

# Impact of Intelligent System on Vehicle Safety

**An Automotive Company Perspective**

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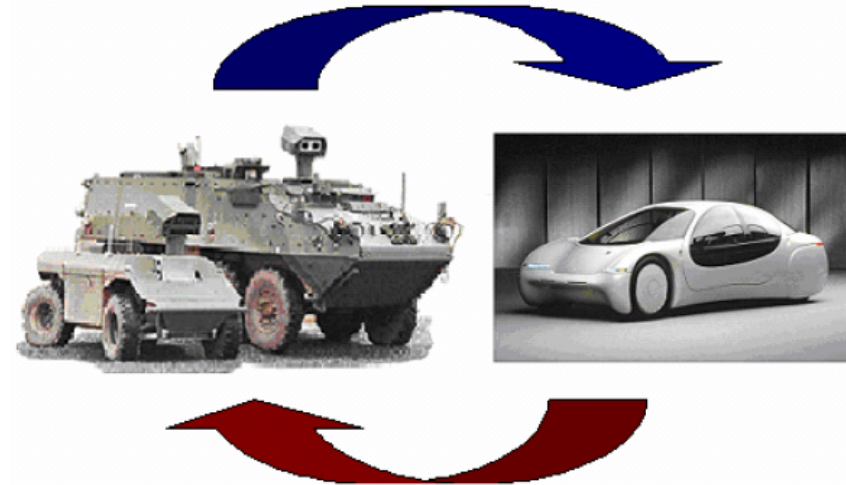
# Scope

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- **Intelligent Vehicle Technologies vs. Driver Assistance / Safety Features**
- **Auto Industry Trends**
- **Consumer Vehicle Safety Data**
- **Forecast on Intelligent System**

# Intelligent Vehicle Technologies vs. Driver Assistance / Safety Features

- **GPS navigation & automated crash notification**
- **Fleet management system**
- **Adaptive cruise control**
- **Crash warning and automated crash avoidance**
- **Near object detection system (back-up object detection)**
- **Lane change warning**
- **Automated lane tracking**
- **Head-up displays**
- **Driver distraction and drowsiness detection and mitigation**
- **Road-departure crash warning**
- **Rollover prevention**
- **Haptic driver warning cues**
- **Automated bus systems**
- **Intersection collision countermeasures (vehicles and pedestrians)**
- **Night vision**
- **Travel and service information**
- **Electronic weighing and inspection**
- **Traffic management systems**
- **Public transit enhancements**
- **Toll collection**



**Driver Assistance /  
Active Safety Features**

# Industry Trends on Safety

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## Passive Safety

- Many OEMs score well on consumer ratings tests today, and it is unlikely that these tests will be a **clear differentiator** for vehicle safety in the near future.
- All OEMs might migrate towards standard curtains and torso bags in the 2008-2010 timeframe, making this feature an unlikely differentiator.

**Passive safety will no longer provide product differentiation  
in the marketplace**

# Industry Trends on Safety

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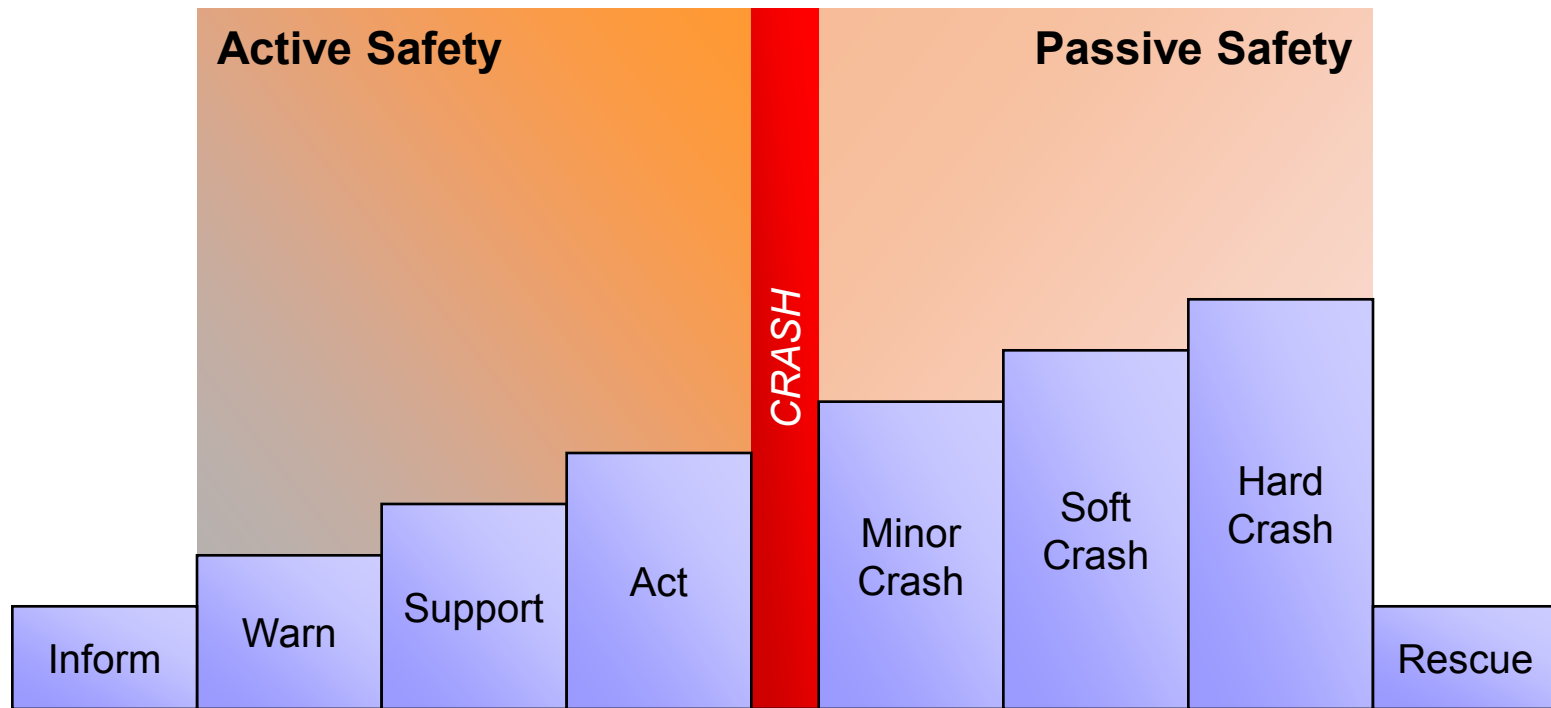
## Active Safety

- The focus in future safety “shifts” from occupant protection (passive) to accident avoidance (active).
- OEMs are aggressively moving towards implementing “advanced” Active Safety features, such as Collision Mitigation and Pre-Safe / Pre-Crash.
- The trend in safety is towards Active Safety addressing the needs of more sophisticated customers for the following:
  - Reduction of Injury and collision severity
  - Advanced driver warning and support systems

**Intelligent System / Active safety technology is the new frontier of consumer marketing**

# Trends on Safety

The focus of vehicle safety is shifting from occupant protection to collision avoidance



The customer will now experience “safety” on a day-to-day basis instead of only when a collision occurs

# Consumer Safety Data

# Consumers Perception About Safety

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- **Significant issues in consumer and crash data:**

- The inability for the driver to detect all objects in the vicinity of the vehicle
- The inability of a driver to act soon enough to avoid a serious injury or fatality accident

- **Emerging safety related technologies are consistently rated as most desirable.** (JD Powers APEAL)

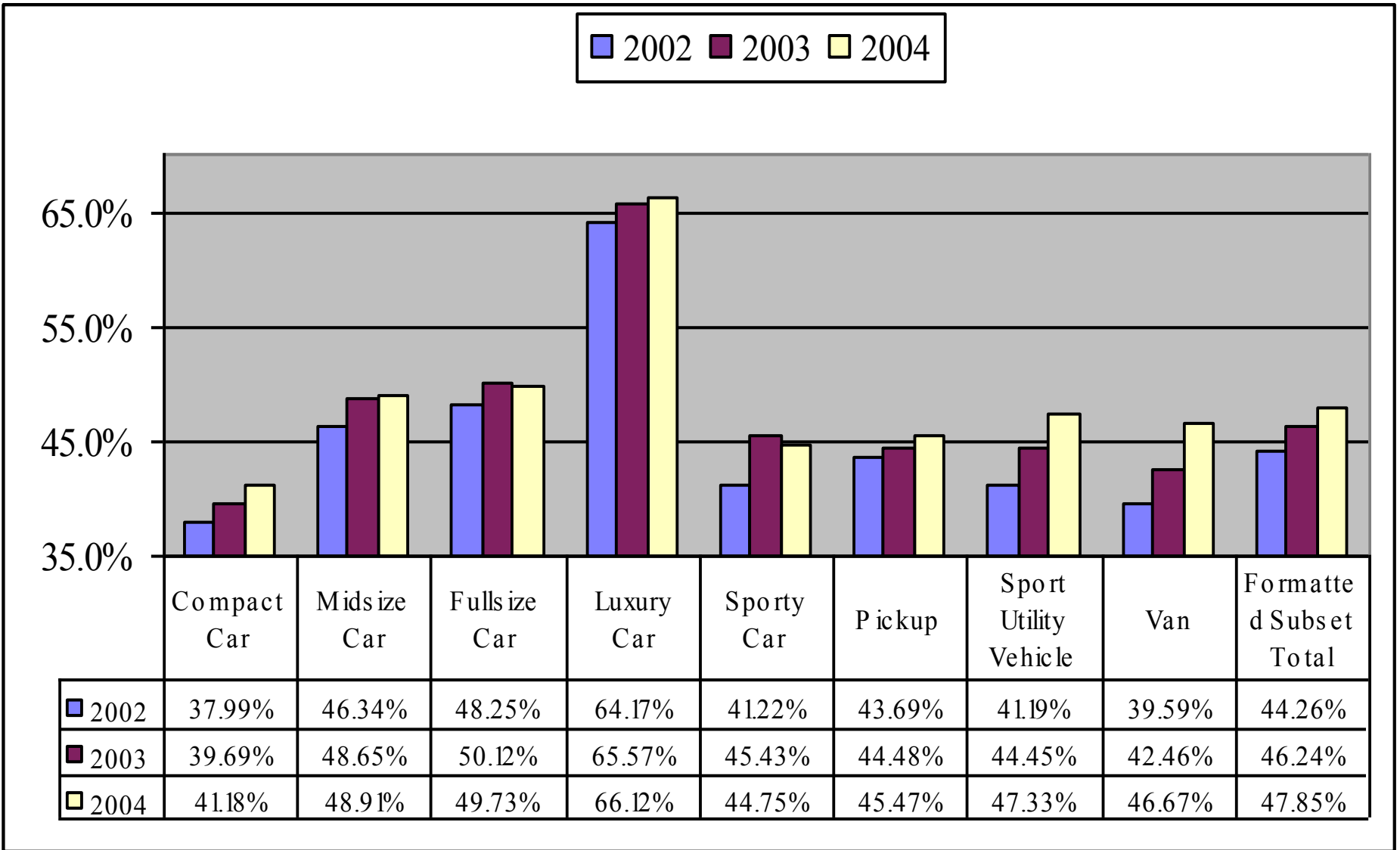
- **Safety related emerging technologies rate consistently higher than convenience features.**

(JD Powers Automotive Emerging Technologies Study 2000-2004)

- **Future Watch studies indicate aging baby boomers desire higher safety**

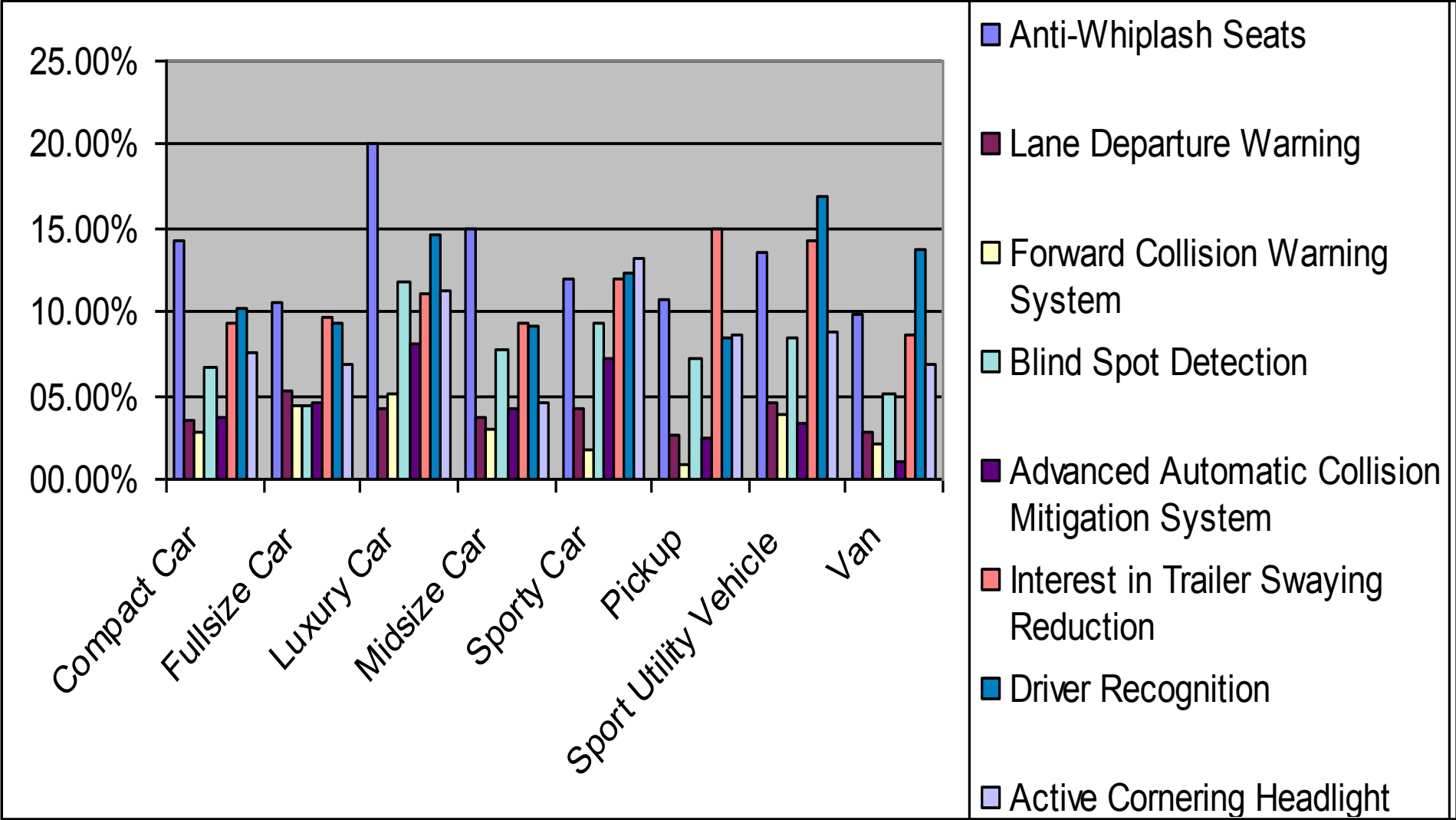
**Safety features play an important part of consumer vehicle image**

# JD Power: Consumer “Feelings about Safety”



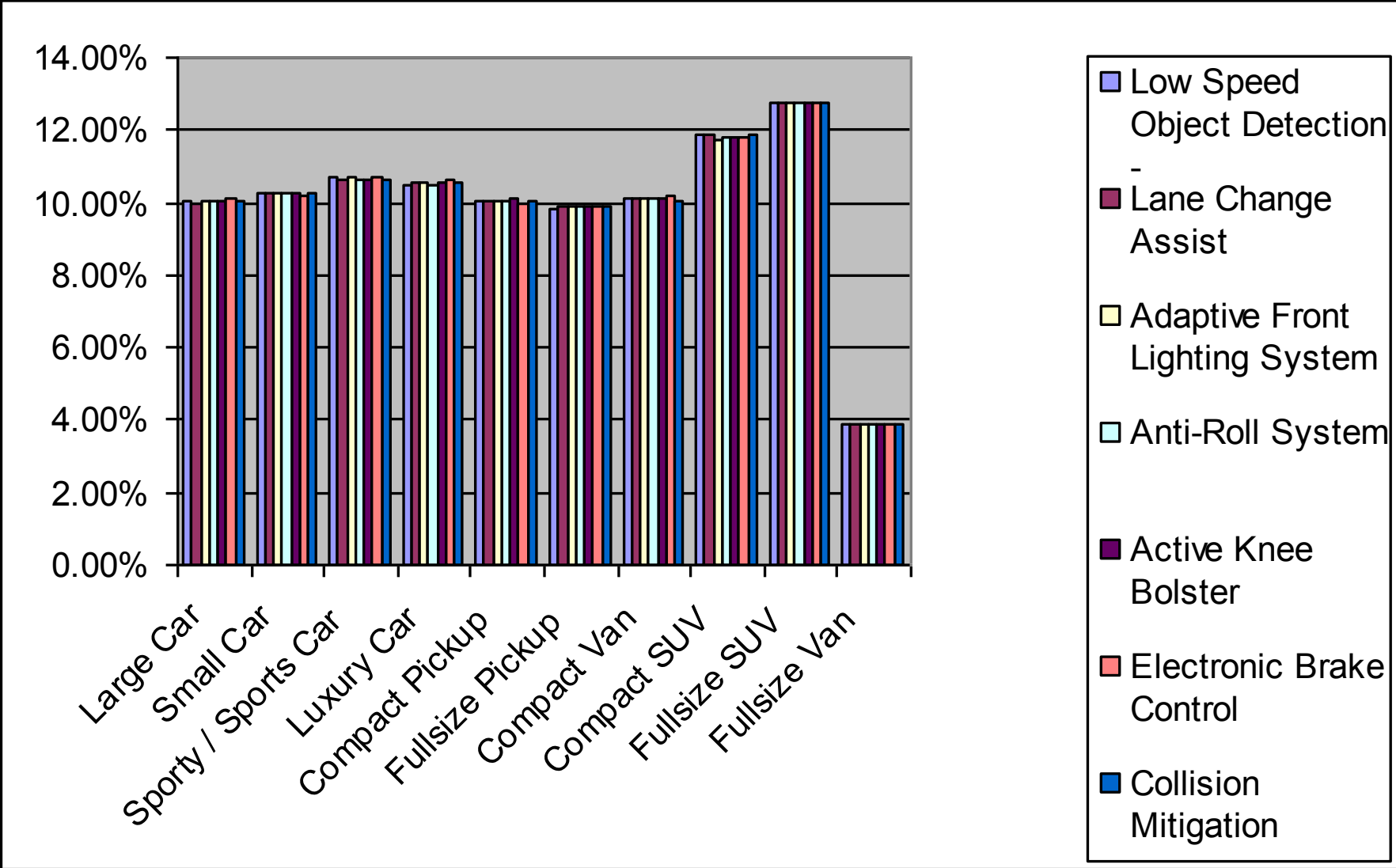
**Most vehicle segments increased in “Feelings About Safety” from 2002 to 2004.**

# Safety Features by Segment



Source: 2005 JDP ET by segment

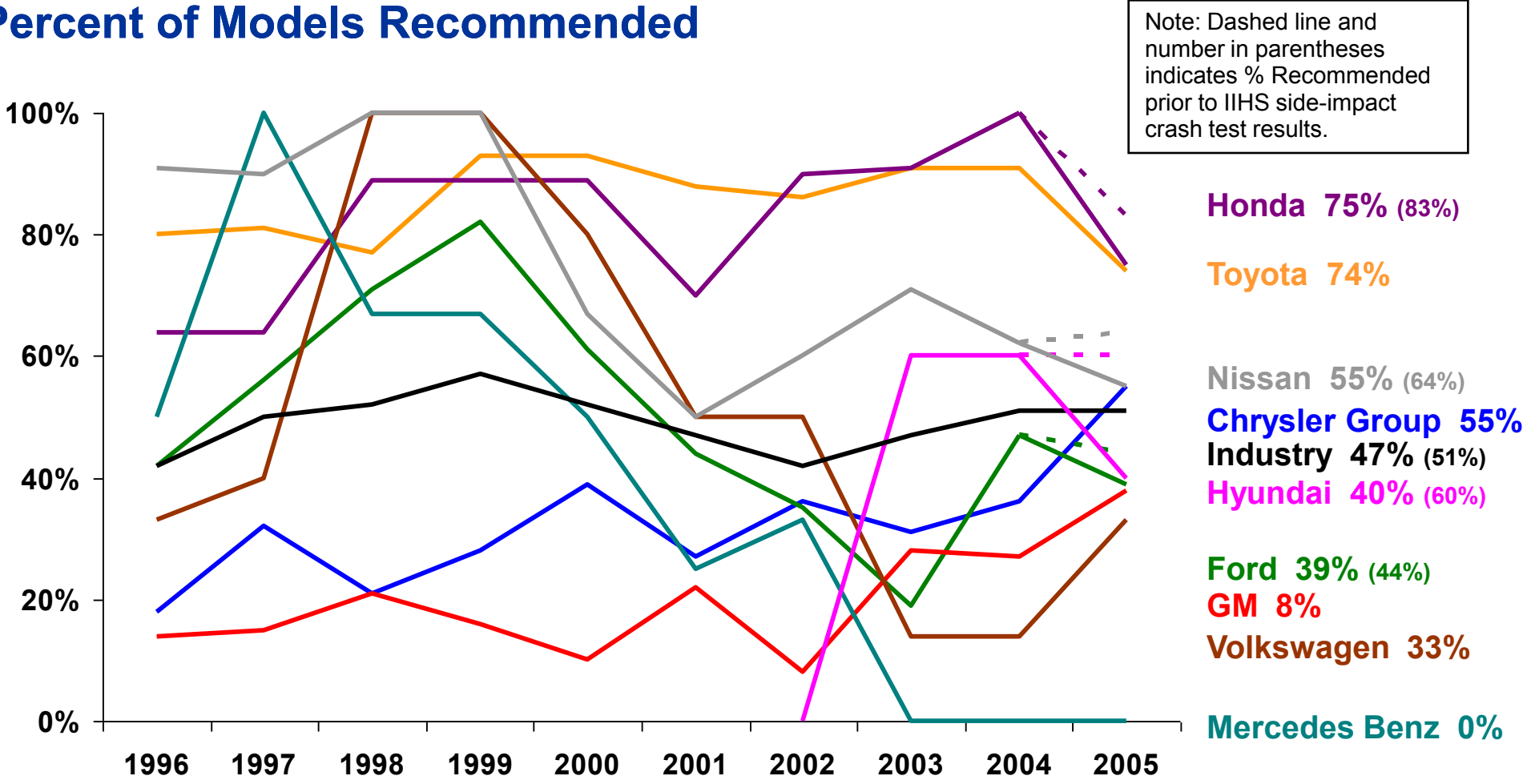
# Safety Features by Segment



Source: 2005 Allision Fisher, by segment

# Consumer Reports - a source of data for car buyers

## Percent of Models Recommended



**Industry Average at 47%**

**Consumer Reports recommendations are the result of quality, reliability, performance, and safety ratings of vehicles for perspective customers**

# Safety as a driver...

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Customers who let "safety" influence their purchase decision constitute a larger share of buyers.

At the same time, these customers are equally willing to pay for safety features. What this means is that if safety feature availability is increased, additional revenue can be achieved.

This is especially true in the Compact & Full Size SUV and Minivan segment, in which safety is among the top purchase reasons.

**Forecast.....**

# Forecast on Intelligent System

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**Injuries and accident severity can be minimized in the future with the use of GPS, radar, LIDAR, and vision based technologies.**

**Intelligent Vehicle Systems will significantly reduce driver error and its effects by providing additional information to the driver and in some cases improve crash results by sensing and automatically reacting to a collision scenario.**

**Intelligent Vehicle Systems will not replace a “good driver” but make the driver even better.**

**Sensor Fusion will be a critical element in Intelligent Vehicle Systems to reduce cost and complexity.**

**Customer acceptance will be determined by system reliability and ease of use.**

**Successful development of military usefulness and commercially feasible intelligent vehicles relies on Network Communication / Architecture, Sensor Fusion, Pattern Recognition, Robust Design, etc**

**Collaboration between Government Agencies, Industry, and Academics can effectively develop technologies and driver assistance features.**