I want it, but will I use it?
Customer value in auto technology

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J.D. Power

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Consumers avoid models that lack technology

<table>
<thead>
<tr>
<th>Industry: Top Avoidance Reasons</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exterior look/design</td>
<td>30%</td>
</tr>
<tr>
<td>Costs too much money</td>
<td>17%</td>
</tr>
<tr>
<td>Interior look/design</td>
<td>17%</td>
</tr>
<tr>
<td>Didn't like image vehicle portrays</td>
<td>16%</td>
</tr>
<tr>
<td>Lacks latest technology features</td>
<td>15%</td>
</tr>
<tr>
<td>Concerned about reliability</td>
<td>14%</td>
</tr>
<tr>
<td>Didn't want foreign/import vehicle</td>
<td>13%</td>
</tr>
<tr>
<td>Vehicle was too small</td>
<td>11%</td>
</tr>
<tr>
<td>Bad reputation of manufacturer</td>
<td>10%</td>
</tr>
<tr>
<td>Doesn't get enough gas mileage</td>
<td>9%</td>
</tr>
<tr>
<td>Unfavorable online ratings and reviews</td>
<td>9%</td>
</tr>
<tr>
<td>Poor quality</td>
<td>9%</td>
</tr>
</tbody>
</table>

Source: J.D. Power 2015 Avoider Study℠
### Strong Acceptance of Techs that Reduce Driving Burden

#### 2015 Most Frequently Selected as Most Preferred

<table>
<thead>
<tr>
<th>Feature</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blind Spot Detection and Prevention</td>
<td>40%</td>
</tr>
<tr>
<td>Night Vision</td>
<td>33%</td>
</tr>
<tr>
<td>Enhanced Collision Mitigation System</td>
<td>30%</td>
</tr>
<tr>
<td>Camera Rear-View Mirror</td>
<td>30%</td>
</tr>
<tr>
<td>Self-Healing Paint</td>
<td>25%</td>
</tr>
</tbody>
</table>

#### Key Features

- **Entertainment & Connectivity**
- **Comfort & Convenience**
- **Collision Protection**
- **Navigation**
- **Driving Assistance**
- **Energy Efficiency**

Building blocks to fully autonomous
Semi-Autonomous Features Pave Path for Success

Interest in Autonomous Driving Mode at $3,000

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest</td>
<td>20%</td>
<td>21%</td>
<td>24%</td>
</tr>
</tbody>
</table>

**Consumer Sentiment**

<table>
<thead>
<tr>
<th></th>
<th>EXCITEMENT</th>
<th>ASSURANCE</th>
<th>CONFIDENCE</th>
</tr>
</thead>
</table>
| Interest in Semi-Autonomous Features Continues to Grow

- As consumers are becoming more aware of semi-autonomous features or even experiencing firsthand their benefits, these **driver-assist features are gaining consumer trust** and paving the way for **acceptance of fully autonomous vehicles**

*Note that the data shown under Fully Autonomous Parking System in 2012 and 2013 was based on the interest in Automatic Park Assist System.*

Source: J.D. Power 2014 U.S. Emerging Technologies Study℠
Who wants a Collision Protection Avoidance Technology on their next vehicle?

Interest by Age

- **Generation Y**
  - 87%
  - 2025
  - $89k

- **Generation X**
  - 79%
  - $108k

- **Boomers**
  - 76%
  - $123k

- **Pre-Boomers**
  - 81%
  - $97k

Source: J.D. Power 2015 U.S. Tech Choice StudySM
## Most/Least Preferred Technologies Overall

### Percentage That Technologies Are Selected As Least Preferred

| Technology                        | Percentage
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Most Frequently Selected as Least Preferred</strong></td>
<td></td>
</tr>
<tr>
<td>Email Integration</td>
<td>32%</td>
</tr>
<tr>
<td>Trailer Connect Assist</td>
<td>31%</td>
</tr>
<tr>
<td>Health and Wellness System</td>
<td>30%</td>
</tr>
<tr>
<td>Apple's CarPlay Suite</td>
<td>28%</td>
</tr>
<tr>
<td>Hidden Door Handles</td>
<td>26%</td>
</tr>
</tbody>
</table>

| **Least Frequently Selected as Least Preferred** |          |
| Enhanced Collision...             | 8%        |
| Reverse Auto Braking              | 8%        |
| Emergency Braking and...          | 7%        |
| Camera Rear-View Mirror           | 7%        |
| Blind Spot Detection and...       | 5%        |

Note: Overall preference ranking is a combination of the frequency of most preferred and least preferred selections.
Technology experience today

• What do consumers use?
DrIVE 1st Gear Objective
Industry perspective at 90 days of ownership

Measures the driver’s experience, usage, and interaction with in-vehicle features in the cockpit space at 90 days of ownership. The study provides an understanding of opportunities for minimizing the gap between customer experience and execution.

**Usage**
- Interaction
- Experience
- Frequency, ease and importance

**Acceptance**
- Emotions
- Redundancy
- Preference

**Missed Opportunities**
- Gaps (experience, execution, expectation)
- Influence future product

90 days of ownership
Entertainment & Connectivity has the highest impact on the satisfaction with technology in the vehicle.
Consumers are most satisfied with their Collision Protection technologies

Q: Taking everything into consideration, how would you rate your overall experience interacting with the technology features of your vehicle?
Lost Value

• What technologies are not being used?
Lost Value Technologies
Why do respondents not use the vehicle to its full capability?

• Have the feature now, but state it is never used. What is the reason?
  – I do not need it
  – I do not know how to use it
  – It is too difficult to use
  – Other (verbatim)

• For the vehicle’s features you are not using, are you using an outside device? If yes, indicate how long you used the in-vehicle equipment before you stopped. Why?

• Have the feature now, but do not want it on their next vehicle. Why?
  – Do not find feature useful
  – Feature is confusing / difficult to use
  – Will no longer need feature on next vehicle
  – Did not want feature on current vehicle, but it came as part of a package
  – Not worth the money
  – Other (verbatim)
Consumers lack knowledge of some technologies

**Consumer Understanding of Technology Contained in their Vehicle - Industry**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built-in Apps</td>
<td>46%</td>
</tr>
<tr>
<td>Phone pairing system</td>
<td>34%</td>
</tr>
<tr>
<td>In-vehicle mobile router</td>
<td>58%</td>
</tr>
<tr>
<td>In-vehicle concierge services</td>
<td>59%</td>
</tr>
<tr>
<td>Blind spot warning and detection</td>
<td>63%</td>
</tr>
<tr>
<td>Adaptive cruise control</td>
<td>54%</td>
</tr>
<tr>
<td>Factory-installed navigation</td>
<td>54%</td>
</tr>
<tr>
<td>Smartphone navigation</td>
<td>46%</td>
</tr>
<tr>
<td>Vehicle interface</td>
<td>39%</td>
</tr>
</tbody>
</table>

Q: Which of the following features do you currently have on your [MAKE AND MODEL], regardless of whether or not you use the feature?
Other technologies they “Never Use”

Q: For each of the features and functions below, please indicate how frequently you use that feature or function when driving your vehicle.

Technologies Consumers State Are Never Used - Industry

- In-vehicle concierge services: 43%
- In-vehicle mobile router: 38%
- Automatic parking system*: 35%
- Head-up display: 33%
- Built-in apps: 32%
- Rear seat entertainment system*: 31%
- Smartphone to vehicle functions: 30%
- Apple CarPlay*: 29%
- Android Auto: 29%
- In-vehicle voice texting: 28%
- Massaging seats#: 27%
- Voice recognition system: 25%
- Adaptive cruise control: 24%
- Other technologies they “Never Use”:

Note: * indicates small sample size (29 < n < 100)
# indicates insufficient sample size (n < 30)
Consumers did not see the value in several technologies

Q: You indicated that you never use the features and functions below. What are the reasons you did not use them?

Lost Value

- I do not need it
- I do not know how to use it
- It is too difficult to use
- Other reasons

Industry Verbatims

- “So far, the system does not recognize anything I say.”
- “Do not enjoy using feature.”
- “Too slow and time-consuming.”
- “Doesn’t understand foreign accent.”
- “Don’t remember I have it most of the time.”

% of Respondents

- Premium
- Non-Premium
- Industry

- 54%
- 51%
- 52%

- 26%
- 24%
- 25%

- 15%
- 16%
- 16%

- 8%
- 13%
- 12%
No longer want feature – Did not see value

- Built-in Apps: 48%
- Fuel Economy Indicator: 44%
- In-Vehicle Voice Texting: 41%
Trial period is short

- Consumers most often determine if they will continue to use a built-in feature after giving it a try for the first month, if they even decide to try it at all

<table>
<thead>
<tr>
<th>% Only tried feature for 1 month or less</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In vehicle phone pairing</strong></td>
</tr>
<tr>
<td><strong>In-vehicle Concierge Services</strong></td>
</tr>
<tr>
<td><strong>Built-in Apps</strong></td>
</tr>
</tbody>
</table>
Dealer demonstration has a positive impact

Percent of Respondents who “Never Use” the Technology:
Dealer Demonstrated the Technology - Industry

<table>
<thead>
<tr>
<th>Technology</th>
<th>% of Respondents who “Never Use”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built-in apps</td>
<td>36%</td>
</tr>
<tr>
<td>In-vehicle mobile router</td>
<td>24%</td>
</tr>
<tr>
<td>In-vehicle concierge services</td>
<td>24%</td>
</tr>
<tr>
<td>Automatic parking system*</td>
<td>39%</td>
</tr>
<tr>
<td>Heads-up display</td>
<td>40%</td>
</tr>
</tbody>
</table>

Note: * indicates small sample size (29 < n < 100)

Q: Among the following features on your [MAKE AND MODEL], please indicate any methods you used to learn about how to operate each feature.
Q: For each of the features and functions below, please indicate how frequently you use that feature or function when driving your vehicle.
The majority of Gen Y’s top rated, least desired technologies are related to Entertainment & Connectivity.

Q: Which of the following features would you be most interested in having on your next new vehicle?
Collision Protection

Tops the list for Gen Y’s most desired technologies for their next vehicle

**Consumer Technology Desired Content for Their Next Vehicle – Industry Gen Y**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Do not want this feature</th>
<th>Want this feature</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blind spot warning &amp; detection</td>
<td>4%</td>
<td>90%</td>
<td>6%</td>
</tr>
<tr>
<td>Park assist</td>
<td>6%</td>
<td>88%</td>
<td>8%</td>
</tr>
<tr>
<td>Fuel economy indicator</td>
<td>8%</td>
<td>86%</td>
<td>7%</td>
</tr>
<tr>
<td>Seat lumbar adjustment</td>
<td>7%</td>
<td>83%</td>
<td>8%</td>
</tr>
<tr>
<td>Low speed collision avoidance</td>
<td>7%</td>
<td>75%</td>
<td>9%</td>
</tr>
<tr>
<td>Lane keeping/centering system</td>
<td>11%</td>
<td>75%</td>
<td>14%</td>
</tr>
</tbody>
</table>
| ^{Q: Which of the following features would you be most interested in having on your next new vehicle?}
Consumer Shift Toward Collision Protection Technologies

- In-vehicle experience
- Driver distraction
- Value add benefit
- Cost (in a world of “free”)

• Occupant and vehicle safety
• Ready for “help”
• Long term benefits
• Enabler

Evolution of Consumer Quality Pyramid
Trust Issues Arise

Traditional Quality
- Warranty Cases
- Malfunctions not brought to warranty

Design Quality

Consumer Behavior

Consumer Quality
- Warranty Cases
- Malfunctions not brought to warranty
- Soft “Inadequacies” needs addressed but not as preferred
- Missed Opportunities vehicle misalignment with market expectations

Evolution of Consumer Quality
- Broken / Not Working
- Difficult to Use / Understand
- Trust and Relationship Building

Comfort level: accuracy, vehicle behavior matches expectation, communication language, no surprises

Source: J.D. Power 1987 through 2015 U.S. Initial Quality Study (IQS) and 2015 U.S. DrIVE Pilot
Vehicles with Blind Spot Monitoring scored higher in APEAL than those that did not have the feature.

APEAL Index

<table>
<thead>
<tr>
<th></th>
<th>Industry</th>
<th>Premium</th>
<th>Non Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have Blind Spot Monitoring</td>
<td>822</td>
<td>846</td>
<td>812</td>
</tr>
<tr>
<td>Do Not Have Blind Spot Monitoring/Don’t Know</td>
<td>784</td>
<td>830</td>
<td>780</td>
</tr>
</tbody>
</table>

Visibility Index

<table>
<thead>
<tr>
<th></th>
<th>Industry</th>
<th>Premium</th>
<th>Non Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have Blind Spot Monitoring</td>
<td>837</td>
<td>856</td>
<td>829</td>
</tr>
<tr>
<td>Do Not Have Blind Spot Monitoring/Don’t Know</td>
<td>786</td>
<td>820</td>
<td>784</td>
</tr>
</tbody>
</table>
While consumers are finding this technology helpful, false positives and false negatives are risk factors that can erode trust in the system.

“Sometimes the system fails to detect a car in my blind spot. There are also a lot of false positives when I’m driving next to a barrier or in a double turn lane (but the double lane one is unavoidable).”

“Alerts when nothing is nearby.”

“Not even sure if I have it or not.”

“ Took me 6 weeks to even know how to use. The factory default was set to off!!! And the dealer didn’t explain the feature to me.”

Helpfulness of Blind Spot Warning and Detection

Source: 2015 J.D. Power DrIVE 1st Gear Study
Trust
Takes years to build
Seconds to break
And forever to repair
In closing

- Technology – customers will continue to want it
- Driver aids – helpful, intuitive, automatic, simple – find greater acceptance
- Those that increase confusion or are less helpful may result in work-around situations and lost value
- Automakers/suppliers/tech companies have a role in design, and dealers have a role in training/communication/delivery
- Trust will be the next differentiator – if you thought usability was tough….hold on!