



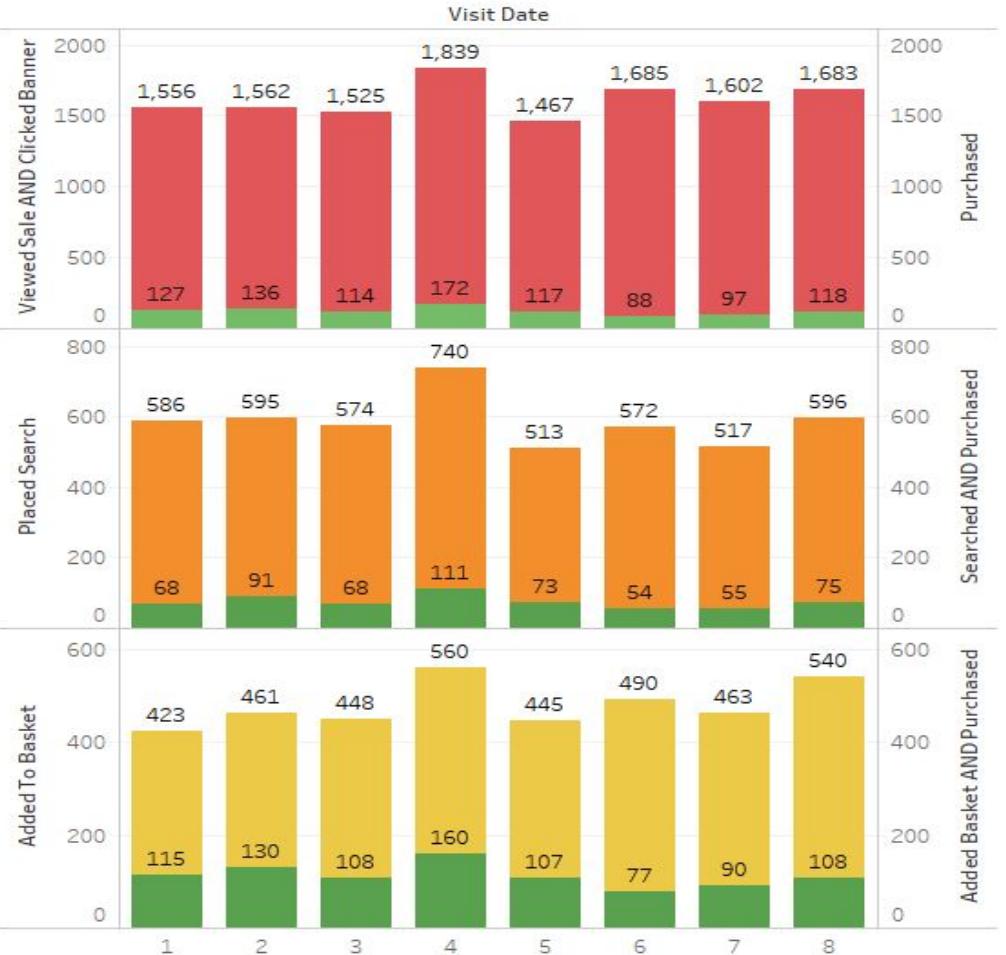
Marketing Analytics Hackathon

Analysis and Data Exploration - Amrita Nair
Mentor – Molly DeJohn



Are your banners effectively converting your users?

Measuring Campaign Performance of users who react to sales

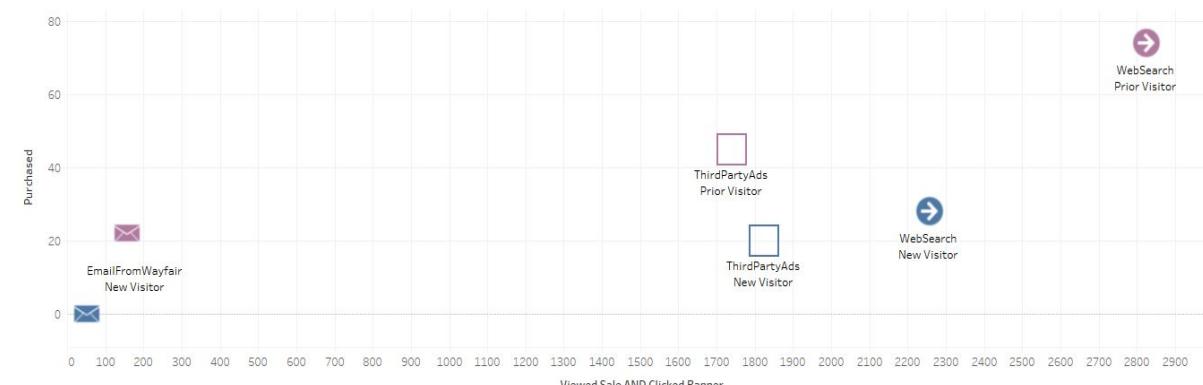


We see that current conversion rate of users who reacted to the sale (both viewed the sale and clicked the banner) is around 8%. The above bar charts show how users who showed interest in the sale engage with the website and how those engagements lead to purchases.

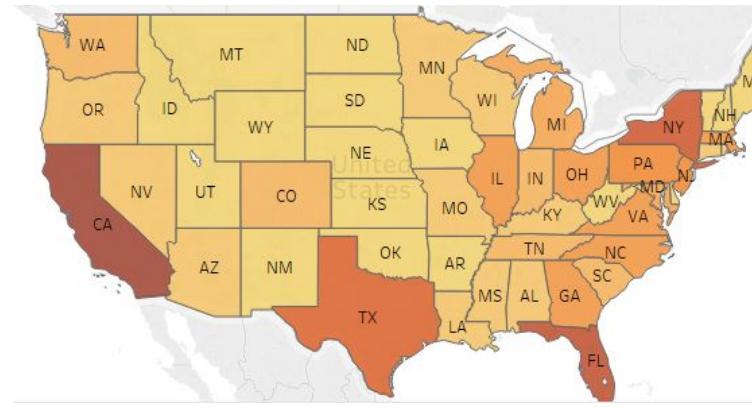
What were the most effective ways of reaching your customers that led to conversions?



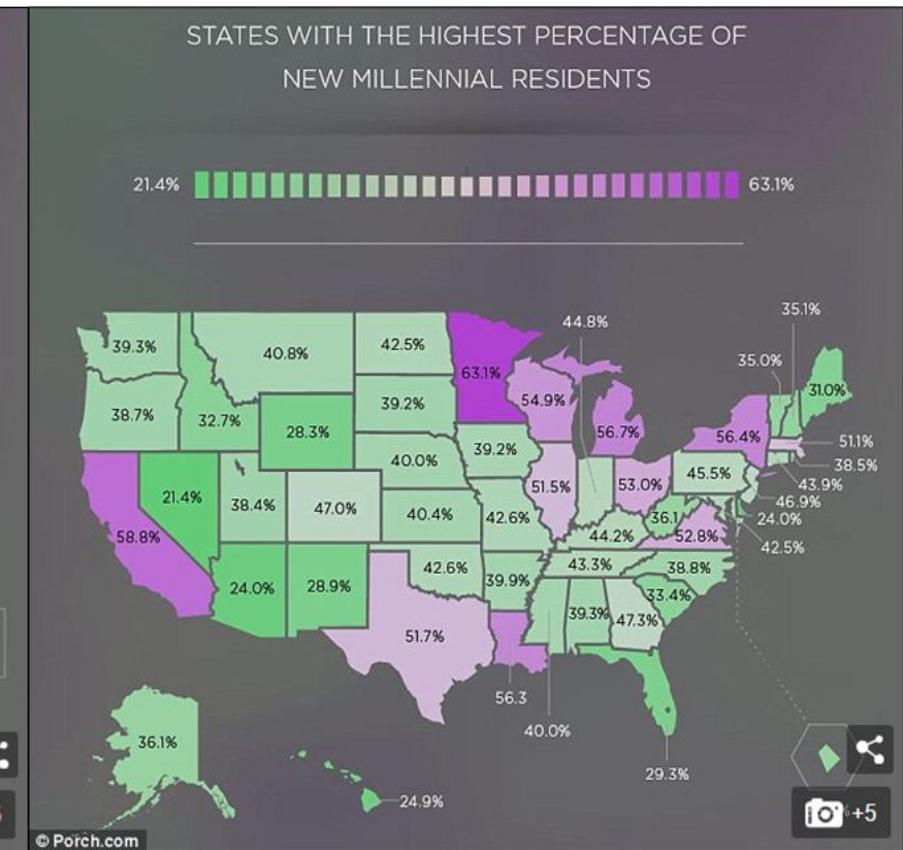
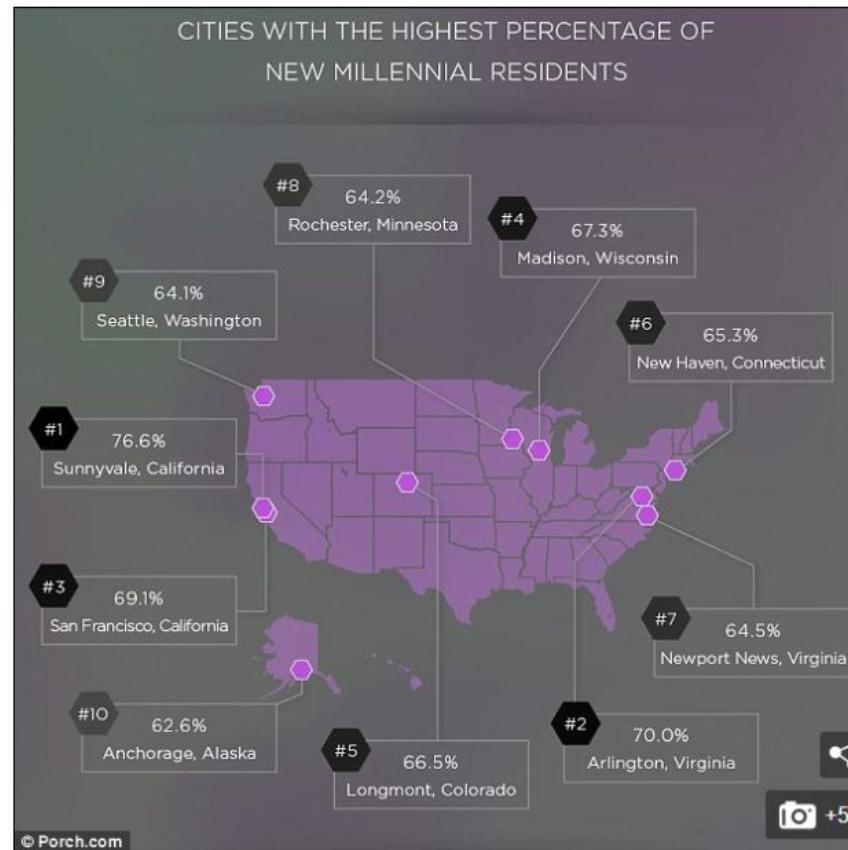
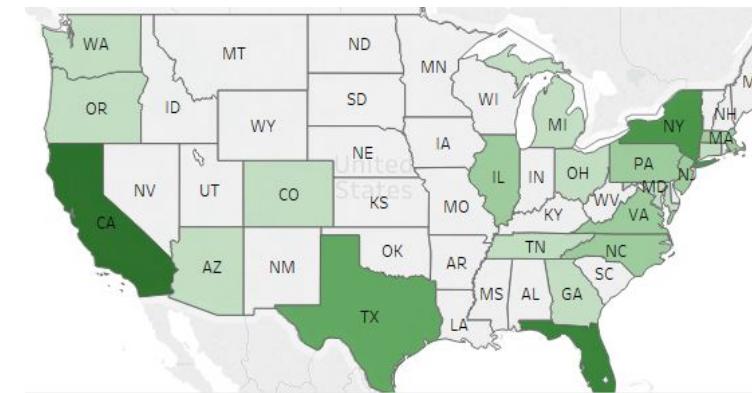
By looking into different visitor groups that reacted to the sale, we see that prior visitors with purchase (pink) are best reached by email – they are the ones who convert. This means that people who are likely to buy more subscribe to emails from Wayfair. For prior visitors(purple), it looks like emails aren't as effective. This can be changed by positioning the email blasts specific to prior visitors. A/B testing should be performed on prior visitors in terms of discounts offered, layout of email, pictures in email and frequency of emails. Monitoring the response rate and conversions of targeted users will help you gauge the performance.



Exploring New Markets



The first heatmap shows the density of users who reacted to the sale by clicking banners for each region. The second shows heatmap of the density of users who converted out of all those who reacted. We see that CA, TX, FL and NY are the top performing states.



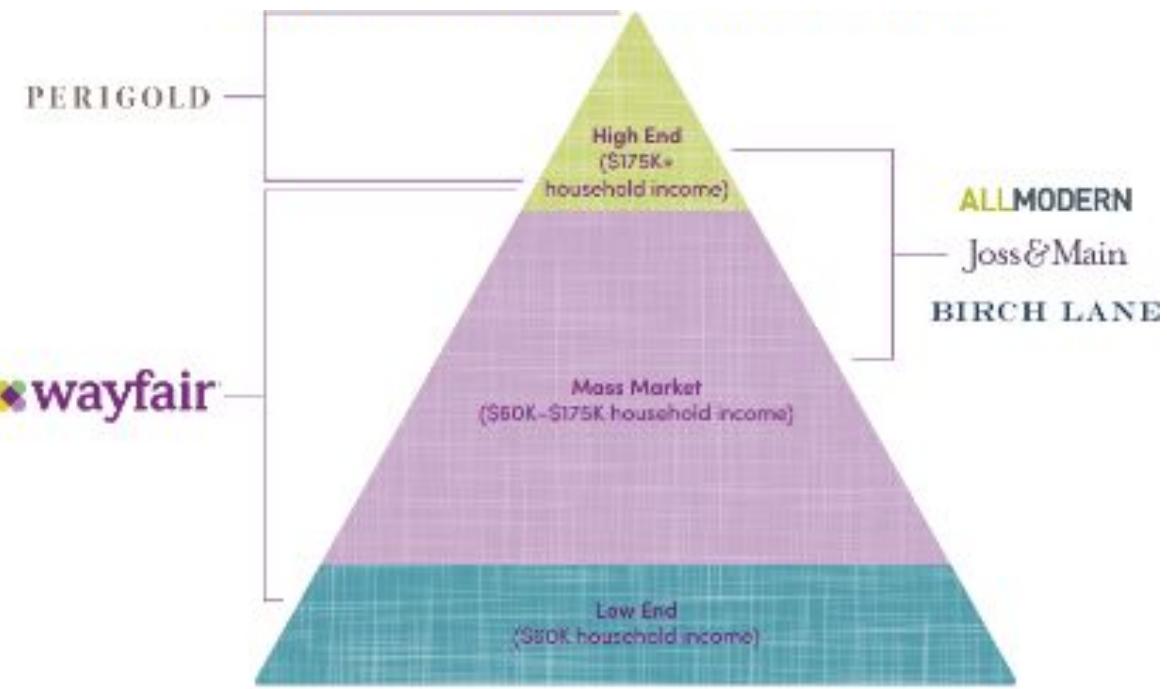
[Recent external data](#) shows us that MN, MI, and LA are some of the states with the highest percentage of new millennial residents. Since this would be your target customers, it would be best to identify regional micro trends and create customized banners that target those users. Considering the first map, it looks like we also need to find a way to raise awareness by performing marketing campaigns through influencers in those states.

Understanding Barriers and Improving User Experience

Demographic data of those who reacted to sale



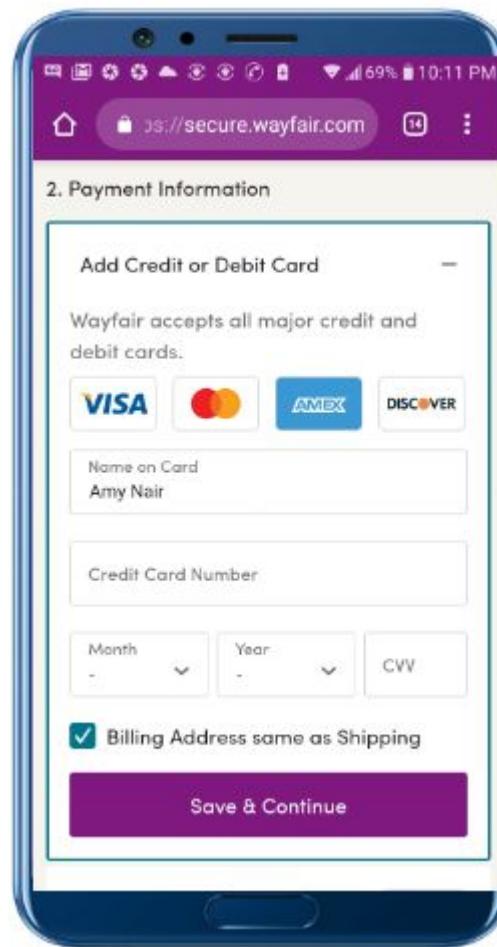
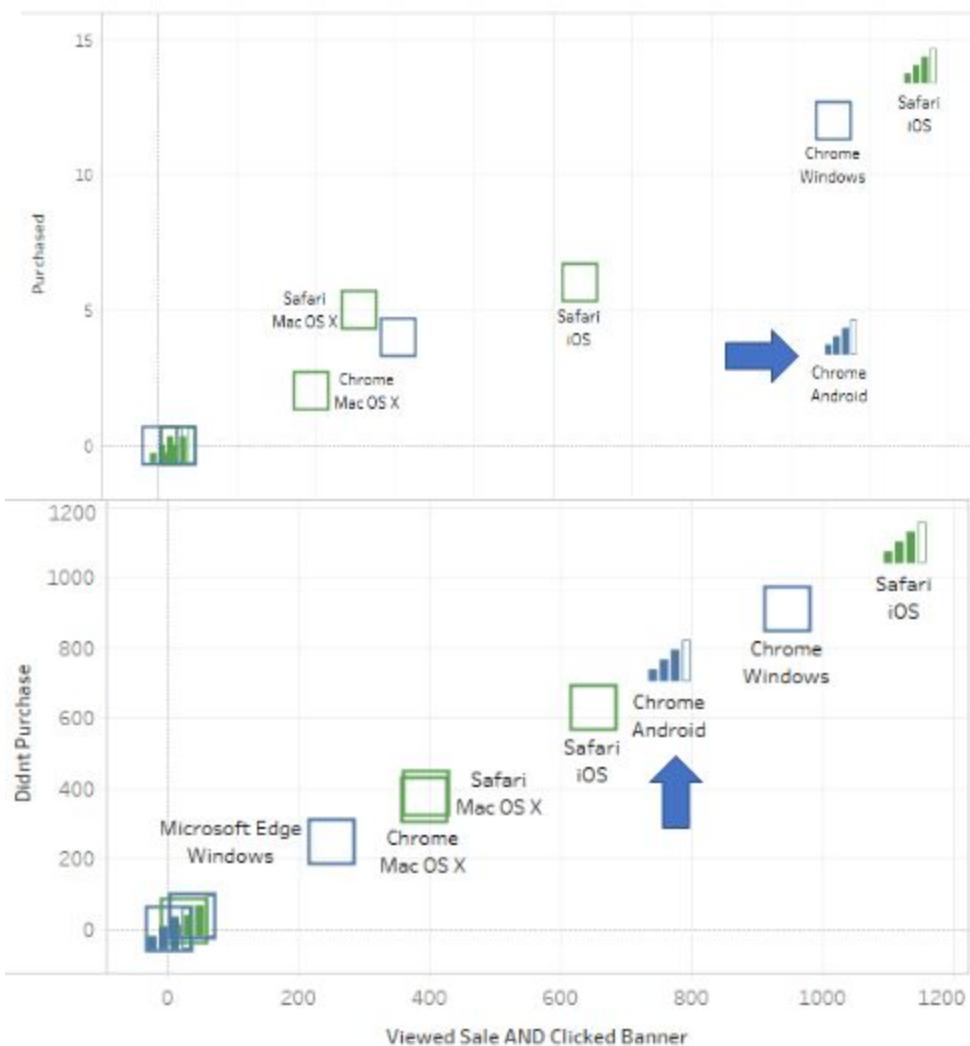
Wayfair's Target segments by income



The point of discounting prices is to attract and convert price sensitive customers. The above graphs show that women of 50-100k income bracket are reacting to the sale by clicking banners but most of them don't convert. Wayfair's target market comprises of 50-100k income range. We need more data to understand why they aren't converting as much as 100-250k income women. It could be the items portrayed on the banner ads, discounts offered, etc. Customizing the experience for 50-100k women by carefully choosing items (based on discounted price and preference) that show up on the page after the banner is clicked could drastically change conversions.

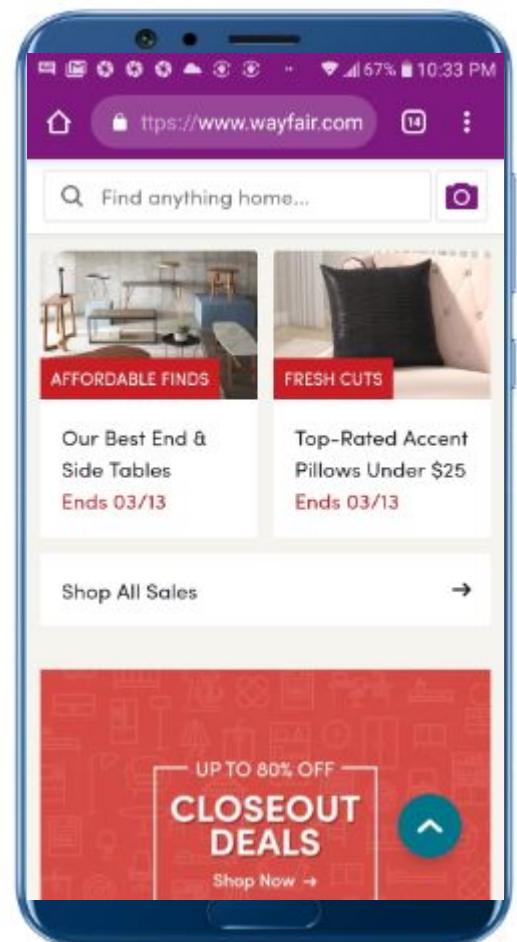
Behavioral data of users who reacted to the sale

Although a lot of users engage via Chrome browsers on their Androids, very few of them purchase items.



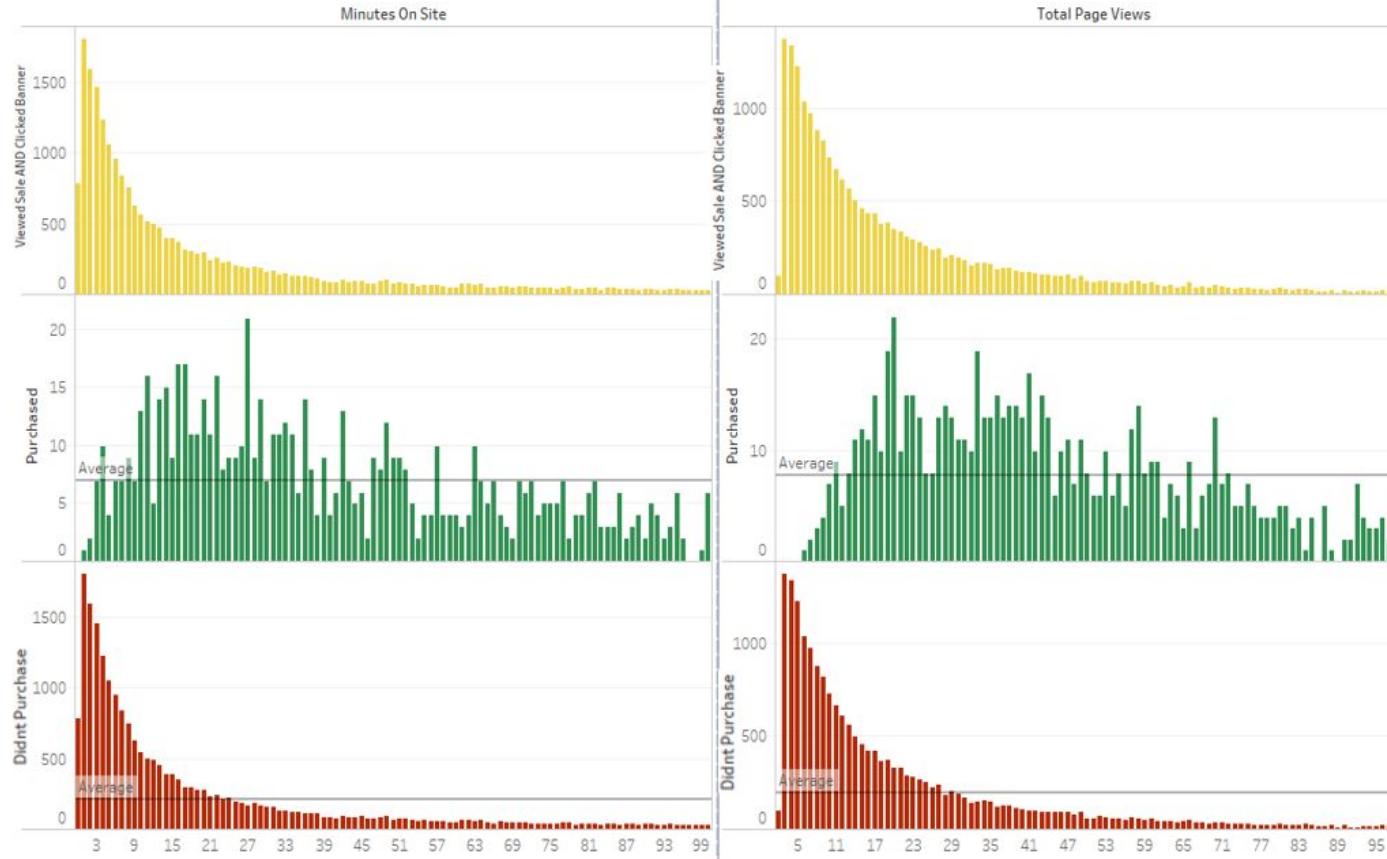
Allow customers to opt-in to save their credit card information instead of forcing them

Show fewer offers by product category based on the user's search history



Understanding Customer Psychographics Trends that leads to Conversions

Time Spent on site - Buyers vs Non-Buyers



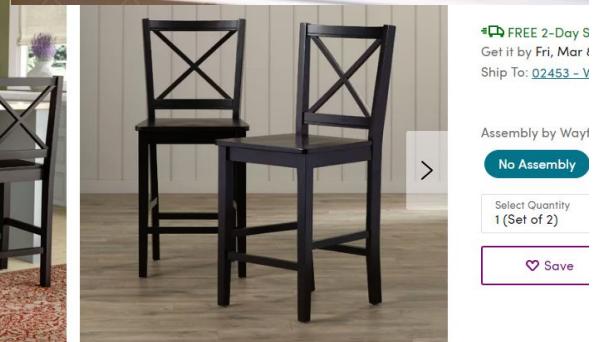
We finally have the psychographic data : How much time users who reacted to sale/banners spend surfing Wayfair and how many pages they visit) of buyers vs non-buyers.

Of the customers who reacted to the sale/banners and purchased, we didn't find a normal distribution that is skewed to the right. There seems to be a sweet spot (9 mins to 65 minutes and 10 to 70 pages views) in the buyer's distribution. Outside this range, we find that if people engage with the platform beyond a certain number of minutes or beyond a certain number of pages, the users would end up not purchasing anything. We tried to find the reason by surveying a small sample of customers. We found that this could happen because users get jaded or overwhelmed with the number of options, and hence leave items in the cart without purchasing. This hypothesis needs to be validated by A/B testing on a bigger sample.

Sally 24" Bar Stool

See More by [August Grove](#)

★★★★★ 574



FREE 2-Day S
Get it by Fri, Mar 1
Ship To: 02453 - V

Assembly by Wayf

No Assembly

Select Quantity
1 (Set of 2)

Save



Charlotte Cross Back
24" Bar Stool (Set o...
By Darby Home Co

\$130.99

★★★★★ 47



Sally 30" Bar Stool
(Set of 2)
By August Grove

\$139.99

★★★★★ 227



Chalkhill 30" Bar
Stool (Set of 2)
By Darby Home Co

\$140.99

★★★★★ 40



Beckett 30" Bar Stool
By Darby Home Co

\$94.99

★★★★★ 55



Elmhurst 24" Bar
Stool
By August Grove

\$90.55

★★★★★ 314



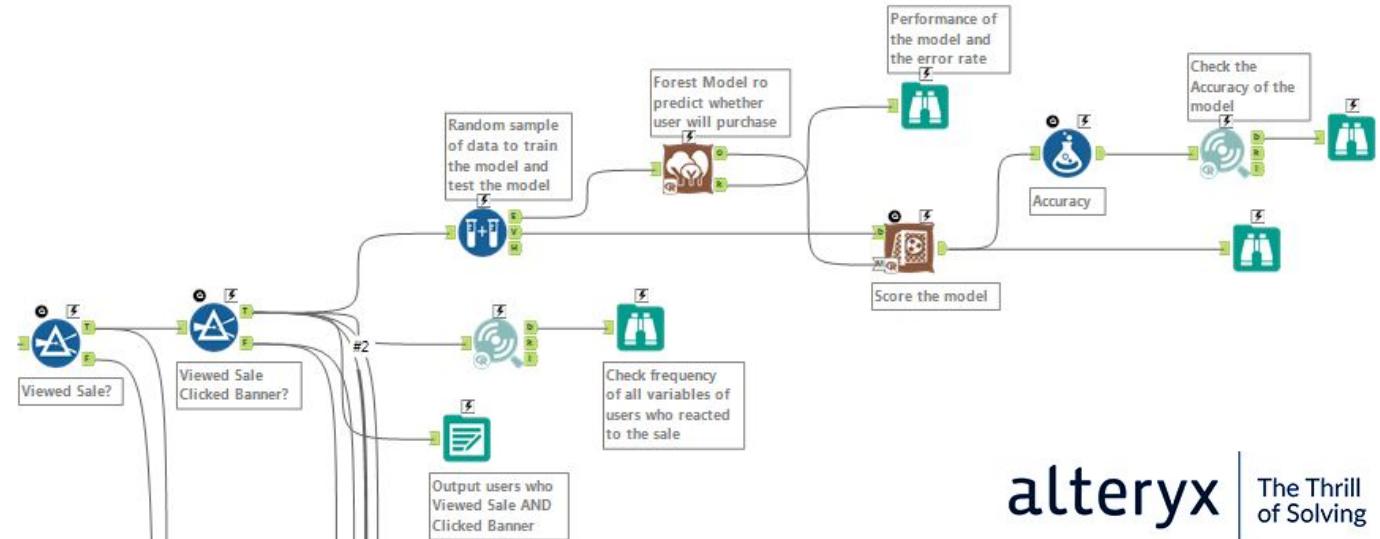
Wayfair is already using cutting edge technology like Augmented Reality and Artificial Intelligence. What if you could use Machine Learning to personalize User Experience?

The Importance of Machine Learning to Personalize User Experience

Our team used the following machine learning models to predict whether a user would purchase given the set of inputs (demographic data, behavioral data, etc.)

- Linear Regression
- Decision Trees: Boost Model and Random Forest Model

We used the Random Forest Model after comparing performances. The input of this model comprised of users who viewed sale AND clicked banners. Our model's performance is as follows:

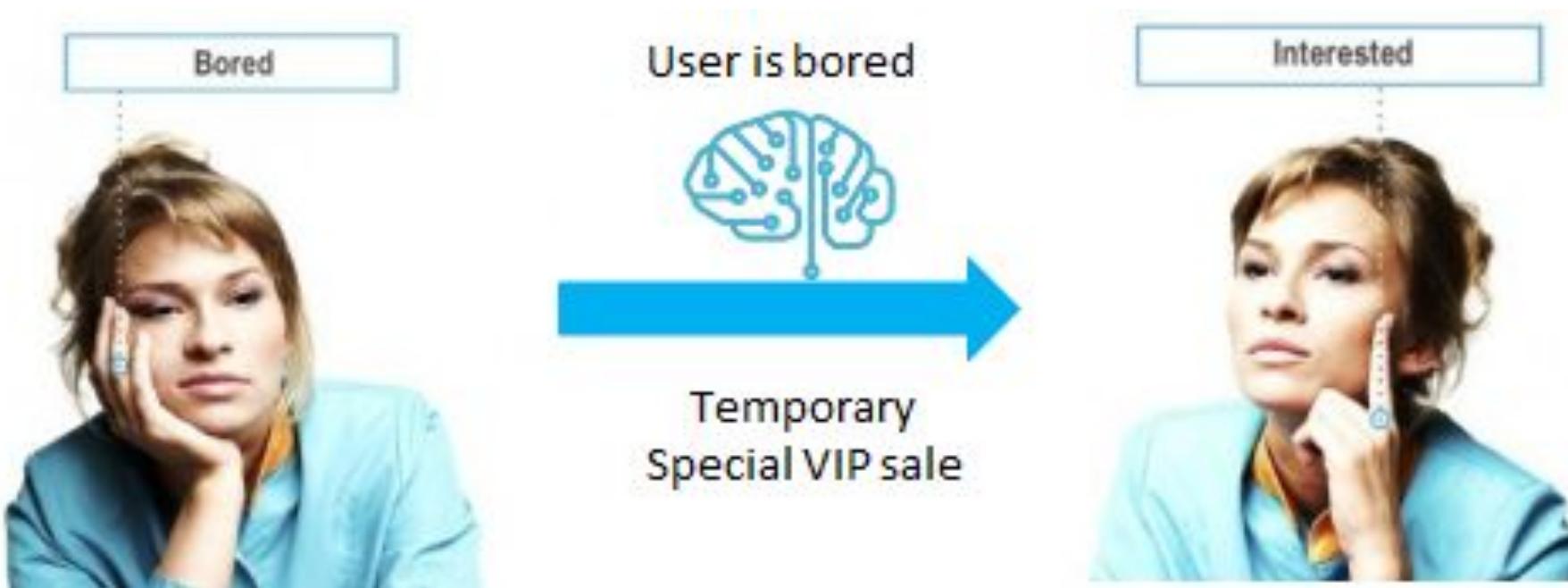


Model Performance		
Accuracy	True Positives	0.24%
	True Negatives	99.98%
Errors	False Positives	0.02%
	False Negatives	99.76%

As you can see above, our model has a very high specificity rate: i.e. our model can very accurately (99.98%) predict when a customer, after reacting to sale, will not purchase. It performs very poorly if it has to predict whether a customer will convert (0.24%).

We can deploy this model in Wayfair's server during the next sale season to gauge whether a user is about to abandon cart after reacting to sale.

Deploy the predictive model to Personalize User Experience



As soon as our machine learning model identifies users who are about to abandon their cart, Wayfair can change their interaction with them:

- Offer a special VIP sale that ends in a few hours
- Grant the bored user a sneak peak into the new AR capability
- Show relevant recommendation based on user's demographics and search history
- Pop-up chat with interior designer consultant

Feedback/Q&A



Appendix



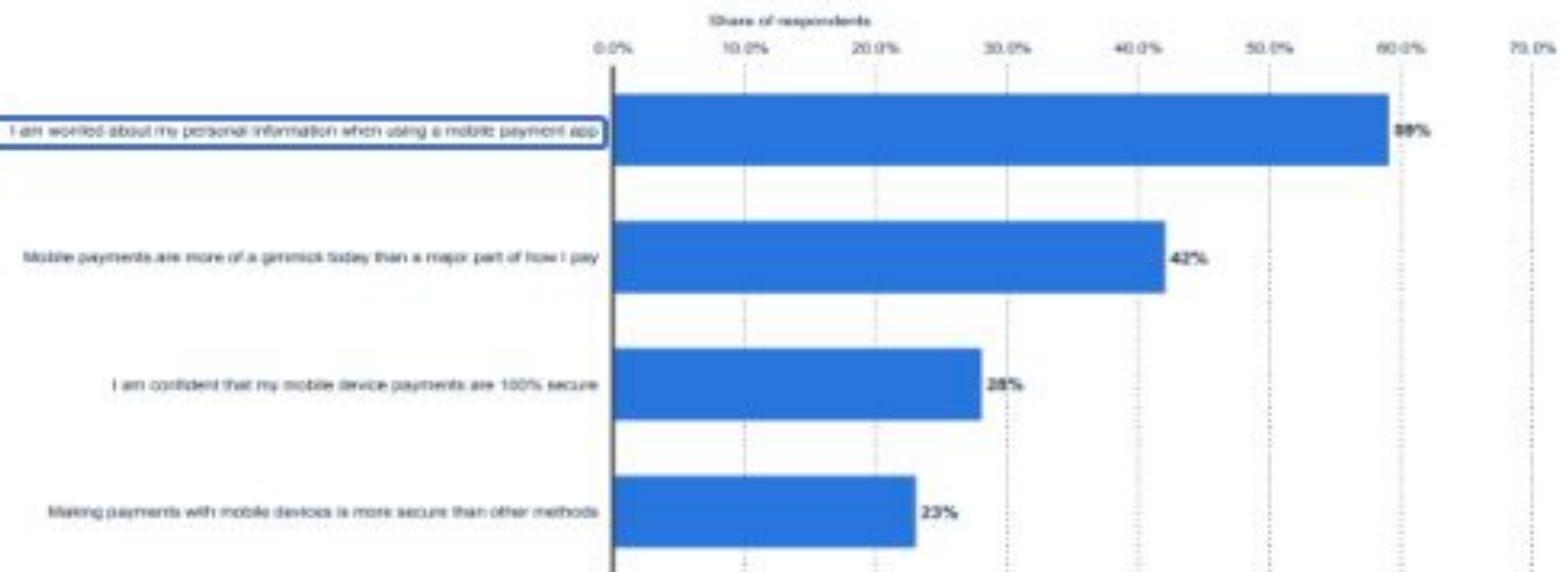
Wayfair should focus on impressions and not just Clicks

- According to a Mintel study, 39% of internet users notice ads and do not try to remove them.
- 37% state that they pay attention to ads whether or not they click on them. So while a click certainly indicates successful placement and creative materials, for about 1/3rd of adults, banner ads and pre-roll digital video ads are making a successful impression even though they don't click.
- Wayfair should focus on impressions, rather than clicks, as the basis of sales.

The image shows a screenshot of the Wayfair website. At the top, there is a navigation bar with the Wayfair logo, a search bar, a camera icon, 'Room Ideas' dropdown, 'Sale' link, 'FREE Shipping Over \$49' link, 'Account' dropdown, and a user profile icon. Below the navigation bar, there is a horizontal menu with categories: Furniture, Bed & Bath, Rugs, Décor & Pillows, Storage, Lighting, Kitchen, Baby & Kids, Outdoor, Renovation, Appliances, and Home. A large promotional banner for an 'Early-Access OUTDOOR SALE' is displayed, featuring a wooden swing set with colorful pillows and a large red circle with white text 'UP TO 70% OFF'. The background of the banner shows a bright outdoor patio area with a white sofa, a round ottoman, and various plants. The overall theme of the page is home improvement and outdoor living.

Attitudes towards mobile payments according to online shoppers in the United States in 2017

U.S. shopper mobile payment attitudes 2017



Most convenient to use money transfer and payment apps according to users in the United States as of July 2017

U.S. opinion on most convenient money transfer and payment apps 2017



Mobile Payment Trends

Source: Statista



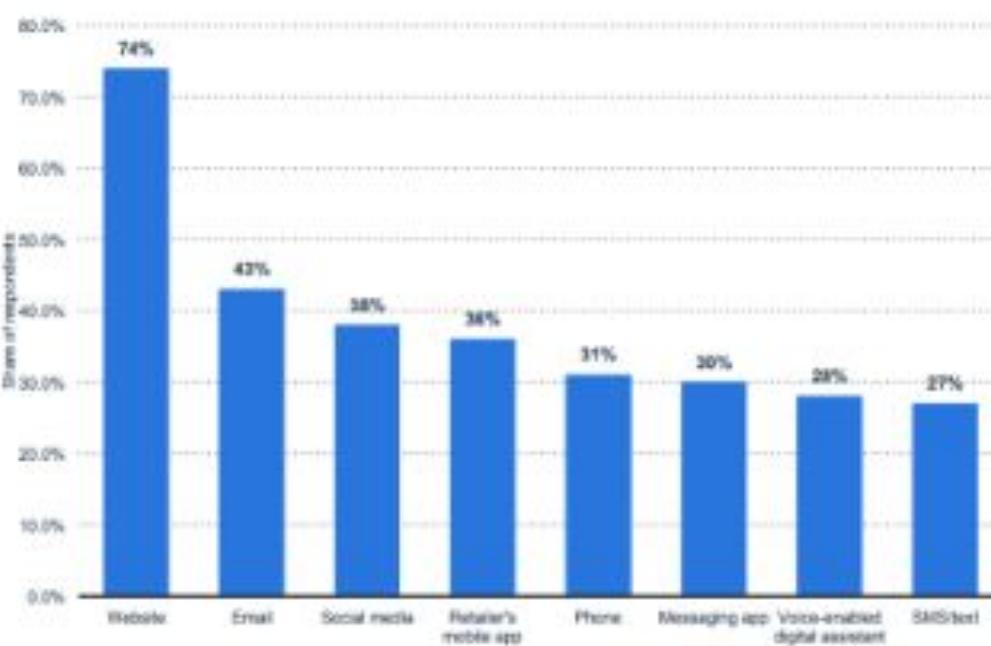
Why Random Forest?

- Random Forest (RF) is a collection of Decision Trees (DT).
- The biggest problem with a (deep) DT is that it can **overfit**. DTs can “memorize” the training set like a person can memorize an Eye Chart.
- The point of RF is to prevent overfitting by creating random subsets of the features and building smaller (shallow) trees using the subsets and then combining the subtrees.
- The downside of RF is it can be slow if you have a single process but it can be parallelized.

User Behavioral Trends (2017)

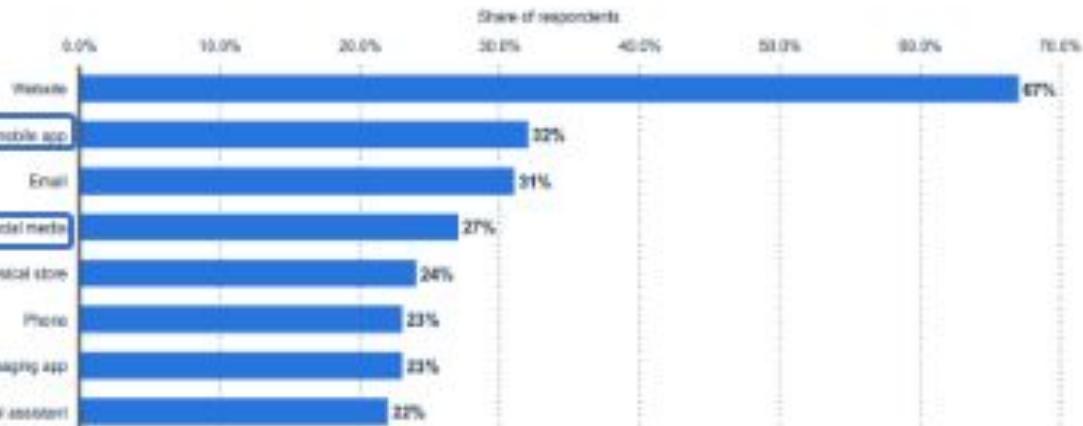
Source: Statista

Which channel do you use to research products from online retailers? (2017)

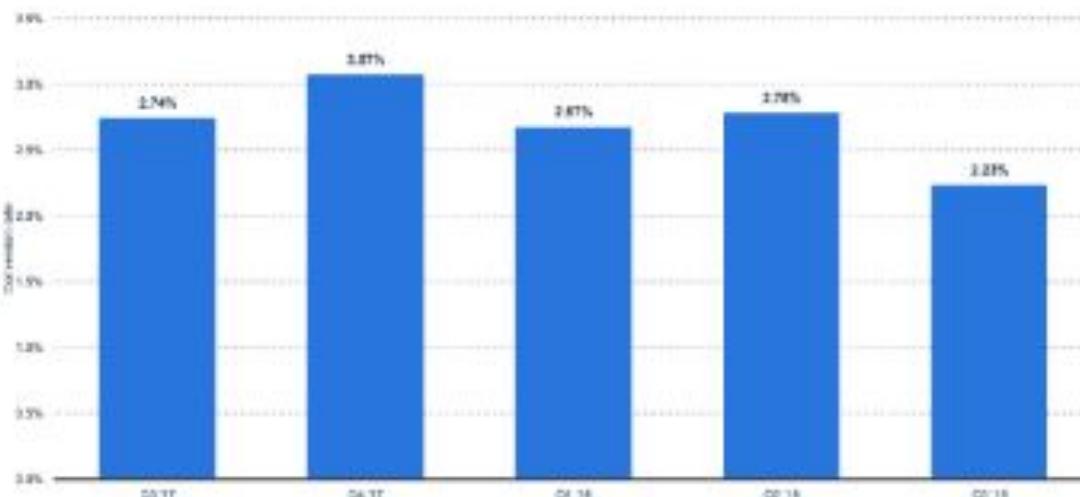


Which of the following channels do you use today when buying products from an online retailer?

Leading channels to purchase products from online retailers in the U.S. 2017

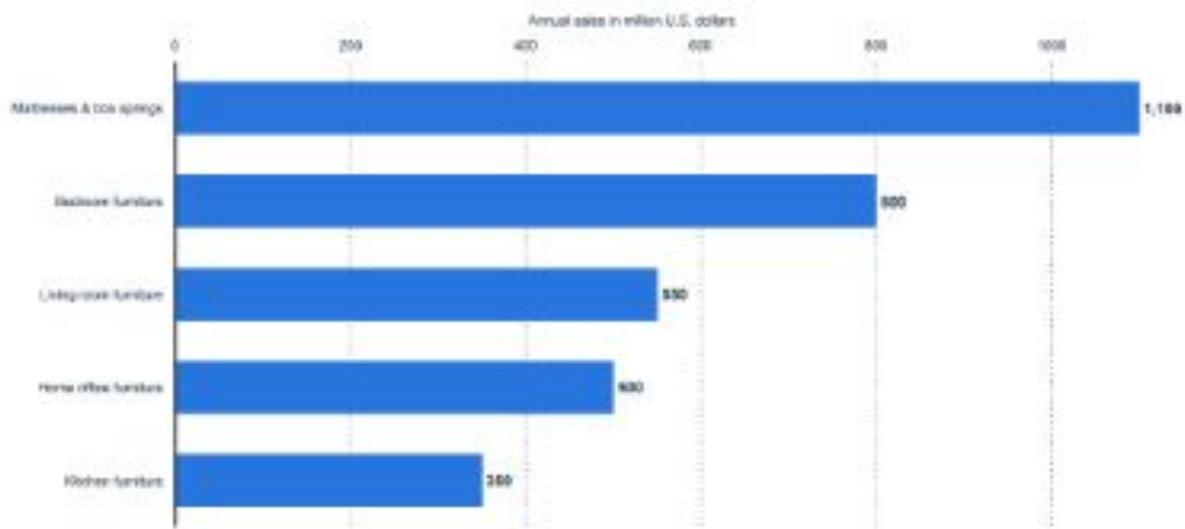


Conversion rate of online shoppers in the United States as of 3rd quarter 2018
U.S. online shopper conversion rate 2017-2018



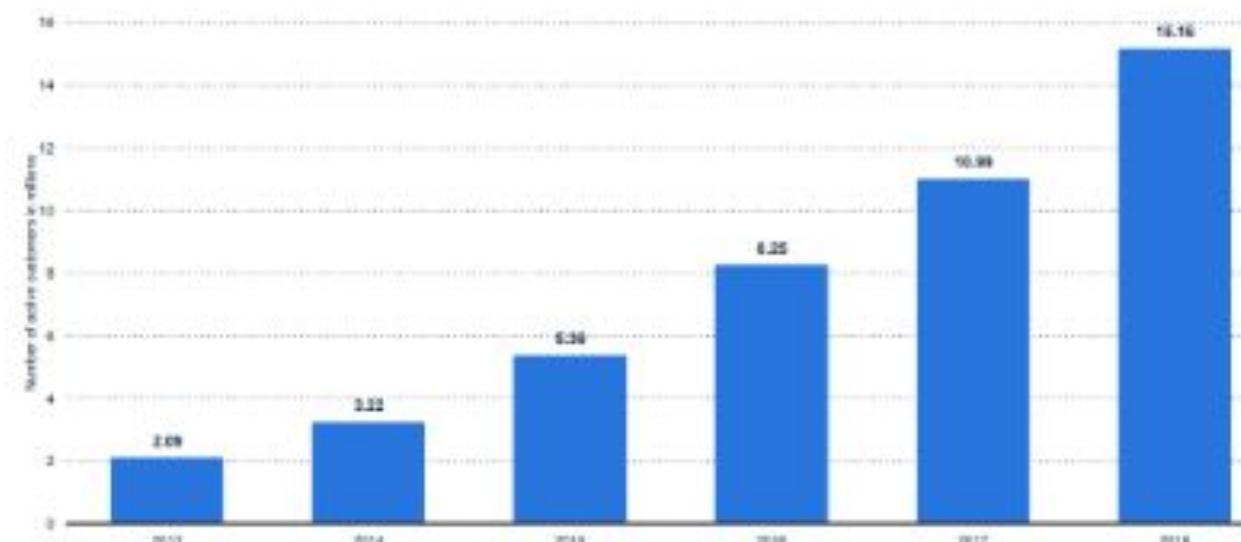
Furniture product category sales on Amazon.com in the United States in 2017 (in million dollars)

Amazon.com furniture sales in the U.S. 2017, by category



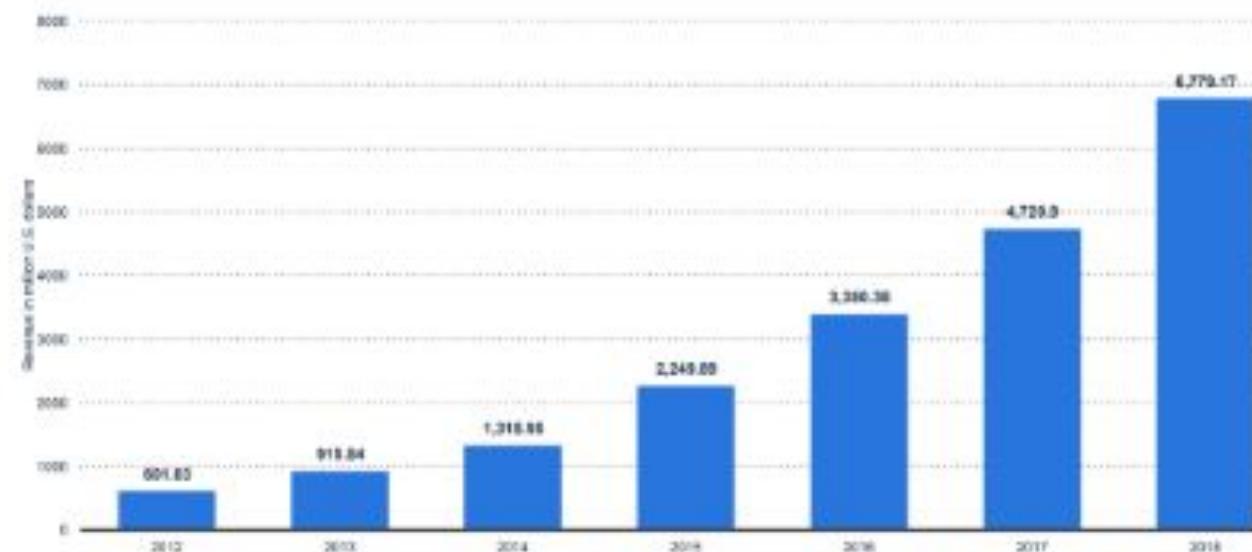
Number of active Wayfair customers from 2013 to 2018 (in millions)

Wayfair active customers 2013-2018



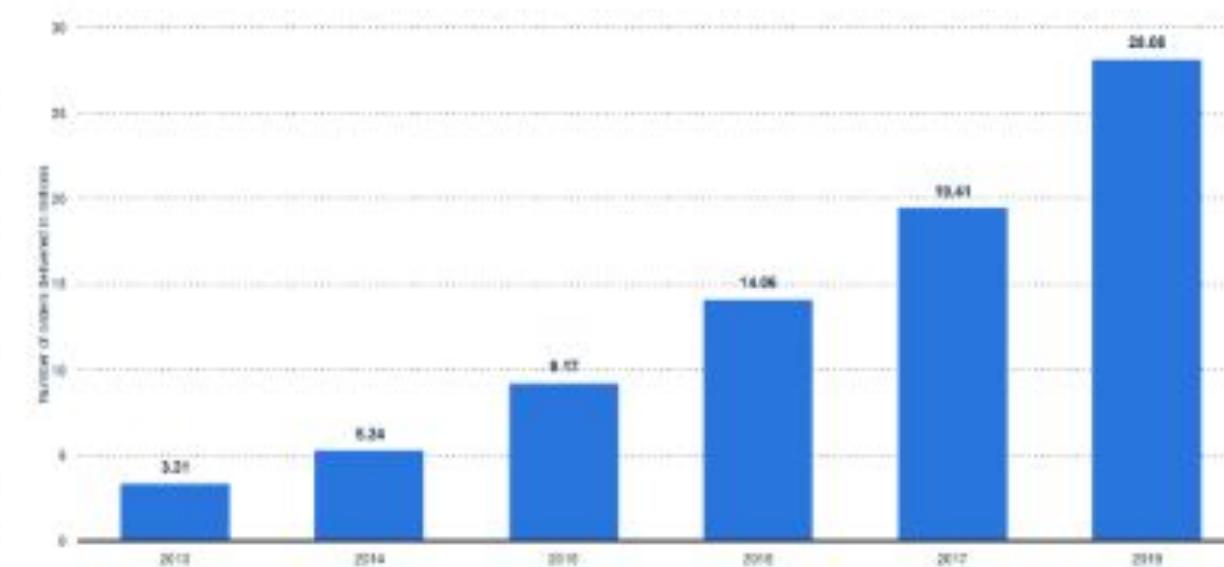
Annual revenue of Wayfair from 2012 to 2018 (in million U.S. dollars)

Wayfair annual revenue 2012-2018

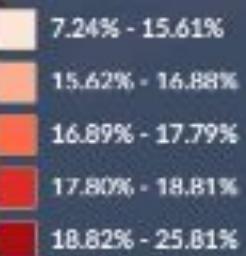


Annual number of orders delivered by Wayfair from 2013 to 2018 (in millions)

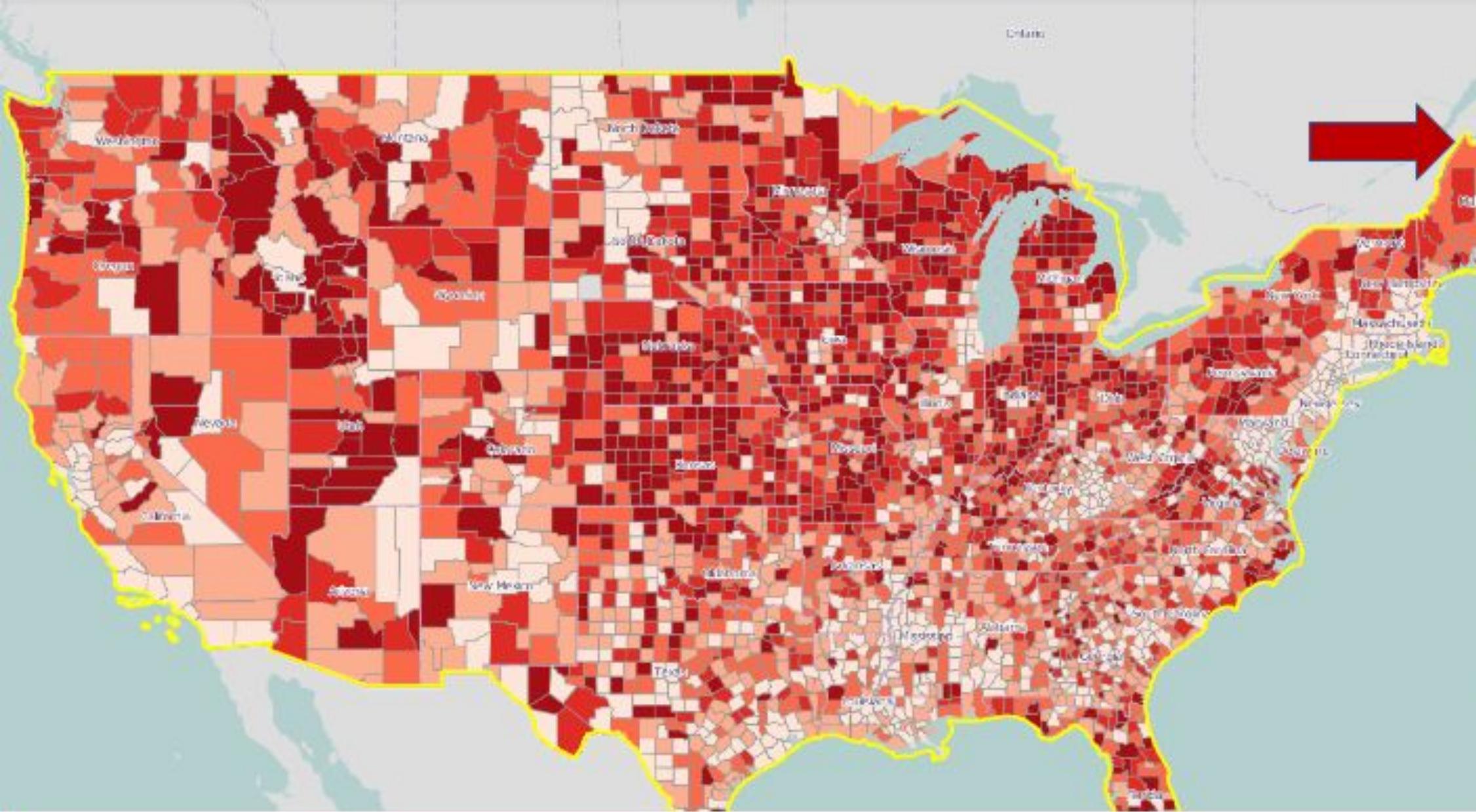
Wayfair annual order volume 2013-2018



% Households w/
Income \$50,000 to
\$74,999, 2018 by
Counties



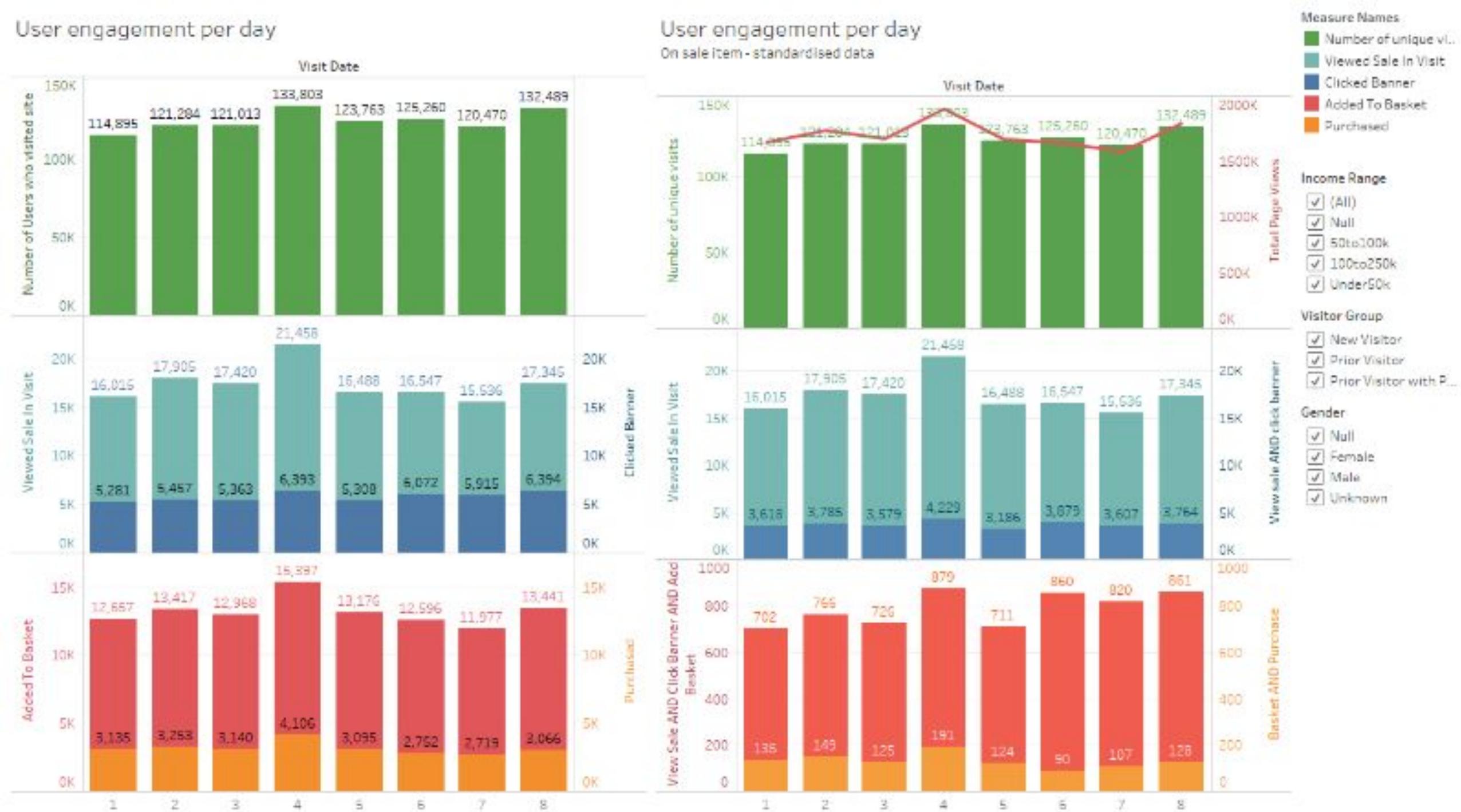
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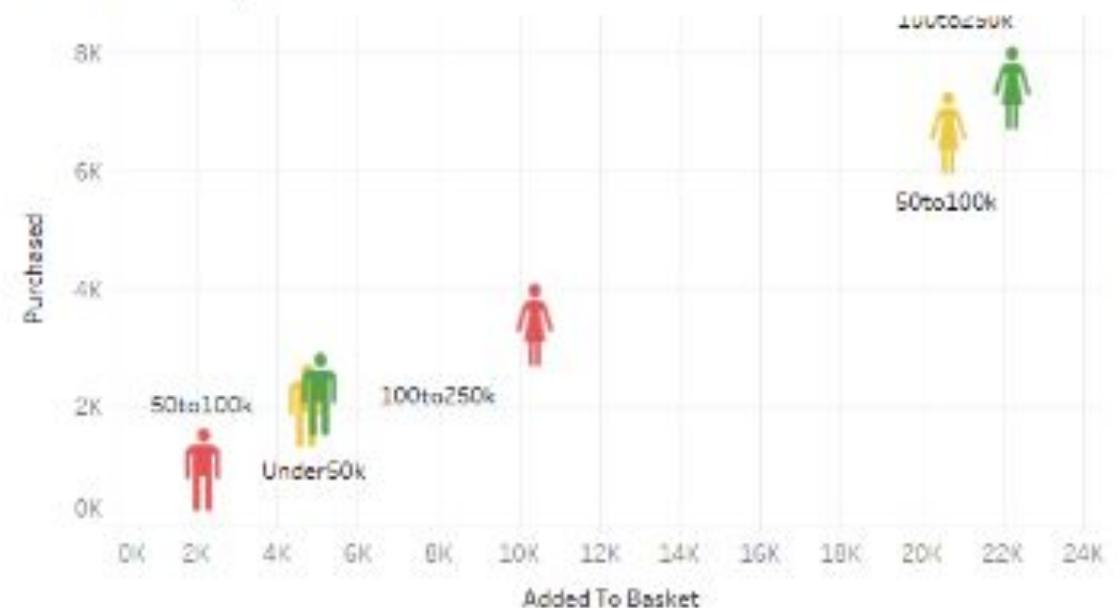
Use 'SimplyAnalytics' to find out the market size and market density by geographical area of Wayfair's target market

Tableau viz when looking
at Overall User Data





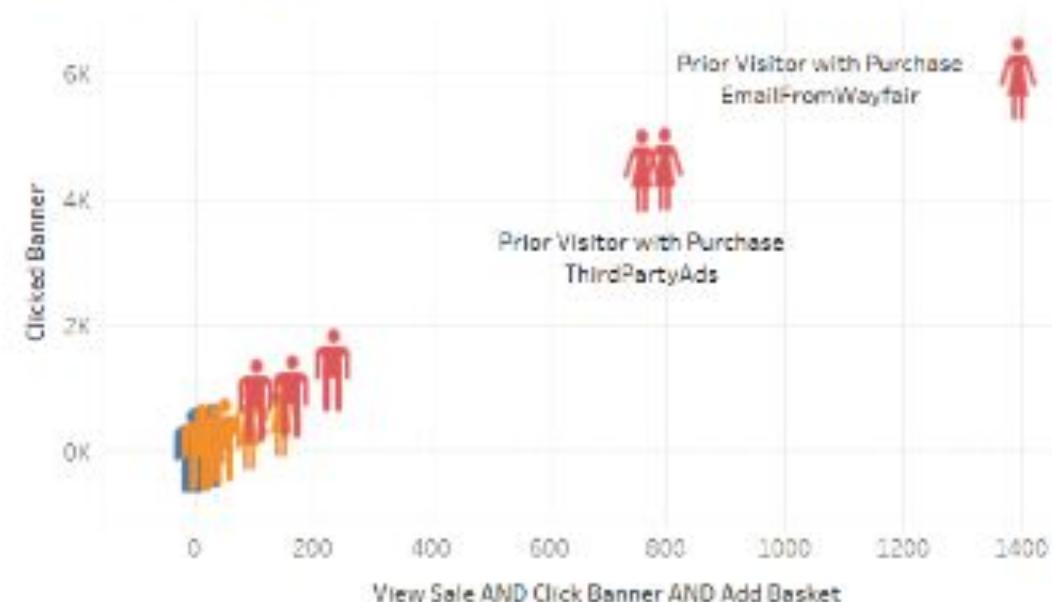
Income Group



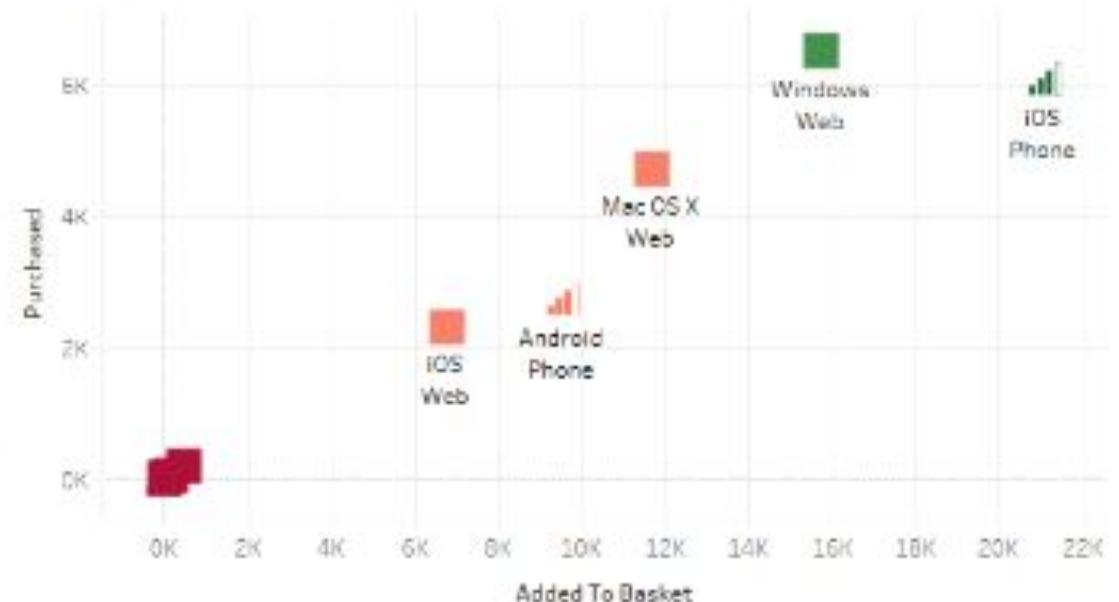
Visitor Group



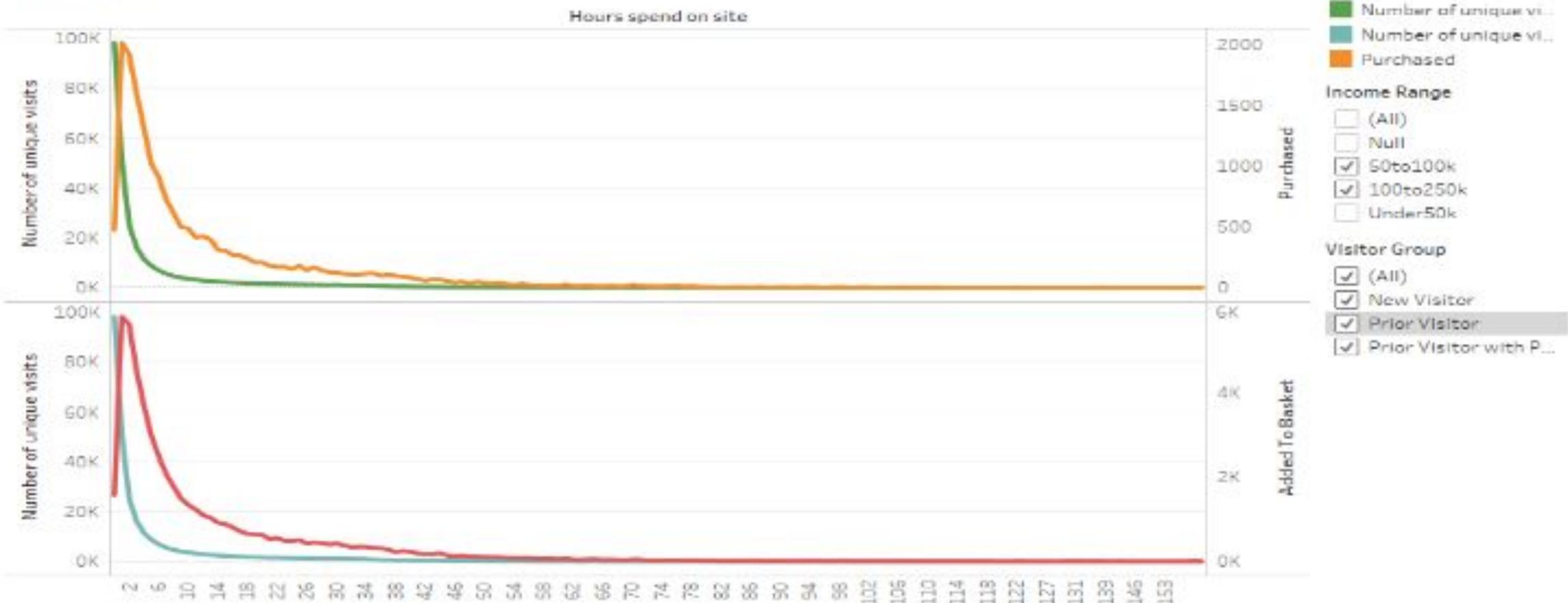
Marketing Medium



Platforms



Time spent vs purchases



Pages visited vs purchases

