

# Final Project: Increase the overall net income of 'TrueCar.Inc' to mitigate the current Covid-19 impact on USA used car market

Report By Farhan, Sayantani, Chaitanyasinh, Kedar, Kanchi(S5, group9).

## Introduction:

Truecar Inc. is an automotive pricing and information website for the new, used car buyers. The company is headquartered in Santa Monica, California with sales office in Austin, TX. The company reported \$55 million in revenue for the quarter ended Sept. 30, down nearly 29%. Its losses a share were 7 cents, compared to earnings of 9 cents a share in the same quarter last year. The company reported a **\$6.8 million net loss**, as compared to net income of \$11.6 million in the third quarter of 2020.

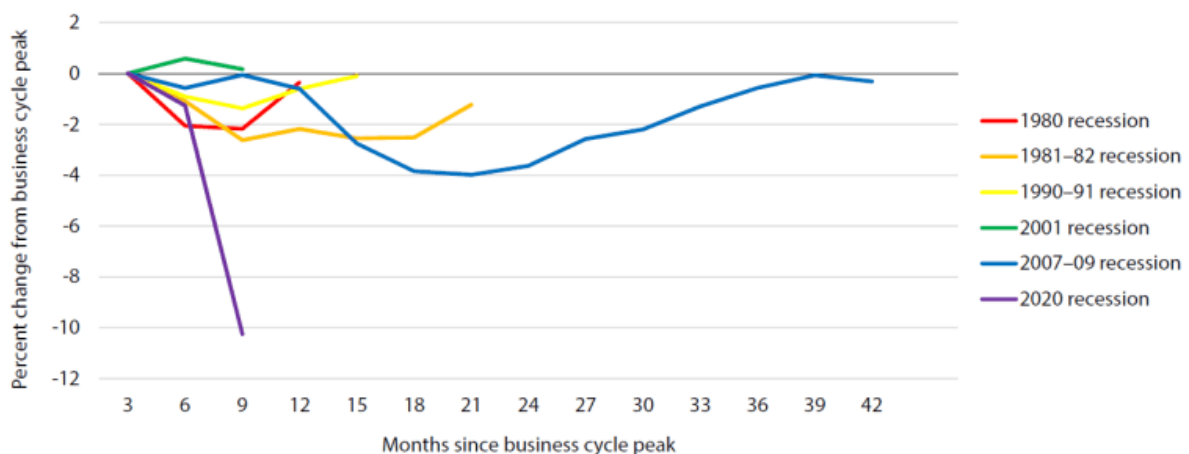
## Reasons for revenue drop:

### 1. Covid-19 Impact:

Businesses saw a massive supply chain interruption, demand declined along with the service requirements due to the covid-lockdown, shortages in supplies and inputs and government-mandated closures. **USA GDP recorded its steepest quarterly drop** in economic output on record, a **decrease of 9.1% in the second quarter of 2020** [BEA].<sup>1</sup> The below graph shows the impact in reference to the historical crisis.

FIGURE C.

Percent Change in GDP Relative to Business Cycle Peak, by Business Cycle



Source: U.S. Bureau of Economic Analysis (BEA) 1980-2020; NBER n.d.; authors' calculations.

Note: The figure shows the quarterly percent change in real Gross Domestic Product (GDP) from the peak of a business cycle until GDP returns to the level of the previous business cycle peak. GDP is in billions of chained 2012 dollars.

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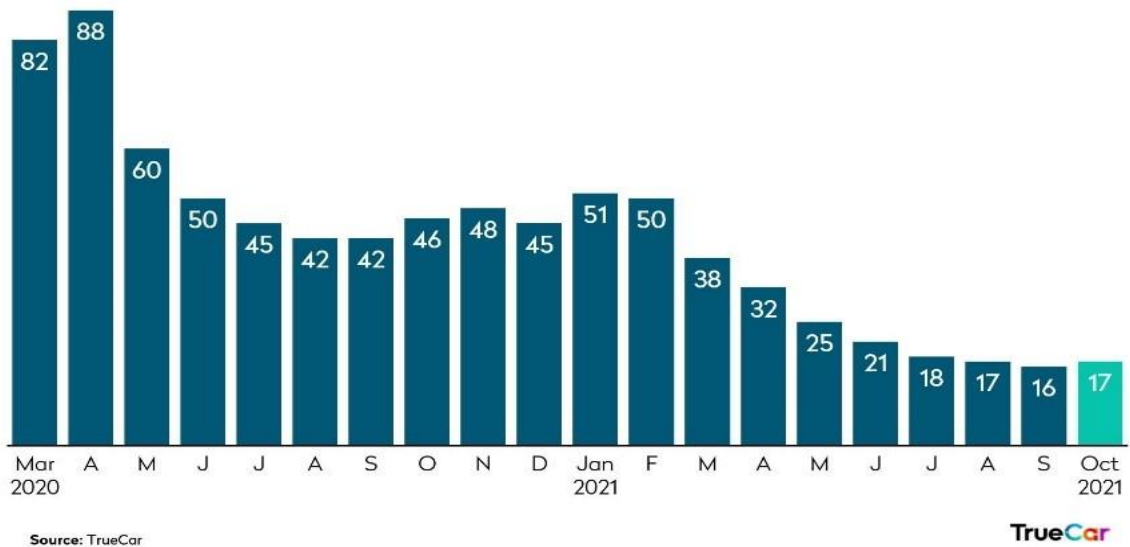
### 2. Short Supply of New-Cars:

The data provider Cox expects about 14.3 million new-cars sales in the U.S. in 2020, down from about 17 million in 2019. The used-car market is more than double the size of the new-car market, with about 40 million in annual vehicle sales. Many providers delayed their launch of the models and as a result there was a short supply of new cars and people were not selling their used cars as well.<sup>2</sup>

<sup>1</sup> . Bauer, L., Broady, K. E., Edelberg, W., & O'Donnell, J. (2020, September 17). *Ten facts about COVID-19 and the U.S. economy*. Brookings.

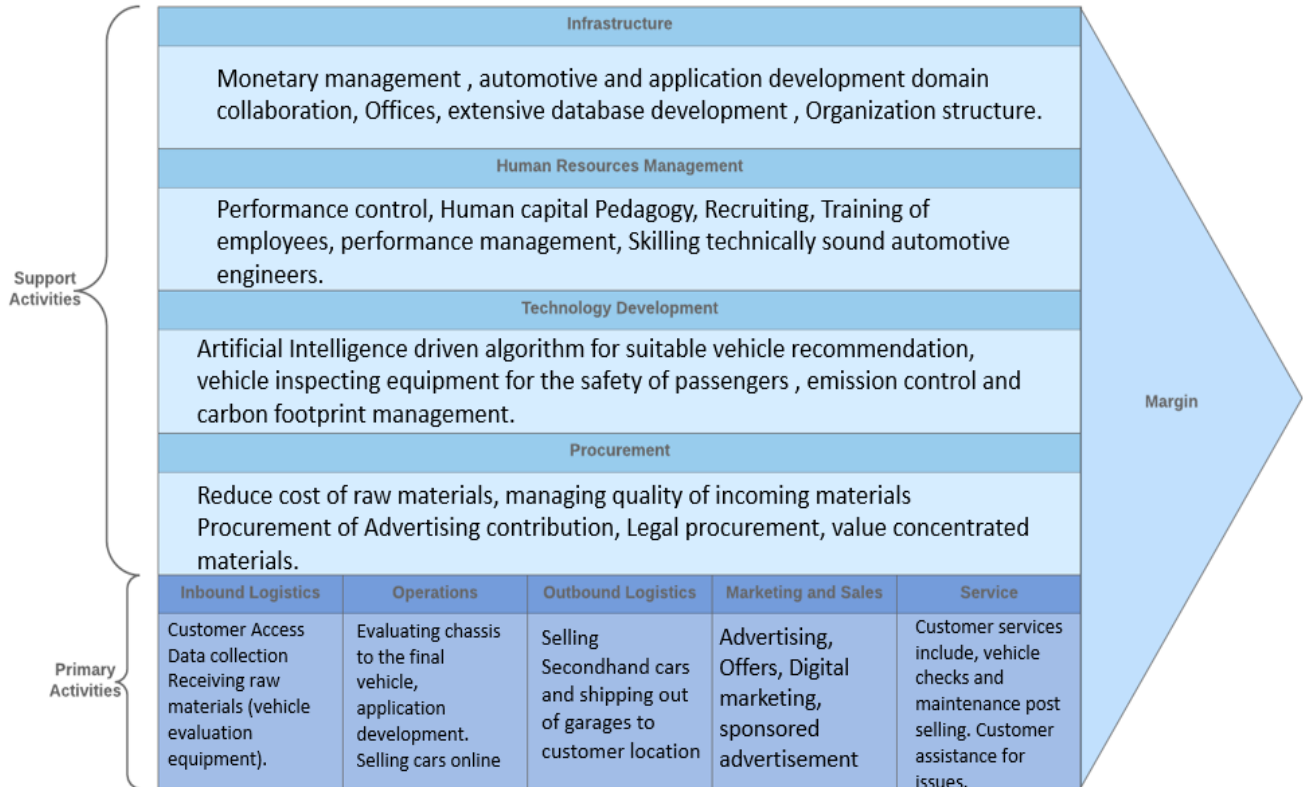
<sup>2</sup> Bureau of Labor Statistics. (2021, November). *US Consumer Price Index: Used Cars and Trucks*. Ycharts.Com.

**New Car Days Supply (Inventory)**



Car financing and discounts: To mitigate the impact many companies extended their leases with payment discounts and deferrals. Companies also offered 0% financing and discounts to survive the impact which in a way impacted the overall company profitability.

### Value Chain Analysis



## **Primary activities:**

**Inbound Logistic:** Receiving raw materials from suppliers for vehicle evaluation and distributing them through their production line to begin manufacturing. To obtain the lowest cost materials, it is critical to maintain a good working relationship with the supplier.

**Operations:** The primary production stage is covered in the second stage. From the chassis until the finished vehicle, it can be separated into numerous parts. Vehicle evaluation and algorithm development to market to clients.

**Outbound logistic:** It is the process of the final goods being moved out of the manufacturing units to the retailers. Some car makers have their own showrooms and some work through franchisees.

**Marketing and Sales:** Promotions, advertising, distribution, sales force management, and customer relations are all included in this section.

**Services:** This is the final activity that adds value to the product along the value chain. It also involves customer service after the product has been purchased.

## **Secondary activities:**

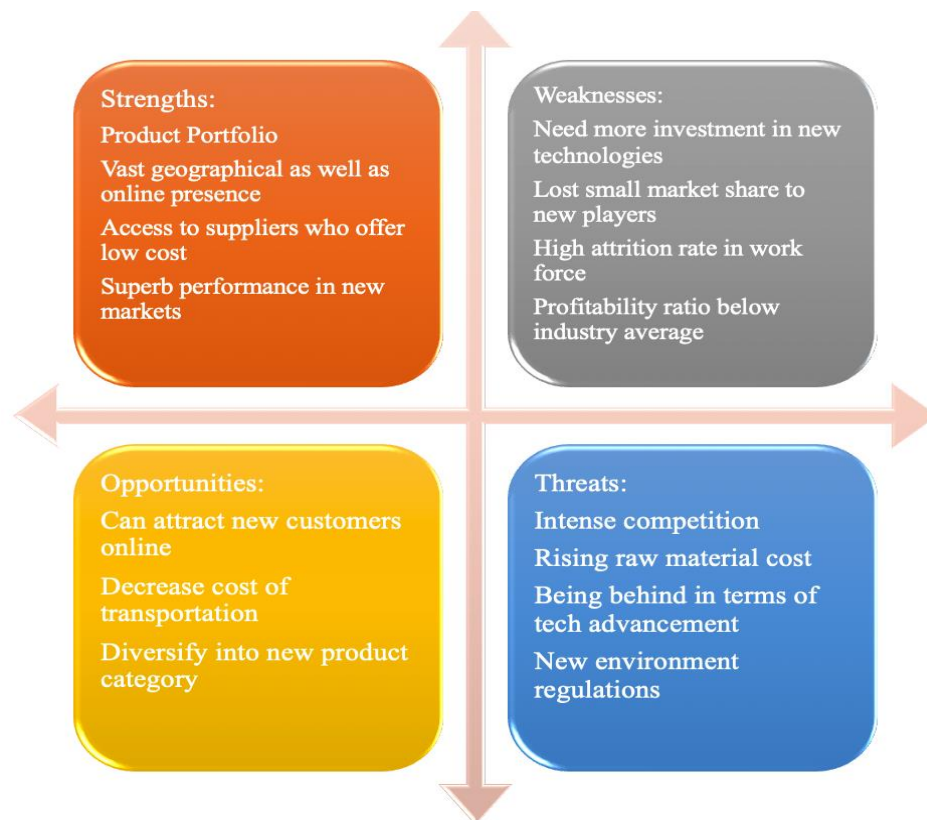
**Infrastructure:** It oversees the culture and corporate structure of the corporation. It is critical to understand who is responsible for each division and to guarantee that the financial aspect of the business is well-managed to increase earnings.

**Human resource management:** It is an important part of the business because motivated and well-managed employees are critical to the brand's success.

**Technology development:** Without a question, this is the area where technology is making the most progress and exerting the most effect, because the online automobile selling business model need unique and custom-tailored solutions .

**Procurement:** It entails locating and purchasing raw materials from vendors. Managing this component aids in cost savings as well as assuring high-quality of second-hand cars and durable cars and then selling it online.

## SWOT Analysis



### Tangible Resources:

1. Product Portfolio(S): TrueCar has a wide range of product categories.
2. Dealer Community(O+T): Strong relationship with the dealers that not only sell their products but also market them.
3. Labor Force(T): TrueCar has invested a lot in training of its labor force which is good but on the other side there is high turnover for human resources at Truecar Inc. which is bad for the company.
4. Shareholders(T): As of now, Truecar's is using around 8-11% percent of their stock market revenue to pay off their employees, where the competitors only use around 1-3%.
5. Customer support (S+O): The company follows customer centric culture where they try to provide the best customer service.

### Intangible Resources:

6. Website(S): The interactive website makes it user-friendly for customers
7. IT(S): The company has an established IT network for internal and external work
8. Research and Development(T): Company has been investing in the R&D for their models to be better, but still in comparison to other companies they have put in less
9. People(S): The staff is a major part of the company without which it is impossible to get a place in the market
10. Technological Developments: Since the company is into automobiles there is a lot of scope for technological development
11. Management(S): The company is following a centralized system which is working great for them as they have many levels in the company

12. Environmental laws(S+W): The laws keep on changing frequently with the increasing awareness of saving the climate. Sometimes it works great for the company and sometimes they prove to be a threat.

**Capabilities:**

1. Efficient cost Structure: 2, 3, 5, 4, 11, 13, 9, 1
2. Organizational Culture:6, 10, 8, 12, 4

**Core competencies:**

The core competency of **TrueCar is its IT team** they have an established IT network for internal and external work, it will not be possible to imitate it fully. It is durable and it does add value. TrueCar gets competitive superiority, and it is non substitutable.

**Swot Matching:**

Weakness	Strength Utilised / Action Taken
Low amount spend on Research and Development	They need to spend more on this which will ensure better models for customer through new technologies
High employee turnover	More motivation should be given to employees and actions must be taken to reduce turnover rate
<b>Opportunities:</b>	
Changing Technology	With increase in the investment of R&D, they can cope with it
Development in AI	Can use AI to predict demand and cater to consumer needs
<b>Threats:</b>	
New environment regulations	They can be threat and sometimes they can be an opportunity as well
Threat of new entrants and mergers	The industry is highly competitive and hence there will be a threat of new entrants as well as merger between major companies

**As per our Swot analysis, Truecar should go with Cost leadership.**

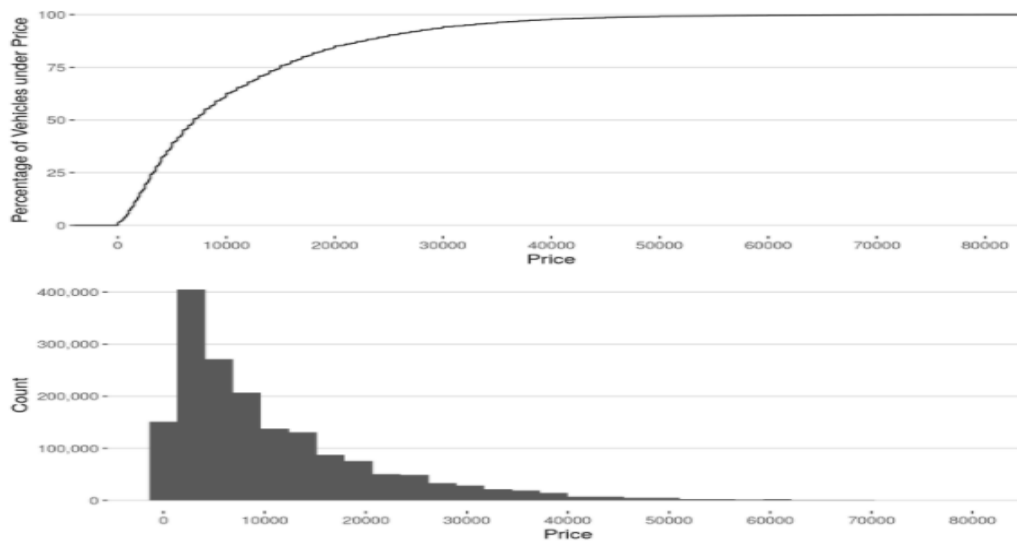
**Managerial conclusion: How to increase profitability of TrueCar (focus used car segment)**

We collected the USA used car market data (Source: <https://www.kaggle.com/paulinan/usa-used-cars-market-analysis/data>) . We used 'R' and 6202 understanding to predict the following outputs:

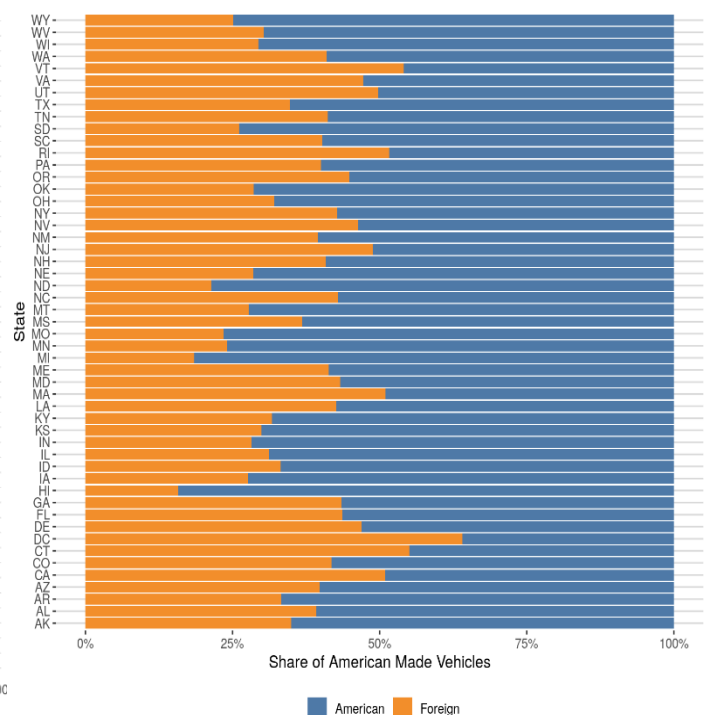
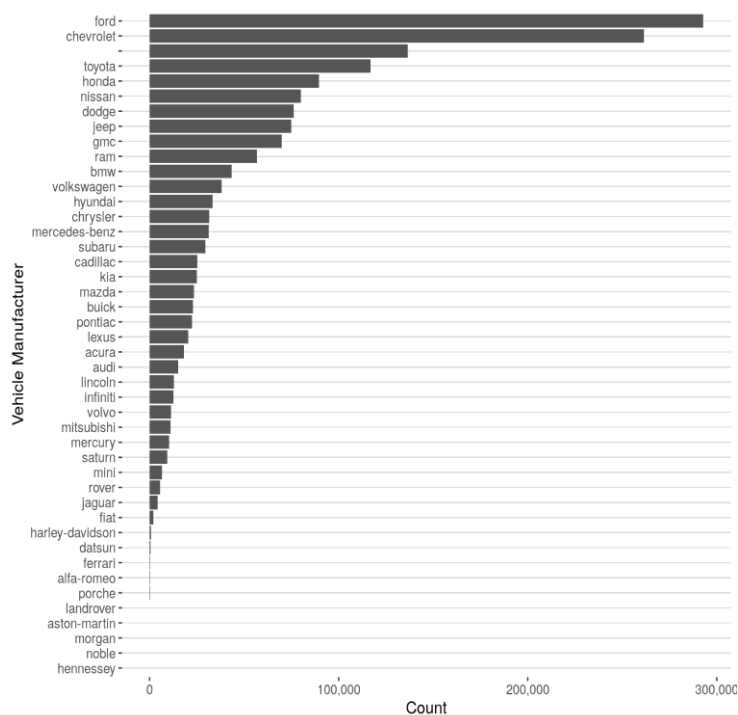
**Reduce the cost of the car to increase volume sales :** 550313 vehicles of the 550313 listings include prices. Of those, 549306 are priced under \$80,000. 50% of vehicles are priced under \$8,000. 75% are priced under \$15,000.<sup>3</sup>

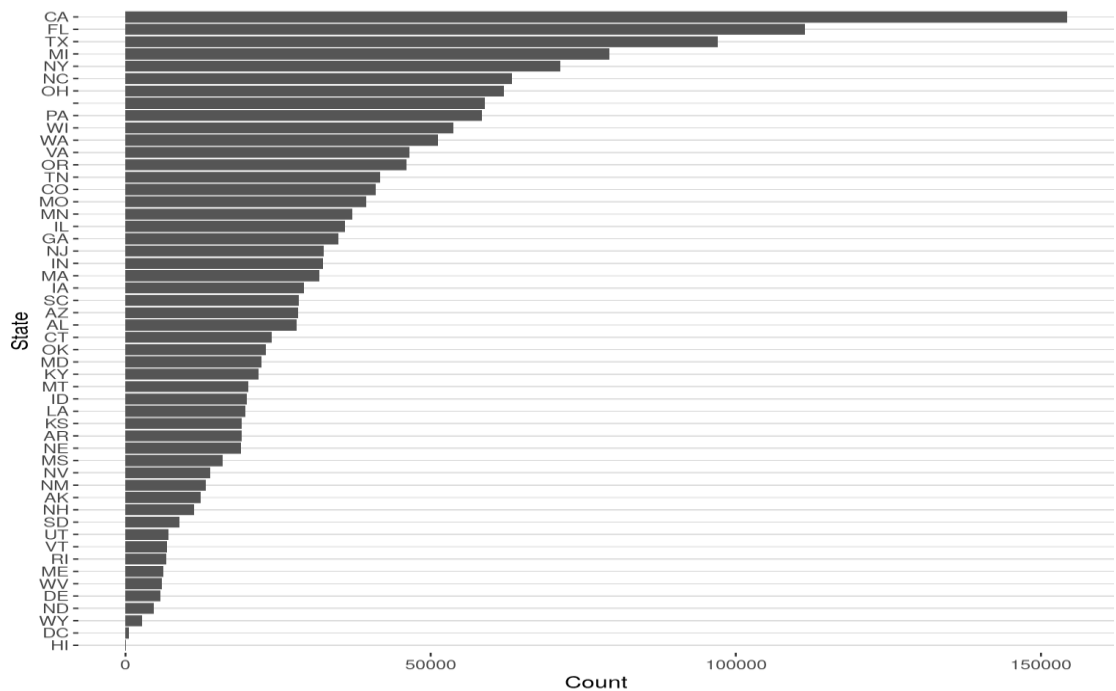
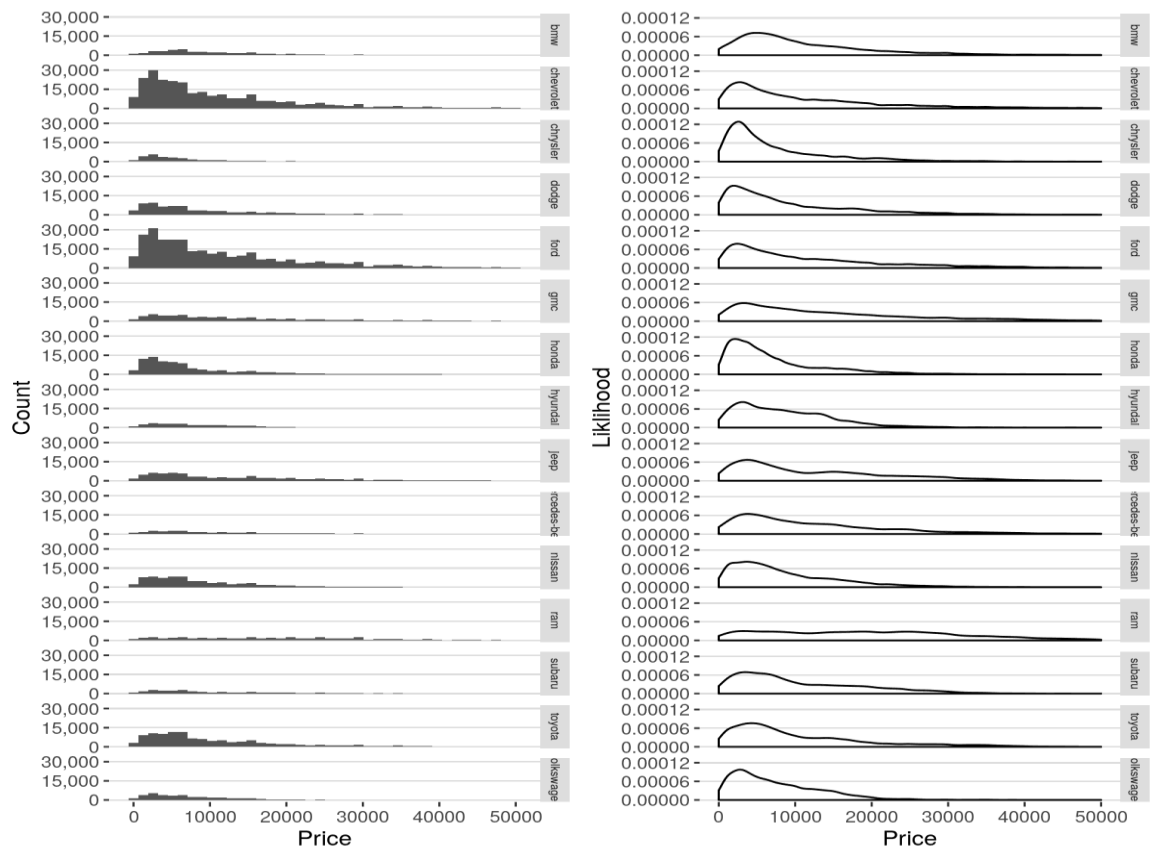
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<sup>3</sup> . Craw, M. (2021, October 11). *TrueCar: Good Business model ,too much risk today*. Seekingalpha.Com.



- **Focus on the American manufacturing brands** compared to any other brands: Hawaii represents the highest percentage of American made vehicle followed by Michigan ( home to American auto industry) and TrueCar should focus restocking of the model accordingly.
- Below chart also shows the price relationship between model sale and price. Looking at the below chart is it **better to avoid BMW, Chrysler** to restock for used car sales at least the current financial year.





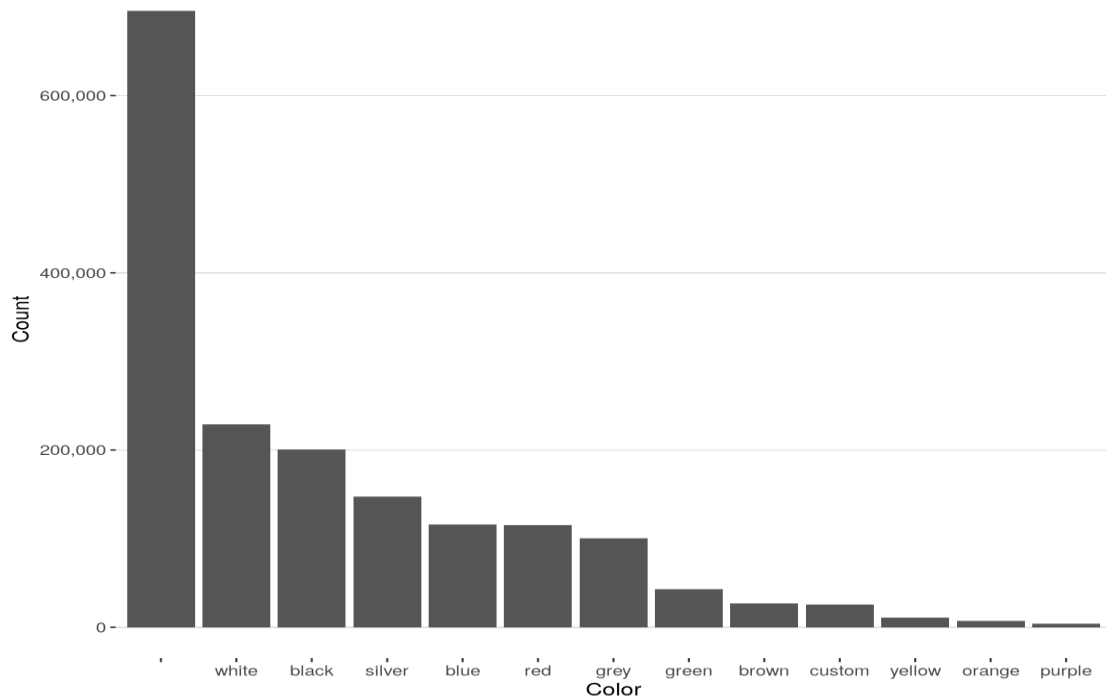
```

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signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

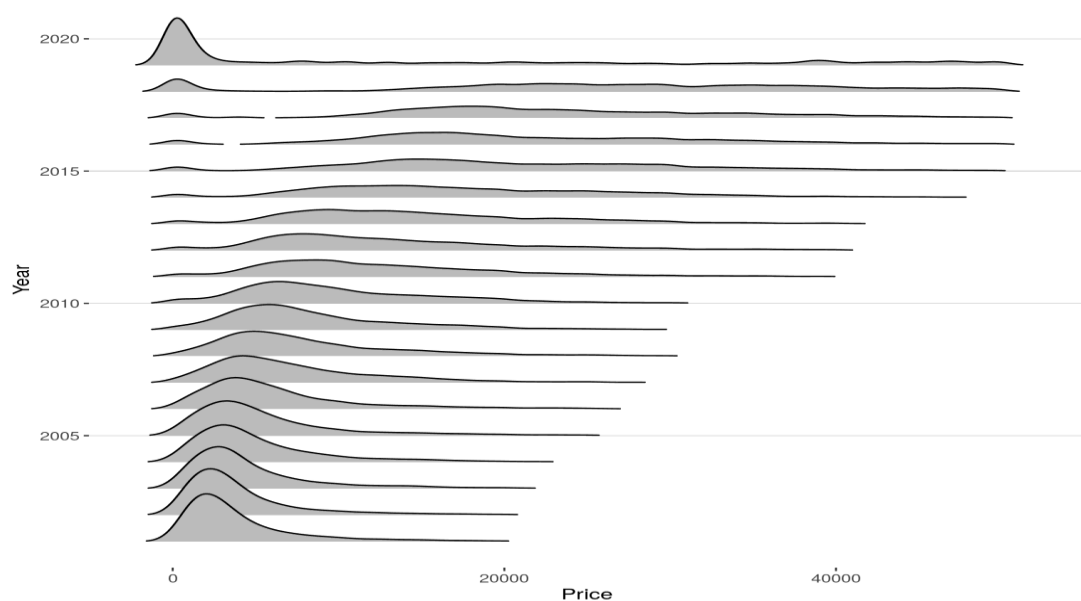
Residual standard error: 6542 on 970 degrees of freedom
Multiple R-squared:  0.8405,    Adjusted R-squared:  0.5744 
F-statistic: 3.159 on 1618 and 970 DF,  p-value: < 2.2e-16

```

- After performing a regression on geographical regions we found that for used car market they should **focus on states like California, Florida, Texas** based on their high usage.
- Based on the below graph we could easily say that people are more **interested in basic colors like white, black, silver, blue**.

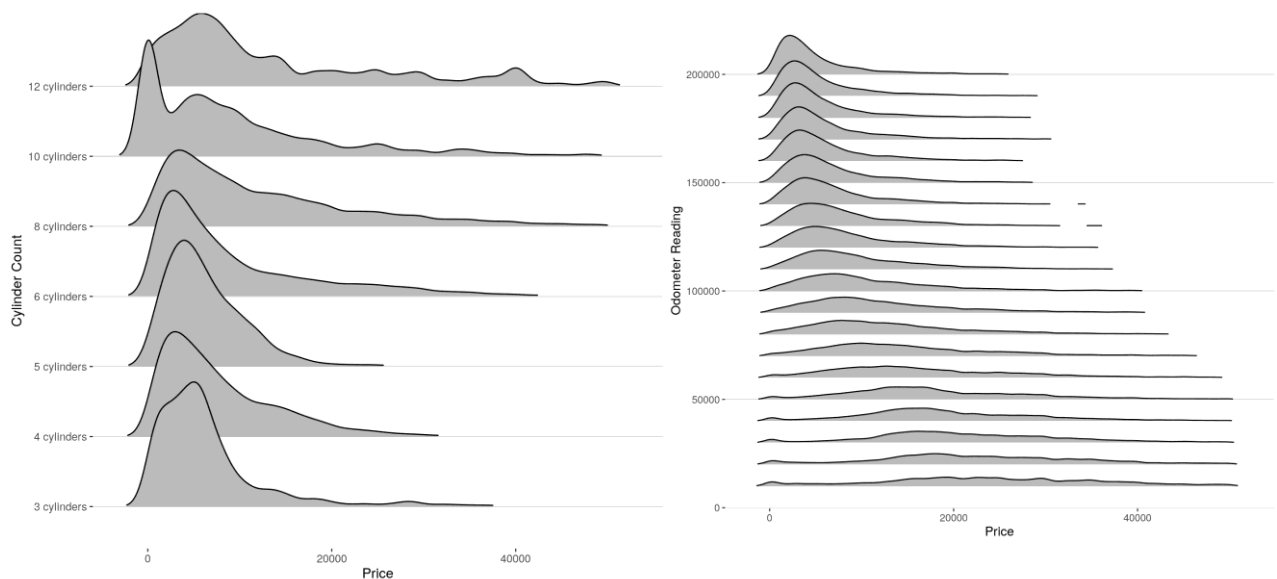


- Through the data shows a slight anomaly in 2020 as there is a spike but otherwise the data is showing expected result that the newer model would be priced more. Hence though used car segment but Truecar should focus on newer models for the buys specially the most used car states like CA and TX etc.

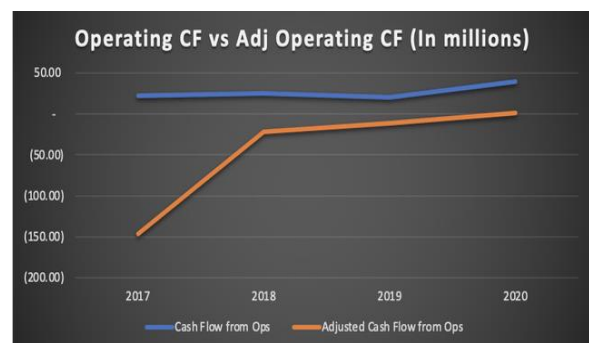
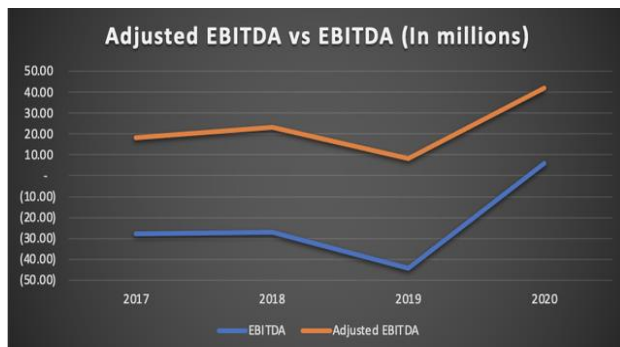




- Below graphs shows the price comparison in respect to cylinders and odometer reading as in continuation of the previous conclusion we could say it is better to focus on the newer cars to get better profitability.<sup>4</sup>



- Truecar should **focus on the shareholders pay** i.e., TrueCar payoff their employees with 8-11% of their stock returns compared to other companies which use 1-3% only.<sup>5</sup>



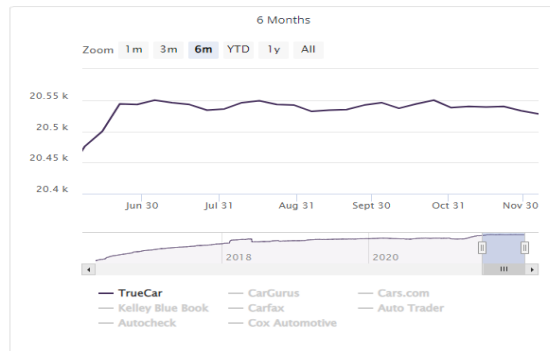
- Focus on **innovative marketing plan to increase traffic**: Truecar should focus on their online dealer's customer relationships, marketing campaigns like (buy a car from home), after sale service to capture more market share before the new competition takeover.

<sup>4</sup> Truecar Inc Comparisons to its Competitors, Market share and Competitiveness by Segment - CSIMarket. (2021).

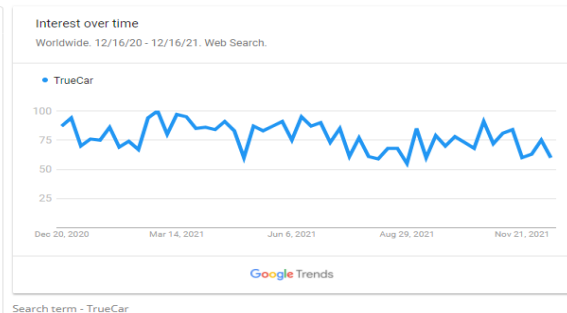
<sup>5</sup> Subaru, C. (n.d.). TrueCar Buyer's Bonus at Clay Subaru. Claysubaru.Com. Retrieved December 17, 2021, from

## TrueCar Online and Social Media Presence

 20.53k Twitter followers



## TrueCar's Trends



Below graph shows number of dealerships decreasing with Total sales.



## Code Used:

```
library(tidyverse)

## Warning: package 'dplyr' was built under R version 4.1.2

library(lubridate)
library(ggthemes)

## Warning: package 'ggthemes' was built under R version 4.1.2

library(leaflet)

## Warning: package 'leaflet' was built under R version 4.1.2

library(scales)
library(gridExtra)

## Warning: package 'gridExtra' was built under R version 4.1.2

Vehicles <- read.csv("C:/Users/Diya/Dropbox/My PC (LAPTOP-
F3UUJ2B7)/Desktop/craigslistVehicles.csv", header=T, na.strings="")

CtAll <- Vehicles %>%
  summarise(ct = n())

CtUnder80k <- Vehicles %>%
  filter(price < 80000) %>%
  summarise(ct = n())

PriceNotBlank <- Vehicles %>%
  filter(! is.na(price)) %>%
  summarise(ct = n())
```

### Distribution of Vehicle Price < \$80000

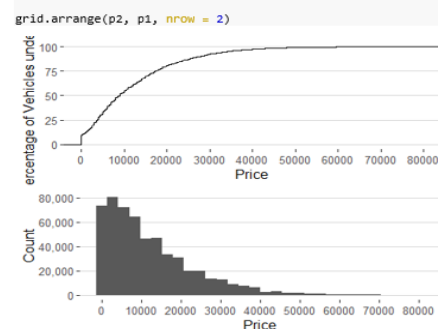
550313 vehicles of the 550313 listings include prices. Of those, 549306 are priced under \$80,000.

50% of vehicles are priced under \$8,000. 75% are priced under \$15,000.

```
p1 <- Vehicles %>%
  filter(price < 80000) %>%
  ggplot(aes(price)) +
  geom_histogram() +
  scale_x_continuous(breaks = seq(0, 80000, 10000)) +
```

```
scale_y_continuous(labels = comma) +
  theme_hc() +
  labs(x = "Price", y = "Count")

p2 <- Vehicles %>%
  filter(price < 80000) %>%
  ggplot(aes(price)) +
  stat_ecdf(geom="step") +
  scale_x_continuous(breaks = seq(0, 80000, 10000)) +
  scale_y_continuous(breaks = c(0, .25, .5, .75, 1), labels = c("0", "25",
"50", "75", "100")) +
  theme_hc() +
  labs(x = "Price", y = "Percentage of Vehicles under Price")
```



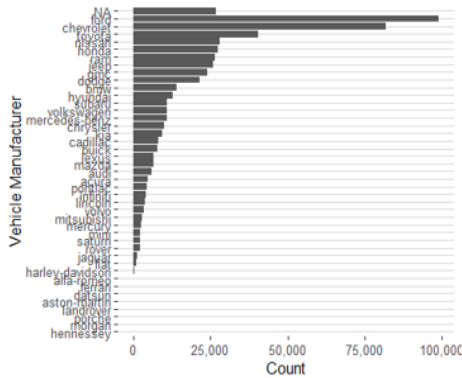
### Count of Vehicles by Manufacturer

American made brands top the list. A number of listings do not include a manufacturer.

```
lut <- c("alfa" = "alfa-romeo", "aston" = "aston-martin", "chev" =
"chevrolet", "chevy" = "chevrolet",
"harley" = "harley-davidson", "infinity" = "infiniti", "land rover"
= "landrover",
"mercedes" = "mercedes-benz", "mercedesbenz" = "mercedes-benz", "vw"
= "volkswagen")
```

```
Vehicles$manufacturer <- ifelse(Vehicles$manufacturer %in% c("alfa", "aston",
"chev", "chevy", "harley",
"land rover", "mercedes", "mercedesbenz", "vw"),
"infiniti",
lut[Vehicles$manufacturer],
Vehicles$manufacturer)

Vehicles %>%
  group_by(manufacturer) %>%
  summarise(count = n()) %>%
  ggplot(aes(reorder(manufacturer, count), count)) +
  geom_bar(stat = "identity") +
  coord_flip() +
  scale_y_continuous(labels = comma) +
  theme_hc() +
  labs(x = "Vehicle Manufacturer", y = "Count")
```



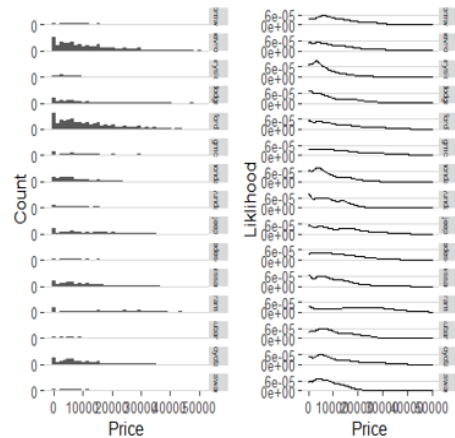
#### Comparing the Price Distribution between Brands

```
Vehicles %>%
  group_by(manufacturer) %>%
  summarise(count = n()) %>%
  filter(manufacturer != "") %>%
  arrange(desc(count)) %&>%
  mutate(rank = row_number()) %>%
  filter(rank <= 15) %>%
  select(manufacturer, rank) -> ManfToShow
```

```
p1 <- Vehicles %>%
  filter(manufacturer %in% ManfToShow$manufacturer & price < 50000) %>%
  ggplot(aes(price)) +
  geom_histogram(bins = 40) +
  facet_grid(manufacturer ~ .) +
  scale_y_continuous(labels = comma, breaks = seq(0,120000,15000)) +
  theme_hc() +
  labs(x = "Price", y = "Count") +
  theme(strip.text.y = element_text(size = 6))

p2 <- Vehicles %>%
  filter(manufacturer %in% ManfToShow$manufacturer & price < 50000) %>%
  ggplot(aes(price)) +
  geom_density() +
  facet_grid(manufacturer ~ .) +
  scale_y_continuous(breaks = seq(0,.00012, .00006)) +
  theme_hc() +
  labs(x = "Price", y = "Likelihood") +
  theme(strip.text.y = element_text(size = 6))
```

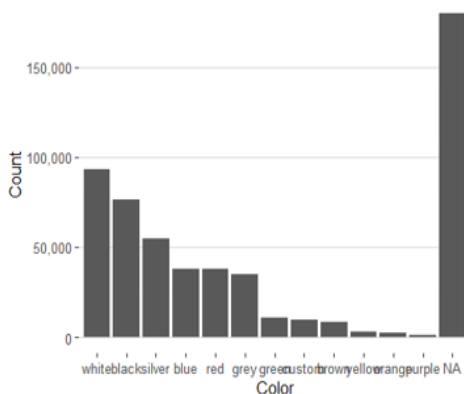
grid.arrange(p1, p2, nrow = 1)



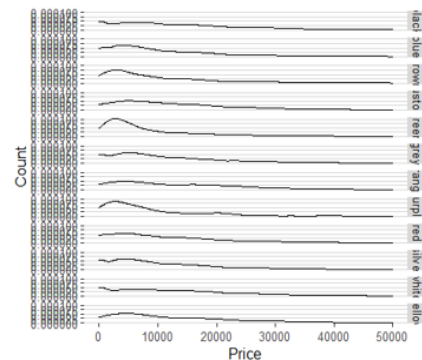
#### Vehicle Color

What color vehicles are for sale?

```
Vehicles %>%
  group_by(color) %>%
  summarise(ct = n()) %>%
  ggplot(aes(reorder(color, -ct), ct)) +
  geom_bar(stat = "identity") +
  theme_hc() +
  scale_y_continuous(labels = comma) +
  labs(x = "Color", y = "Count")
```



```
Vehicles %>%
  filter(color != "" & price < 50000) %>%
  ggplot(aes(price)) +
  geom_density() +
  theme_hc() +
  scale_y_continuous(labels = comma) +
  labs(x = "Price", y = "Count") +
  facet_grid(color ~ .)
```



#### Price Distribution by Year

Not sure what to make about the vehicles showing in the low price area of 2020, but otherwise we see the expected results of price decreasing as the vehicle ages.

```
#install.packages("ggiridges")
library(ggiridges)
```

## Warning: package 'ggiridges' was built under R version 4.1.2

```
Vehicles %>%
  filter(year>2000 & price < 50000) %>%
  ggplot(aes(x = price, y = year, group = year)) +
  geom_density_ridges(rel_min_height = 0.01) +
  theme_hc() +
  labs(x = "Price", y = "Year")
```

#### Price and vehicle color

Does the price distribution change for different color vehicles? Black, grey, and white have flatter price distributions.

## References:

### References

1. Bauer, L., Broady, K. E., Edelberg, W., & O'Donnell, J. (2020, September 17). *Ten facts about COVID-19 and the U.S. economy*. Brookings. <https://www.brookings.edu/research/ten-facts-about-covid-19-and-the-u-s-economy/>
2. Bureau of Labor Statistics. (2021, November). *US Consumer Price Index: Used Cars and Trucks*. Ycharts.Com. [https://ycharts.com/indicators/us\\_consumer\\_price\\_index\\_used\\_cars\\_and\\_trucks](https://ycharts.com/indicators/us_consumer_price_index_used_cars_and_trucks)
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4. F-Stat Research Partners. (2021, May 26). *A True Path to FInd*. Seekingalpha.Com. <https://seekingalpha.com/article/4431517-truecar-true-path-to-profit>
5. *Measuring Price Change in the CPI: Used Cars and trucks*. (2021, July 20). Bls.Gov. <https://www.bls.gov/cpi/factsheets/used-cars-and-trucks.htm>
6. Subaru, C. (n.d.). *TrueCar Buyer's Bonus at Clay Subaru*. Claysubaru.Com. Retrieved December 17, 2021, from <https://www.claysubaru.com/true-car-buyers-bonus-norwood-ma.htm>
7. *Truecar Inc Comparisons to its Competitors, Market share and Competitiveness by Segment - CSIMarket*. (2021). Csimarket.Com. [https://csimarket.com/stocks/compet\\_glance.php?code=TRUE](https://csimarket.com/stocks/compet_glance.php?code=TRUE)
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9. U.S. BUREAU OF LABOR STATISTICS. (2021). *CPI for All Urban Consumers (CPI-U)*. Bls.Gov. [https://data.bls.gov/timeseries/CUUR0000SETA02?output\\_view=data](https://data.bls.gov/timeseries/CUUR0000SETA02?output_view=data)