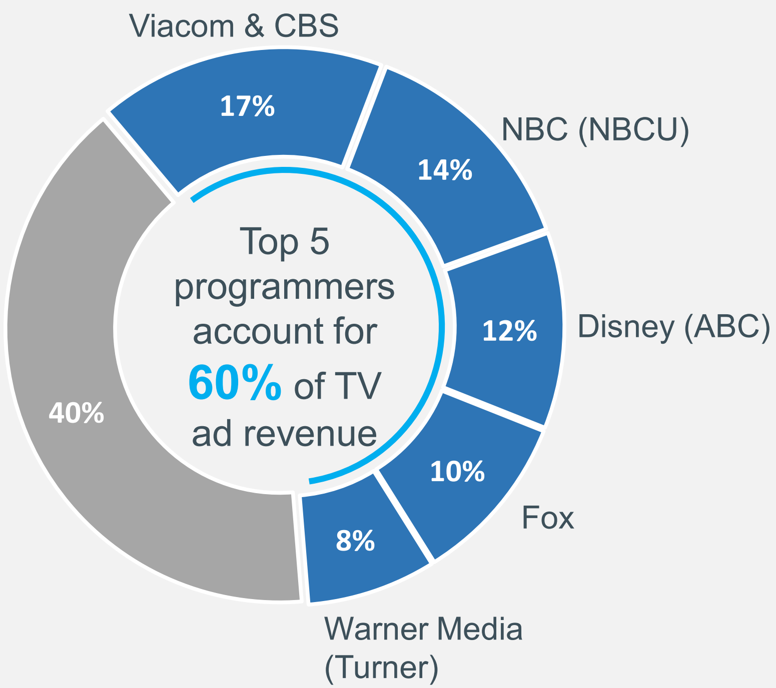
- Choose content based on quality, ad load

- Content producers serve as two-sided platform
- Compete for consumers, sell access to advertisers
- Concerns about market power, e.g. of local newspapers

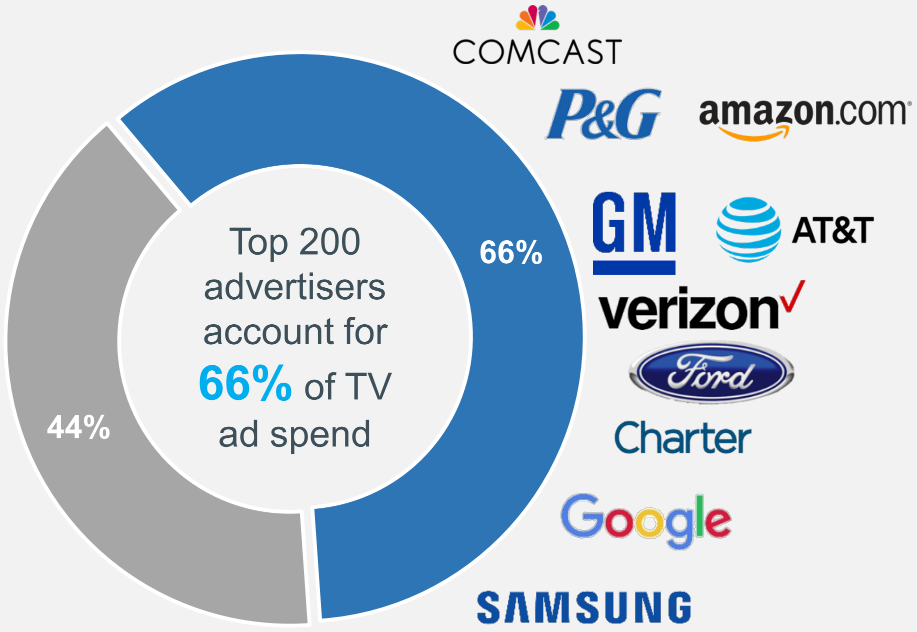
- Understand audience of content producers
- Aggregate across content to maximize reach and minimize duplication

Buyers and sellers of TV advertising are relatively concentrated

Concentration of TV advertising sellers*



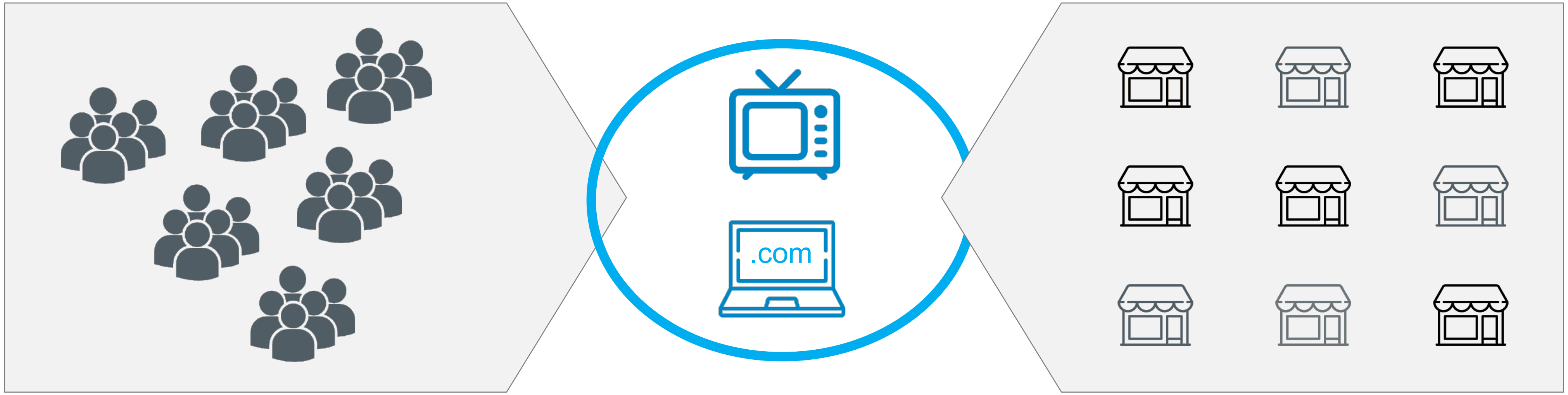
Concentration of TV advertising buyers**



Sources: Statista, AdAge "200 Leading National Advertisers 2018 Fact Pack"
* 2015 data.
** 2018 data.

Advertising Platforms: Impact of Digital

Viewers *Advertisers*



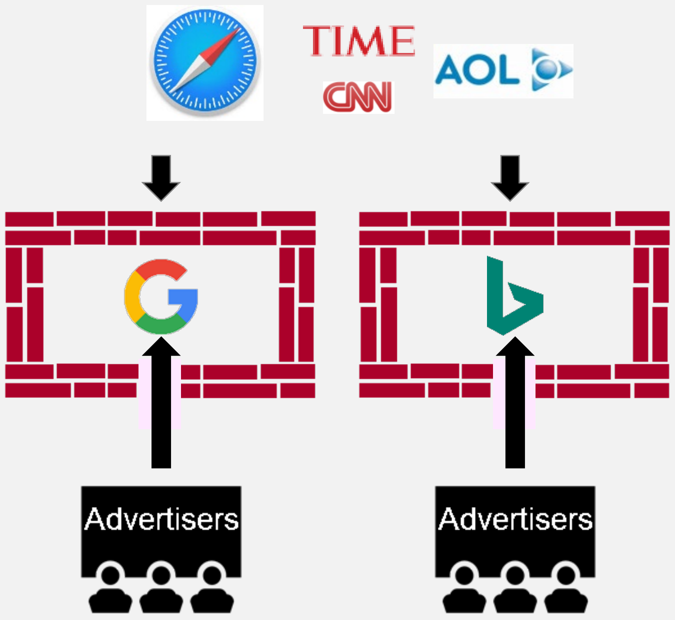
- Upper bound on time
  - Mobile increases addressable time
- Internet increased switching
- Digital video, cord cutting

- **Web:** search and display ad platforms; fragmented publishers
- **Mobile:** expand existing platforms, new location-based or ads-in-app platforms
- **Digital video**: expand existing platforms, new platforms, ad-free services

- Measuring ROI
  - Effectiveness
  - Duplication
  - Attribution
  - Fraud
  - Safety
- Tracking consumers across platforms and media
- Reaching all consumers

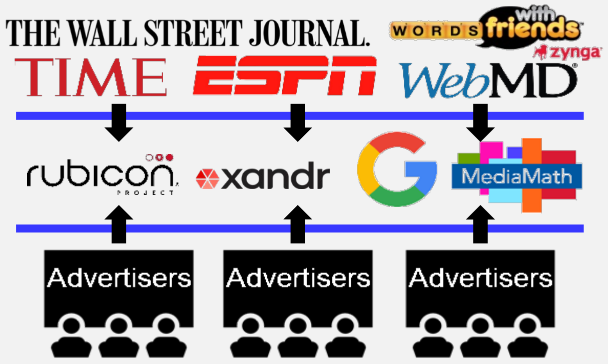
Digital Advertising: Intermediation Important due to Fragmentation

Search Advertising



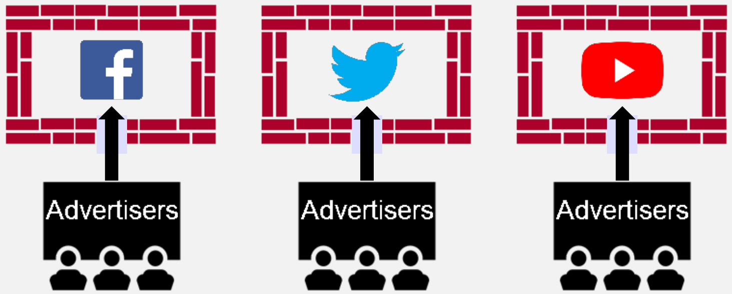
Search includes first-party advertising as well as intermediated search advertising (publishers) and distribution (e.g. browsers)

Intermediated Display Advertising



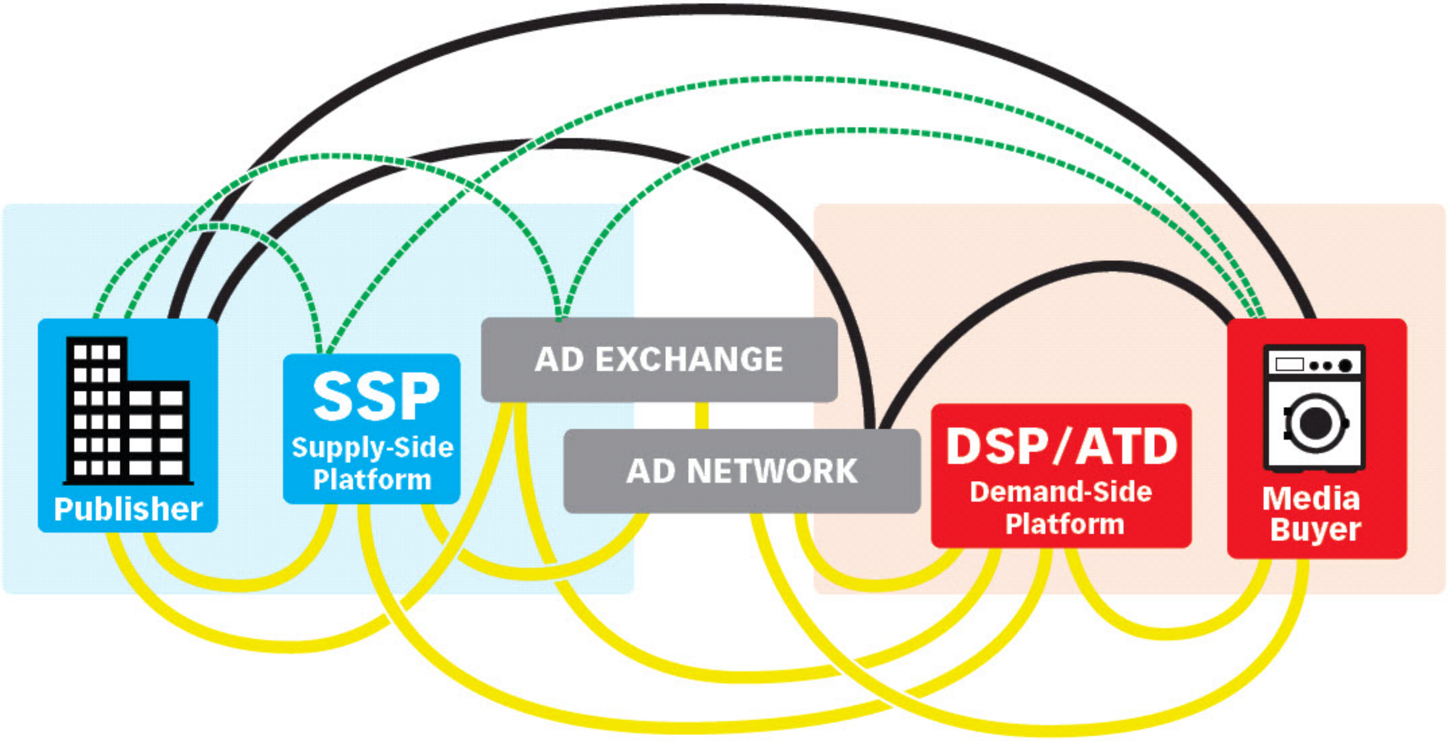
First-Party Display Advertising

(AKA walled gardens)



Complexity within Display Advertising

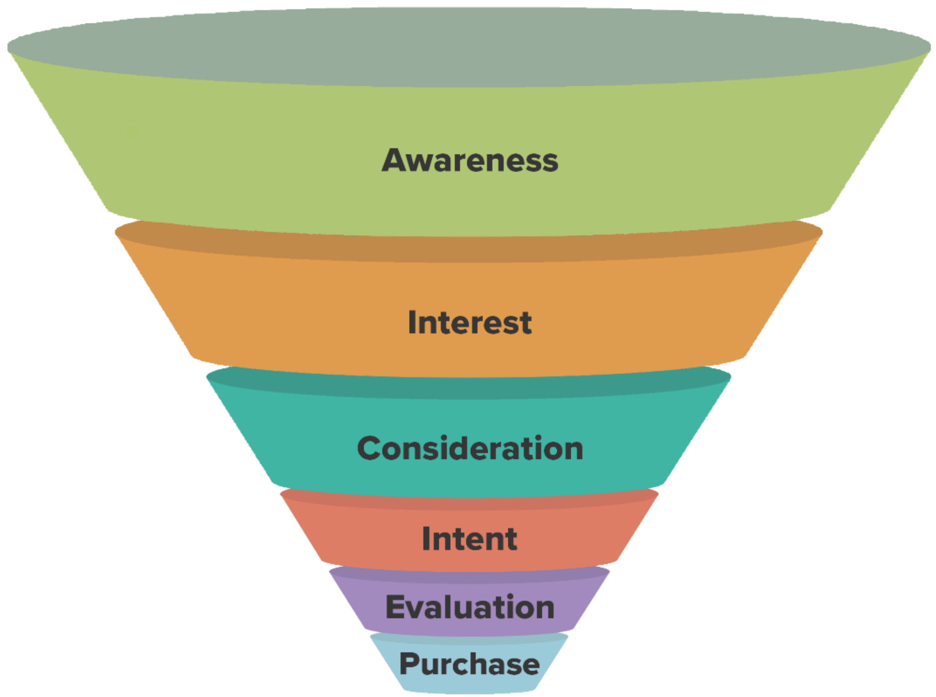
Large Variety of Different Purchase Paths

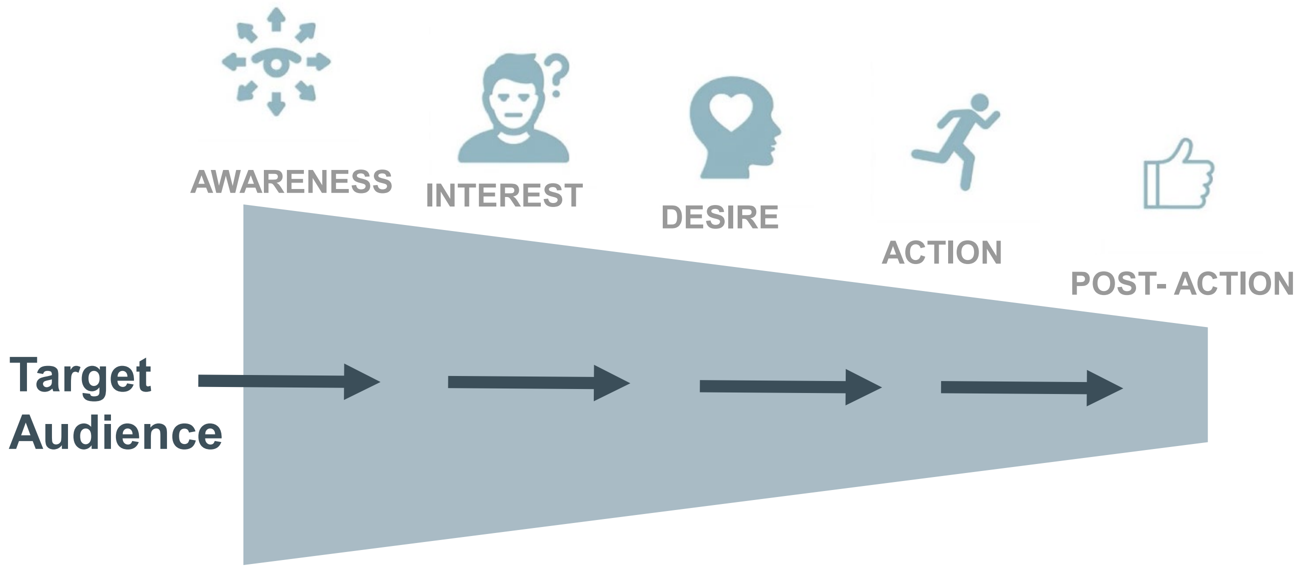


Source: eMarketer

Why do companies advertise?

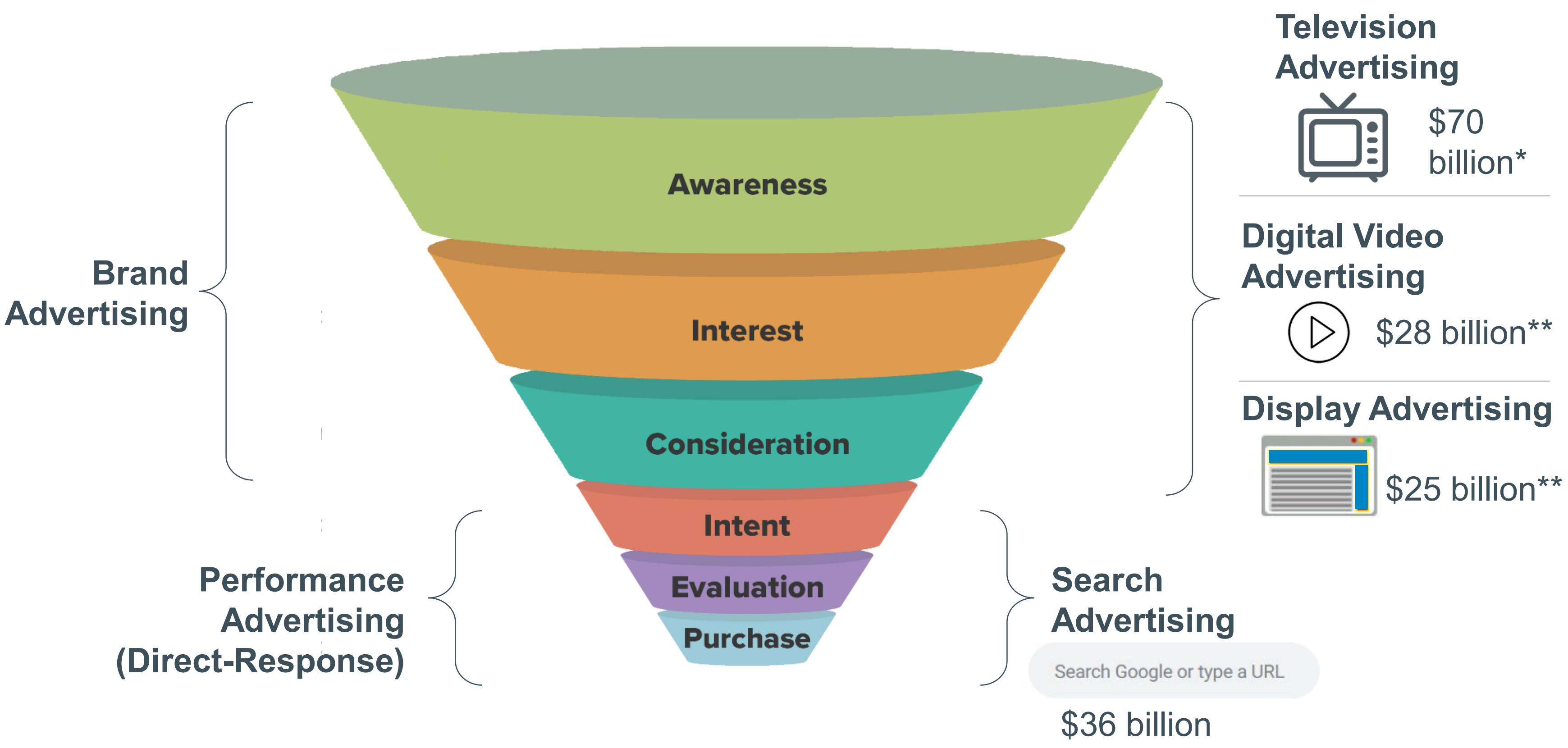
The Marketing Funnel	The Consumer Journey





The Funnel and Advertising Channels

The Marketing Funnel



- In the traditional view, display (and TV) advertising is typically top-funnel brand advertising used to generate awareness
  - For catching attention of a very large number of consumers, TV is still king
- Search advertising is typically direct-response advertising which falls towards the end of the funnel
- Some challenges and changes in the view
  - Nonlinear journey
  - Tracking consumers throughout

Source: eMarketer, 2016. **Advertising spend is U.S. only.**
* Includes Broadcast (national, syndication, and spot) and cable TV.
** Digital video includes advertising that appears on desktop and laptop computers as well as mobile phones, tablets and other internet-connected devices;
*** Banner advertising only, social media excluded.

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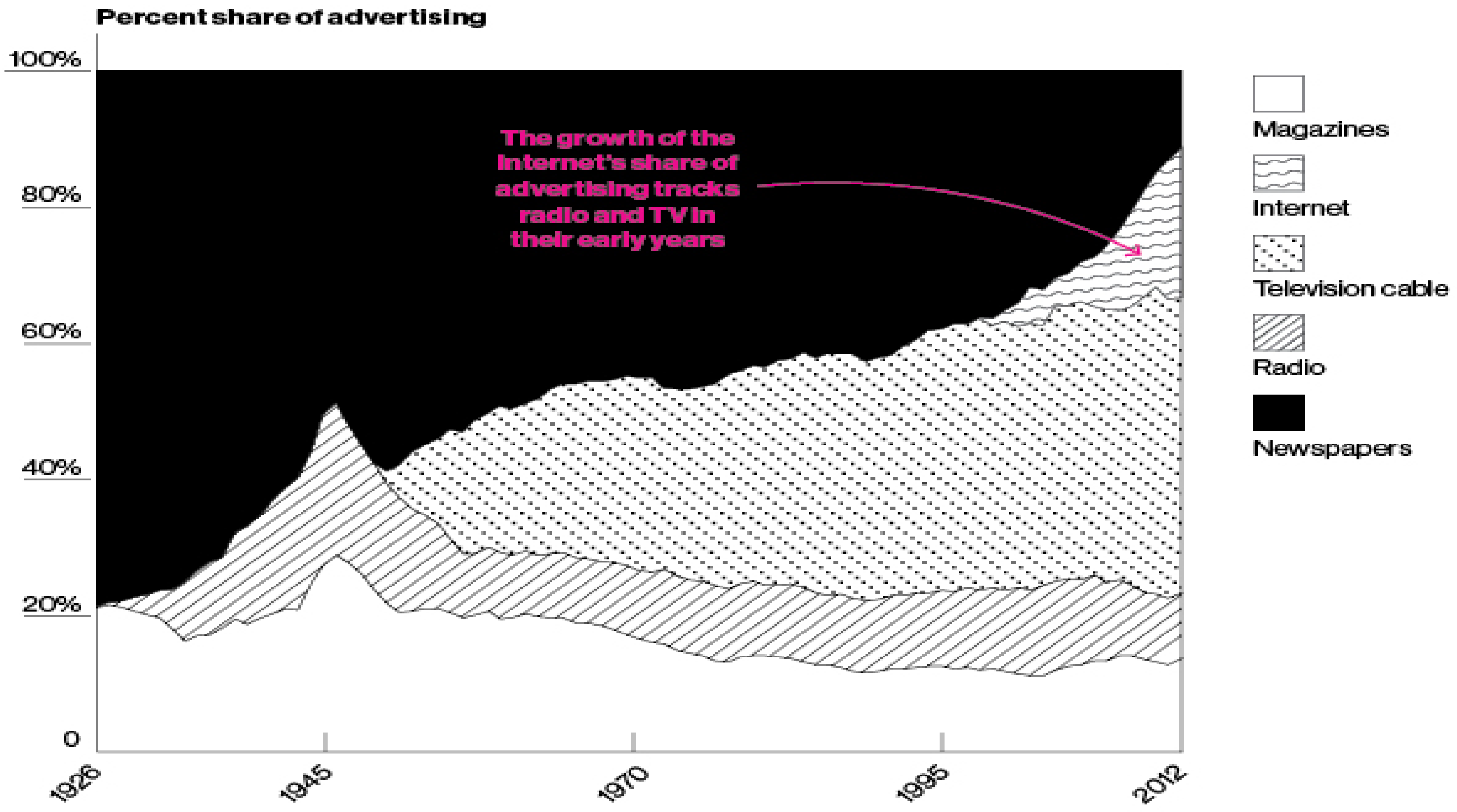
A History of Entry by New Media

The Flow of Ad Dollars Over Time

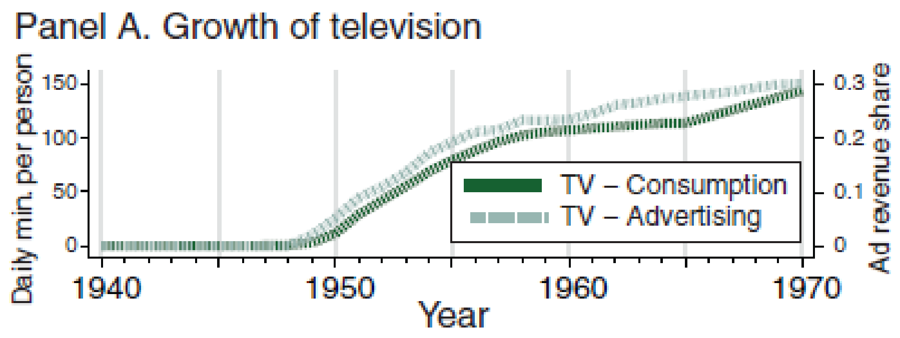


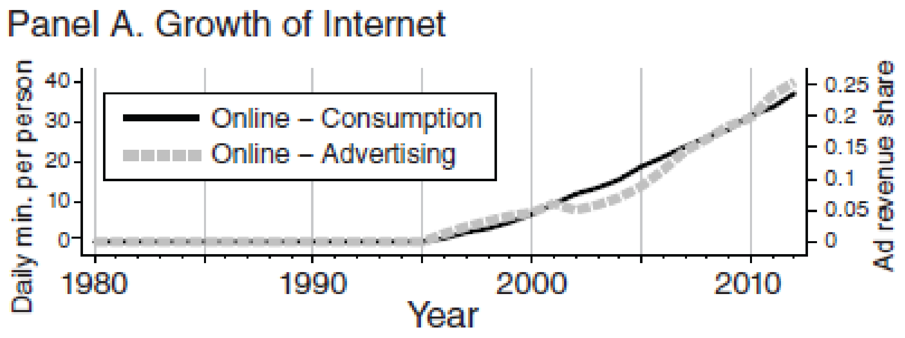
- Print and magazines have reigned supreme up until the eighties
- TV is the biggest piece of revenue in the ad market through 2012
- Radio has been surprisingly stable for a long time
- Despite its fast growth, the Internet trailed TV in its early growth
- New media captures consumer attention; but advertising within the various media channels are not necessarily substitutes

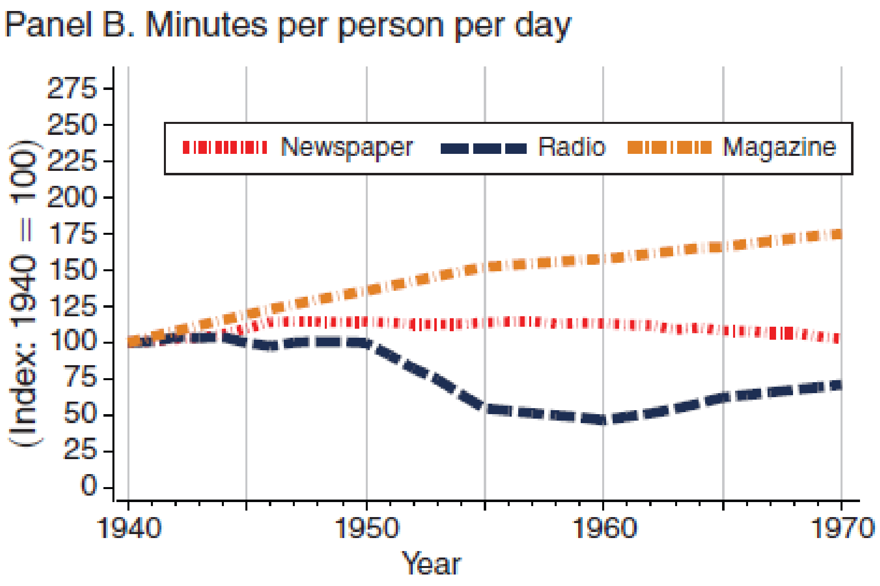
Graphic by Bloomberg Businessweek; Data: DBS Research

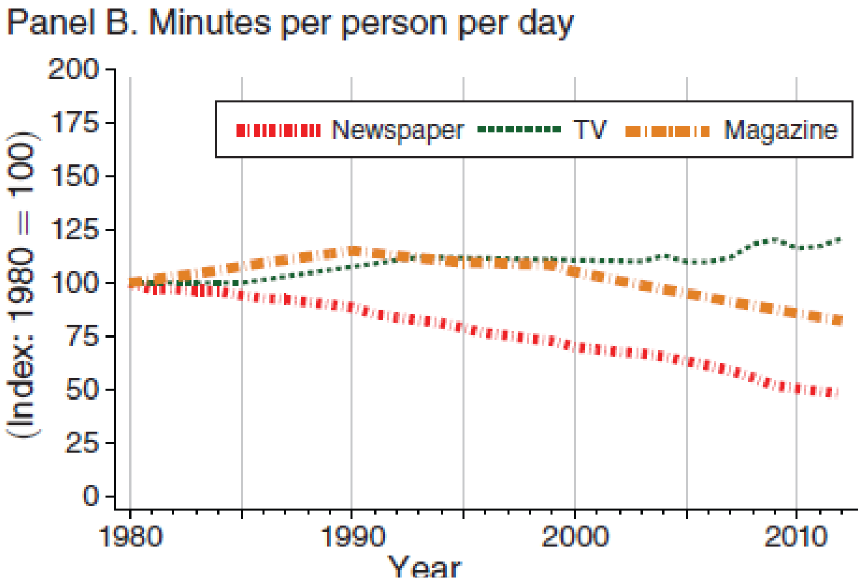
Entry of TV v. Internet

Entry of TV (1940-1970)	Internet Entry (1980-2012)







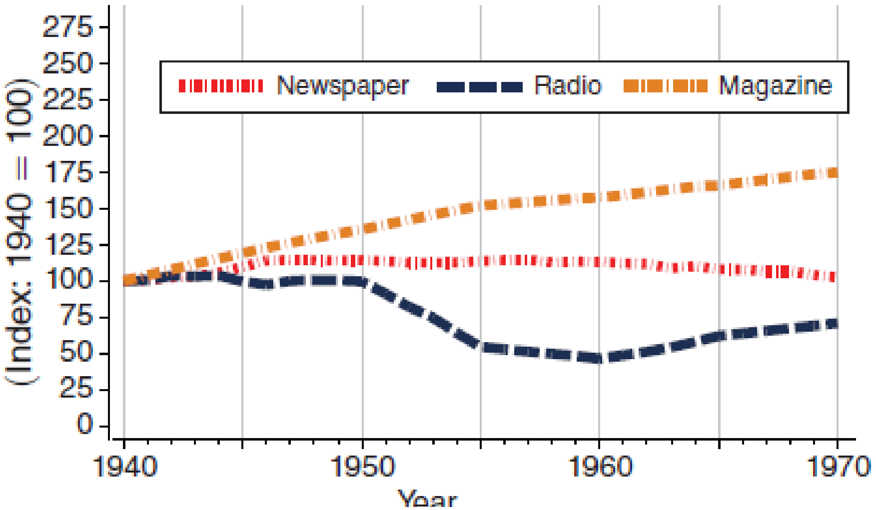


Source: Gentzkow (2014)

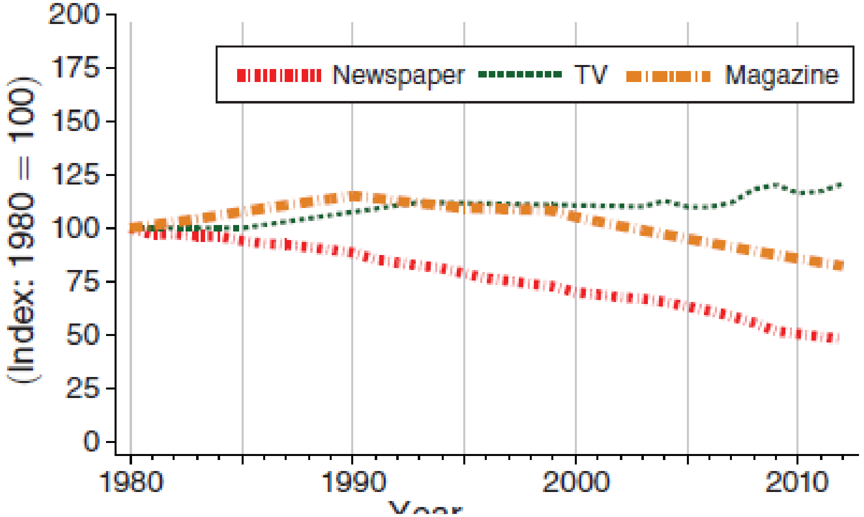
Entry of TV v. Internet

Entry of TV (1940-1970)	Internet Entry (1980-2012)

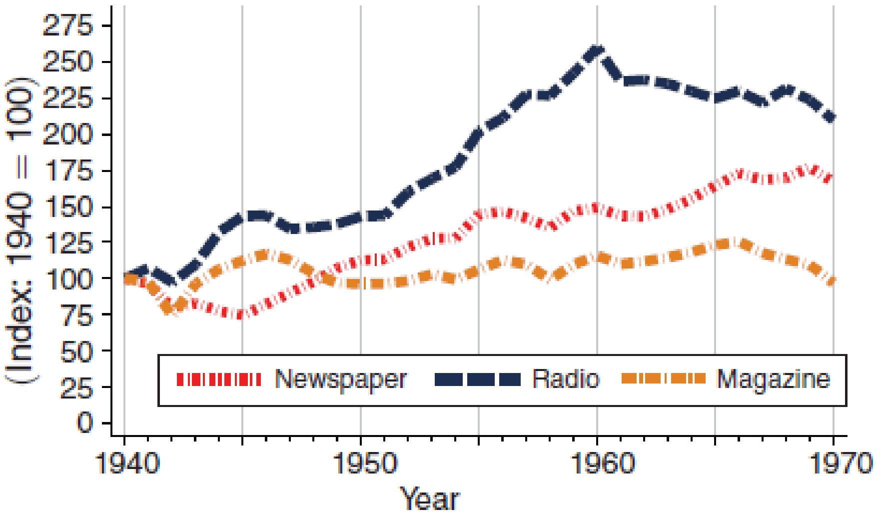
Panel B. Minutes per person per day



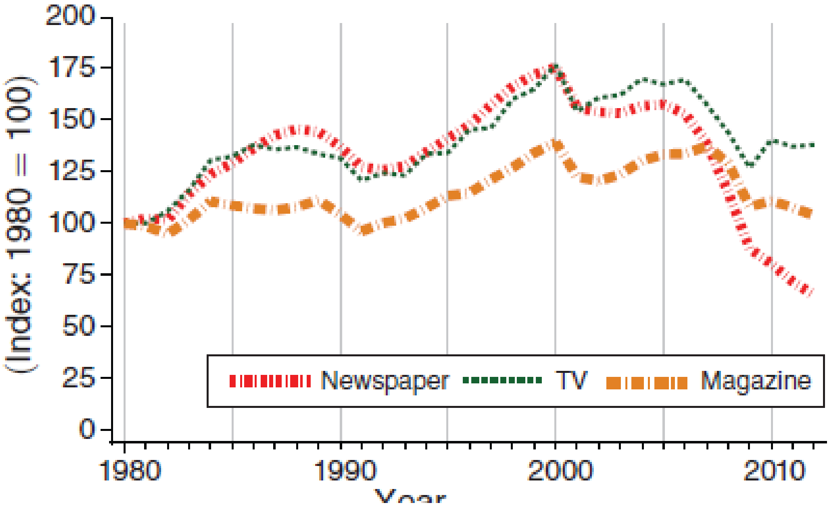
Panel B. Minutes per person per day



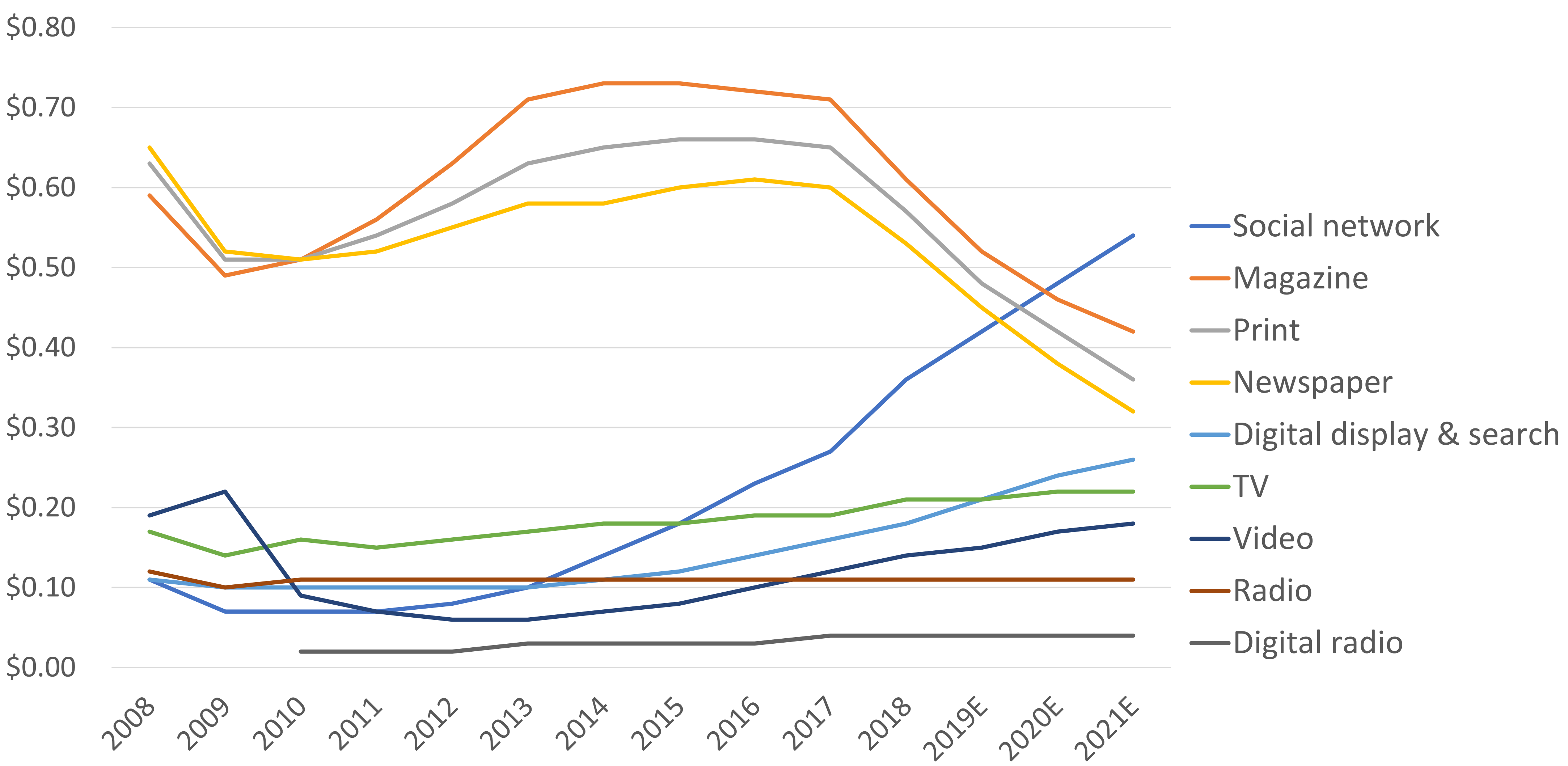
Panel C. Ad revenue per hour



Panel C. Ad revenue per hour



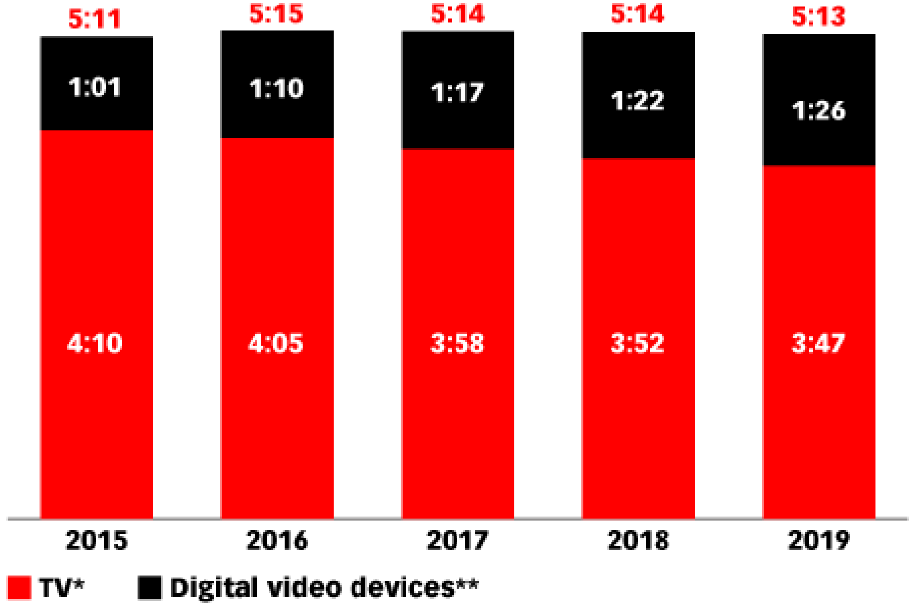
Advertising Revenue per Hour by Media in Recent Years



Source: eMarketer

Video and TV consumption is shifting devices and changing venues

Avg. Time Spent per Day with Video by US Adults, By Device



*Note: ages 18+; time spent with each medium includes all time spent with that medium, regardless of multitasking; for example, 1 hour of multitasking with digital video while watching TV is counted as 1 hour for TV and 1 hour for digital video; numbers may not add up to total due to rounding; *excludes digital; **includes time spent watching digital video via game console, connected TV or over-the-top (OTT) device, as well as via desktop/laptop or mobile device; excludes time spent with video via social networks*

US Adult Pay TV and Non-Pay TV Views, by Type

US Adult Pay TV and Non-Pay TV Viewers, by Type, 2016-2021

millions and % change

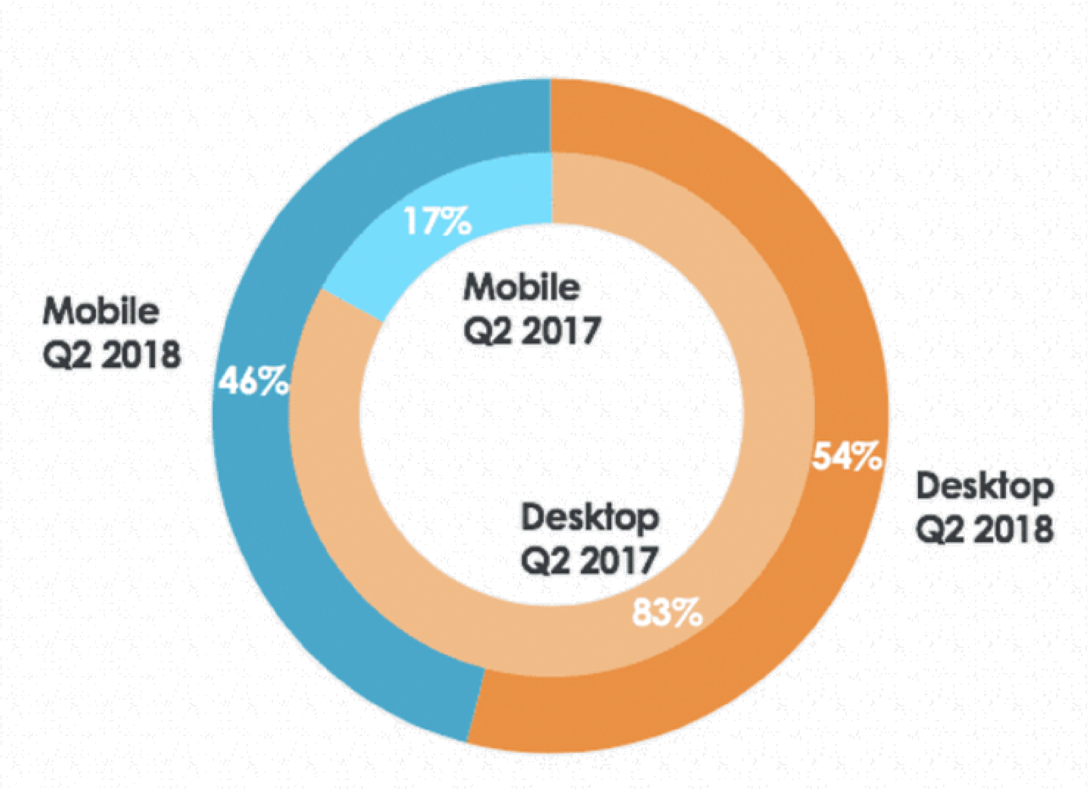
	2016	2017	2018	2019	2020	2021
Pay TV viewers	**201.1**	**196.3**	**192.0**	**188.3**	**184.7**	**181.7**
Pay TV viewer growth	**-1.6%**	**-2.4%**	**-2.1%**	**-2.0%**	**-1.9%**	**-1.6%**
Non-pay TV viewers	**49.2**	**56.6**	**63.4**	**69.7**	**75.7**	**81.0**
—Cord-nevers	32.5	34.4	36.3	38.0	39.6	41.0
—Cord-cutters	16.7	22.2	27.1	31.7	36.1	40.1
Non-pay TV viewer growth	**13.7%**	**15.1%**	**12.1%**	**9.9%**	**8.5%**	**7.1%**
—Cord-nevers	6.7%	5.8%	5.6%	4.7%	4.2%	3.6%
—Cord-cutters	30.2%	33.2%	22.0%	17.0%	13.7%	11.0%

Note: ages 18+; pay TV viewers are individuals who have access to traditional pay TV services; excludes IPTV and pure-play online video services (e.g., Hulu, Netflix, YouTube, Sling TV, etc.); non-pay TV viewers are individuals who no longer have access to traditional pay TV services or have never had access to traditional pay TV services

Source: eMarketer, 2017.

Digital Video Shifting to Mobile

Digital Video Ad Spend, By Platform



- The desktop-to-mobile shift has occurred rapidly
- Different characteristics of mobile video vs. desktop; shorter attention span, sound and captioning, etc.

Source: PubMatic

Streaming services are proliferating, creating demand for SVOD bundles

Streaming Services

SVOD*

Ad Supported*

As streaming services and content fragment, demand for **bundles** arises, for example, Prime Video Channels:

Get more with Prime Video Channels
Prime members can subscribe to 100+ premium channels like HBO, SHOWTIME, STARZ, CBS All Access, and Cinemax. Only pay for the channels you want and cancel anytime—no cable required.

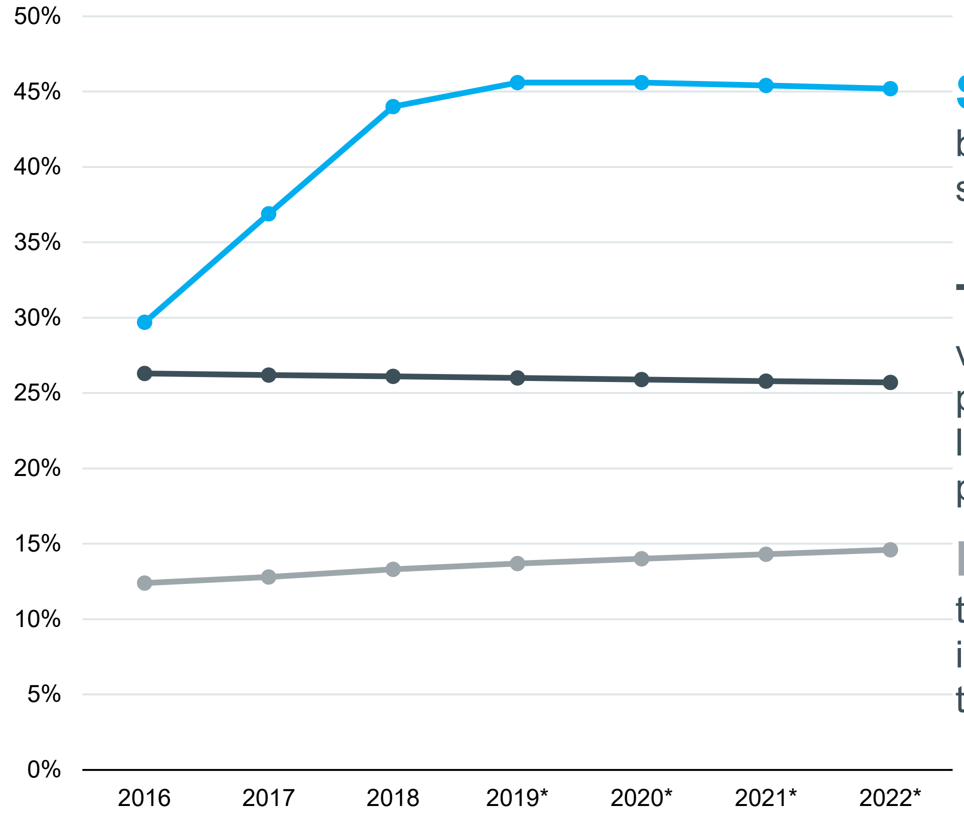
BARRON'S
Market for Streaming Starts to Look a Little Like Cable
By Jack Hough Dec. 28, 2018 7:32 p.m. ET

THE VERGE
Netflix, Amazon Video, and Xfinity are accidentally re-creating cable TV
As Xfinity's distribution deals expand, disruptors are taking up the same models as past cable companies
By Graeme Mcmillan | Aug 13, 2018, 11:14am EDT

Source: IAB Video Landscape Report (2018), *Barron's*, *The Verge*.
* Some services, e.g., Hulu and CBS All Access, are hybrid.

SVOD has undergone rapid penetration growth, but appears to be plateauing

Digital Video User Penetration in the US, by Type



SVOD, subscription-based video on demand services (e.g., Netflix)

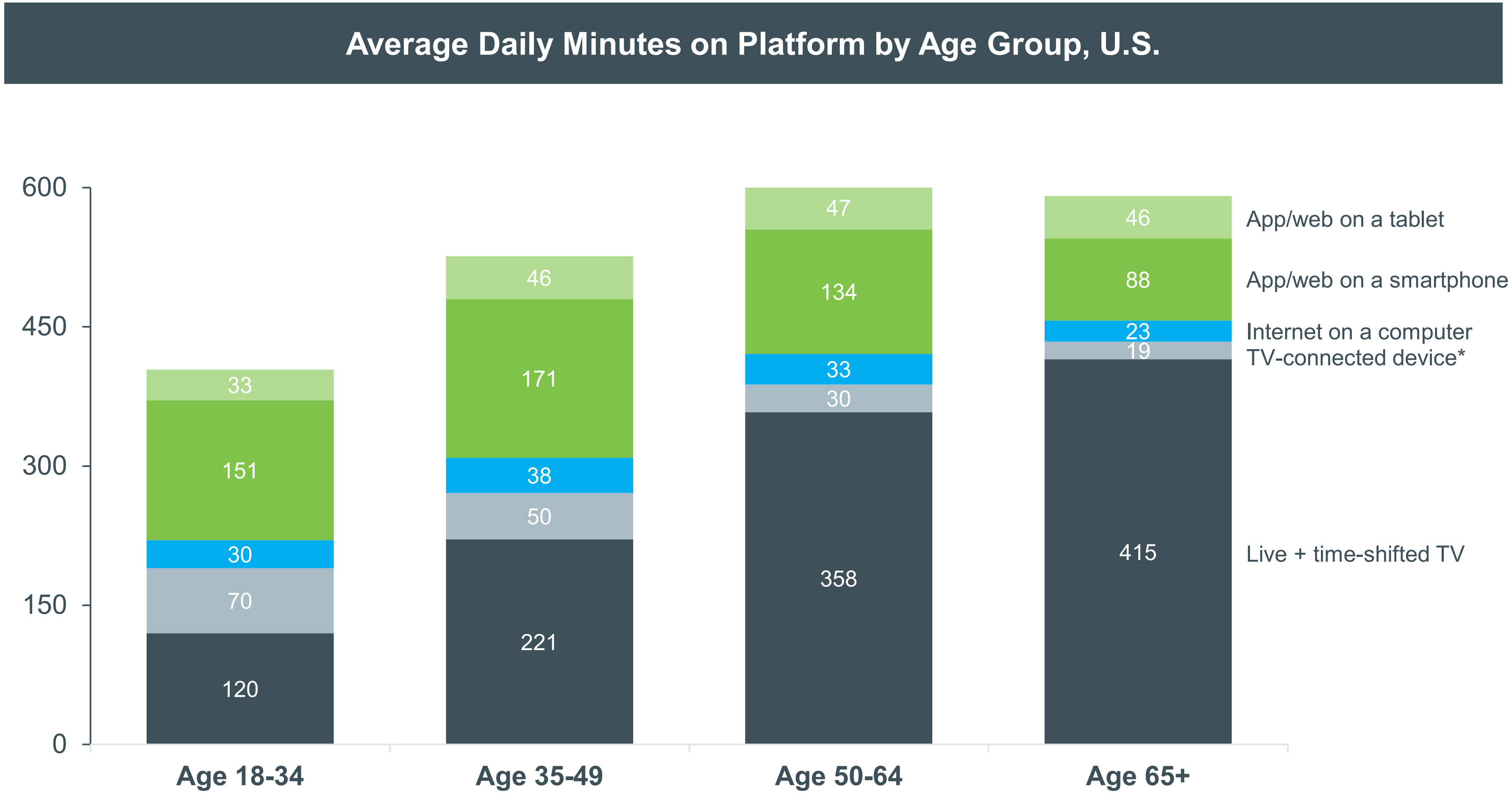
TVOD, transaction-based video on demand services or pay-per-view offers (time-limited digital access to premium video content)

EST, electronic sell-through (video content that is purchased in a one-time transaction)

- SVOD appears to be reaching saturation, predicted to plateau
- TVOD and EST penetration hold steady
- Ad-free content reduces supply of user attention for advertising

Source: Statista, 2018.

Millennials and Gen Xers shifting away from TV; Digital is reaching valuable younger users



TV-connected device includes: DVD / Blu-ray, Game Consoles, Internet connected device

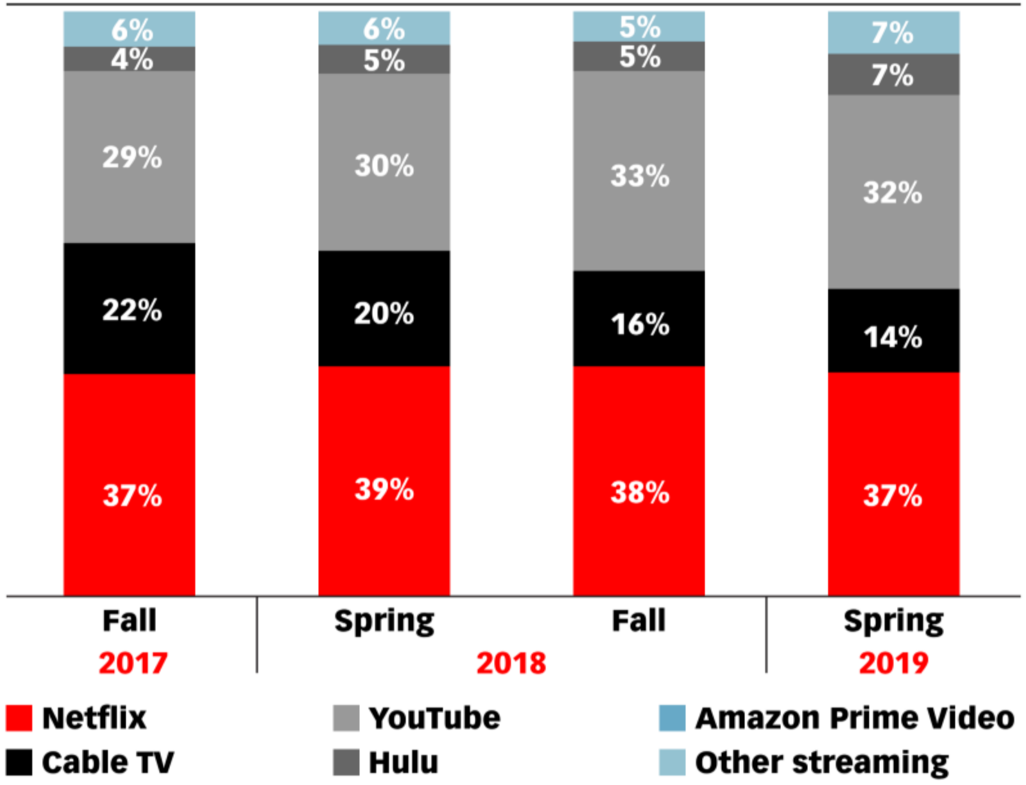
- Millennials spend more time consuming digital media than live TV
  - Their digital media consumption is predominantly mobile
- It should be noted, however, that younger viewers are watching more TV via TV-connected services and time-shifted via DVR and video-on demand (see next slide for details)

Source: Nielsen, Q2 2018

A new challenge for video advertisers: the Unreachables

- 47% of Millennials and Gen-Xers
- Mobile-first or Mobile-only
- 43% watch streaming only (cord-cutters and cord-nevers)
- $1.3T annual buying power in US
- Most streaming video (e.g., Netflix) has no advertising

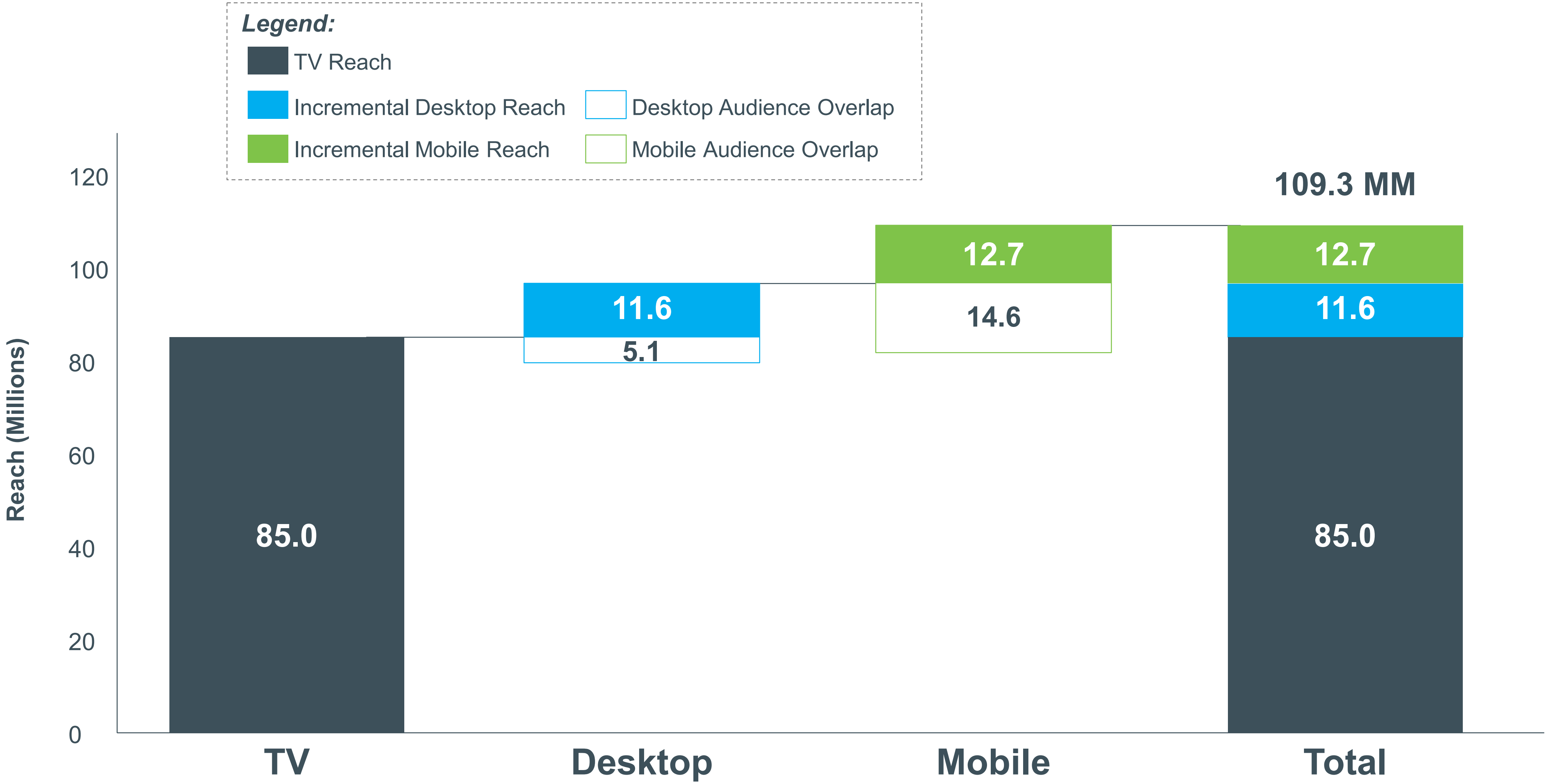
Share of Daily Time Spent Viewing Video Content Among US Teens, by Platform, Fall 2017-Spring 2019
% of respondents



Note: teens with an average age of 16; numbers may not add up to 100% due to rounding
Source: Piper Jaffray, "Taking Stock with Teens: Spring 2019," April 8, 2019

Sources: Heart and Science.- Wharton Future of Advertising, Sep 2017;
Piper Jaffray / eMarketer.

Overlapping and Incremental Audiences



Source: comScore, 2016

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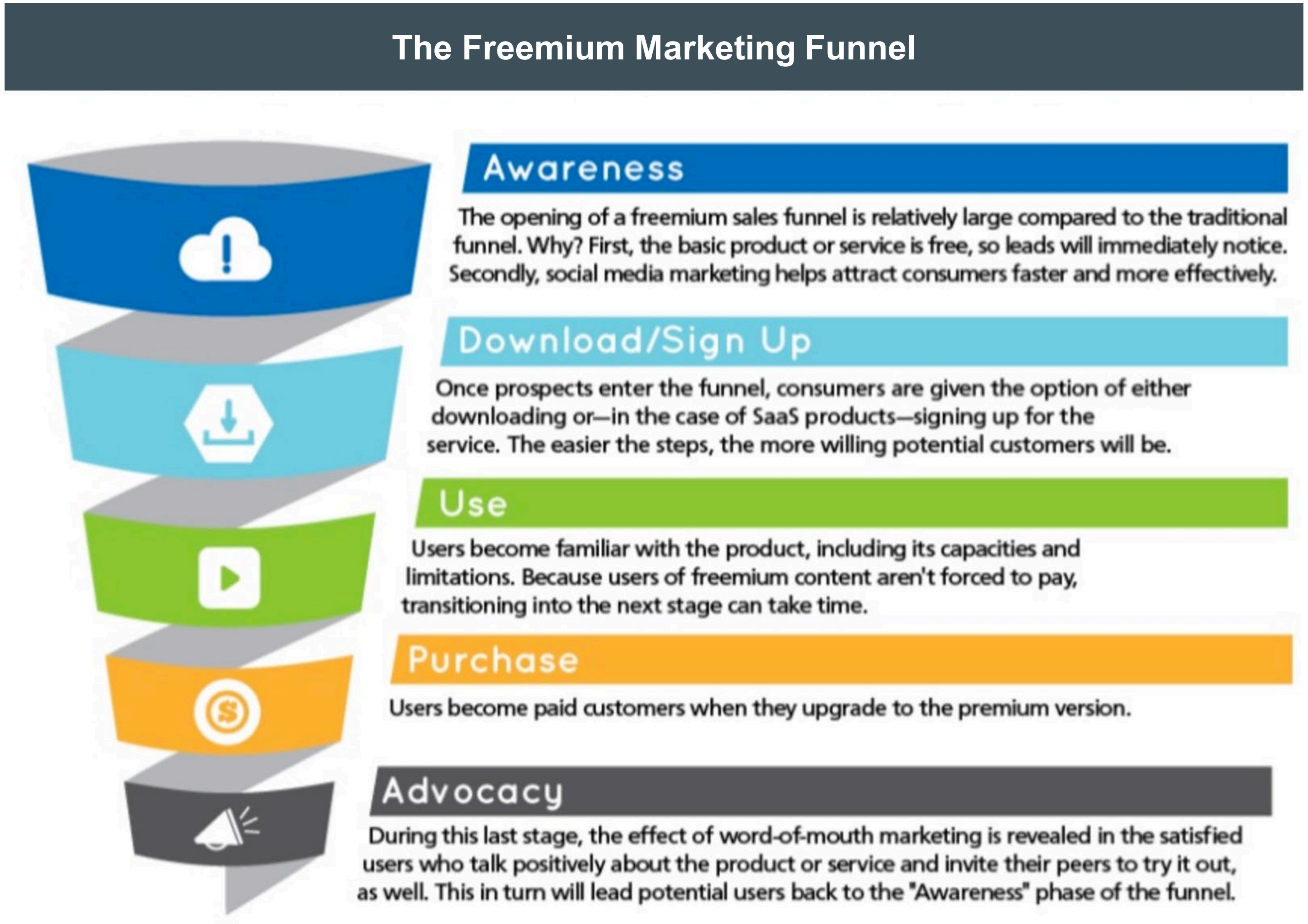
Freemium Monetization: Ad-Supported to Subscription



Thriving freemium businesses

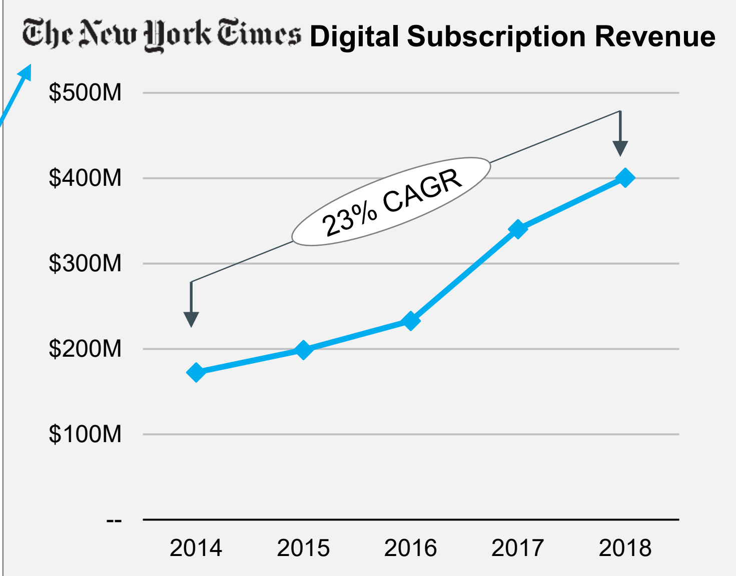
… and thousands of medium and small size apps with in-app purchases

Freemium Model Norms

Subscription Type	User Share	Revenue Share	Monetization Mode
Free	95%-98%	20% - 50%	Advertising, Source of paid leads
Paid	2% - 5%	50% - 80%	Subscription

Subscription services are growing rapidly across many verticals

Online Subscription Services Representative Companies		Subscribers 2017	Growth Y/Y
Netflix	Video	118MM	+25%
Amazon	Commerce / Media	100MM	--
Spotify	Music / Audio	71MM	+48%
Sony PlayStation Plus	Gaming	34MM	+30%
Dropbox	File Storage	11MM	+25%
The New York Times	News / Media	3MM	+43%
Stitch Fix	Fashion / Clothing	3MM	+31%
LegalZoom	Legal Services	550K	+16%
Peloton	Fitness	172K	+173%



"We expect news provides to focus increasingly on generating revenue from subscriptions […] Whereas certain titles had a 10:90 ratio of subscription to ad revenue in 2012, we predict it may be 50:50 by 2020."

Deloitte.

Source: Mary Meeker Internet Trends Report 2018, New York Times public financials, Deloitte Technology, Media and Telecommunications Predictions 2018 Report.

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Overview of challenges to measurement and attribution

- **Advertising effectiveness measurement is really, really hard**
  - Signal-to-noise ratio implies huge experiments needed to learn (e.g. Lewis and Rao)
  - Non-random assignment of advertisements; observational studies biased even using best-practice methods
  - Randomized tests increasingly prevalent but face challenges in implementation
  - Measurement of outcomes, tracking of users

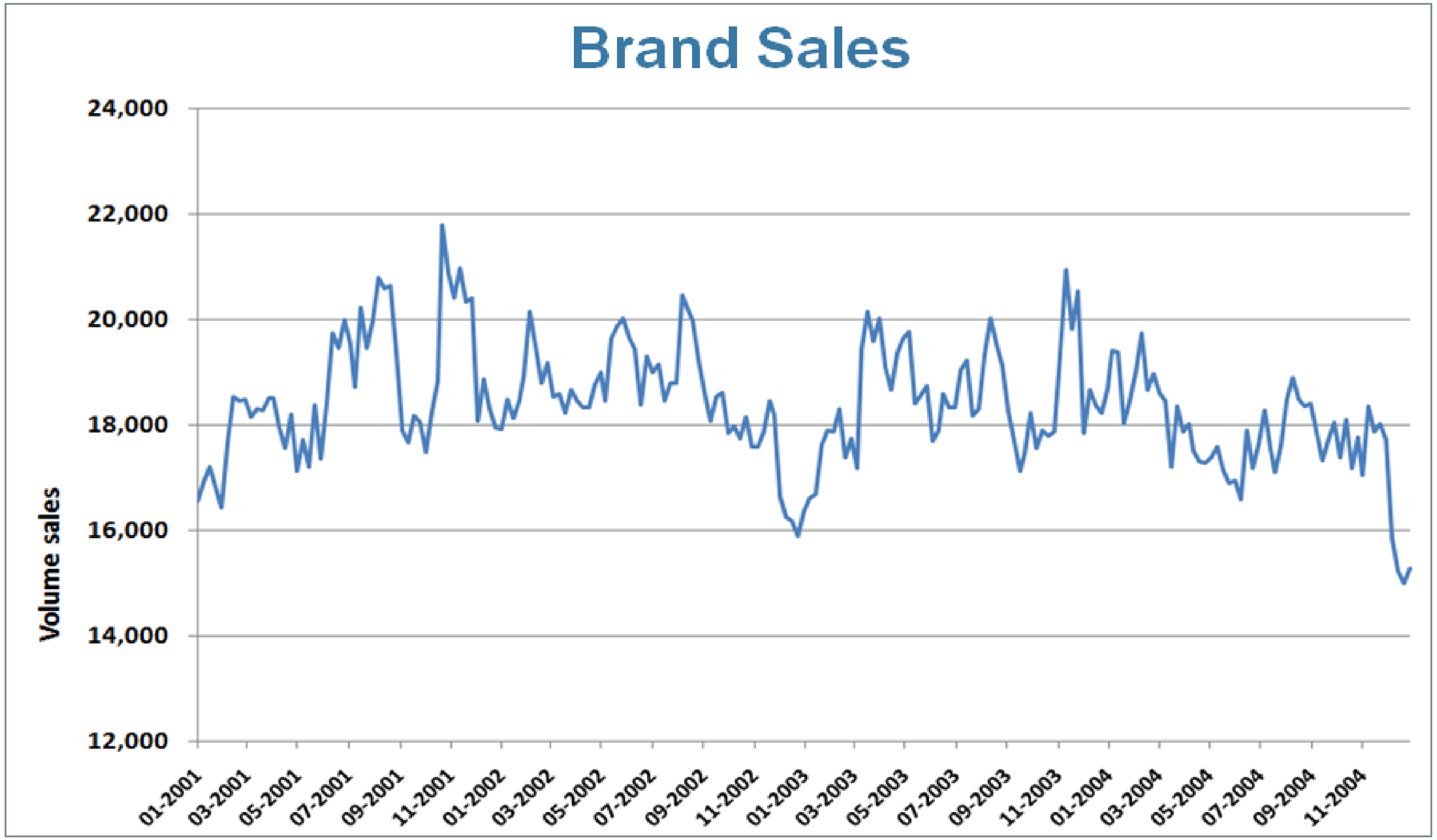
- In digital work, **simpler methods typically overstate ad effectiveness**

- **Perverse incentives**
  - Third party firms and in-house buyers have shared incentive to show high ROI to top management
  - Unsophisticated and poorly incentivized in-house buyers do not pressure 3rd parties, publishers to improve things

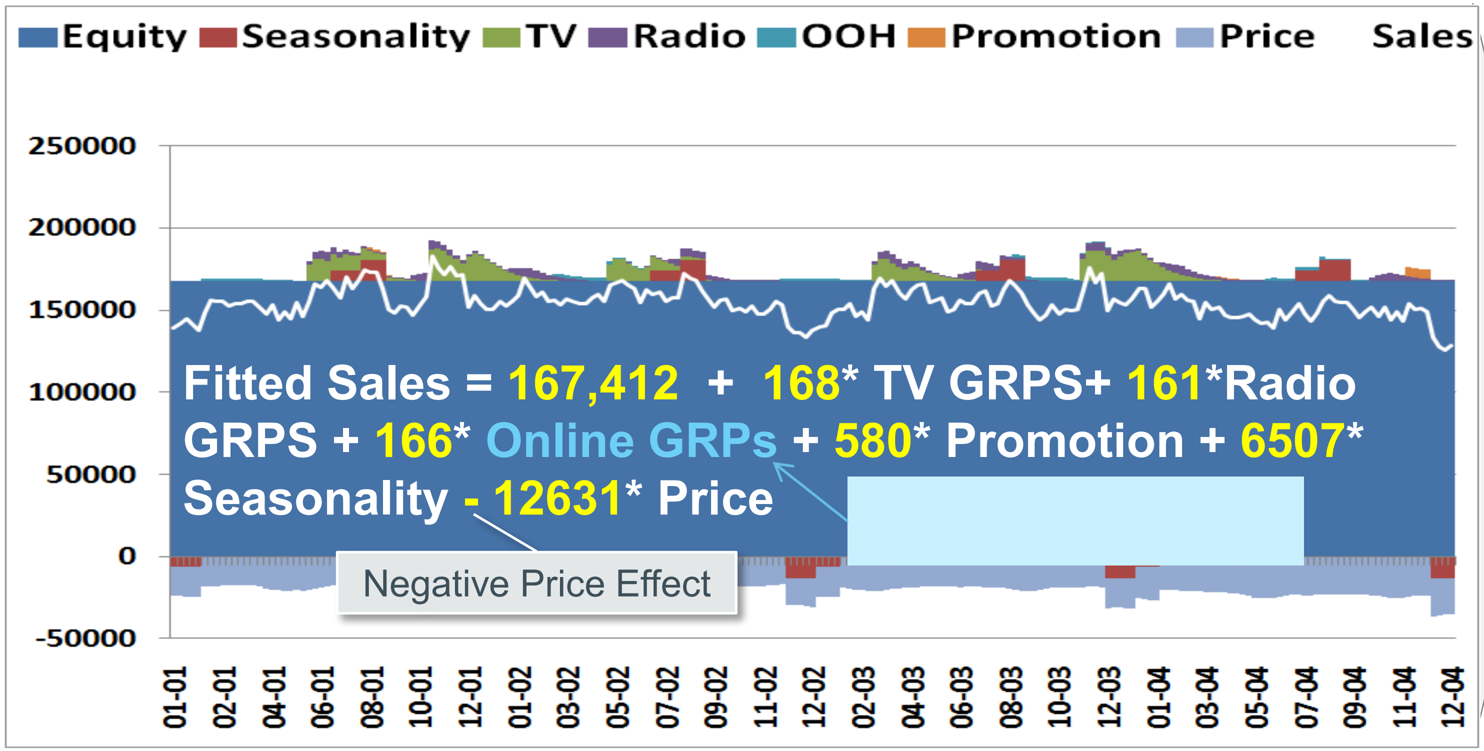
Marketing mix models (MMM):
Evaluate the impact of marketing mix on sales

Explanatory Variables

- **Company Controlled**
  - TV
  - Radio
  - Online
  - Sales Promotion
  - Price
- **External**
  - Seasonality
  - Competition



MMM: Estimating contribution to sales and results



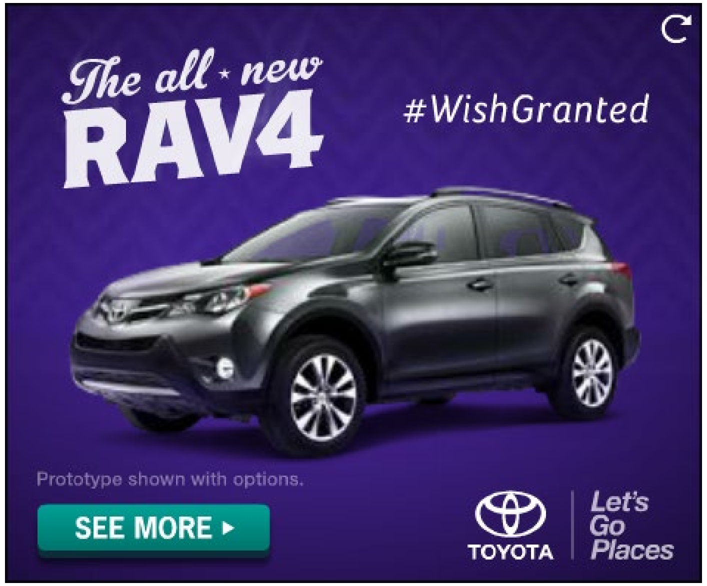
Investments in media generated $61.9 MM in revenue

- $16 Million driven by TV
- $5.2 MM due to radio
- $39 MM generated by promotions
- $1.7MM generated by online initiatives

Note: OOH refers to out-of-home advertising.

Changes in Digital Era: Ad Randomization

1. Ad Delivery Can Be Randomized



2. Ad Delivery and Purchase Data Can Be Linked at the Individual Level

Changes in Digital Era: Linkage to Outcome -- Challenges

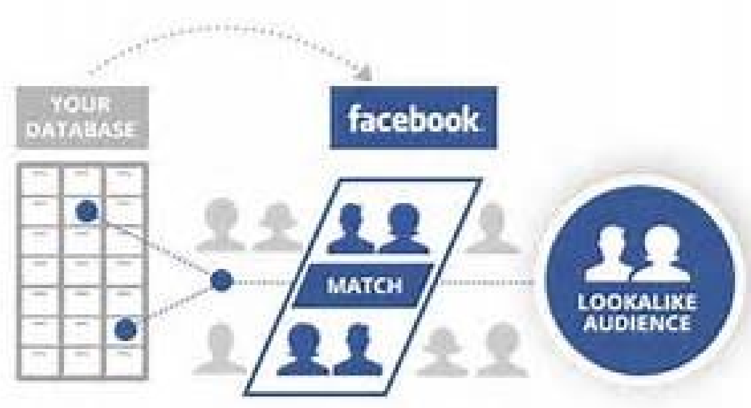
2. Ad Delivery and Purchase Data Can Be Linked at the Individual Level

Cross-Device Graph

Average of 3 Internet-connected devices per use, worldwide

Source: Cisco Visual Networking Index

3. Ad delivery and measurement process are based on imperfect and asymmetric information



Display Advertising is Saddled with Serious Problems

Poor Targeting Delivery

Viewability Problems

Fraud

Excessive Frequency Delivery

X X X X X X X X X
X X X X X X X X X
X X X X X X X X X
X X X X X X X X X

There is a Growing Crisis of Confidence in Digital Ad Industry Practices

AdAge

P&G TELLS DIGITAL TO CLEAN UP, LAYS DOWN NEW RULES FOR AGENCIES AND AD TECH TO GET PAID

Going Clear! The Digital Ad Industry's Supply Chain Revolution Just Happened

04.03.17

By Randall Rothenberg., CEO IAB

Do you know how many seriously harmful advertising impressions float through cyberspace each year? Between 3% and 37% of impressions are fraudulently generated by bots, according to the most recent study by the ad tech firm White Ops and the Association of National Advertisers. Add to those the valid ad impressions that appear on porn sites, or adjacent to pirated copyrighted entertainment, or near falsified content and other forms of "fake news,". And therein lies the digital media, advertising, and marketing industries' challenge, and our goal. We must create a fully trustworthy supply chain.

The big news of last week is that marketers, after a long decade of ostrich-like ignorance, are finally taking charge of their own digital destiny.

DIGIDAY

Viewability or fraud: Marketers are split on which is the bigger issue

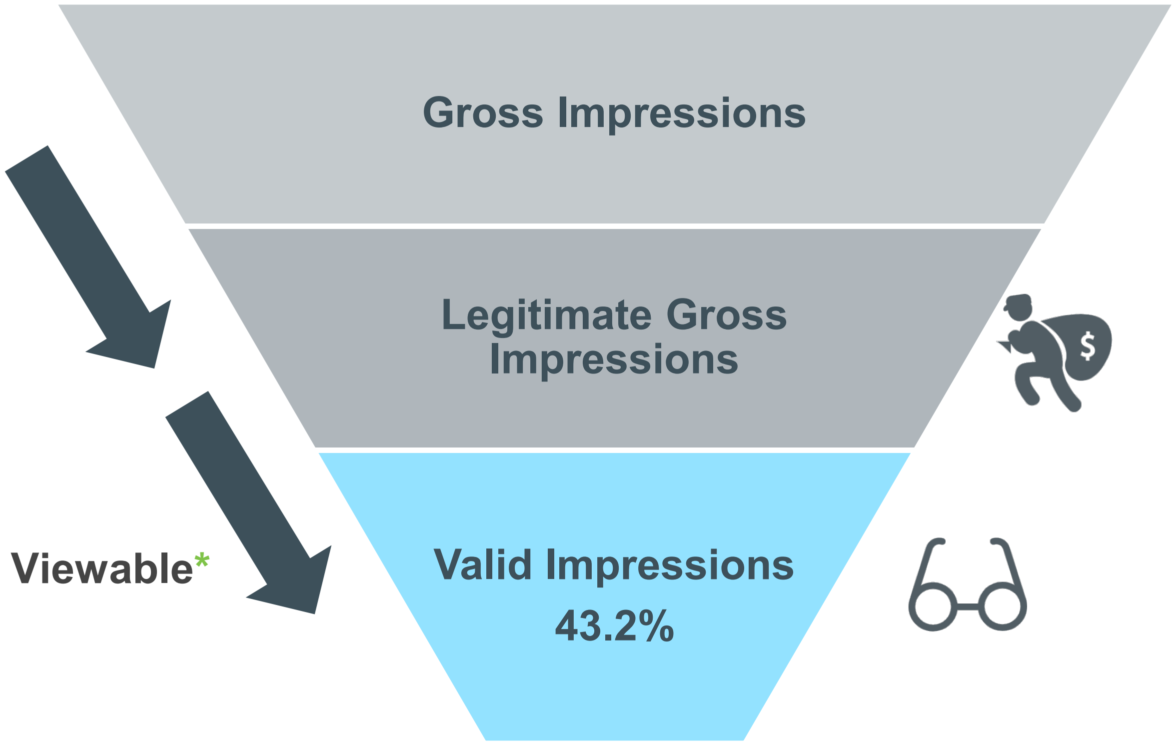
MARCH 9, 2017 by Ross Benes

The Yield After Fraud and Viewability is Low

All Impressions Served by an Ad Server

Filtering out Non Human Traffic (NHT)

Filtering out non Viewable* Impressions



Source: 100+ Campaigns Evaluated by comScore. *Based on IAB criteria of more than 50% of the ad viewable for at least 1 second.

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Market Power and Competition in Ad Tech and Platforms

- Economies of scale
  - Network effects across sides of market, algorithms/R&D, data, etc.
  - Platforms need to overcome chicken and egg problem
  - Scale economies acute especially at low scale
- Market power
  - Is ubiquitous but not inevitable in ad tech
  - Outcome with two similarly sized competitors dramatically more efficient than monopoly
    - Competition induces ad exchanges to pass advertising revenue on to publishers
- Consequences
  - Low quality, low transparency, high prices/take rates
  - Product markets that rely on advertising function less well, less competitive
- Since entry is important and very challenging, competition policy important
  - Guard against exclusionary conduct by incumbents that thwarts entrants who need to gain scale to remain viable competitors

Conclusions

- Advertising plays an outsized role in market economies relative to its revenue size
- Competition and efficiency in advertising crucial for consumer welfare
- Media traditionally served as two-sided platform matching advertisers and users, digital and mobile have led to new platforms serving third-party publishers (e.g. programmatic exchanges), new challenges
- Programmatic exchanges have captured the lion share of ad sales in digital publishing, with mixed results for smaller publishers
- Monetization by digital publishers and services shifts toward hybrid subscription models
- Video is now a digital battle ground for consumer attention. Millennials shift their time, force traditional advertisers to expand beyond TV
- Advertisers use cross media for balanced audience reach, but the tools are still maturing
- Digital display and video advertising have been plagued with quality, market power problems that are gaining more attention in the last few years