



C525 Capstone Project



Agenda

- Introduction
 - Objective & Executive Summary
- Spatial Analysis
- Creative Analysis
- Audience Analysis
- Inventory Analysis
- Conclusions
 - Final Recommendations



Objective

- Combine and consolidate Campaign Data and Demographic Data into a single dataset.
- Closely examine the dataset and extract valuable insights from the data.
 - 17 different exchanges.
 - 700+ User ids.
 - 7 month timeframe from 9/1/24 to 3/31/25.
- Identify key metrics to minimize costs and maximize profits and engagement.
- Create data visualizations that are accurate, relevant, and efficient.

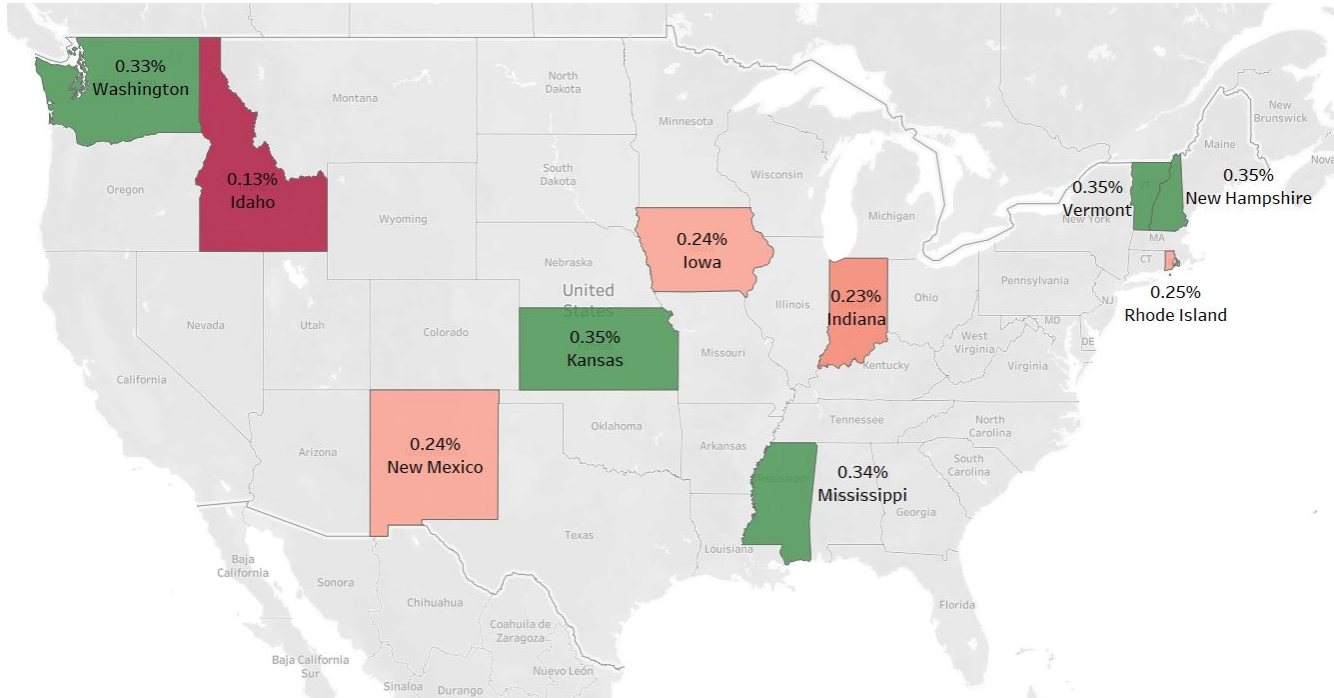
Executive Summary

- The top-performing states based on CTR are Vermont, New Hampshire, and Kansas, while Idaho and Iowa lead in CPA.
- “Sign up now” offers are scalable and balanced while “Subscribe Today - 10% discount” offers are too expensive for the payoff.
- Focus on individuals who had high impressions and engagement and prioritize smartphone traffic.
- Recommended Exchange: Google Ad Manager.
- Recommended publishers: Streetinsider.com, Activebeat.com, Msn.com,

Spatial Analysis

Presented By: Moiya Leacok, Atiya Mirza, Ericka Pérez, & Darren Yau

Branding Metrics: Click Through Rate (CTR)



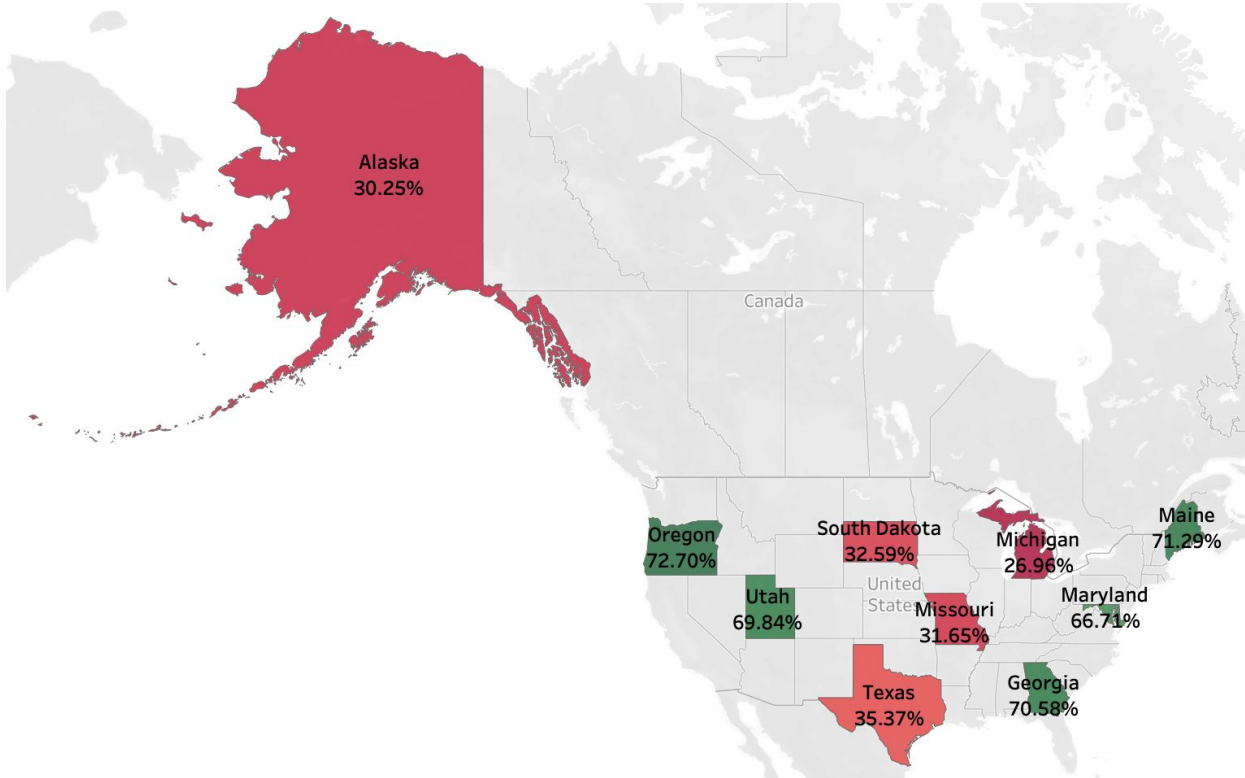
Top Performing States

1. Vermont (0.35%)
2. New Hampshire (0.35%)
3. Kansas (0.35%)
4. Mississippi (0.34%)
5. Washington (0.33%)

Bottom Performing States

1. Idaho (0.13%)
2. Indiana (0.23%)
3. New Mexico (0.24%)
4. Iowa (0.24%)
5. Rhode Island (0.25%)

Branding Metrics: Viewability



Top Performing States

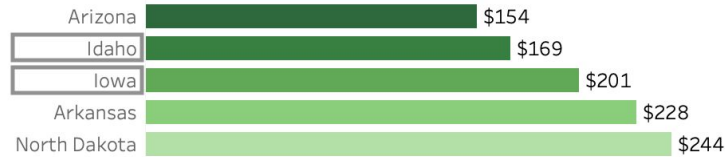
1. Oregon (72.70%)
2. Maine (71.29%)
3. Georgia (70.58%)
4. Utah (69.84%)
5. Maryland (66.71%)

Bottom Performing States

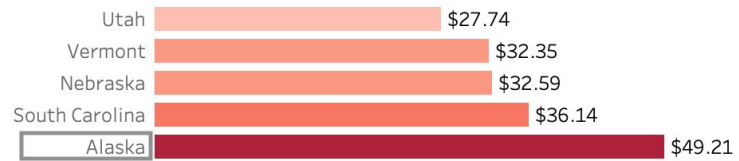
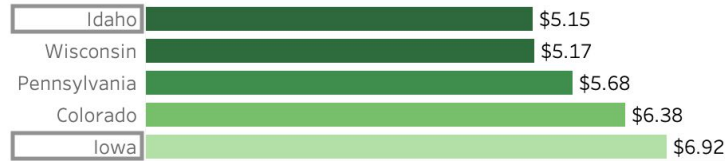
1. Michigan (29.96%)
2. Alaska (30.25%)
3. Missouri (31.65%)
4. South Dakota (32.59%)
5. Texas (35.37%)

Performance Metrics: Cost Per Acquisition, Click, Mille

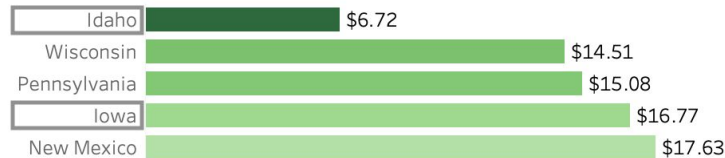
CPA



CPC



CPM



Most cost-effective: Idaho & Iowa

Not cost-effective: Alaska

Location Strategy Recommendations

I. Target Audiences with Intent + Lifestyle Relevance

- Prioritize on audience segments experiencing life changes and pursuing hobbies
 - For Vermont → Focus on job seekers and home shoppers
 - For Kansas → Tailor creative to photography and business niches
 - For NH → Explore more food, travel, and sports content to capture niche interests

II. Device Optimization

- Across all three states, smartphones dominate.
 - Ensure all creatives are mobile optimized

III. Creative Rotation & Testing

- Repetitive communications: *"10% Discount - Ends 6/1"* or *"Subscribe Today - 10% Discount"* dominate but may be a downfall
- Recommend A/B testing:
 - Urgency-focused: *"Only 48 Hours Left - 10% Off"*
 - Highlight: *"Join 1M+ Users - Get 10% Off Today"*

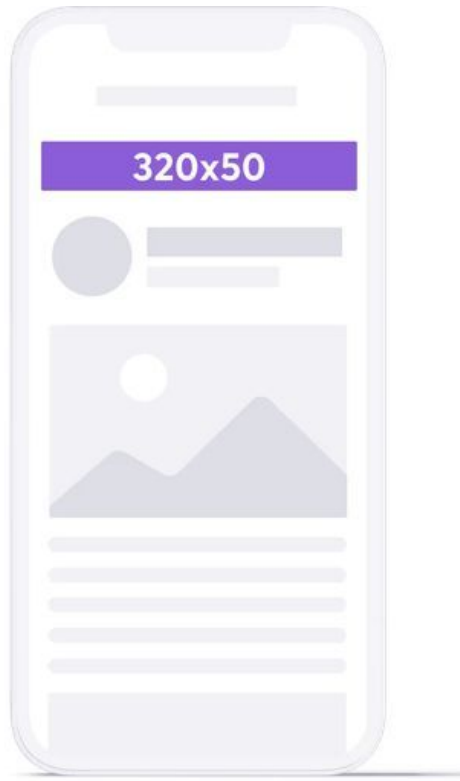
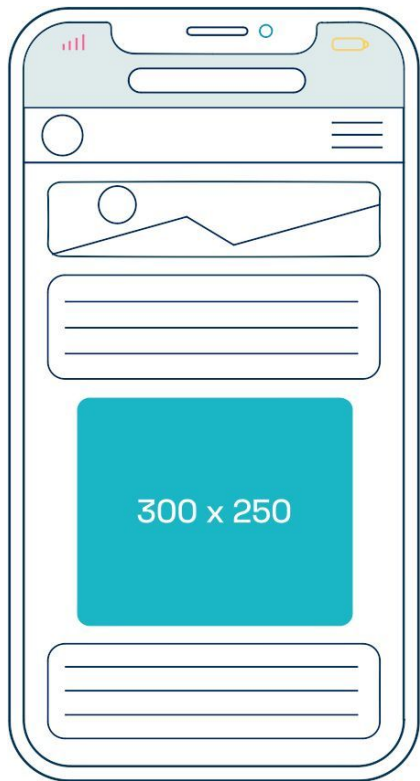
IV. Improve Engagement on Key Sites

- Tailor creatives per site/app:
 - On buzzfeed.com and thesaurus.com, test entertainment-based call to action
 - On business-oriented sites like cbsnews.com, use professional tone and offer-driven messaging

Creative Analysis

Presented By: Jessica Lin, Luis Carabajo, and Jason Urena

Creative Sizes



A/B Test: Creative Message Performance by CPA and CPC

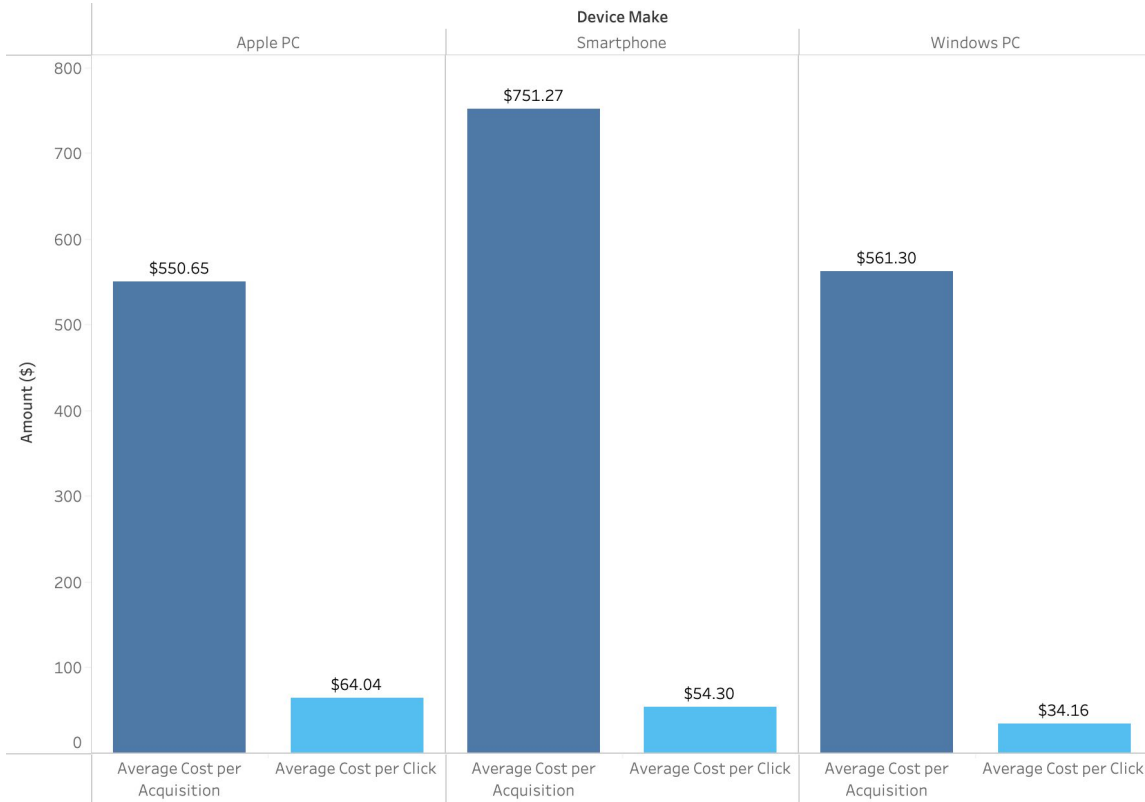
Creative Messaging	CPA	CPC	CPA to CPC Ratio	CVR
Sign up Now - 10% Off	☆ \$102,490.35	☆ \$7,462.76	☆ 13.73	☆ 16.79%
Subscribe Today - 10% Discount	\$183,418.88	\$12,686.32	14.46	23.99%

Subscribe Today – 10% Discount has the highest CVR (23.99%) but it's also much more expensive (CPA \$183k, CPC \$12.6k).

Sign Up Now – 10% Off offers better cost-efficiency (CPA \$102k, CPC \$7.4k) and still a strong CVR (16.79%).

Conclusion: **Sign Up Now** is more scalable and balanced, while **Subscribe Today** converts best but would require budget control or further testing.

Average CPA vs CPC by Device Make



Smartphones have the highest average cost per acquisition (\$751.27) and the second highest cost per click (\$54.30), suggesting they are the most expensive overall. This may require optimization to improve cost-efficiency.

Apple PCs show an unusual pattern: they have the highest cost per click (\$64.04) but the lowest cost per acquisition (\$550.65). This indicates that clicks may be expensive, but they convert well, warranting further analysis.

Windows PCs fall in the middle for both metrics (CPA: \$561.30, CPC: \$34.16), reflecting a balanced performance and potential for cost-effective scalability.

Top Creative Sizes by Creative Message by CPA

Creative Messaging

Creative Size	10% Discount - Ends 6/1	Sign up Now - 10% Off	Sign up Today - 10% Off	Subscribe Today - 10% Discount
300x50	\$817.70	\$360.61	\$1,102.94	\$784.67
300x250	\$666.40	\$562.18	\$675.44	\$944.25
320x50	\$556.73	\$813.89	\$586.58	\$749.95

Sign Up Today – 10%

- Off paired with 300x50 creative size had the highest cost (\$1,102.94), indicating poor cost-efficiency for that combination.

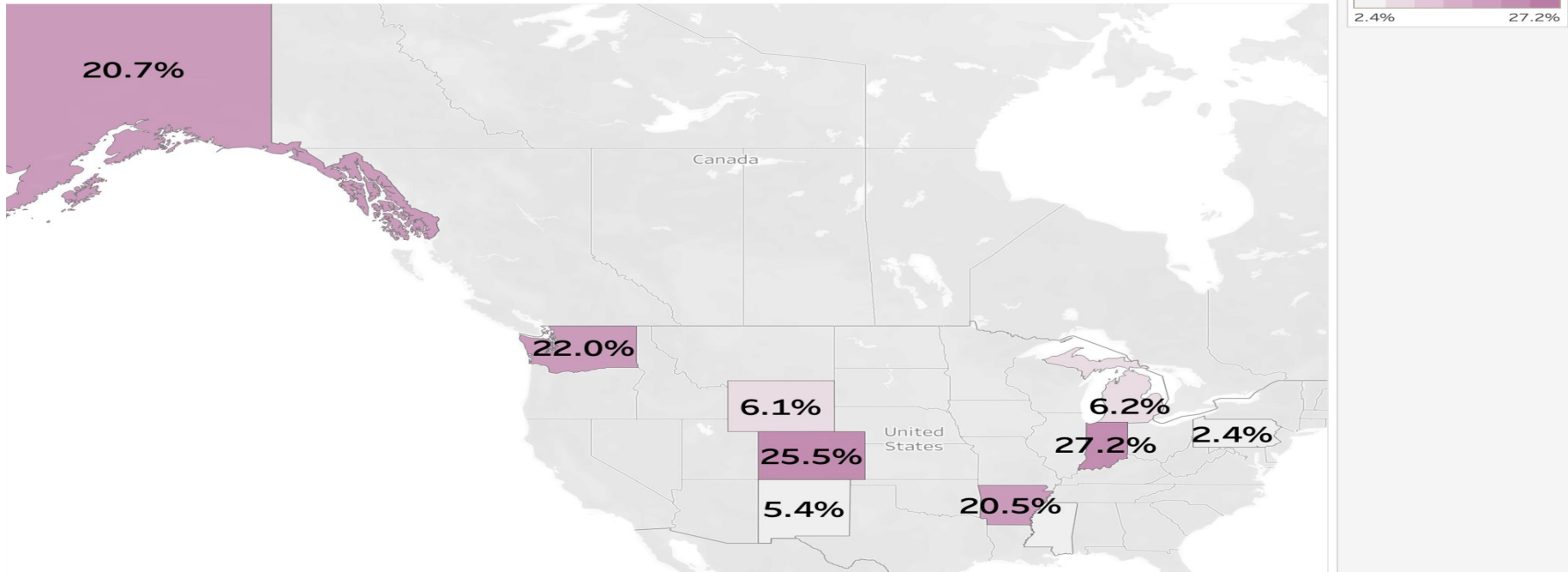
Sign Up Now – 10% Off with 300x50

- Had the lowest cost (\$360.61), making it the most budget-friendly pairing in this dataset.

Creative size 320x50

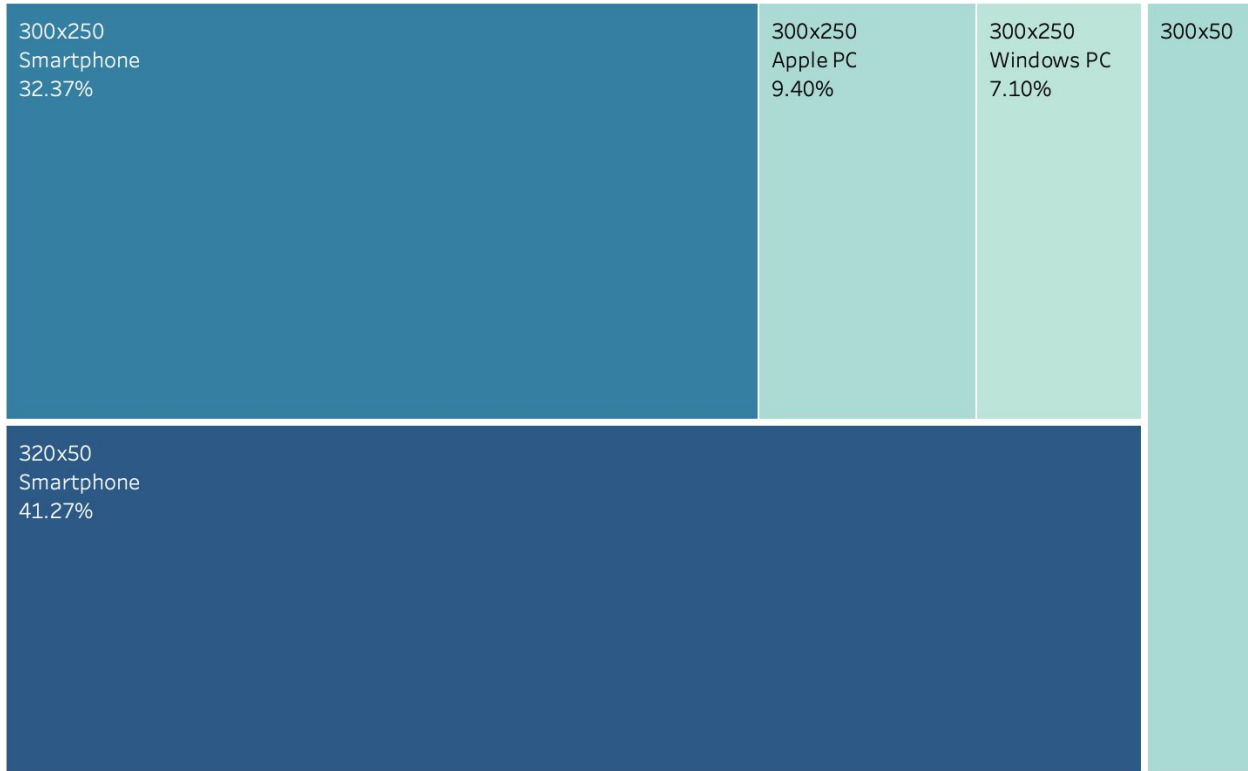
- Consistently shows mid-to-high costs, especially for “Sign Up Now” (\$813.89), suggesting it may not be the most efficient format across messages.

Reallocation Opportunity by CVR Performance (State Level)



- **Top performing states** - particularly NC, TX, MN exceed 20% CVR, offering strong ROI opportunities for reallocation.
- **Underperforming states** - NE, PA fall below 9%, signaling possible misalignment or targeting inefficiencies.
- **Recommendation** - allocate media budget to top states and reevaluate strategy in low performing regions.

Top Devices by Creative Sizes and CPM



Smartphones:

- 320x50: 41.3%
- 300x250: 32.4%
- Together, smartphone sizes contribute to **nearly 74% of impressions**, but they also account for a **major share of total CPM cost**, especially in more expensive formats like 300x250.

PCs:

- Apple PC (300x250): 9.40% of impressions, but it shows **higher CPMs**, making it one of the **least efficient** platforms.
- Windows PC (300x250): 7.1% delivers **lower CPMs**, suggesting it's a more **cost-effective option** for viewable impressions.

Recommendations

- **Pick “Sign Up Now – 10% Off”**
Best balance: low CPA (\$102k), low CPC (\$7.4k), strong results.
- **Avoid “Subscribe Today – 10% Discount”**
Too expensive for what it delivers.
- **Use Apple PCs more**
High CPC, but lowest CPA — great conversion value.
- **Cut back on Smartphones**
Highest costs with weaker returns.
- **Lower CPC to lower CPA**
Every \$1 more in CPC = \$3.72 more in CPA.

Creative Recommendations:

➤ Top Creative Recommendation

- Use "Sign Up Now – 10% Off":
 - Strong performance: Low CPA (\$102k), Low CPC (\$7.4k), CVR 16.79%
 - Best balance of cost and results
 - Scale across high-performing platforms and audiences
- Limit "Subscribe Today – 10% Discount":
 - High CVR (23.99%) but too costly: CPA \$183k, CPC \$12.6k
 - Use only in selective, high-converting segments

➤ Creative & Format Optimization

- Best Performing Combo:
 - "Sign Up Now – 10% Off" + 300x50 size = Lowest CPA (\$360)
- Avoid Expensive Formats on Mobile:
 - 300x250 drives high impressions but inflates cost
 - Test alternative formats or reduce mobile bids

➤ Device Strategy

- Focus on Windows PCs:
 - Balanced cost-efficiency (CPA \$561, CPC \$34)
 - Good candidate for scalable reach
- Leverage Apple PC Users:
 - High CPC (\$64), but lowest CPA (\$550)
 - Indicates high conversion intent—warrants further testing
- Cut Back on Smartphones:
 - Highest CPA (\$751), CPC (\$54)
 - Poor efficiency, especially with costly formats like 300x250

➤ Geo Targeting & CPC Efficiency

- Reallocate to Top-Performing States:
 - NC, TX, MN: CVR > 20% = strong ROI
 - Shift budget away from NE, PA (<9% CVR)
- Lower CPC to Improve CPA:
 - Every \$1 increase in CPC = \$3.72 increase in CPA
 - Optimize bids, targeting, and creative for cost control

Audience Analysis

Presented By: Andy Chen, Rochelle Rhooms, Tahsin Hossain, Nashalae Martin

Most cost effective audiences

Cost Per Acquisition (CPA) by Audience Segment



Takeaways

Credit and Lending is the most cost-effective audience — CPA only **\$52.2**

Finance-related segments take 4 of the top 10 spots.

Car and vehicle interest audiences (like Porsche) deliver high conversions at low cost

Audience persona 1: The Adaptive Early Adult

Demographics:

Age: 18-24

Gender: Females 55% Male-45%

Education level: 52% College graduates 48%
Non-college graduates

Parental Status: Parents - 47% Not Parents 53%

Device usage: 84% Smartphones users 11% Windows PC
6% Apple PC

Location: Maine, Montana, Kansas and Texas

Key Insight: Group is digitally fluent.
Interests span shopping, family, and real estate



Pain Points:

Financial Pressure:

- They are early in their careers or still in school, with limited income. Even those who are parents face added costs, making them highly cost-sensitive.

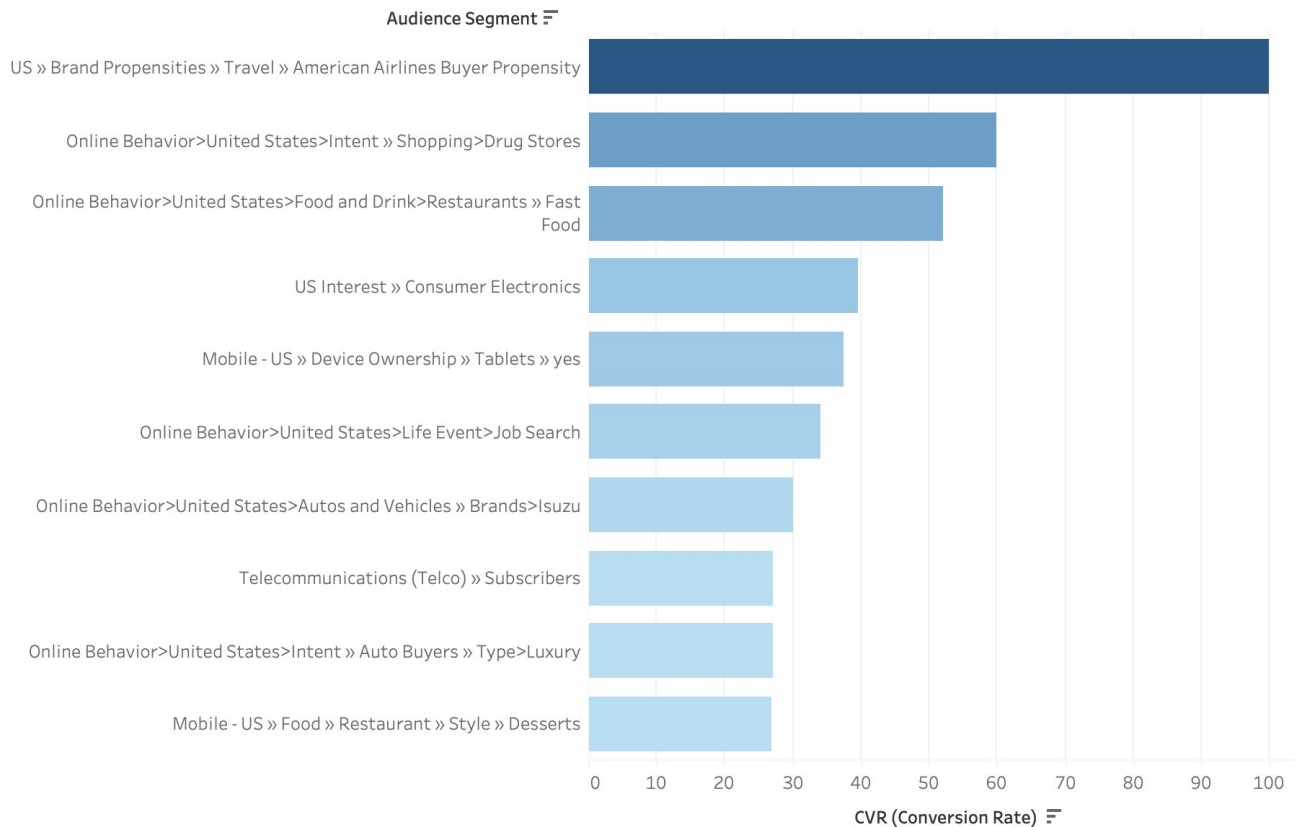
Uncertainty Around Career & Identity:

- They're trying to "figure it out". Whether that's identity, career, family, or future plans.

Engagement w/Ads:

- Highly responsive to promotional messages. "Subscribe Today - 10% Discount" "Sign Up Now - 10% Off"
- Utility focuses as oppose entertainment first(checks email frequently)

Age 25-34 Audience Segments and CVR Performance



The **Travel segment** stands out with a **high conversion rate** compared to other segments.

Audience Persona 2: Miles the Millennial Traveler

- **Demographics**

- Age: 25–34 (Millennials)
- Gender: 59% Male, 41% Female
- Education: 54% College Graduates, 46% Non-College Graduates
- Parental Status: 46% are parents, 54% are not
- Device Usage: 80% use smartphones, 12% use Windows PCs 8% use Apple PCs
- Location (top 5): North Dakota, Wisconsin, New Mexico, Kansas, and Oklahoma.
- Income (Estimated): \$70,000–\$100,000

- **Pain Points**

- Doesn't like hidden fees or long booking steps
- Leaves quickly if a site isn't mobile-friendly
- Needs clear reviews and trust signals to feel confident
- Dislikes overly complicated checkouts or unclear cancellation policies

- **Engagement with Ads:**

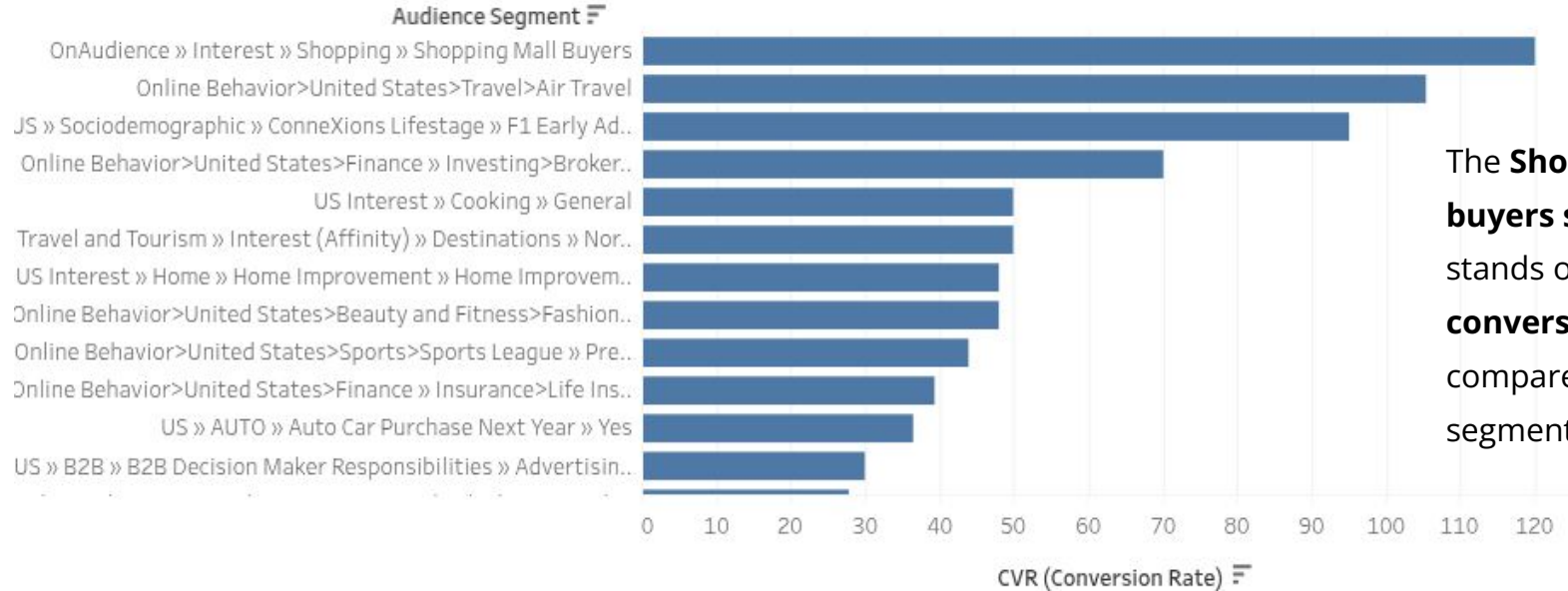
- Clicks on limited time travel deals and flexible booking options
- Responds well to mobile-friendly visuals and simple CTAs ("Sign up")
- Influenced by peer reviews, 4+ star ratings, and authentic travel content
- Engages with clean visuals that show real experiences



Performance Metrics From Data

- ✓ CVR: 13.75% – Excellent
- ✓ CPA: \$422 – Moderate to High
- ✓ Viewability: 55% – Slightly Above Average

Age Group: 35-49



The **Shopping mall buyers segment** stands out with a **high conversion rate** compared to other segments.

Audience Persona 3: The One Stop Shopper

- **Demographics**

- Age: 35-49
- Gender: Diverse, but mostly female
- Status: Likely married
- Parental Status: Parent of 2+ children
- Device: Smartphone
- Location: Northwest United States (Oregon is a top state)
- Income: Estimated \$75,000-\$125,000

- **Pain Points**

- Juggling work, parenting, errands, etc. Malls are family friendly and serve as a one-stop shop for this customer.
- Budget conscious and bargain-aware. Supporting a family 4+ is not cheap, but this customer still favors trusted that offer quality and value.

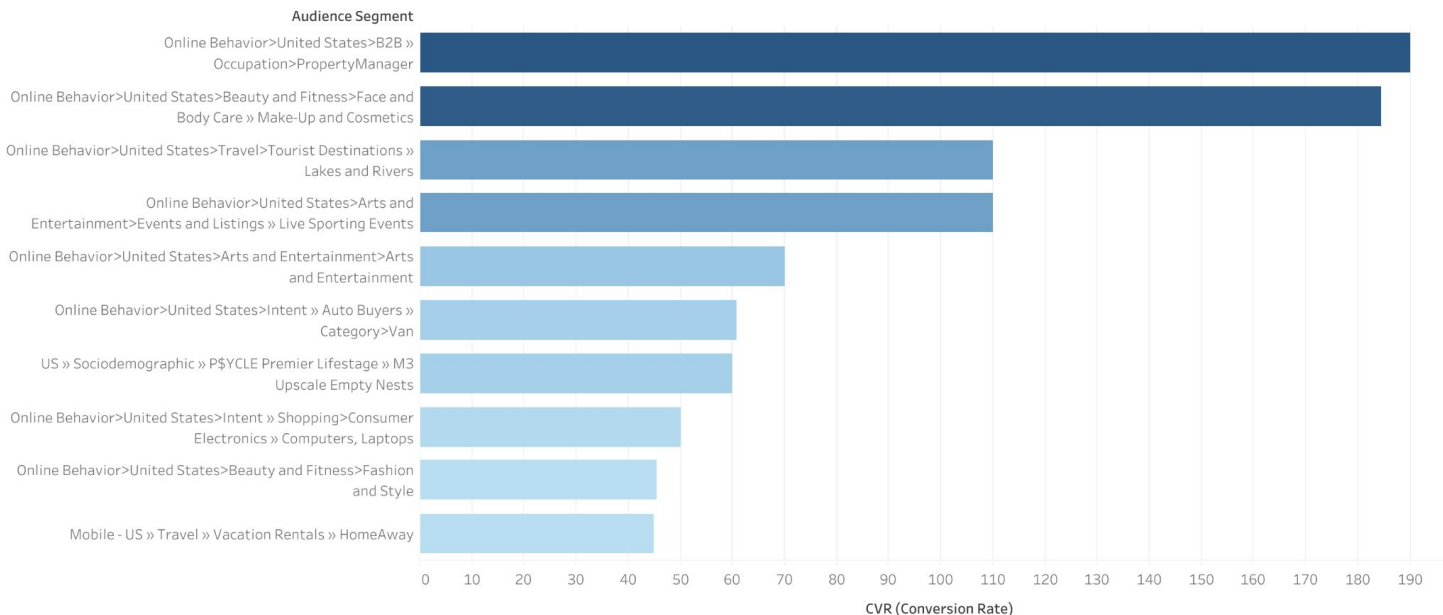
- **Engagement with Ads:**

- Likely to engage more around key calendar moments (back to school, holidays, tax refund season, etc.)
- SMS or email promotions with clear CTA's (e.g., "Show this code at checkout." Loyalty or rewards updates are also engagement drivers)
- Tend to ignore generic ads but engages with ads that feels tailored to them and their family needs (ads that offer real value - discounts, bundles, convenience, ease, etc)



Age Group: 50+

Age Group: 50+



- B2B > Occupation > Property owner
- Face and Body Care > Makeup and Cosmetics
- Travel > Tourist Destinations > Lakes and Rivers

Audience Persona 4: John the Property Manager

- **Demographics**

- Age: 50+, Boomers
- Gender: Diverse
- Status: Likely married, Late career, Retired
- Location: Urban or Suburban areas with active real estate
- Income: \$150k+ annually

- **Pain Points**

- Needs efficient solutions for tenant communication, rent collection, and property maintenance.
- Wants to stay competitive in a shifting real estate market (post-pandemic changes, interest rate fluctuations).

- **Engagement with Ads:**

- Clicks on ads about B2B services such as property tech tools, CRM systems, or leasing software.
- Prefers professional, clean visuals like buildings, dashboards, or tenant satisfaction stats.
- Interested in webinars or eBooks about improving occupancy rates, cost-saving strategies, or regulation updates.



Audience Recommendations:

I. Leverage Strong CVR Performance

- A **conversion rate** shows users find the offer highly relevant
 - Keep value-driven offers and clear CTAs
 - Prioritize audience segments that are showing strong intent

II. Optimize CPA for Efficiency

- The **CPA** is acceptable, but optimization is needed
 - Simplify landing pages and clarify pricing
 - Emphasize savings, limited-time offers, or flexible terms
 - Exclude low-intent audiences to reduce waste

III. Maintain Mobile-First Design

- 80%+ of users are on smartphones
 - Ensure fast load times, short forms, and mobile-friendly layouts
 - Continue testing creatives built for mobile browsing

IV. Build Trust Through Visuals & Reviews

- Peer reviews and visuals help drive action
 - Use authentic content and 4+ star ratings
 - Avoid overly polished or generic visuals

V. Reduce Drop-Off at Booking Stage

- Users lose interest when the process feels slow or unclear
 - Streamline checkout steps and surface key info upfront
 - Highlight “No hidden fees” or “Book now, cancel anytime”

Inventory Analysis

Presented By: Noah Quezada, Jovita Lin, Ivan Li, and
Yaseen Bhat

Performance Metrics

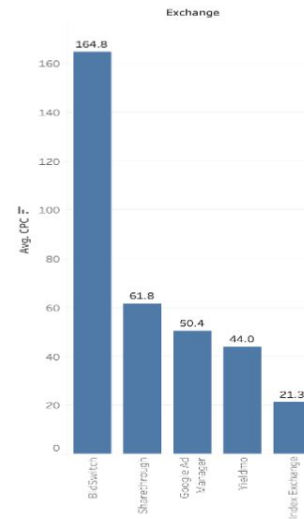
CPA Insights

- The cheapest sources:
- Kargo** (\$113.79), **PulsePoint** (\$311.23), **Yieldmo** (\$337.99), **Taboola** (\$352.17) and **GumGum** (\$416.10).
- The priciest sources:
- Sharethrough** (\$1,461.79), **Yahoo Exchange** (\$1,283.99), **TripleLift** (\$1,263.26), **BidSwitch** (\$769.38) and **Google Ad Manager** (\$733.31).
- Action:** Shift budget toward the cheapest sources and pause or renegotiate with the highest-cost vendors.

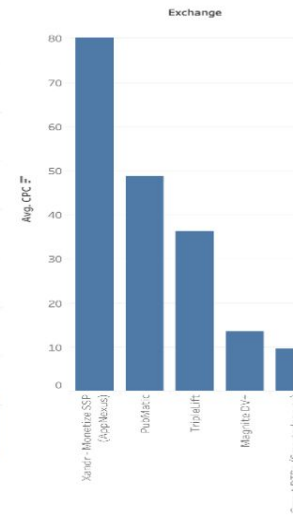
CPC Insights

- The lowest-cost clicks:
- GumGum** (\$10.87), **Sovrn** (\$14.91), **Kargo** (\$18.96), **Taboola** (\$21.25) and **Smart RTB+** (\$32.45).
- The highest-cost clicks:
- Yahoo Exchange** (\$114.19), **PulsePoint** (\$65.32), **BidSwitch** (\$62.12), **Sharethrough** (\$61.87) and **Index Exchange** (\$60.05).
- Action:** Use low-CPC channels to drive volume and limit spend on high-CPC platforms unless they prove strong in conversions.

5 Inventory Sources (Exchanges) with Highest CPC



5 Inventory Sources (Exchanges) with Lowest CPC



5 Inventory Sources (Exchanges) with Highest CPA



5 Inventory Sources (Exchanges) with Lowest CPA



Performance Metrics

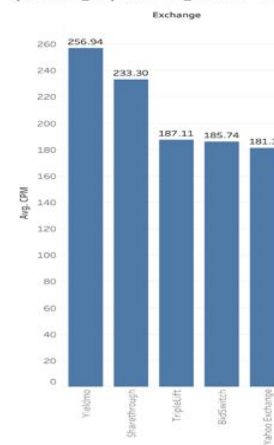
CVR Insights

- The top five converters:
- **PulsePoint** (34.86%), **Sharethrough** (32.84%), **Kargo** (16.67%), **Yieldmo** (16.53%) and **Xandr** (16.14%).
- The bottom five converters:
- **GumGum** (2.31%), **Sovrn** (5.92%), **Taboola** (5.99%), **TripleLift** (7.05%) and **Smart RTB+** (7.55%).
- **Action:** Double down on high-CVR sources and optimize creative or targeting on the low-CVR exchanges.

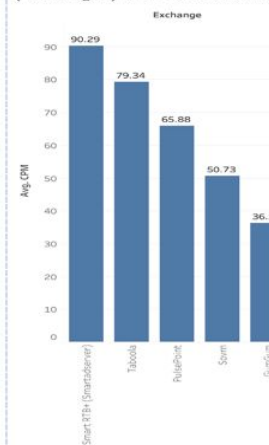
CPM Insights

- The cheapest impression rates:
- **GumGum** (\$36.27), **Sovrn** (\$50.73), **PulsePoint** (\$65.88), **Taboola** (\$79.34) and **Smart RTB+** (\$90.29).
- The priciest impression rates:
- **Yieldmo** (\$256.94), **Sharethrough** (\$233.30), **TripleLift** (\$187.11), **BidSwitch** (\$185.74) and **Yahoo Exchange** (\$181.39).
- **Action:** Allocate broad-reach campaigns to low-CPM exchanges and reserve premium spots for targeted or retargeting messages.

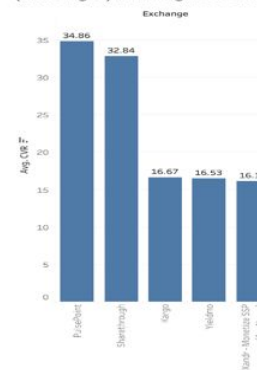
5 Inventory Sources (Exchanges) with Highest CPM



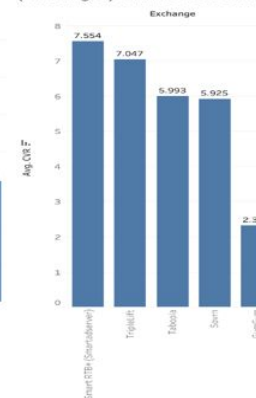
5 Inventory Sources (Exchanges) with Lowest CPM



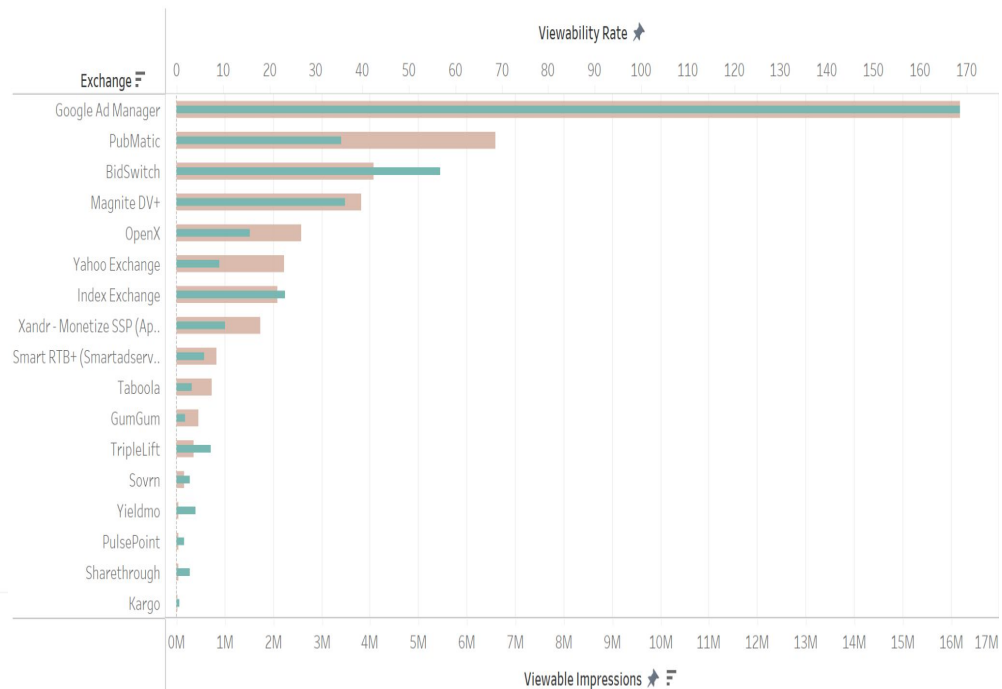
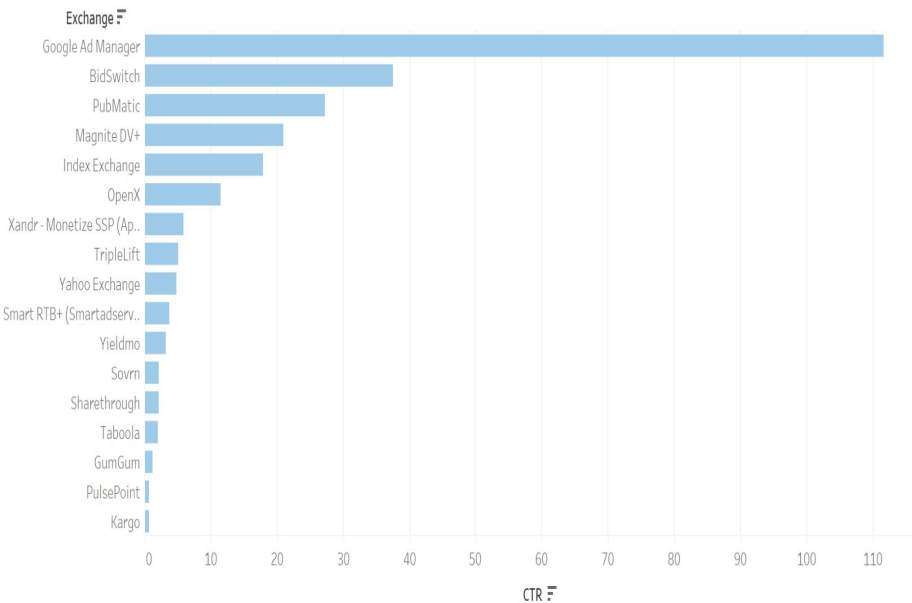
5 Inventory Sources (Exchanges) with Highest CVR



5 Inventory Sources (Exchanges) with Lowest CVR

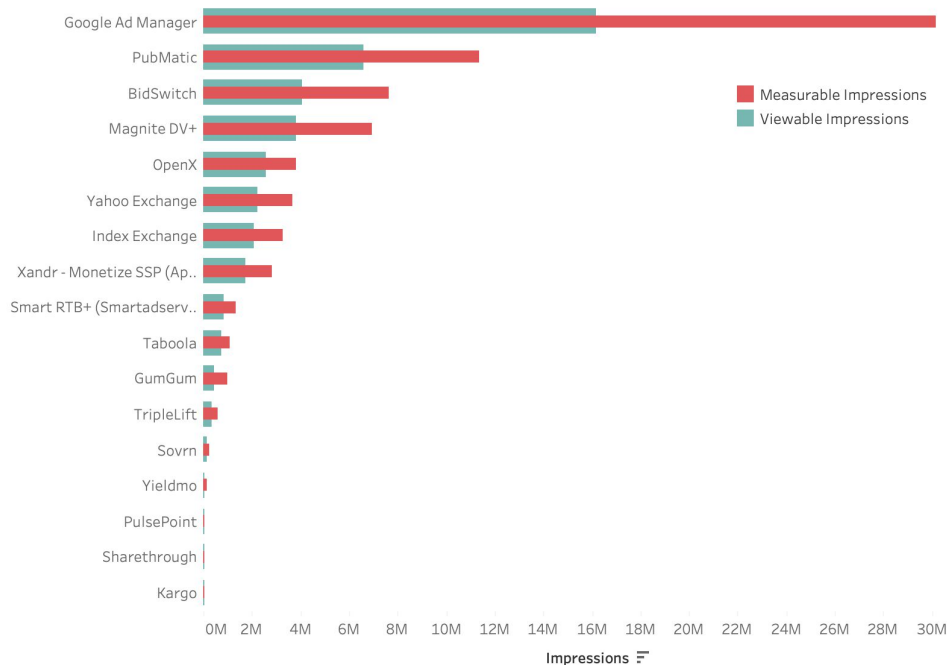


Branding Metrics



Top performing metrics based on the CTR (click-through rate) the left chart, and the Viewability Rate (Viewable Impressions/Measurable Impressions) and Viewable Impressions on the right chart

Impressions



- Google Ad Manager far surpasses all other exchanges in both "Measurable Impressions" (red) and "Viewable Impressions" (teal), demonstrating its dominant position in terms of volume

Top 5 Publishers

Viewability is important. Ads that aren't viewable simply can't drive conversions.

Websites with low CPM do not matter if they have low conversion rates.

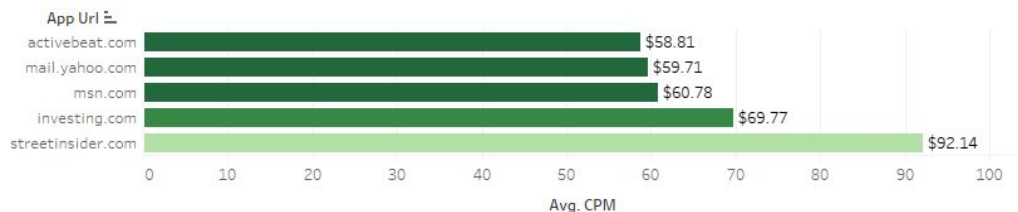
These publishers offer a balance of strong viewability and conversions with below average CPM and CPA.

App Url	⚙	Avg. Viewability	Avg. Total Conversions	Avg. CPM	Avg. CPA
streetinsider.com		75.78%	13	\$92.14	\$313.96
activebeat.com		66.31%	13	\$58.81	\$288.52
msn.com		65.89%	25	\$60.78	\$640.42
mail.yahoo.com		64.90%	22	\$59.71	\$424.47
investing.com		60.01%	13	\$69.77	\$333.24



Publishers Direct Buy

Recommended rate for a direct buy of 1k impressions:



These rates ensure good ROI while being competitive and fair for the value provided by the publisher.

Conclusions

Spatial Analysis:

- For more clicks, focus on campaigns in Vermont, New Hampshire, Kansas.
- For more views, focus on campaigns in Oregon, Maine, Georgia.
- To reach more people for less money, reallocate funds from Alaska and Mississippi to more cost-effective states like Idaho and Iowa.

Creative Analysis:

- “Sign up now” offers are more scalable and balanced.
- Apple PCs have High CPC, but low CPA - great conversion value.
- Avoid “Subscribe Today - 10% Discount” - too expensive for what it delivers.

Audience Analysis:

- Focus on individuals who had high impressions and engagement, this might be profitable area to convert these clicks.
- Prioritize Smartphone as a majority of the traffic noticed came from these devices, so creative must be mobile-first: short, direct, and visually engaging.
- Refine audience targeting to sub-segments with better performance (e.g., specific interests or behaviors).

Inventory Analysis:

- Recommended exchanges: Google Ad Manager, PubMatic, Bidswitch.
- Recommended publishers: Streetinsider.com, Activebeat.com, Msn.com, Mail.yahoo.com, and Investing.com.