

Business Insight Report

A study on top 3 VR companies, Similarities and Customer Sentiments

Virtual Reality is a somewhat new technology that has gained an exponential amount of popularity in recent years. However, it was invented in the early 1800's wherein the stereoscope was invented. The stereoscope was the first iteration of a virtual reality headset which utilized twin mirrors to project a single image to the user, this was invented by a man named Charles Wheatstone. This simple, non-electronic device paved the way towards the virtual reality we are accustomed to today. Which is an electronic headset equipped with 2 sets of screens which allow the user to feel fully immersed in a virtual environment. Evidently taking a user from the real world, to a virtual one.

Today the top three Virtual Reality (Hardware) industry leaders are **Oculus**, **Valve (a.k.a. Steam)**, and **Playstation** (a.k.a. P.S.). These top companies all create their own Virtual Reality products for consumers as well as produce and/or publish virtual reality software, which are released on their respective platforms. As an avid Virtual Reality enthusiast, I opted to delve into the minds of their customers and analyze what they think are the similarities between the companies and products in relation to VR. I will also be looking at their sentiments towards each individual company. By figuring out these two inquiries, we will be able to determine which company the which company is above the other two in the eyes of their customers and if we can recommend any actions that the companies should take to change to sway their consumers.

I used an R script to extract any tweets with relevant hashtags (**#vr**, **#oculus**, **#steam**, and **#ps4**). After getting the data through the twitter database, we run it through some code to remove any unnecessary stop words, and plot the data using a ggplot correlation model. In the graph (Word Correlation) we can clearly see certain key words which are unique to each company. For Steam the words are "HTC Vive" and "Valve Index", Oculus has the unique word "Rift" attached, and lastly Playstation of course has "PS" (Play Station). These terms are the products each company has rights to. There are some interesting terminology that are interesting, like "distortion" and "pc" are more unique to Steam than Oculus, which is confusing, as both platforms are used on a laptop or Personal Computer, also the fact that Steam provides the more expensive product.

We see odd terms like "fishing" being a common correlation for all 3 companies. As well as "Steam" being a platform incompatible with the ps4, but compatible with Oculus. The unique business insights that we can take from this is that maybe since fishing is a reoccurring term, perhaps consumers prefer to use virtual reality for an at home fishing experience. "Birthday" is another interesting term, as majority of consumers apparently receive their product on their birthday. Perhaps a bundle or promotion may be applied to customers to further promote purchases of their products.

After the correlation graph, I proceeded to create sentiment word clouds for each of the companies' data sets. This led to several insights as well. Oculus' sentiment word cloud shows an odd arrangement of words, most are alarming, but more to that later. The largest occurrence is "rift" which is expected as their products are both "Rift S" and "Oculus Rift", "cheap", "problem", "bad" and "impatient" ("die", "murder", "death", "destruction", "evil", "demon", etc... are evident all word cloud and will be discussed later) are the words I would like to focus on, these indicate a problem with the companies' product, or at least the consumers seems to see it this way. Although offset by the large amount of positive words, there are few who see the product as a negative.

The sentiment word cloud for playstation has less unique words, but a larger occurrence. "rift" is odd as their product is known as "PSVR" which is not at all present. "bad", "lost", and "delayed" may speak about the late release of their product. The amount of words is once again offset by its positive counterparts.

Lastly, Steam's Sentiment word cloud, also containing the word "rift" either show that the consumers are making the comparison of oculus' product, to that of Steam's. Words such as "headache", "silly", and "cheap" are alarming to see as in virtual reality, motion sickness is already an issue that must be rectified as soon as possible. The fact that cheap is among the words is especially odd, as of June 28, 2019 Steam released the most expensive Virtual Reality headset the "Valve Index" amounting to a staggering \$999 at market price on the day of the release.

The odd words "bomb", "danger", "die", "murder", "death", "destruction", "evil", and "demon" are most likely words concerning the industries' video game software. Majority of Virtual Reality Games cater towards the horror and thriller genre more than most, Hence the high occurrences of similar terminologies among all three companies' sentiment word clouds.

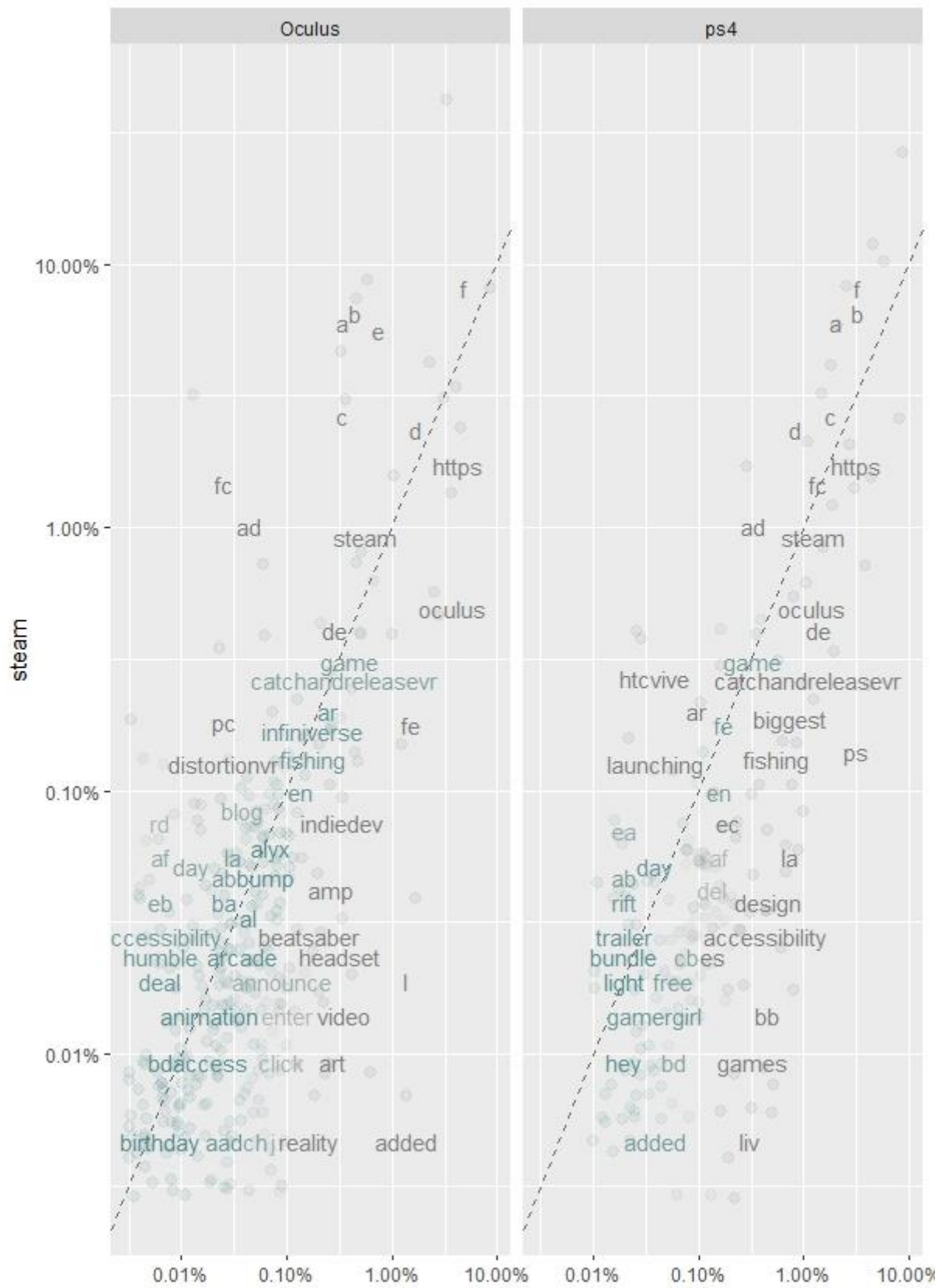
Virtual Reality is still new technology, and thus the data on the products is limited, and the consumers for them even more so. The product is still considered expensive given the alternate entertainment options. VR is still seen as "high-class" and the fact that the products are expensive and are usually received as birthday presents to individuals further support this theory. We will see what the future holds for Virtual Reality but until then, the companies still have a lot of work to do to fully cater to their consumers.

Appendix:

Word Correlation Input

```
8 library(twitter)
9 library(tm)
10 library(tidyverse)
11 library(tidytext)
12 library(dplyr)
13 library(twitter)
14 library(tm)
15 library(tidy)
16 library(reshape2)
17 library(scales)
18 library(wordcloud)
19 library(ggplot2)
20 library(reshape2)
21
22
23 #necessary file for windows
24 setwd("C:/Users/jlmpa/OneDrive/Desktop/Rrrrr/Text Analytics/TwitterAPI")
25 download.file(url="http://curl.haxx.se/ca/cacert.pem", destfile="cacert.pem")
26
27 #to get your consumer key and consumer secret see the twitter documentation for instructions
28 consumer_key <- 'tdj1PwK9tpswmirlecPub0g'
29 consumer_secret <- '02n19PuxKdzsr1rmk3L2lmyL7gs5nvjmaGtrEm3U3QyF4DLJ'
30 access_token <- '32834962-fdnrcgekkagv38zRWAnexlVHQ0K9QH7CzBFQWRS'
31 access_secret <- 'EP5e8NQFayP1V2vunquygZTPqfjyY23DFbJNCANGtavFn'
32
33 setup_twitter_oauth(consumer_key, consumer_secret, access_token, access_secret)
34
35 vr_oculus <- twitter::searchTwitter('#vr + #oculus', n = 1000, since = '2018-06-01', retryOnRateLimit = 1e3)
36 d = twitter::twListToDF(vr_oculus)
37
38 vr_steam <- twitter::searchTwitter('#vr + #steam', n = 1000, since = '2018-06-01', retryOnRateLimit = 1e3)
39 e = twitter::twListToDF(vr_steam)
40
41 vr_ps4 <- twitter::searchTwitter('#vr + #ps4', n = 1000, since = '2018-06-01', retryOnRateLimit = 1e3)
42 f = twitter::twListToDF(vr_ps4)
43
44 #setup_twitter_oauth(consumer_key, consumer_secret, access_token=NULL, access_secret=NULL)##
45
46 setwd("C:/Users/jlmpa/OneDrive/Desktop/Rrrrr/Text Analytics")
47
48 write.csv(d, "vroculusdf.csv")
49
50 vr_oculus <- read.csv(file = "vroculusdf.csv")
51 mydf_oculus <- data_frame(line=1:1000, text = as.character(vr_oculus$text))
52 tidy_oculusdf <- mydf_oculus %>%
53   unnest_tokens(word, text) %>%
54   anti_join(stop_words)
55 tidy_oculusdf %>%
56   count(word, sort=TRUE)
57
58 write.csv(e, "vrsteamdf.csv")
59
60 vr_steam <- read.csv(file = "vrsteamdf.csv")
61 mydf_steam <- data_frame(line=1:504, text = as.character(vr_steam$text))
62 tidy_steamdf <- mydf_steam %>%
63   unnest_tokens(word, text) %>%
64   anti_join(stop_words)
65 tidy_steamdf %>%
66   count(word, sort=TRUE)
67
68 write.csv(f, "vrps4df.csv")
69
70 vr_ps4 <- read.csv(file = "vrps4df.csv")
71 mydf_ps4 <- data_frame(line=1:268, text = as.character(vr_ps4$text))
72 tidy_ps4df <- mydf_ps4 %>%
73   unnest_tokens(word, text) %>%
74   anti_join(stop_words)
75 tidy_ps4df %>%
76   count(word, sort=TRUE)
77
78
79 frequency <- bind_rows(mutate(tidy_steamdf, common="steam"),
80   mutate(tidy_oculusdf, common="oculus"),
81   mutate(tidy_ps4df, common="ps4")
82 )%>%#closing bind_rows
83 mutate(word=str_extract(word, "[a-z']+")) %>%
84 count(common, word) %>%
85 group_by(common) %>%
86 mutate(proportion = n/sum(n))%>%
87 select(-n) %>%
88 spread(common, proportion) %>%
89 gather(common, proportion, `oculus`, `ps4`)
90
91 ggplot(frequency, aes(x=proportion, y=`steam`,
92   color = abs(`steam`- proportion)))+
93   geom_abline(color="grey40", lty=2)+
94   geom_jitter(alpha=.1, size=2.5, width=0.3, height=0.3)+
95   geom_text(aes(label=word), check_overlap = TRUE, vjust=1.5) +
96   scale_x_log10(labels = percent_format())+
97   scale_y_log10(labels = percent_format())+
98   scale_color_gradient(limits = c(0,0.001), low = "darkslategray4", high = "gray75")+
99   facet_wrap(~common, ncol=2)+
100   theme(legend.position = "none")+
101   labs(y= "steam", x=NULL)
102
```

Word Correlation Output



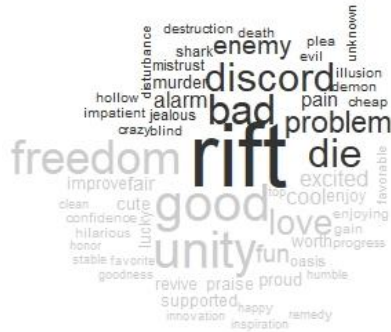
Sentiment Word Clouds Input

```
105 ◀ ###word_cloud###
106
107 ##for oculus##
108 tidy_oculus <- d %>%
109   unnest_tokens(word, text) %>%
110   inner_join(get_sentiments("bing"))
111 tidy_oculus
112 tidy_oculus %>%
113   group_by(sentiment) %>%
114   top_n(10) %>%
115   ungroup() %>%
116   mutate(word=reorder(word, n)) %>%
117   ggplot(aes(word, n, fill=sentiment)) +
118   geom_col(show.legend = FALSE) +
119   facet_wrap(~sentiment, scales = "free_y")+
120   labs(y="Contribution to sentiment", x=NULL)+
121   coord_flip()
122 tidy_oculus %>%
123   inner_join(get_sentiments("nrc")) %>%
124   count(word, sentiment, sort=TRUE) %>%
125   acast(word ~sentiment, value.var="n", fill=0) %>%
126   comparison.cloud(colors = c("grey20", "gray80"),
127                     max.words=500,
128                     fixed.asp = TRUE,
129                     title.size = 1)
130
131 ##for steam##
132 tidy_steam <- e %>%
133   unnest_tokens(word, text) %>%
134   inner_join(get_sentiments("bing"))
135 tidy_steam
136 tidy_steam %>%
137   group_by(sentiment) %>%
138   top_n(10) %>%
139   ungroup() %>%
140   mutate(word=reorder(word, n)) %>%
141   ggplot(aes(word, n, fill=sentiment)) +
142   geom_col(show.legend = FALSE) +
143   facet_wrap(~sentiment, scales = "free_y")+
144   labs(y="Contribution to sentiment", x=NULL)+
145   coord_flip()
146 tidy_steam %>%
147   inner_join(get_sentiments("nrc")) %>%
148   count(word, sentiment, sort=TRUE) %>%
149   acast(word ~sentiment, value.var="n", fill=0) %>%
150   comparison.cloud(colors = c("grey20", "gray80"),
151                     max.words=500,
152                     fixed.asp = TRUE,
153                     title.size = 1)|
154
155 ##for ps4##
156 tidy_ps4 <- f %>%
157   unnest_tokens(word, text) %>%
158   inner_join(get_sentiments("bing"))
159 tidy_ps4
160 tidy_ps4 %>%
161   group_by(sentiment) %>%
162   top_n(10) %>%
163   ungroup() %>%
164   mutate(word=reorder(word, n)) %>%
165   ggplot(aes(word, n, fill=sentiment)) +
166   geom_col(show.legend = FALSE) +
167   facet_wrap(~sentiment, scales = "free_y")+
168   labs(y="Contribution to sentiment", x=NULL)+
169   coord_flip()
170 tidy_ps4 %>%
171   inner_join(get_sentiments("nrc")) %>%
172   count(word, sentiment, sort=TRUE) %>%
173   acast(word ~sentiment, value.var="n", fill=0) %>%
174   comparison.cloud(colors = c("grey20", "gray80"),
175                     max.words=500,
176                     fixed.asp = TRUE,
177                     title.size = 1)
178
```

Sentiment Word Clouds Output

(Black words = Negative; Grey Words = Positive)

Oculus Word Cloud:



Steam Word Cloud:



PS4 Word Cloud:

