

Design Assignment

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As we started our brainstorming session in class, we thought of two key customer segments: **“Family Needs”** and **“I’ve made it.”** The “Family Needs” segment consists of families with children still in the household. This segment needs a larger, more comfortable car to move. The segment values capabilities such as more seating, cup holders, entertainment consoles, and safety. Additionally, the segment is more value-driven. The “I’ve made it” segment is interested in the social status benefits and is attracted to those brands that are perceived as accessible to high-status demography. During our brainstorming session, we first agreed to identify as many pain points as we could in a 10 minute timebox. Subsequently, we had another timebox of 15 minutes to come up with features to solve every pain point. In both these sessions we decided not to think about the feasibility of the idea, and were hence able to come up with a lot of ideas.

The WSJ article, “Is It Possible to Have Too Many Cup Holders?”, mentions the needs of large families. We thus decided to focus on the Family Needs segment and came up with the following pain points and probable features:

Pain Points:

- Using space for other things
- No dedicated vanity storage
- Can’t store bigger bottles
- Having to stop by the Coffee Shop drive through every morning
- Long drives can be agitating

Feature Ideas:

- Cup heater for hot beverages or cooler
- Multi-size holder
- Coffee dispenser (similar to Keurig mechanism)
- Large enough to fit a 40 fluid ounce bottle
- Cup holder space customizable for vanity storage
- Easily removable and washable
- Rectangular cavity with a modular organizer to customize storage space
- Gyroscopic holder to prevent liquid spilling around
- Extra Entertainment Monitor in one of the cup holders
- A device in a cup holder that monitors blood pressure etc and prompts to relax

After our brainstorming session, we wanted to focus on the most value-maximizing yet feasible ideas by utilizing a Selection Table¹. We wanted to understand the budget we could demand for the new cup holder design. Hence, we took a look at the Industry and Competition.

Industry: The Car and Automobile Manufacturing industry has experienced turbulence over the five years to 2019². In the coming years, improvements to the economy are expected to help the auto sector overall. Additionally, declining



¹ Exhibit 5

² Exhibit 1

prices for crude oil³ have helped strengthen demand for light trucks and sport utility vehicles at the expense of compact cars and sedans⁴. As a result, the popularity of hybrids and CUVs supplanted most SUV demand; CUVs accounted for 40.8% of total automobile sales in 2019⁵.

Over the five years to 2019, the performance of the SUV and CUV segment has been strong, largely due to upward trends of key macroeconomic indicators. The Consumer Confidence Index has been strong throughout the period. Increased consumer sentiment was further assisted by historically low-interest rates. With rates staying low for much of the period, increased financing options and access to credit encouraged consumers to spend money on big-ticket discretionary items such as automobiles. However, the industry is expected to decelerate as rising interest rates and unemployment are expected to hinder vehicle purchases.

Competition: The CUV, SUV, and the luxury SUV segments are hypercompetitive as manufacturers claim high margins and regularly introduce new models to gain market share. Companies from the luxury sports car segment have already introduced SUVs and are reaping rich dividends from their



products. A few leading examples are Porsche Cayenne and Macan, the Bentley Bentayga, the Lamborghini Urus, the Rolls Royce Cullinan, and the yet to be launched Ferrari Purosangue.

The competitive nature of the segments and the cost focus of the customers meant that we had limited budget for our new design solution. The design would have to add as little burden on

³ Exhibit 2

⁴ Exhibit 3

⁵ Exhibit 4

the cost as possible. We wanted to increase the customer's willingness to pay with same or only slightly higher costs thus ensuring that we offered significant value to customers compared to our competitors. This conclusion dictated our design choice and we decided to proceed with four features to satisfy these customer needs:

1. Cup heater for hot beverages or cooler
2. Large enough to fit a 40 fluid ounce bottle
3. Adjustable to secure smaller size cups
4. Easily removable and washable

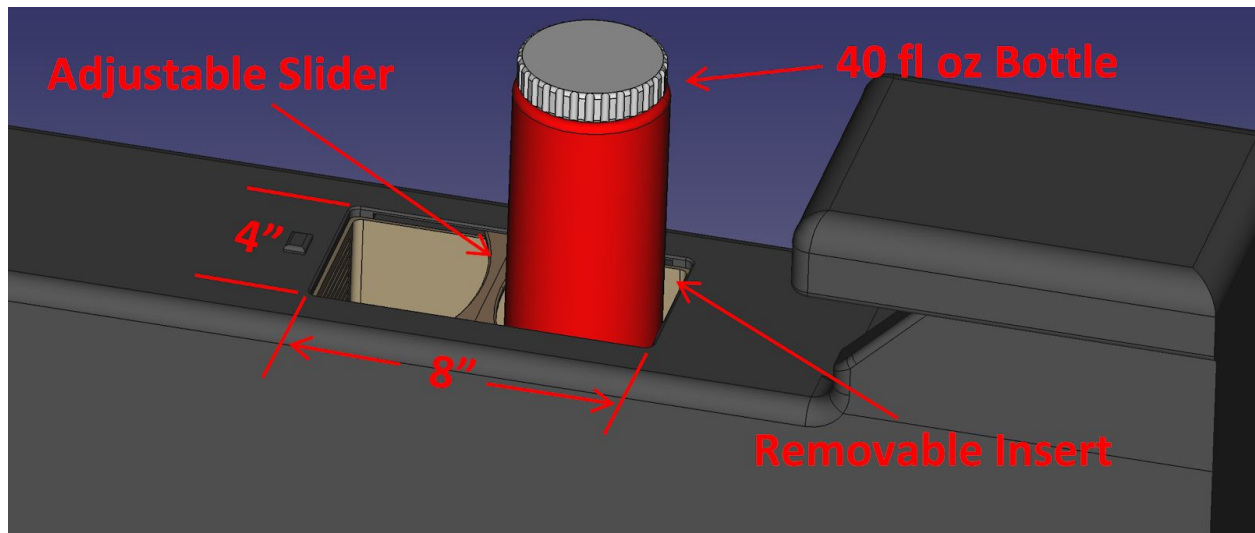
Our design deviates from the 2 round center console cup holders design which is prototypical for SUV's. Realizing a need for driver accessible storage as well as growing



popularity in larger water bottles and cup sizes, our design is a rectangular cavity with an adjustable slider. This allows the driver to secure a range of bottle and cup sizes as well as not limiting the space to just holding round shaped cups. This is an important feature as even the big gulp cup has

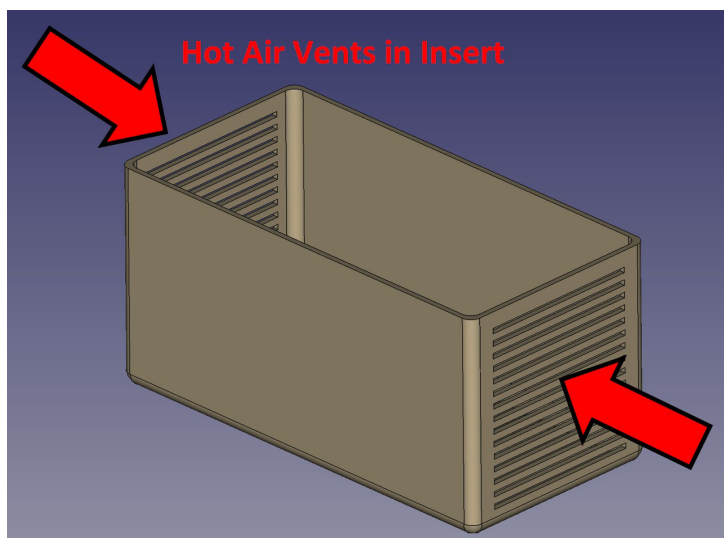
transformed over the years to taper at the bottom in an effort to fit into the prototypical cup holder. We want to give the customer the ability to fit a large range of cup and bottle sizes. Additionally, most people will throw miscellaneous items into the cupholder or do not use their

cup holders for cups at all. A large rectangular cavity offers more utility than the prototypical round design for storage of miscellaneous items.

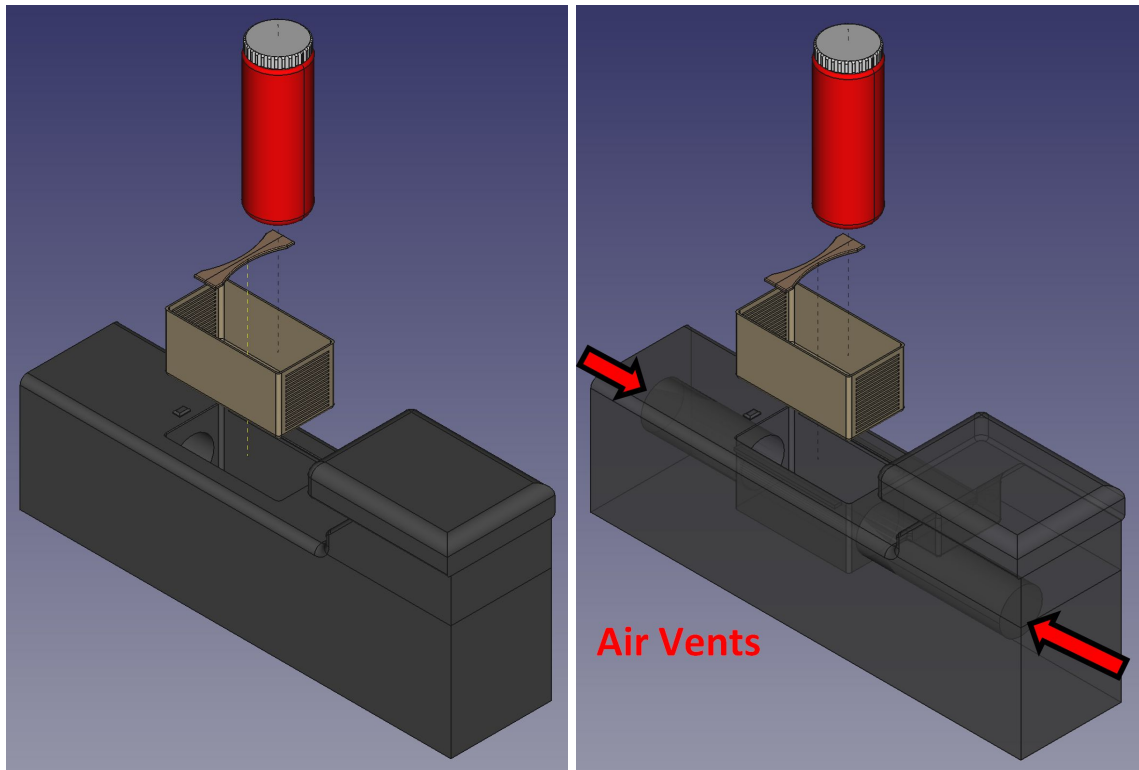


Over time frequently used cup holders can get dirty. Whether it be from leaking containers, food, or other items tossed in over time, the ability to remove a liner from the center console for washing is a nice feature not currently offered by most vehicles. The design of our insert is shown below. An added benefit of the rectangular cavity design is that aftermarket manufacturers or the automaker itself would be able to offer various types of inserts matching different storage needs of customers.

Slats are added to the walls of the liner to allow flow of hot or cold air from vents running through the center console. The ability to help keep hot drinks hot and cold drinks cold is a distinct feature of this cup



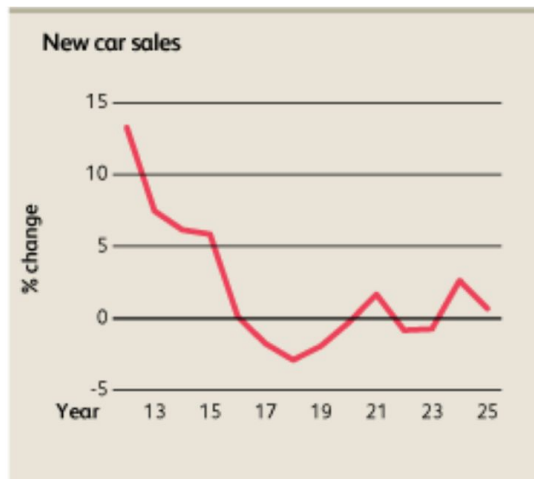
holder design. The below views show how AC vents are designed into the center console area to make this possible.



Many SUV's already run vents through the center console to provide AC to the second row of seating so this is not expected to drive a significant cost impact compared to prototypical cup holder designs. Also, for an automaker implementing any new cup holder design, there will be new plastic injection molding tooling required so this is not a relevant cost as this center console cavity design is not expected to cost any more or less than a typical round cavity. Generally, the extra cost of this design will be in producing the inserts as well as the adjustable slider piece. Both are also likely to be injection molded parts so their addition is expected to fit within the 2X cost margin of prototypical designs. This design delivers these 4 new and useful features without a large impact to cost.

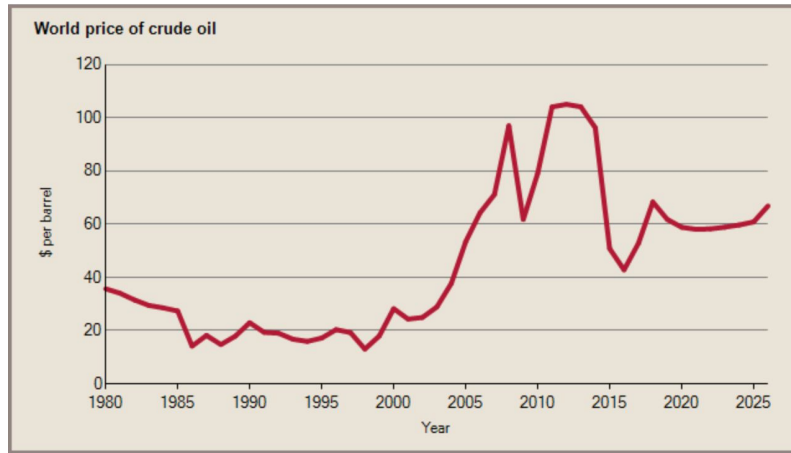
Exhibits:

1. New car sales - Source: IBISWorld



2. Crude oil outlook - Source:

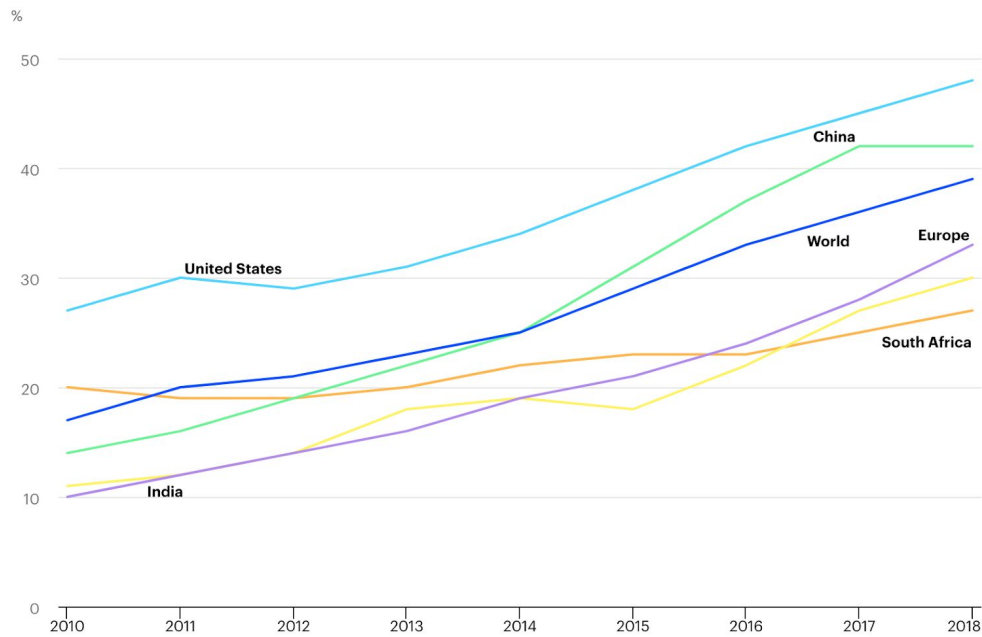
<https://clients1-ibisworld-com.ezproxy.lib.uconn.edu/reports/us/bed/default.aspx?bedid=990007>



Year	\$ per barrel	% Change
2003	28.90	15.8
2004	37.72	30.5
2005	53.36	41.5
2006	64.28	20.5
2007	71.16	10.7
2008	96.97	36.3
2009	61.77	-36.3
2010	79.04	28.0
2011	104.05	31.7
2012	105.01	0.9
2013	104.07	-0.9
2014	96.25	-7.5
2015	50.79	-47.2
2016	42.84	-15.7
2017	52.81	23.3
2018	68.33	29.4
2019	61.78	-9.6
2020	58.83	-4.8
2021	58.05	-1.3

The price of crude oil is expected to experience a variety of upward and downward price pressures over the next five years. Ultimately, however, the world price of crude oil is expected to grow slowly over the next five years. US production levels will continue to be strong and the removed export restrictions could further encourage upstream companies to keep production levels high. In addition, OPEC's production levels are anticipated to remain high. Together, this will ensure high levels of oil supply for the globe, putting downward pressure on prices if not for high demand. Following a projected decline in oil prices in 2020 and 2021, prices are expected to rise due to economic growth and high demand in emerging and developed markets. As a result, IBISWorld estimates the world price of crude oil to increase an annualized 0.7% over the five years to 2025.

3. SUV share

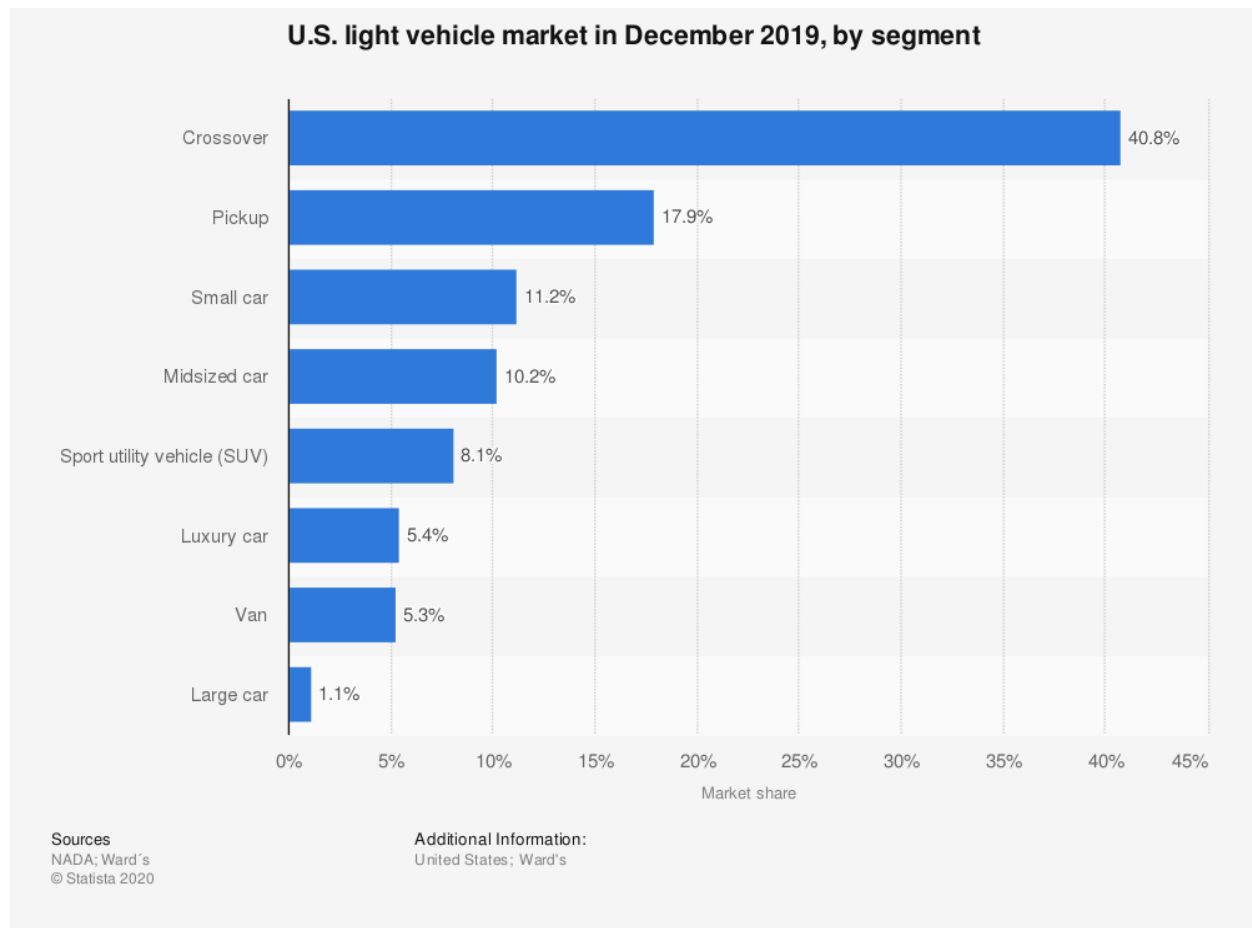


Source: IEA, "Share of SUVs in total car sales in key markets, 2010-2018", IEA, Paris
<https://www.iea.org/data-and-statistics/charts/share-of-suvs-in-total-car-sales-in-key-markets-2010-2018>

4. CUV sales 2019 (% of Market Share)

NADA. (2020). U.S. light vehicle market in December 2019, by segment. Statista. Statista Inc.. Accessed: February 13, 2020.

<https://www.statista.com/statistics/276506/change-in-us-car-demand-by-vehicle-type/>



5. Feature Selection Table:

Feature Selection Table				
	Convenience	Safety/Reliability	Cost	Sum
Cup heater for hot beverages or cooler	2	2	-1	3
Multi-size holder	2	2	-1	3
Coffee dispenser (similar to Keurig mechanism)	2	1	-2	1
Large enough to fit a 40 fluid ounce bottle	2	2	-1	3
Cup holder space customizable for vanity storage	1	2	-1	2
Easily removable and washable	2	2	-1	3
Rectangular cavity with a modular organizer to customize storage space	2	2	-1	3
Gyroscopic holder to prevent liquid spilling around	2	1	-2	1
Extra Entertainment Monitor in one of the cup holders	1	1	-2	0
A device in a cup holder that monitors blood pressure etc and prompts to relax	1	1	-2	0
2 - Very Good, 1 - Good, -1 Poor, -2 Very Poor, ? - Unknown				
Cost: -2 ~ Too Costly, -1 ~ Regular R&D Costs				