Executive Summary

Overview

We will be conducting this analytical study on Netflix with an emphasis on its decline in total subscribers. This decline in subscribers is incredibly significant to Netflix's business model as subscription accounts for more than 99% of its revenue stream.

To answer this question, we first leveraged existing data from sources such as Kaggle and Google Trends. Then, we designed an online questionnaire focused on understanding what factors are most imperative to people using streaming services, what segments of users and audiences are there, and what are their individual needs. We have also analyzed this first-hand data using Factor Analysis, Segmentation Analysis, and Regression Analysis. As a result, we have developed several recommendations and marketing mock-ups based on quantitative results and managerial usefulness.

The Problem

Netflix, the company that spearheaded modern-day video streaming business models, is losing subscribers. Starting from Q4 of 2021, Netflix has been in a constant state of decline in total subscribers, which is its first subscriber loss in over a decade. We have identified four main reasons for the subscriber loss hitting Netflix right now: Competitors, Price, Movie Library, and Show Cancellation Strategies.

1. **Competitors**: With new entrants in the market, such as Disney+, HBM Max, Peacock, Paramount Plus, and Apple TV+, it has become increasingly difficult for Netflix to keep its title as the frontrunner when providing the same kind of offerings they had to consumers. Netflix has to up its game in order to stay competitive.
2. **Price**: Netflix subscription fees have become more expensive. The monthly price of the standard subscription has been increased six times since 2014, making Netflix the most expensive streaming service on the market. And it is still unknown how its new introduction of a "Basic with Ads" plan will be received by the market.
3. **Movie Library**: It is suggested that Netflix's movie library has shrunk by more than 40% in 2022, now that traditional entertainment titans are all branching into streaming themselves.
4. **Netflix's Show Cancelling Strategy**: Netflix evaluates a show's performance by balancing viewership against the cost of the renewal process with heavy reliance on algorithms. This over-dependence on algorithms could cause failures since they might not capture everything and the data may be incomplete, which both lead to fallacious results.

The Solution

To summarize our analysis and conclusion, we have come up with the following recommendations for Netflix to reverse its losing trend in total subscribers:

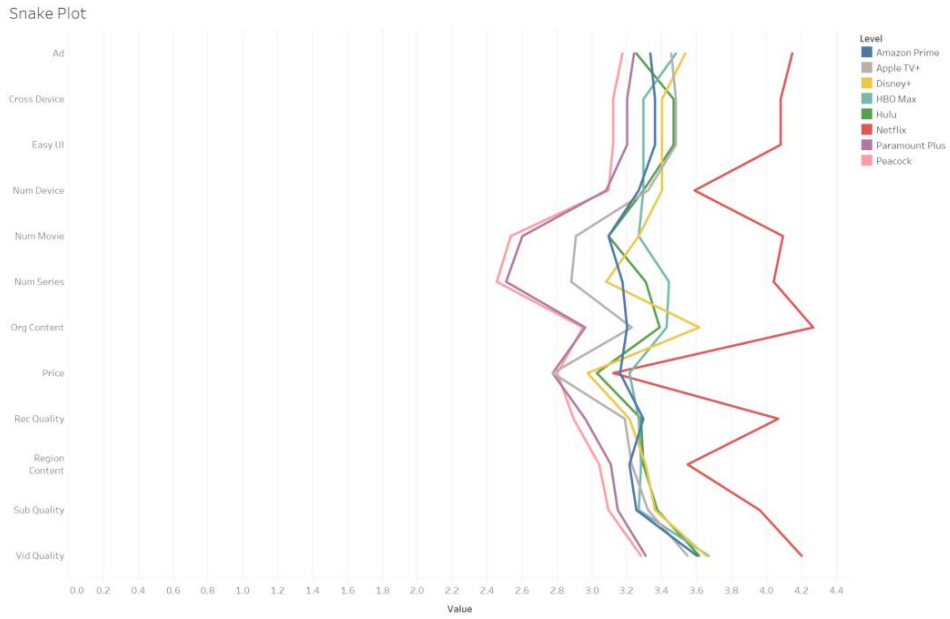
1. **Prioritize productions of Romance and Reality TV Netflix Original content**
   Our segmentation analysis results as well as Netflix's own past success in creating original content in these genres both showcase the benefits and potential success that

could come with this implementation. We strongly believe that Netflix should consider this adoption as making more Netflix Original romantic or reality content would also further enrich Netflix's movie library.

2. **Continue to better user experience on the platform**
   Our segmentation analysis also indicated that user experience is a heavily prized aspect of video streaming for consumers. It is also suggested from web research that user interface and cross-device experience have positive impacts on willingness to continue subscriptions. Therefore, continuing to better UX should be another main area of focus for Netflix.
3. **Explore alternative sources of income other than being heavily reliant on subscription fees**
   With more than 99% of its revenue stream coming from subscriptions, this stream of subscriber loss has a huge impact on Netflix's quarterly performance. Therefore, we believe that instead of fixating on subscription-based income, Netflix should venture into alternative income sources, such as movie production and the box office.
4. **Improve its show cancellation rule and deepen the collaborations and conversations with showrunners and producers**
   Netflix's cancellation rule should not depend only on algorithms and the balance between costs and revenue. Instead, conducting regular social listening analyses and collaborating more closely with showrunners and producers would help Netflix create better shows that cater to the need of the market.

Highlights

We asked respondents to rank the performance of each video streaming platform of each of these factors from one to five (worse performing to best performing). From the snake plot, we can see that Netflix performed the best among all factors, but is considered only third best when it comes to price. This calls for a desperate need for change in Netflix's revenue model. Since while they heavily rely on subscrition fees, consumers are not satisfied with the amount they are paying and just might switch because of this.



Define the Marketing Analytics Research Study

The company we will be conducting the analytical study of is Netflix. Netflix is losing subscribers starting this year, its first subscriber loss in over a decade. Since it is a subscription-based business model, that hampered its revenue growth and decreased its stock price.

According to Netflix's quarterly earnings report shown in Figure 1, the number of total subscribers declined from 221.84 million in 2021 Q4 to 221.64 million (-0.09%) in 2022 Q1 and continued decreasing to 220.67 million (-0.44%) in 2022 Q3. For the regional breakdown shown in Figure 2, UCAN, EMEA and LATAM all experienced the drops; only the number of paid memberships in APAC increased. Figure 3 shows that the revenue growth by quarter slowed down and even dropped in Q3 2022. According to TechCrunch reports, Netflix’s market share has dropped significantly from 55.7% to 45.2% globally between Q1 2020 and Q1 2022. Its shares decreased by 23% in after-market trading on the news of the subscriber declines, eliminating $30 billion in market value. According to Yahoo Finance, its stock price dropped by 38.2% in Q1 2022 and dropped again by 52.9% in the next quarter as shown in Figure 4.

There were many discussions on the reasons for the decline in subscribers. According to TechCrunch reports, the competitive landscape changed and heated up. Netflix historically competed with linear TV, Amazon, Youtube and Hulu, but traditional entertainment companies began to realize streaming is the future and launched streaming services. So new entrants, such as Disney+, HBM Max, Peacock, Paramount Plus and Apple TV+, came to the market and increasingly became competitive. On the other hand, Netflix subscriptions have become more expensive. The most recent hike brought the price to $15.49, almost double the original $7.99. Netflix is now the most expensive streaming service. In addition, a 2019 study suggested that the library of movies on Netflix had shrunk by more than 40% in 2022 (Michael Kennedy, 2022). Netflix seems to have almost no quality control on the originals, which Netflix was famous for,

since it released as many bad ones as good ones (for example Adam Sandler's Netflix movies). The cancellation rule was also a big problem. It evaluated a show's performance by balancing viewership against the cost of the renewal process and the decision-making process was commercially sensitive. The evaluation was in secrecy, not disclosed to showrunners, so they didn't know how their shows performed. Also, the over-dependence on algorithms could cause failures since the algorithms might not capture everything and the data may be incomplete. For instance, it abruptly canceled 'GLOW', which was a hit. Whereas, its rivals released episodes weekly instead of dropping them all at once, which drove more engagement and repeat viewership as well as drawing for talents because showrunners and producers could understand the decisions being made better and were confident that their shows would be marketed.

In sum, Netflix is losing many subscribers. The possible reasons found by previous research and analyses are increasing competition, higher subscription prices, and the shrink of good content caused by producing bad originals and inappropriate cancellation rules.

Analyze Available Existing Data

To understand how customers perceive the streaming service provided by Netflix and its competitors, we conducted research on Google Trends, Google Play Store Review, Twitter, and an external dataset downloaded from Kaggle.

(1) Trend analysis with Google Trends

We explored the following 3 topics by conducting trend analysis on Google Trends over the past year: how frequently Netflix and its competitors are searched by people in different markets, which attribute of Netflix has been frequently mentioned, and which attribute of the streaming service does customer search the most.

To realize how popular each streaming service is in the US, we compared the number of Google searches of Netflix and its major competitors (Hulu, Disney+, HBO Max, Amazon Prime Video) in the US. We can tell that Netflix ranks first in search over the past year by looking at Figure 5. Disney+, Hulu, HBO Max, and Amazon Prime video rank 2nd, 3rd, 4th, and 5th respectively. Next, Figure 6 provides detailed information on the breakdown by different countries. We can find Netflix dominates most of the international markets. The second place of each country usually depends since these streaming services choose to launch their services in different markets and they have launched their service for different lengths of time. For example, Disney+ ranks 2nd in the UK while Hulu ranks 2nd in Japan.

After we understood how popular Netflix is in each market, we were curious about what people are searching for about Netflix. Figure 7 displays trends for several Netflix-related keywords. We can find out that people are most interested in Netflix movies, followed by

Netflix series, price, and quality. On the other hand, we would like to know what attributes customers care about when they search for streaming services. Figure 8 indicates trends of different descriptions for best streaming services. Customers are interested in the best movie streaming service, followed by the best quality streaming service, best value streaming service, and best tv series streaming service.

To conclude the trend analysis, we can tell that Netflix dominates the search in the US and other countries. When it comes to the most popular streaming-related keywords, “movie” outperforms other keywords. Meanwhile, Netflix is also well-known for its movie collection. From the perspective of trend analysis, we can conclude that the competition in the streaming market could be a potential reason for the drop in Netflix’s market share.

(2) Sentiment Analysis with Google Play Store review

To realize what customers are complaining about Netflix, we scraped 10,000 app reviews from Google Play Store using the Google Play Scraper library in Python. All reviews collected were created in either August or September 2022. Figure 9 shows the distribution of the ratings among 10,000 reviews. The average rating of Netflix is 3.79. Over 50% of reviews are 5-star. Next, we conducted sentiment analysis on the reviews. Figure 10 shows the sentiment score distribution of the sample. Only 7% of reviews got a net negative sentiment score.

To discover the common themes mentioned in negative comments, we conducted a word count on comments. Figure 11 shows the top 50 most frequent terms and phrases within all comments while Figure 12 shows the top 25 terms and phrases within negative comments. From the word count, we can see that there are several themes users complain about:

- UX: black screen, new subtitle with black background
- Payment: payment method issue
- Value: waste of money, waste of time
- Corporate function: poor customer service
- Content: Vampire Diaries expired, Stranger Things delayed-release

To conclude the sentiment analysis, we can tell that there are several common topics complained about by customers. These topics will become a good resource for survey design in the next section. These topics could be potential reasons for the drop in Netflix’s market share.

(3) Sentiment Analysis with Twitter

To get people's feelings about Netflix, we scraped 23,040 tweets written in English, using the snscrape library in Python. The tweets were from January 2022 to September 2022.

Using the text explorer in JMP, we found the common themes through the terms and phrases that appeared frequently in the tweets. According to Figure 14, the most frequent phrase was 'Season 2' which appeared 249 times, indicating eager anticipation for the following seasons. The second most frequent phrase was 'stranger things', one of Netflix's flagship series and other famous series also appeared a lot with praise, such as 'Dahmer – Monster: The Jeffrey Dahmer Story' and 'All of Us Are Dead'. Additionally, there was much excitement on Netflix bringing back Cameron Diaz as shown in Figure 17. These indicated the need to continue creating high-quality original series and keep popular series as well as famous actors in order to retain and attract subscribers.

HBO Max and Amazon Prime, two of the competitors, were mentioned the most. Many people used or subscribed to multiple platforms and they often compared and used alternatively. Some mentioned the Amazon Prime video bundled with prime membership and the low charged price in contrast with the great increase in Netflix's subscription price. In addition, the term 'cancel' appeared 518 times. After closely looking at the texts (selected tweets shown in Figure 18), we found the main reasons for canceling subscriptions were the increased subscription price and cancellations of shows. These implied more intense competition, customers being more price-sensitive and their dissatisfaction with Netflix's recent strategies.

Then we conducted sentiment analysis. Figure 13 shows the distribution of the sentiment scores among all tweets with scores. The average score is 39.6 and the proportion of positive tweets is 77.2%. According to the word count for the negative tweets, the texts related to the terms 'hate' and 'money' showed additional complaints about the lack of variety in the original series Netflix produced and quickly taking off newly released movies. There were complaints about Netflix judging the shows based on money not quality, which corresponded with the commercially sensitive decision-making process illustrated in previous studies.

(4) Quantitative analysis with Netflix Catalogue dataset downloaded from Kaggle

We noticed people complaining about the increasingly low quality of content and the lack of accessibility to TV series and movies. We downloaded the Netflix Catalogue dataset from Kaggle to figure out the trends of the number of shows and movies across time on Netflix.

By adding up the total number of movies and shows in each month, we plotted the trends of how the total number of contents changed from Jan-2016 to Sep-2020. From this plot, we noticed that from the middle of 2016 to the middle of 2020, Netflix kept

increasing its content. However, starting from mid-2020, the number of contents had a sharp decrease.

To take a closer look at how this pattern formed, we plotted the number of contents added and removed over time in the same axis. We noticed that the number of contents removed has a steep increase, however, Netflix didn't increase its content accordingly. Therefore, the total amount of content decreased.

Collect and Analyze Survey Data

(1) Survey Design

Our survey splits into four parts, in the first part, we asked about respondents' behavior in using streaming services to gain a better understanding of our respondents. Questions like watch frequency, how much time and money spend, favorite streaming services, etc. are listed. We also asked respondents to rate their preference for different genres on a scale of 1 to 5.

In the second part, we wanted to understand how different attributes and features of streaming services affect customers' purchase behavior. We asked respondents to rate factors including, a large number of movies I like, price of subscription, quality of the recommendation system, original content, cross-device compatibility, etc.

The third part was designed for the positioning analysis. We wanted to understand how Netflix is perceived by customers. Therefore, we first asked customers to rate Netflix. And then we asked them to rate each competing brand accordingly. Hulu, Amazon prime, HBO Max, Disney+, Paramount Plus, Peacock were selected as Netflix's competitors. For this part, we used the same attributes and features asked in the previous part.

Every respondent was required to answer all the questions in the first three parts. However, in the fourth part, we separated the customer into 3 blocks. We divided the respondents by asking if they are current Netflix subscribers, and if not, then they will be asked if they have ever subscribed to Netflix before. By this method, we're able to divide respondents into 3 blocks including Netflix subscribers, Netflix churners, and non-Netflix users. For the Netflix subscribers, their behavior and experience of using Netflix were being questioned. One net promoter score question was also included. We wanted to know how to win back lost subscribers, therefore, for the Netflix churners we added a question asking what will make them decide to subscribe again in the next 3 months. Other questions are the same as Netflix subscribers. For non-Netflix users, since they haven't used it before, we couldn't ask them Netflix specific questions, they will be moved to the final question directly.

The final question is related to Netflix's "Basic with Ads" plan. A full question list can be found in the appendix.

With all the data we get from the survey, we're able to perform clustering, positioning analytics and regression analysis.

(2) EDA

Our survey has a total response of 75. 44 of our respondents are current Netflix subscribers. Among the 31 non-subscribers,16 of them have subscribed before, for some reason they canceled their subscription. (Figure 21,22)

76% of the respondents spend less than $14 each month on streaming services which is lower than the cost of a standard Netflix plan ($15.49) as well as HBO Max ($14.99). Probably because people share accounts and they split the bill. (Figure 23)

62.67% of the respondents chose Netflix as their favorite video streaming service. After adding "If Netflix subscribers" dimension to the view, we noticed that 27% of the Netflix current subscribers didn't choose Netflix as their favorite, indicating that they are not fully satisfied with Netflix. 9% of Netflix subscribers chose HBO Max as their favorite. 7% of them chose Hulu. Also, it's interesting that none of Netflix's current subscribers chose Amazon Prime Video as their favorite. None of our respondents chose Paramount Plus or Peacock as their favorite. (Figure 24)

We also investigated whether Netflix subscribers also subscribe to other streaming services at the same time. Among 44 Netflix subscribers, 13 of them also subscribe to HBO Max and Amazon Prime Video. This pattern indicates HBO Max and Amazon Prime Video have high-quality content that Netflix doesn't have, people have to subscribe to both services to get full access to their desired content. We also investigated non-subscribers' subscription lists. Among the non-Netflix subscribers, 30.77% of them don't subscribe to any streaming service. We can conclude that most of the people who do subscribe to streaming services are highly likely to subscribe to Netflix. Also, 23.08% of non-Netflix subscribers subscribe to HBO Max. It seems HBO Max is Netflix's biggest competitor. (Figure 25, 26)

By plotting the churner's subscription time, we noticed people who subscribe for less than 3 months are most likely to churn. And launching high-quality TV series would be the key factor to winning them back. (Figure 27, 28)

Netflix is launching a new subscription plan called "Basic with ads". The "Basic with Ads" option will include an average of four to five minutes of commercials per hour. Those ads will be 15 or 30 seconds in length and will play before and during TV series and movies. Subscribers can enjoy limited Netflix content in HD video quality on only one supported device. We're curious about whether people would be interested in that plan. Therefore,

we asked how much people are willing to pay for this service. The survey results show that most respondents would like to pay approximately $5 for this service which is a little bit lower than Netflix's offer of $6.99. (Figure 29)

(3) Clustering

We leveraged hierarchical clustering to segment our respondents. We included question sets 8 (Different movie genres) and 9 (Different offerings of video streaming) in this section of analysis. Since we did not observe an apparent elbow in our scree plot, we decided to move on with three clusters as our number of segments as it causes a moderate amount of data loss according to the dendrogram and makes the most sense from a managerial perspective. The following are the description of each segment:

Segment 1

- 35 people are in this segment – consisting of 47% of the pool of respondents
- Hopeless Romantics – Most likely females who enjoy romance and reality TV drama, as well as original content from different platforms
- Consider Original Content an important aspect of video streaming services
- Enjoy the genre of Romance
- Enjoy the genre of Reality TV
- Do not enjoy the genre of Action, Science Fiction, or Documentary

Segment 2

- 13 people are in this segment – consisting of 17% of the pool of respondents
- Video Streaming Unenthusiasts – Most likely do not use streaming services, or simply rarely watch films and TV
- Do not consider Video Quality, Subtitle Quality, Recommendation System Quality, Ad-free experience, Number of devices allowed, Cross-device compatibility, Regional Content Availability, and Original Content important aspects of video streaming services
- Do not enjoy the genre of Fantasy

Segment 3

- 27 people are in this segment – consisting of 36% of the pool of respondents
- Streaming fanatics – Most likely use streaming services a lot in their free time, enjoy movies, and desire a seamless and smooth experience
- Consider the Number of Movies they like, Price, Video Quality, Subtitle Quality, Ad-free experience, Number of devices allowed, Cross-device compatibility, Easy-to-use Interface, and Regional Content Availability important aspects of video streaming services
- Enjoy genres including Action, Comedy, Fantasy, Science Fiction, and Documentaries
- Do not enjoy the genre of Romance

(4) Factor Analysis

From the scree plot, we can see that the elbow happened when there was 1 factor. But at 2 factors, there was also an elbow. This prompts us to look at the Eigenvalues chart. We can see from this chart that when the number of factors is one and two factors the Eigenvalues are all more than 1. We can also see from the cumulative percentage that when there is 1 factor, we cover 55.5% of the data. But when there are 2 factors, we can cover 70.4% of the data. Combining what we are seeing from the Eigenvalue chart and scree plot, we decided to use 2 factors the optimal number of factors. The following are the 2 different factors:
For **Factor 1**, we can see that User Interface, Subtitle Quality, Cross-Device compatibility, Number of devices allowed, Regional Content Quality, Recommendation System Quality, Video Quality, Ad-Free experience, Original Content, and Price all score high. Hence, we will name Factor 1 “Technical and Lingual Friendliness + Price Affordability”.
For **Factor 2**, we can see that Recommendation System Quality, Video Quality, Original Content, and Number of Movies and TV Series I like all score high. Hence, we will name Factor 2 “Content and Visual Quality”.

(5) Perceptual Map & Snake Plot

We structured the perceptual map and snake plot using Tableau and JMP Pro.
From our snake plot (Figure 30), we see that Netflix is the highest-performing streaming service in most variables and it is ranked third in price, behind Hulu and Amazon Prime Video.

From our perceptual map (Figure 31), we can see that Netflix is the front-runner in factors 1 and 2. For Factor 1, Netflix scored highest in technical and lingual friendliness among all streaming platforms.
For Factor 2, Netflix was also placed highest in content and visual quality, scoring far more than all other streaming platforms.

(6) Regression

To understand what stops users from keeping their subscriptions with Netflix, we conduct a regression analysis. The dependent variable is the likelihood of continuing their Netflix subscriptions in the next three months with a range of 1 to 5. On the other hand, we choose how users perceive Netflix from 12 different perspectives as our independent variables. Figure x shows the results of the initial model. We can find out that “number of movies”, “user interface”, “cross-device experience” and “recommendation system” are significant. Next, we build our finalized model with 4 significant variables. The results are shown below:

Summary of Fit

RSquare	0.601079
RSquare Adj	0.560165
Root Mean Square Error	0.659686
Mean of Response	4.181818
Observations (or Sum Wgts)	44

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	4	25.573200	6.39330	14.6910
Error	39	16.972254	0.43519	Prob > F
C. Total	43	42.545455		<.0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|	VIF
Intercept	0.7318113	0.582708	1.26	0.2166	.
number_of_movies_n	0.4590098	0.150339	3.05	0.0041*	1.7882481
recommendation_system_n	-0.484534	0.156658	-3.09	0.0037*	2.09683
user_interface_n	0.5172137	0.128676	4.02	0.0003*	1.794256
cross_device_n	0.3327188	0.138119	2.41	0.0208*	1.6020049

This model explains 60.1% variance of the likelihood of continuing subscription using 4 different variables. The Prob > F is less than 0.0001, which means this model is significant. All variables have a significant impact at 0.05 level. The most important independent variable is “user interface”. In terms of the level of significance, “recommendation system”, “number of movies” and “cross-device experience” rank 2nd, 3rd, and 4th respectively. In terms of impact on the likelihood to continue the subscription, “user interface” has the highest unit positive impact among all variables. A unit increase in perception of “user interface” leads to a 0.51 increase in likelihood. “Number of movies” and “cross-device experience” rank 2nd and 3rd in terms of positive impact. Interestingly, the better people perceive Netflix’s “recommendation system”, the less likely they are going to continue their subscription. A unit increase in perception of “recommendation system” leads to a 0.49 decrease in likelihood.

Recommendation based on survey results and analysis

From the results of our sentiment analysis, cluster analysis, factor analysis, perceptual map, snake plot, and regression analysis, here are our recommendations:

1. **Prioritize productions of Romance and Reality TV Netflix Original content**
   We can see that those in segment 1, which consists of almost 50% of the sample size, enjoy romance and reality TV, and they also consider original content an important element of video streaming services. On top of this, Netflix was also met with tremendous success when they release the dating reality series “Too Hot to Handle” back in 2020. Recently, ‘Stranger Things’ won lots of discussions on social media and helped Netflix slow down customer churn in Q2 2022. Therefore, Netflix should come out with more original content that caters to the preferences of these audiences.

2. **Continue to better user experience on the platform**
   For die-head streaming fanatics, a smooth and fluent in-app experience is a very important aspect of video streaming. UX was also a common complaint in Google Play store reviews. In addition, we found out that user interface and cross-device experience have positive impacts on willingness to continue subscriptions. Hence, in order to keep these people on our platform, Netflix should continue to maintain its current quality, as well as invest more in an even better recommendation system and user interface.

3. **Explore alternative sources of income other than its traditional subscription fee**
   From the sentiment analysis and cluster analysis results as well as our personal experiences, we know that price is something consumers are most focused on when it comes to Netflix. And as an attempt to satisfy consumers, Netflix came out with a basic-with-ad subscription plan.
   We believe that instead of fixating on subscription-based income, Netflix should venture more into alternative income sources, such as movie production and the box office. Take for instance “Red Notice”, the most popular Netflix Original movie of all time. It was streamed for a total of 364.02 million hours on Netflix. We can just imagine the gross income had it been released at the same time in theaters.

4. **Improve cancellation rule and deepen the collaborations and conversations with the showrunners and producers**
   Data-driven approach helped Netflix win a dominant position in the market in the past but some strategies need to take other factors into account. The cancellation rule should not depend only by algorithms and only consider the balance between costs and benefits. Conducting sentiment analysis on social media and surveys to understand customer interest would be beneficial to decision-making. It could consider releasing episodes weekly and collaborating more closely with the showrunner and producers so that they could better understand the decisions made by Netflix and know how to improve their plots later. That would also enhance their loyalty and produce more high-quality shows in accordance with viewers’ preferences and hot trends.

Mock up

For our mock up, we decide to visualize the third recommendation: Explore alternative sources of income other than its traditional subscription fee. (Figure 33 and 34) Netflix has actually ventured into the box office revenue stream recently, releasing the highly anticipated *Glass Onion: A Knives Out Mystery* out in theaters for a limited one-week only during thanksgiving break. From Friday to Sunday, it has outperformed releases from Disney and Steven Spielberg, making it the highest performing movie in the US and Canada. This success could encourage internal teams to develop a model simulating the decision making process of where to show the movie, where to set up pop-up store for official merchandise, and estimating box office revenue. The model could take in variables such as genre, actor, director, potential customer profile (ip, demographic), number of search on Google Trends, discussion on social media, and page view of the

trailer as input. By leveraging machine learning, AI, and geo-targeting technique, the model would be able to predict estimated revenue and provide targeted zip code for decision maker to decide where to put their movies in the box office and pop up stores. These could consider as alternative sources of income.

Evaluate Your Analytics Research and Plan for Further Analytics Research

(1) Evaluation of analyzing existing data

Strengths:
Google Trends are valuable secondary data, showing the number of searches for different words and phrases and by different time periods and geographies. We get a sense of the popularity of Netflix and its competitors in the US and international markets from it. We also get insights about the content on Netflix that people are most interested in and the attributes they care about when searching for streaming services. This information helps us design survey questions.
Sentiment analysis on Google Play Store reviews and Twitter helped us realize common topics appreciated and complained about by customers. We then used these insights to provide specific recommendations to solve the problems.

Limitations:
When conducting trend analysis, we were not able to easily create different variations of the keyword and aggregate their trends together. That led to inaccurate estimates for the overall trend. For instance, “best movie streaming platform” and “best film streaming service” are the same set of keywords. However, the numbers of searches for these two terms were not able to aggregate as one line in Google Trends. What we can do is download the original dataset, do the calculations manually, and plot them out. If we were able to do it again, we would like to try a few more keywords, aggregate them based on topics, and observe if there will be new insights.

(2) Evaluation of analyzing survey data

Strengths:
The carefully designed survey questions enabled us to do cluster analysis, positioning analytics and regression. We identified three segments and provided recommendations corresponded to their characteristics. We created a snake plot to understand customers’ perceptions of Netflix and its competitors. Then we combined factors into 2 dimensions and created a perceptual map to see the positioning of Netflix. Through recognizing its strengths and weakness, we could suggest its improvement direction.
We also built a regression model to predict the likelihood that current subscribers would continue Netflix’s subscription in the next three months. The significant factors are the important aspects that Netflix should focus on to increase the subscription probability.

Limitations:
Since most of our respondents were students, we had an unrepresentative sample. That constrains us to study customer behavior thoroughly. If we were able to conduct the research again, we should definitely send the survey out to people with different backgrounds, stages of life, and income levels. In addition, we would like to recruit people who are actually familiar with or subscribed to multiple streaming services to help us fill out the survey. Based on the feedback we received from respondents, it's difficult for people who have never used a specific streaming service before to rank its performance on different attributes. If we were able to do the research again, we should spend more time on finding suitable respondents.

(3) Additional analysis to conduct

If we had more time and resources, we could study how customers perceive streaming services from a different perspective by running a multidimensional scaling on the dissimilarity/difference perceptions with two dimensions. We could also ask the respondents to rate ideal streaming services on different attributes and add the ideal point on the perceptual map. We would put more effort into the data processing for the textual data. Differentiating between the attitudes towards the Netflix platform and the attitudes towards the plots of the movies and TV series will give better sentiment analysis results. Some movie or series names contain negative words, such as 'limited series' and 'bad vegan', and that will cause wrong calculations on the sentiment scores.

Additionally, we would conduct geotargeting and ESRI Tapestry to study the profile of the segments and suggest digital marketing efforts strategies targeting particular regions.

Appendix

Figure 1: Number of Global Streaming Paid Memberships on Netflix over time

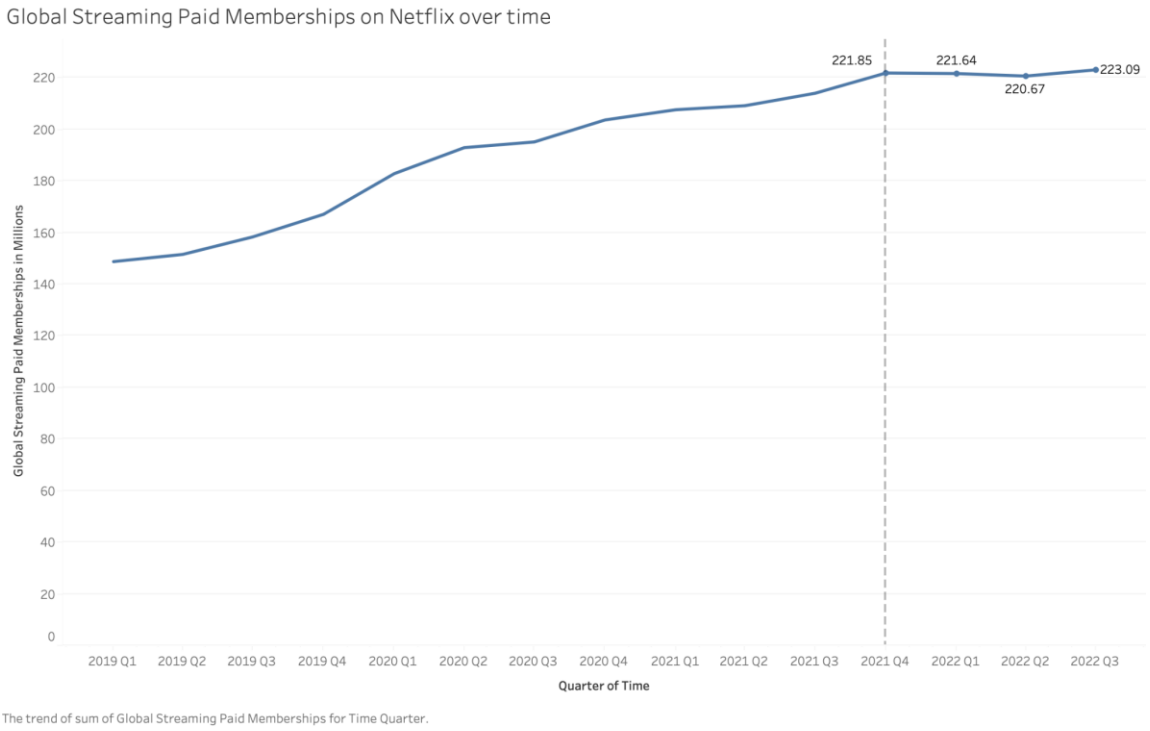


Figure 2: Number of Paid Memberships on Netflix by Region over time

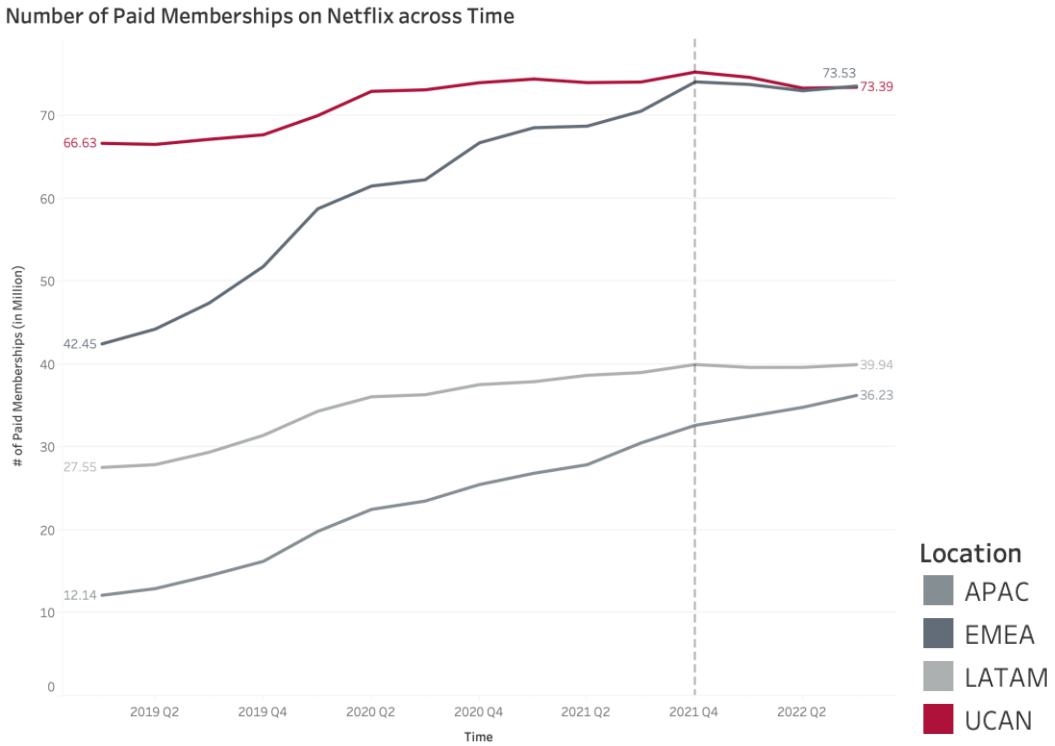


Figure 3: Netflix Revenue over time

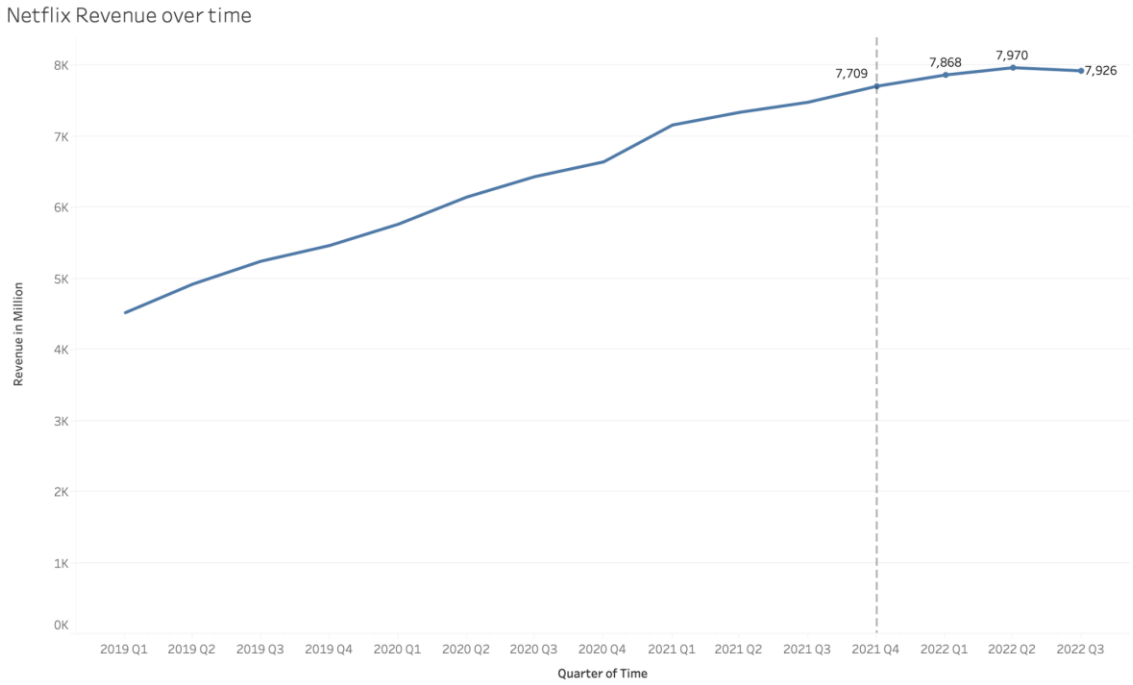


Figure 4: Netflix Stock Price over time

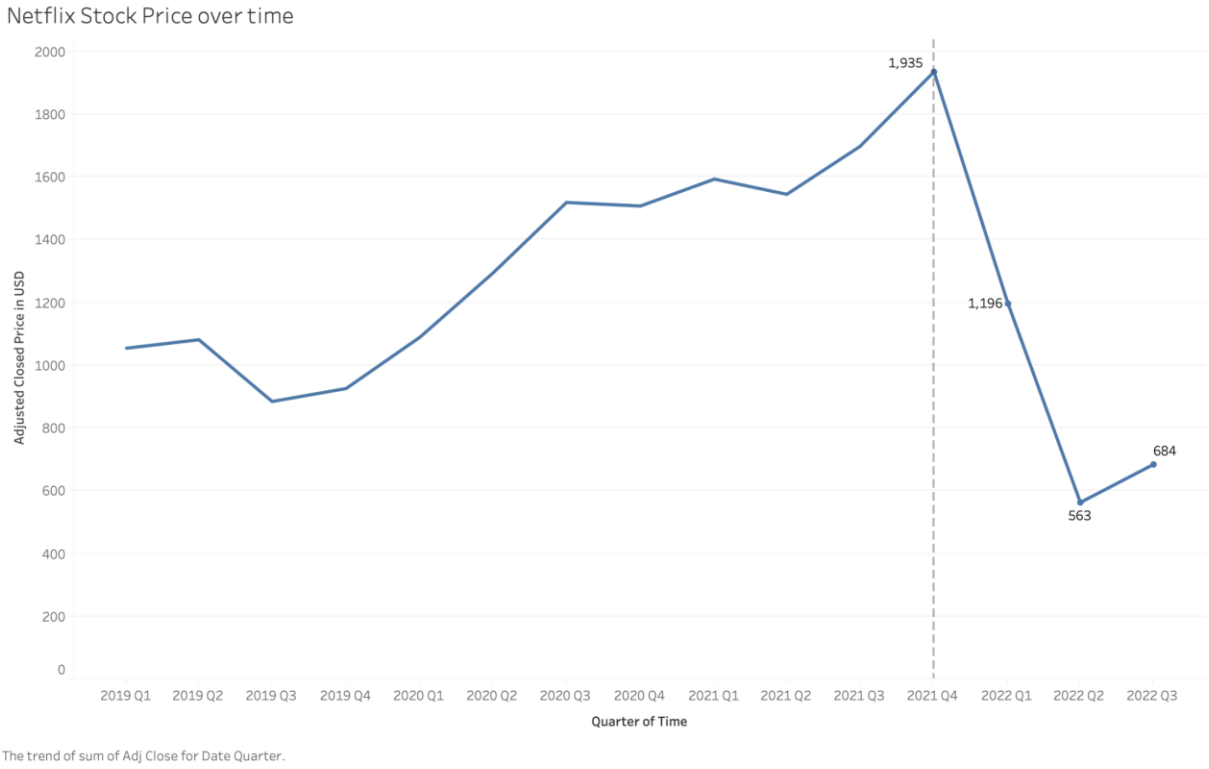


Figure 5: Netflix and its main competitors in the United States on Google Trend

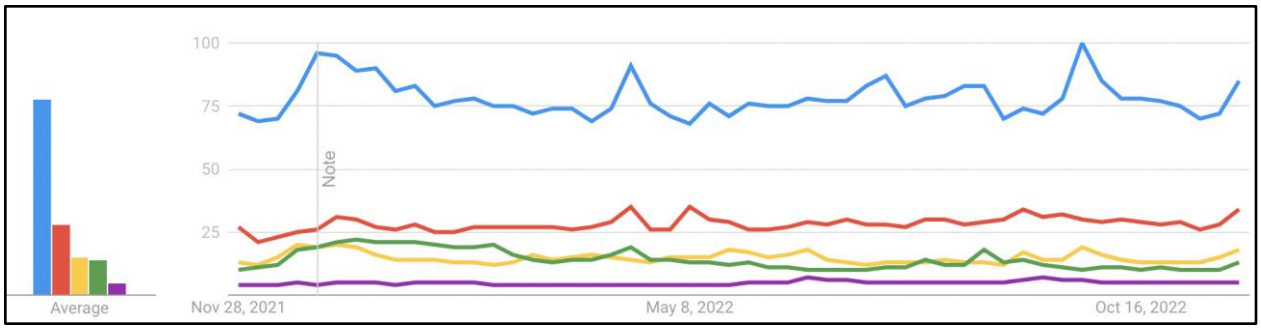


Figure 6: Netflix and its main competitors by different countries

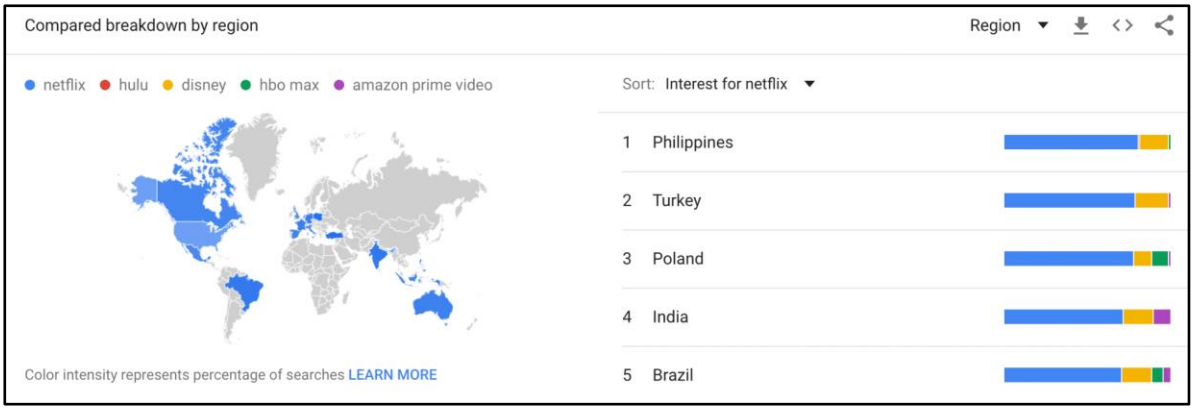


Figure 7: Keywords with “Netflix + attribute”

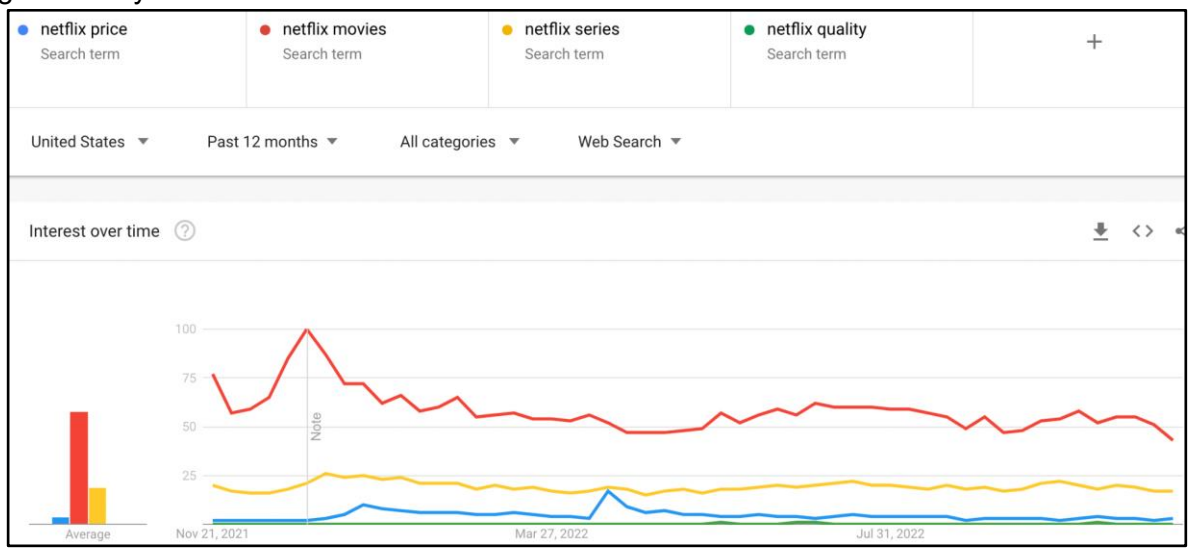


Figure 8: Keywords with “Best XXX streaming service”

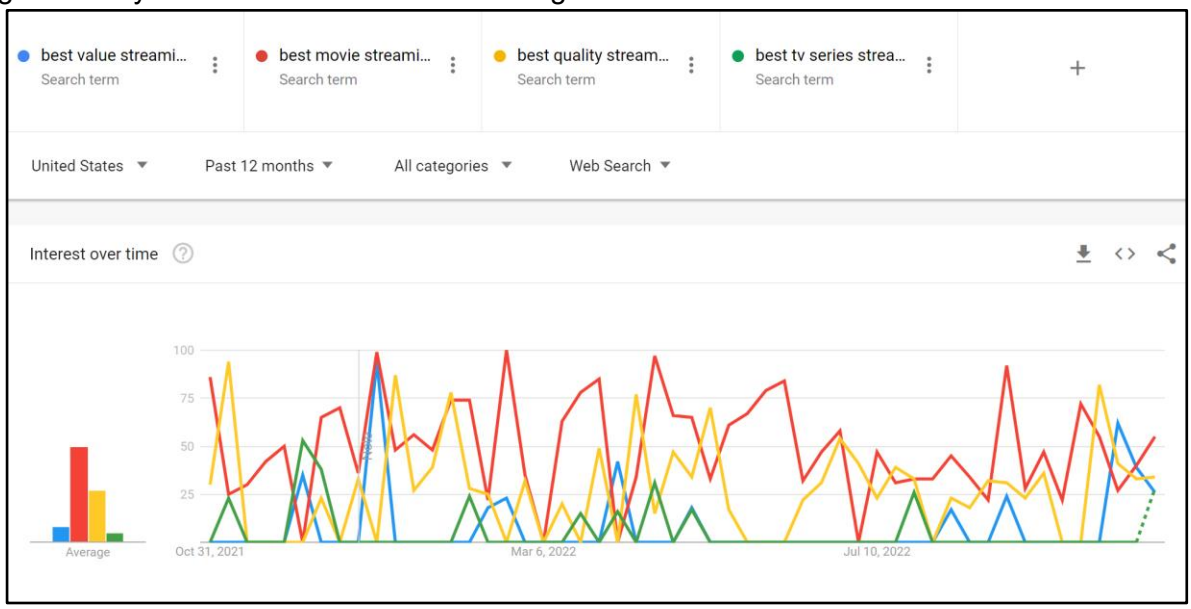
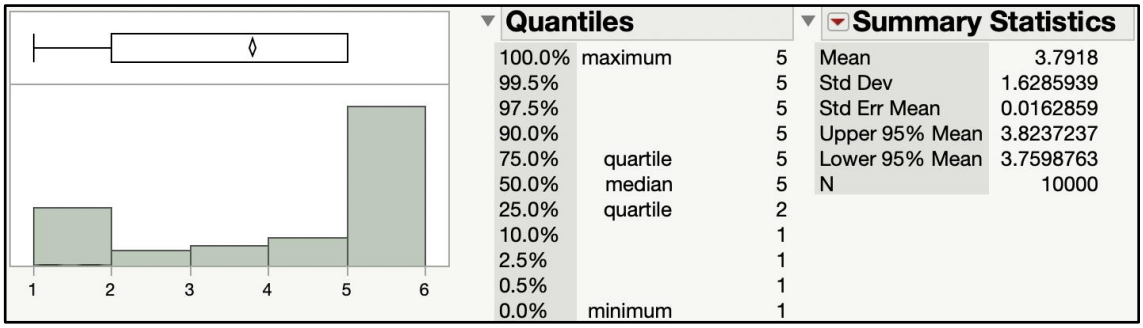


Figure 9: Distribution of ratings of Google review



Quantiles

100.0%	maximum	5
99.5%		5
97.5%		5
90.0%		5
75.0%	quartile	5
50.0%	median	5
25.0%	quartile	2
10.0%		1
2.5%		1
0.5%		1
0.0%	minimum	1

Summary Statistics

Mean	3.7918
Std Dev	1.6285939
Std Err Mean	0.0162859
Upper 95% Mean	3.8237237
Lower 95% Mean	3.7598763
N	10000

Figure 10: Sentiment score distribution

	N	Mean Score
All Scored Documents	5622	52.4
Net Positive Documents	4865	68.9
Net Negative Documents	722	-56.6
No Sentiment Documents	4378	0.0

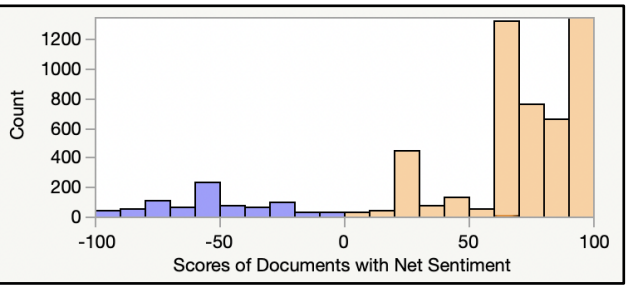


Figure 11: Word count for all comments

Term and Phrase Lists

Term	Count
app	2076
good	1733
netflix	1455
love	869
movies	844
watch	636
great	620
nice	580
best	561
like	520
please	491
shows	473
just	446
movie	342
really	290
even	273
fix	272
series	271
now	254
awesome	251
phone	248
time	247
watching	245
amazing	238
use	235

Phrase	Count	N
good app	181	2
love netflix	155	2
nice app	132	2
best app	118	2
great app	114	2
please fix	112	2
love this app	89	3
app ever	59	2
really good	54	2
shows and movies	49	3
good movies	48	2
watch movies	44	2
netflix app	42	2
good shows	41	2
tv shows	41	2
movies and series	40	3
stranger things	40	2
easy to use	36	3
movies and shows	36	3
new movies	36	2
please add	35	2
best app ever	34	3
5 stars	33	2
every time	33	2
watch anything	33	2

Term	Count
subtitles	223
show	218
update	218
new	214
one	214
want	206
bad	201
screen	196
tv	193
excellent	192
back	174
still	174
ever	165
problem	165
working	164
much	162
see	160
5	159
always	159
content	156
u	153
need	152
add	151
open	151
download	150

Phrase	Count	N
black screen	32	2
want to watch	30	3
best movie	30	2
black background	30	2
connect to netflix	29	3
amazing app	29	2
open the app	28	3
worst app	28	2
like netflix	27	2
netflix is the best	26	4
bring back	26	2
customer service	26	2
watching movies	26	2
app is good	25	3
latest update	25	2
new update	25	2
vampire diaries	25	2
watch netflix	24	2
please help	23	2
great movies	22	2
great shows	22	2
really like	22	2
streaming app	22	2
streaming service	22	2
web series	22	2

Figure 12: Word count for negative comments

Term	Count
app	254
netflix	191
bad	145
problem	106
please	95
working	95
watch	82
just	79
good	78
movies	78
worst	70
fix	63
even	62
now	51
shows	51
phone	49
time	48
like	46
screen	46
update	46
hate	43
service	41
issue	38
really	37
use	37

Phrase	Count	N
worst app	24	2
please fix	22	2
bad app	16	2
black screen	11	2
bad experience	10	2
customer service	10	2
payment method	10	2
really bad	10	2
watch anything	10	2
working properly	10	2
fix this problem	9	3
app ever	9	2
every time	9	2
worst experience	9	2
waste of time	8	3
open the app	7	3
waste of money	7	3
worst app ever	7	3
5 10	7	2
black background	7	2
good app	7	2
netflix app	7	2
new update	7	2
netflix is not working	6	4
1080 p	6	2

Figure 13. Distribution of the sentiment scores among all tweets with scores

	N	Mean Score
All Scored Documents	4903	39.2
Net Positive Documents	3765	67.9
Net Negative Documents	1085	-58.4
No Sentiment Documents	18137	0.0

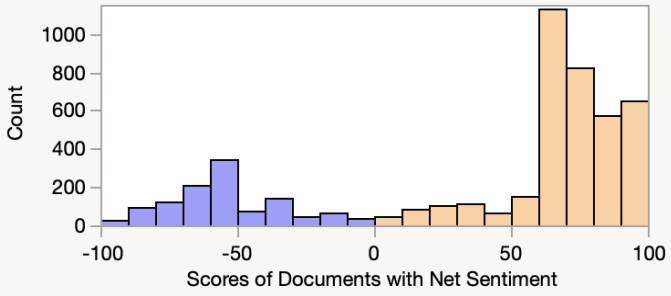


Figure 14: Word count for all tweets

Term	Count
watch·	4852
show·	2671
so	2134
just·	2060
not	1980
like·	1912
movi·	1884
seri·	1762
if	1625
one·	1435
season·	1328
good	1278
new·	1138
go·	1042
no	1010
know·	920
time·	905
more	898
make·	888
think·	885
need·	875
2	870
peopl·	868
want·	835
see·	784

Phrase	Count	N
season 2	249	2
stranger things	227	2
jeffrey dahmer	208	2
us are dead	148	3
so much	140	2
no one	137	2
just watched	136	2
cameron diaz	133	2
dahmer series	120	2
so good	119	2
hbo max	114	2
season 3	112	2
just finished	106	2
jamie foxx	103	2
op netflix fan	102	3
so many	101	2
amazon prime	96	2
via youtube	94	2
across the street	88	3
really good	86	2
winter on fire	85	3
feel like	85	2
so far	85	2
peaky blinders	82	2
season 4	78	2

Term	Count
really	778
thing·	772
love	700
come·	666
episod·	653
would	651
us	641
dahmer·	639
film·	635
documentari·	610
don’t	600
day·	599
back·	597
1	594
should	594
look·	579
only	577
tv·	569
too	559
say·	550
start·	547
3	537
year·	526
cancel·	518
stream·	505

Phrase	Count	N
season 1	77	2
girl in the window	75	4
tv shows	75	2
street from the girl	74	4
woman in the house	74	4
house across	72	2
serial killer	70	2
house across the street	69	4
pk kenzie	69	2
tv show	68	2
new season	67	2
umbrella academy	67	2
criminal minds	66	2
russian propaganda	66	2
should watch	66	2
don’t know	65	2
finished watching	64	2
can’t wait	63	2
marilyn monroe	63	2
want to watch	62	3
bts twt	62	2
started watching	62	2
trust no one	60	3
top 10	60	2
trust no	60	2

Figure 15: Word count for positive tweets

Term	Count
good·	1109
watch·	1052
love·	839
show·	728
movi·	465
just·	449
like·	426
one·	390
great·	375
seri·	375
best	357
better	314
really	282
season·	241
new·	225
now·	199
time·	187
see·	183
make·	180
thing·	174
amaz·	170
know·	169
episod·	161
need·	161
film·	160

Phrase	Count	N
really good	83	2
just watched	47	2
just finished	43	2
us are dead	42	3
one of the best	41	4
pretty good	41	2
season 2	36	2
right now	31	2
good show	27	2
stranger things	27	2
finished watching	25	2
good movie	25	2
across the street	23	3
hbo max	23	2
much better	23	2
op netflix fan	22	3
best show	22	2
best shows	22	2
girl in the window	21	4
street from the girl	20	4
woman in the house	20	4
just finished watching	20	3
house across the street	19	4
good shows	19	2
house across	19	2

Term	Count
go·	160
look·	156
2	150
much	140
also	139
work·	138
us	137
want·	130
happi·	126
day·	124
year·	124
documentari·	117
tv	116
start·	111
first	110
seen	106
1	105
well·	105
stori·	104
way·	104
back·	100
feel·	100
hope·	99
anim·	97
call·	96

Phrase	Count	N
love is blind	18	3
amazon prime	18	2
winter on fire	17	3
choose love	17	2
good series	17	2
great show	17	2
highly recommend	17	2
started watching	17	2
best movies	16	2
sci fi	16	2
binge watching	15	2
feel like	15	2
give us	15	2
rom com	15	2
season 3	15	2
tv shows	15	2
big tech	14	2
jeffrey dahmer	14	2
live action	14	2
tv series	14	2
principles of pleasure	13	3
great movie	13	2
good so far	12	3
movies to watch	12	3
need to watch	12	3

Figure 16: Word count for negative tweets

Term	Count
watch·	275
bad·	199
show·	164
just	154
like·	151
movi·	134
hate·	130
one·	90
make·	85
wrong	81
seri·	78
problem·	77
now	75
sad·	74
season·	73
know·	72
good·	70
time·	70
worst	70
go·	62
really	62
thing·	54
want·	49
see·	48
say·	47

Phrase	Count	N
bad vegan	12	2
jeffrey dahmer	11	2
breaking bad	10	2
just watched	10	2
marilyn monroe	10	2
pk kenzie	10	2
season 2	10	2
really bad	8	2
right now	8	2
serial killers	8	2
sex scene	8	2
worst roommate	8	2
fan https :/ t	7	4
looks like	7	2
awkward moment for fan	6	4
caused a very awkward	6	4
moment for fan	6	3
sex scene caused	6	3
awkward moment	6	2
bad boy	6	2
good thing	6	2
monroe movie	6	2
scene caused	6	2
stranger things	6	2
streaming service	6	2

Term	Count
look·	45
2	44
dahmer	44
need·	44
feel·	41
famili·	40
made	40
new	38
us	38
worse	38
stori·	37
take·	37
cancel·	36
terribl·	36
poor·	35
year·	35
film·	34
day·	33
right·	33
episod·	32
hope·	32
aw·	31
documentari·	31
money·	31
tri·	31

Phrase	Count	N
video games	6	2
wanna watch	6	2
across the street	5	3
marilyn monroe movie	5	3
want to watch	5	3
go back	5	2
hate crime	5	2
kristen bell's	5	2
social media	5	2
started watching	5	2
true story	5	2
worst part	5	2
bell's netflix sex scene	4	4
girl in the window	4	4
house across the street	4	4
kristen bell's netflix sex	4	4
street from the girl	4	4
woman in the house	4	4
bell's netflix sex	4	3
hope i'm wrong	4	3
2 hours	4	2
3 hours	4	2
awful movie	4	2
bad idea	4	2
bad move	4	2

Figure 17: Selected tweets about ‘stranger things’ and ‘Cameron Diaz’

Canceling Netflix after stranger things lmao [8767]

Netflix really lost its appeal to me, i think it’s time to go after stranger things [16942]

might buy netflix to watch the last 2 stranger things episodes this friday.. [17036]

I got so excited for the Cameron Diaz is back news (legit, no cap, there's no one else like her in today's
acting space) that I almost scanned over the fact of.... is that Zelda Williams Robin Williams' daughter
directing this Netflix project? [17229]

Cameron Diaz back on my screen, I've waited for this #Netflix [15699]

Figure 18: Selected tweets about people’s complaints

@batemanjason What really sucks is that Netflix is raising their prices on 2/11 and I’m gonna have to
cancel it. I think I may re-subscribe when part 2 airs. It’s too bad really. The price had all but doubled
in the last 10 years and I’ve gotta draw the line somewhere. [122]

I think I’m going to cancel my Netflix 😩 $19.99 my ass. I’ve been using my Hulu more and it’s 15 [7782]

A 20% increase is a bit rude, don't you think? Amazon prime for instance just charged me $58 per 12 month
on 4 devices.
Netflix made a tonne of the pandemic and people are doing it tough. Shame on Netflix to take advantage
[939]

@Mohranner i'm already fully acquainted with Netflix's cancelling habits at this point, but yeah it STILL
sucked to know the series wasn't going to continue past the second season. so much incredible potential
wasted....but i guess that speaks to the great quality of the show [224]

BRUH @netflix WHY DID YOU CANCEL SO MANY GOOD SHOWS. Like 7SEEDS and The Healing Powers of Dude [366]

No clue what Netflix was doing increasing the subscription fee again 😐 [521]

Rewatching #TheOrder. Why on Earth @netflix chose to cancel it after two series, I’ll never know. [887]

Netflix increasing their monthly price to $20 but cancelling every show after their 2nd season

@Afro_Americas BRUH!! I'VE BEEN SAYING THIS! Netflix has a terrible lack of variety. The only worth while
content Netflix has is some of its own originals. Otherwise, a waste of money really. Hulu has always
been superior. Idk why ppl sleep on Hulu but overhype Netflix [8424]

i hate netflix why do they keep adding movies just to take them off in 2 months [7342]

```
#CountryComfort this show is awesome.
sadly, it doesn't renew to second season despite it's one of most comedy TV shows gives optimism
message
in life
@netflix  always depends on money not quality of show
shame on them @NetflixMENA
@katharinemcphee https://t.co/RTIWZ8yUsJ [1153]
```

Figure 19: Total Number of Shows and Movies on Netflix each year

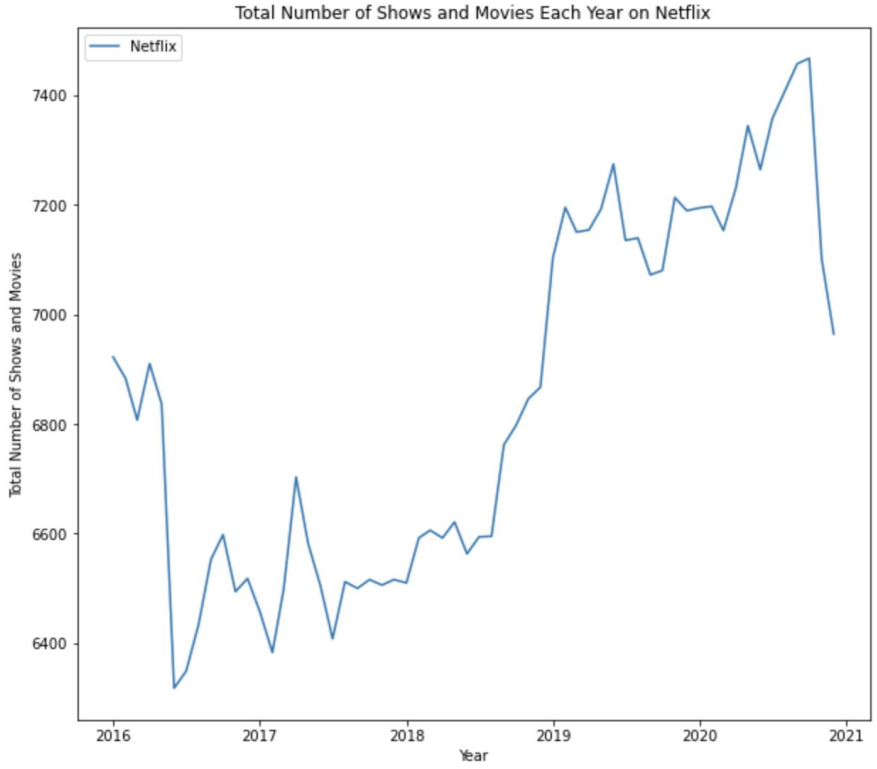


Figure 20: Total Number of Shows and Movies added and removed on Netflix each year

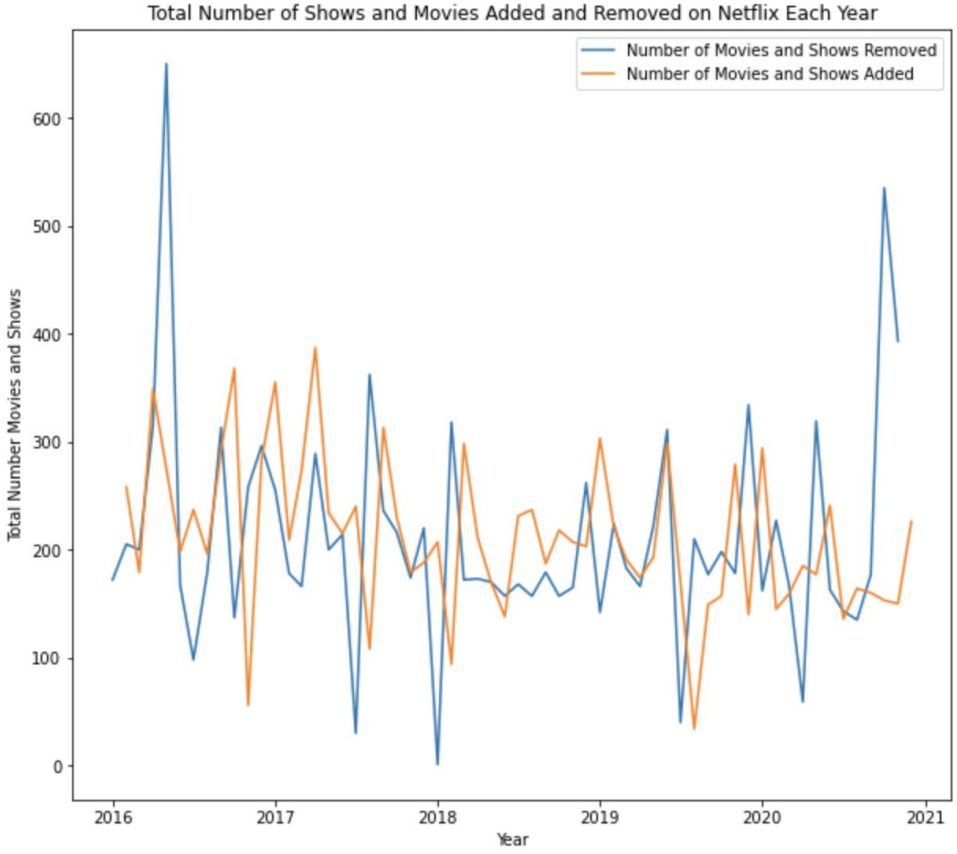


Figure 21: current subscriber

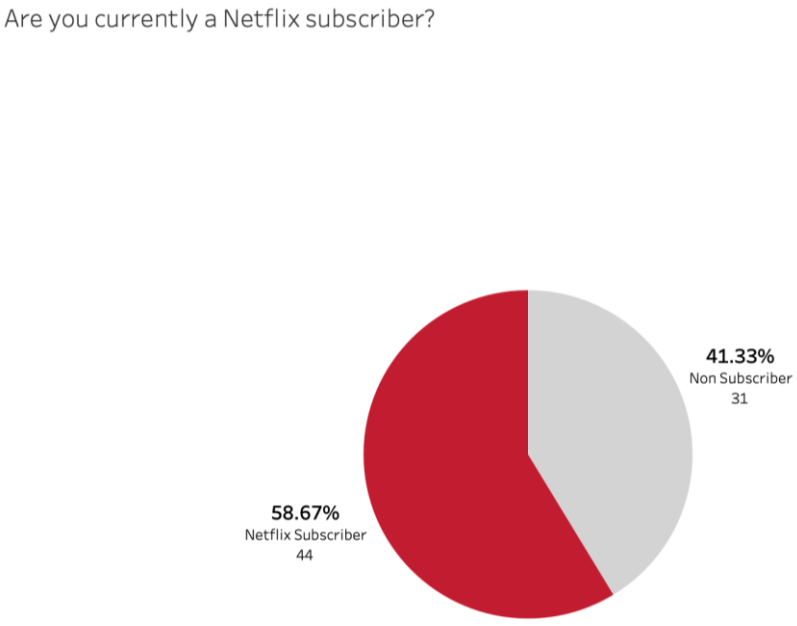


Figure 22: Have you subscribed before?

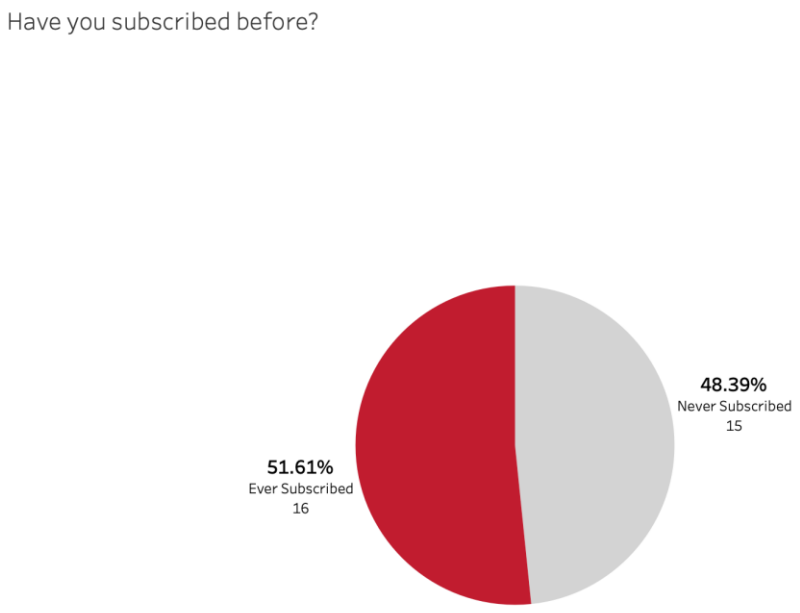


Figure 23: Distribution of money spend per month on streaming services

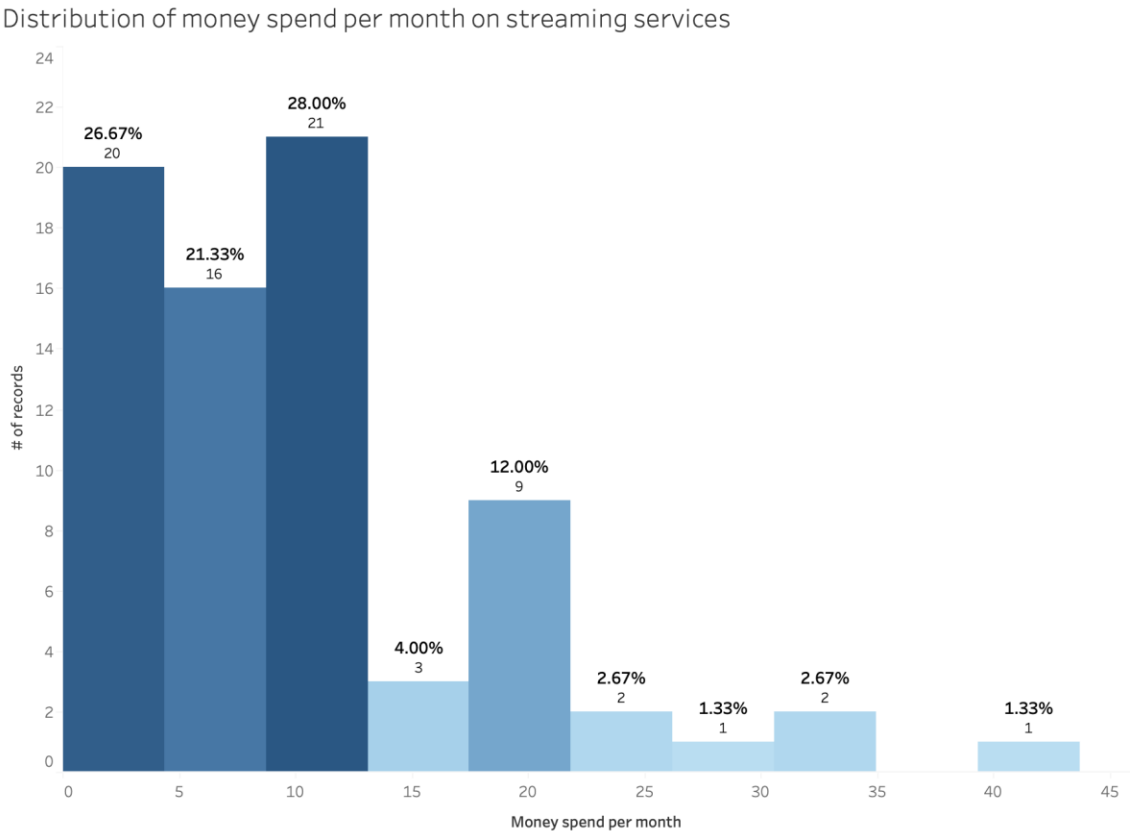


Figure 24: which streaming services do you like the most

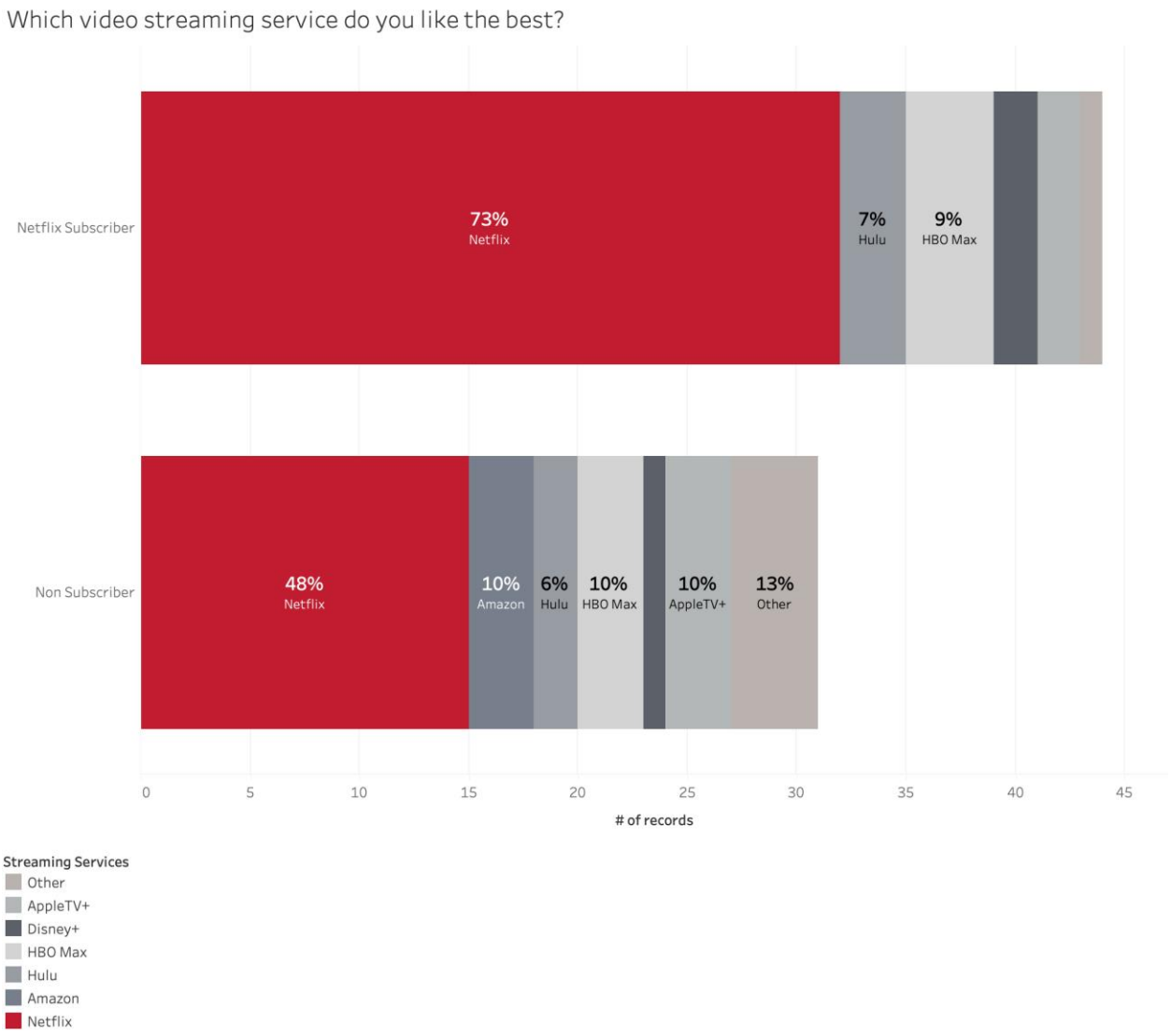

Which video streaming service do you like the best?
Netflix Subscriber
73%
Netflix
7%
Hulu
9%
HBO Max
Non Subscriber
48%
Netflix
10%
Amazon
6%
Hulu
10%
HBO Max
10%
AppleTV+
13%
Other
0
5
10
15
20
25
30
35
40
45
# of records
Streaming Services
Other
AppleTV+
Disney+
HBO Max
Hulu
Amazon
Netflix

Figure 25: Netflix subscriber also subscribe to which streaming services

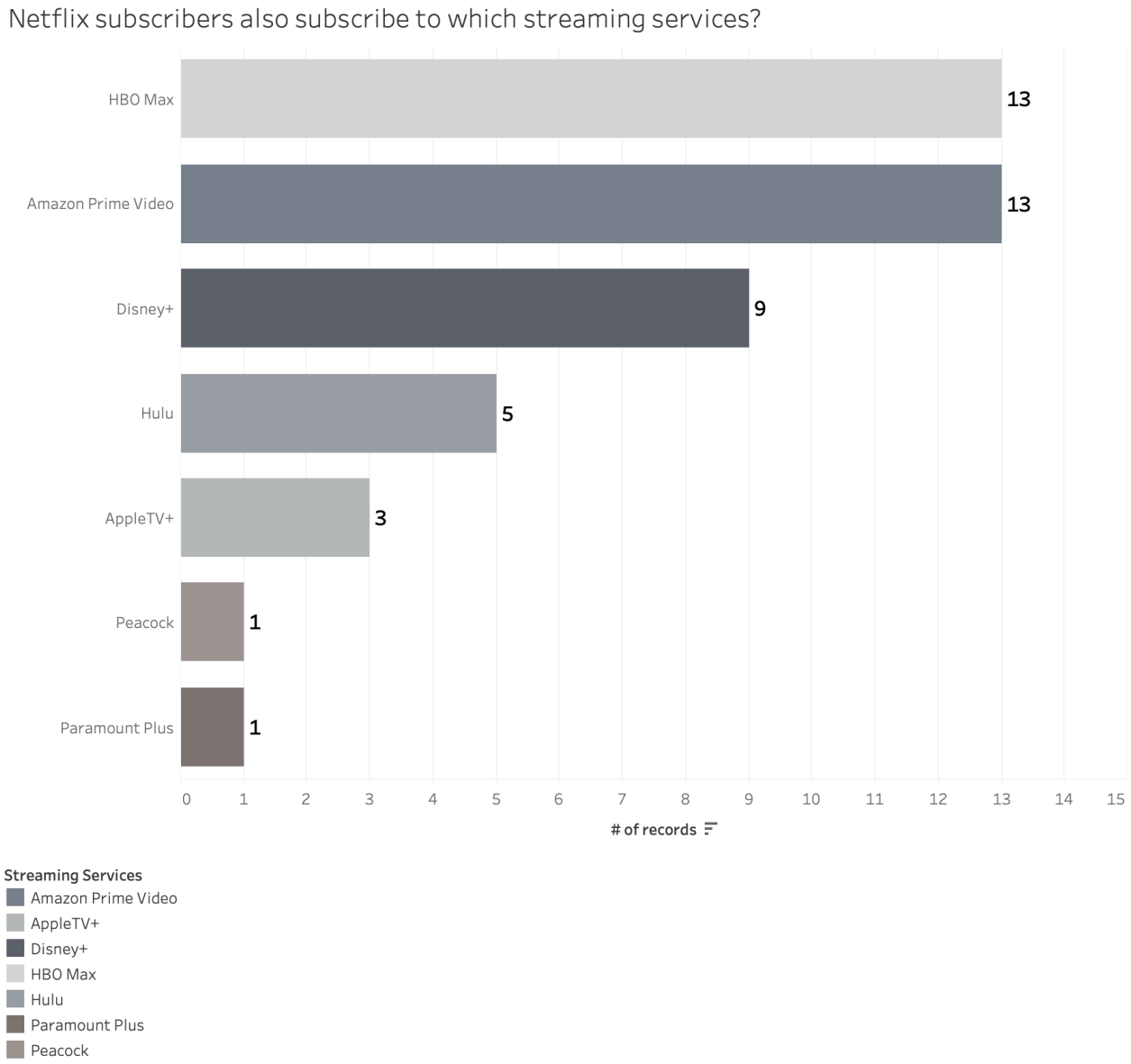


Figure 26: Which streaming services are non-Netflix subscribers subscribing to

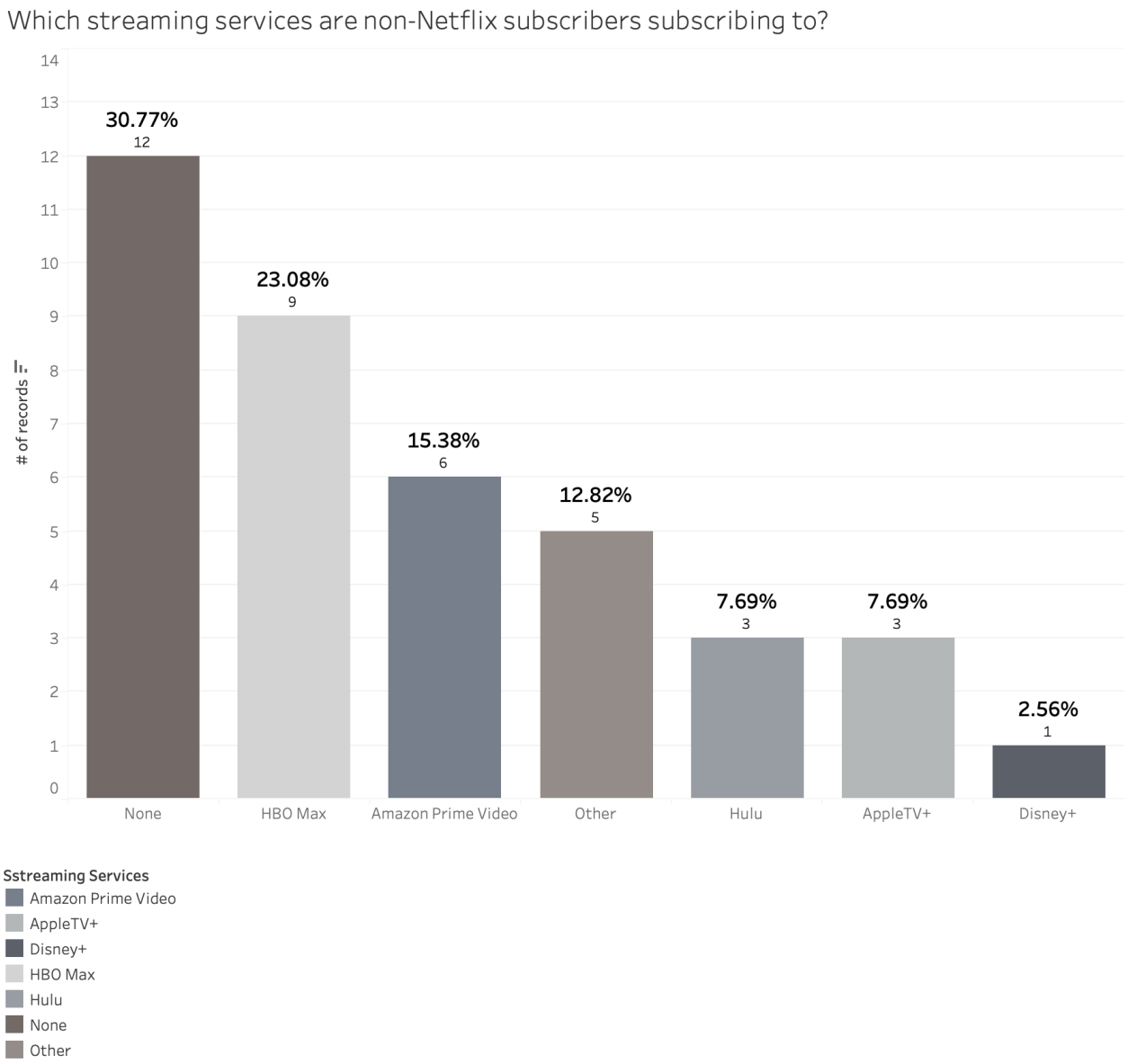


Figure 27: How long have you been subscribing to Netflix?

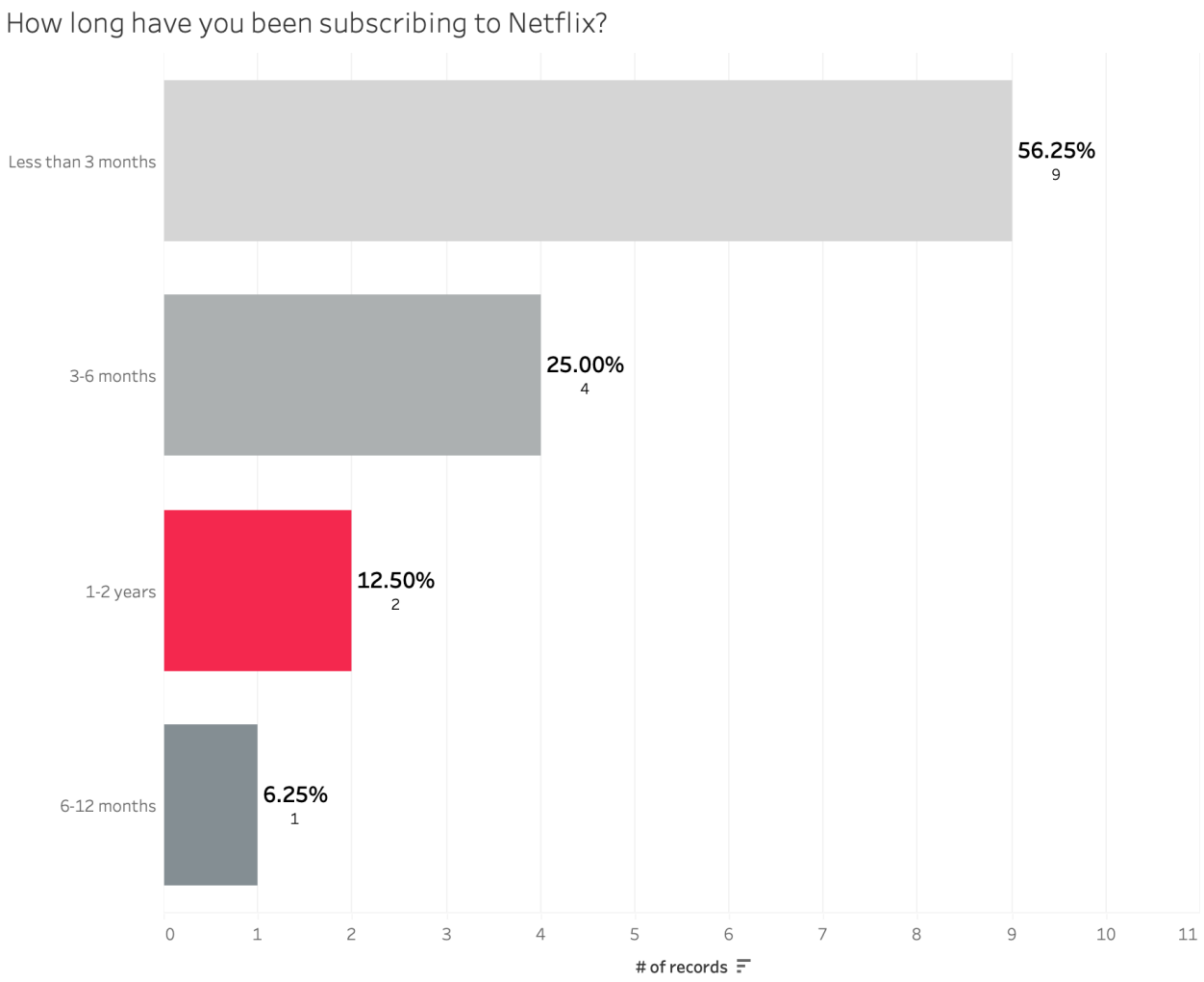


Figure 28: What will make you decide to resubscribe again in the next 3 months

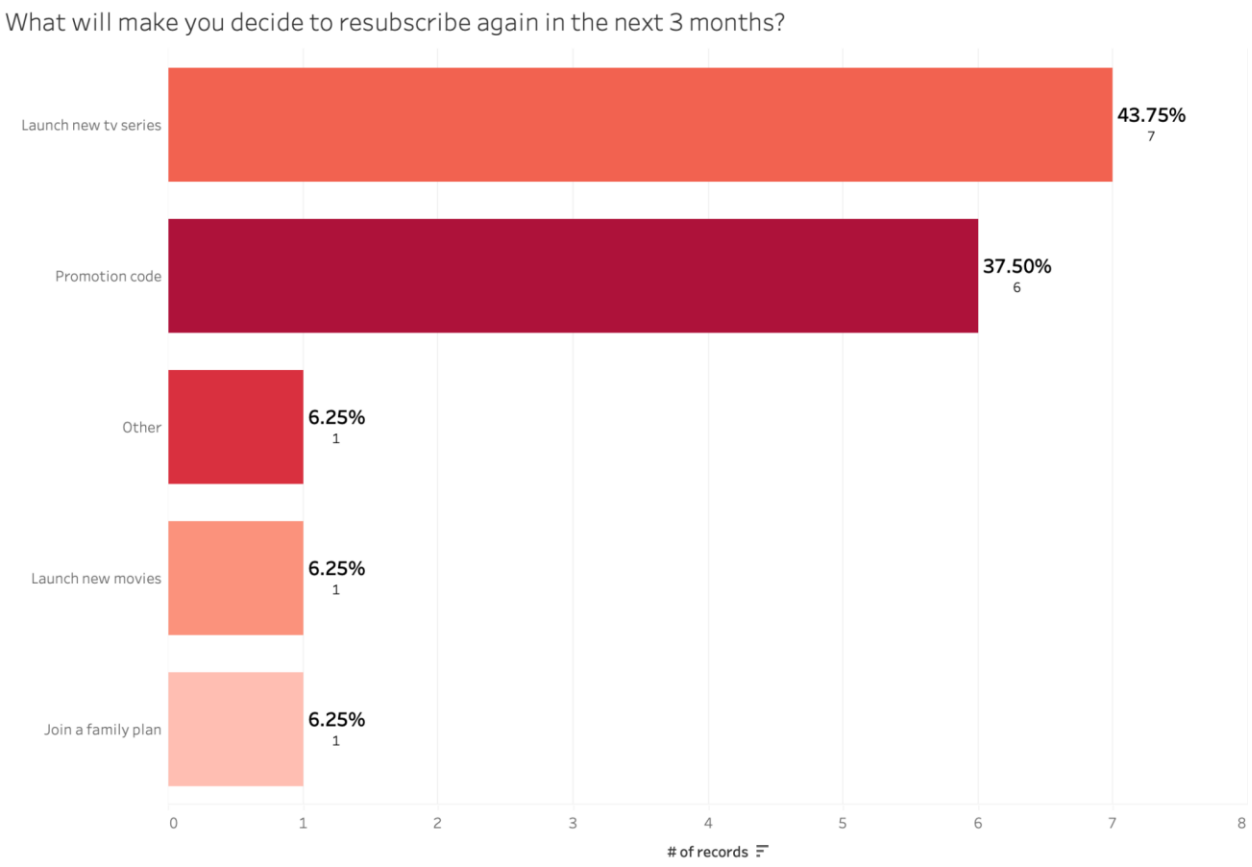


Figure 29: What is the highest price you're willing to pay for the Netflix "Basic with Ads" plan

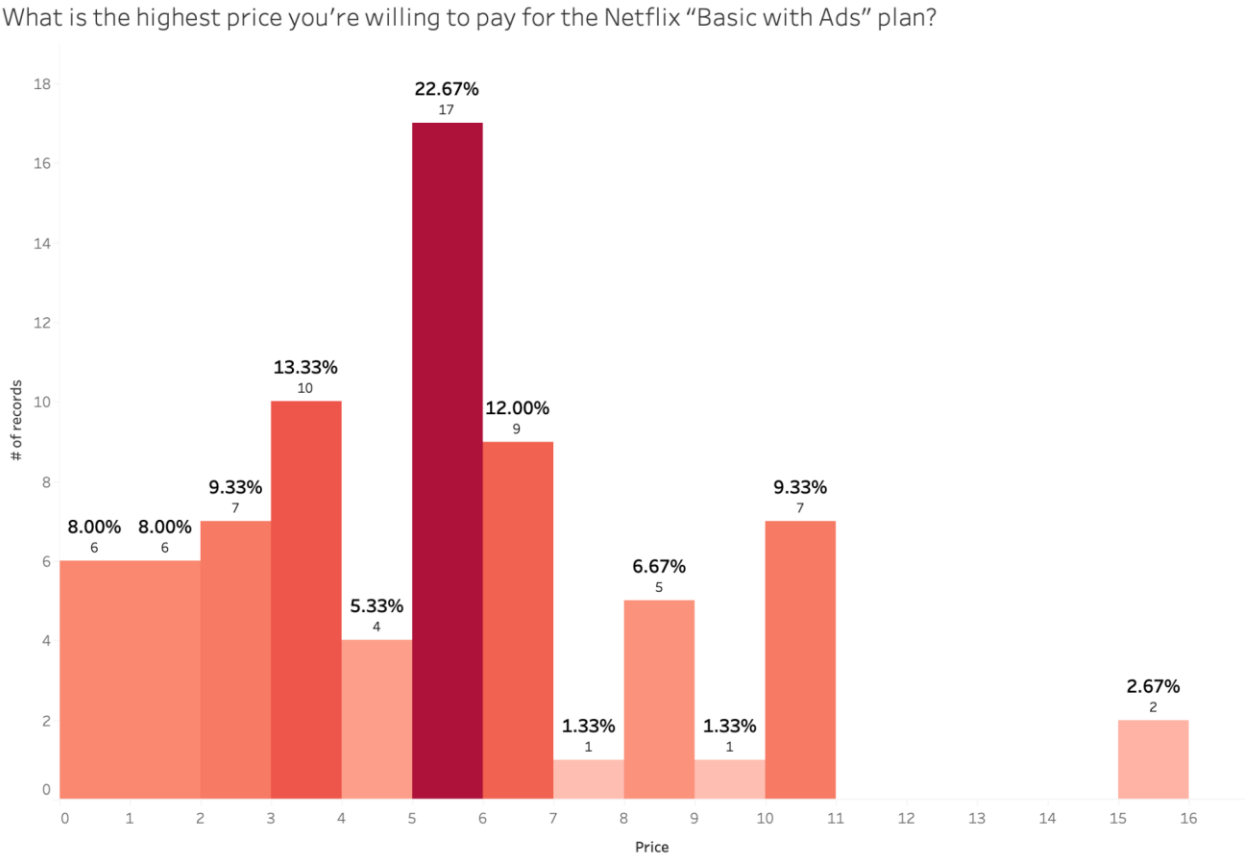


Figure 30: Snake Plot

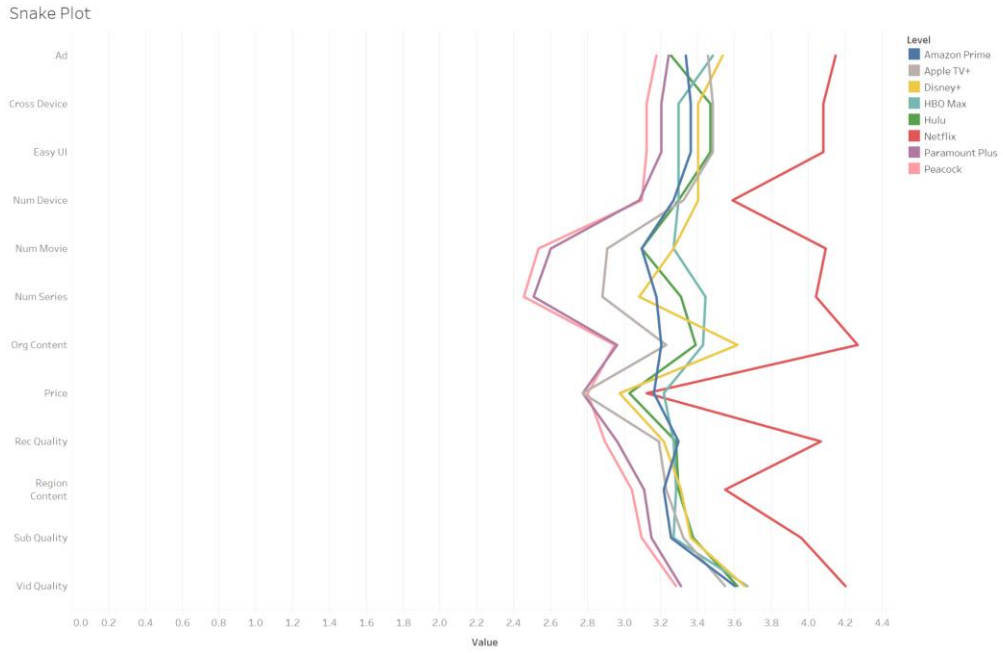


Figure 31: Perceptual Map

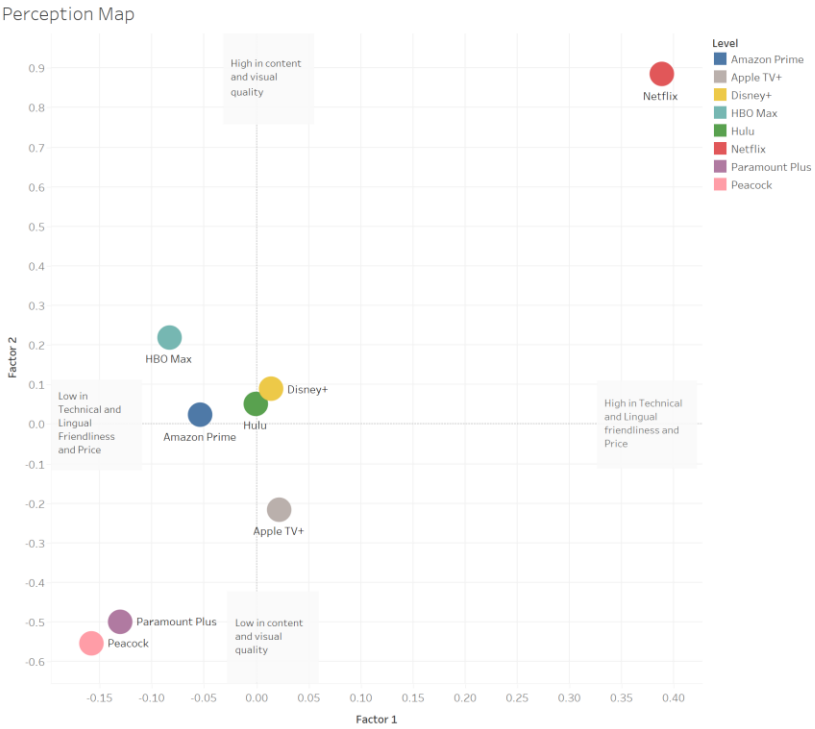


Figure 32: Initial regression model

Summary of Fit

RSquare	0.66737
RSquare Adj	0.53861
Root Mean Square Error	0.675658
Mean of Response	4.181818
Observations (or Sum Wgts)	44

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	12	28.393545	2.36613	5.1830
Error	31	14.151909	0.45651	Prob > F
C. Total	43	42.545455		0.0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.8061196	0.77874	1.04	0.3086
number_of_movies_n	0.4896814	0.203661	2.40	0.0224*
number_of_TV_n	-0.030535	0.176955	-0.17	0.8641
price_n	0.0179508	0.120279	0.15	0.8823
quality_n	0.1977833	0.174408	1.13	0.2655
subtitles_n	0.1245901	0.165794	0.75	0.4580
recommendation_system_n	-0.459418	0.170412	-2.70	0.0112*
ad_free_n	0.1081663	0.18807	0.58	0.5693
number_of_devices_n	-0.19856	0.122881	-1.62	0.1163
cross_device_n	0.3285787	0.149916	2.19	0.0360*
user_interface_n	0.4502942	0.183155	2.46	0.0197*
contents_regions_n	-0.16023	0.123298	-1.30	0.2033
original_content_n	-0.106427	0.156549	-0.68	0.5017

Figure 33: Mock-up exhibit 1 – Showing Netflix original movies in theaters

Figure 34: Moke-up exhibit 2 – Organizing pop-up events with exclusive gifts and guests