Impacts of Navigation

ROI, Safety & Stress

Benoît Vaillé

HERE has a map heritage that spans 3 decades

Industry Firsts

- Map in an in-car GPS EU (1994)
- Map in an online map portal (1995)
- Map in an in-car GPS NA (1996)
- Real-time traffic for in-car NA (2004)
- Map on a mobile phone (2004)
- Digital map to cover all six continents (2005)

Acquisitions

NAVTEQ

NOKIA

gate5

MAP24

earthmine

OI » bit-side

MetaCarta.

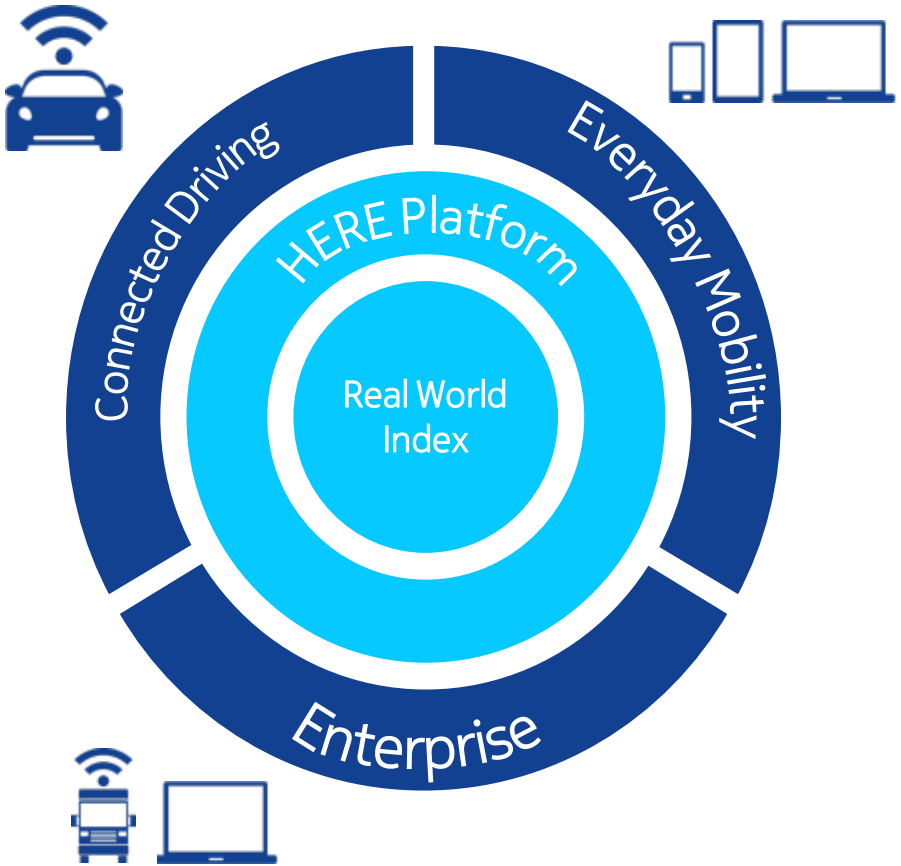
plum

New Brand

here

here

The HERE Cloud



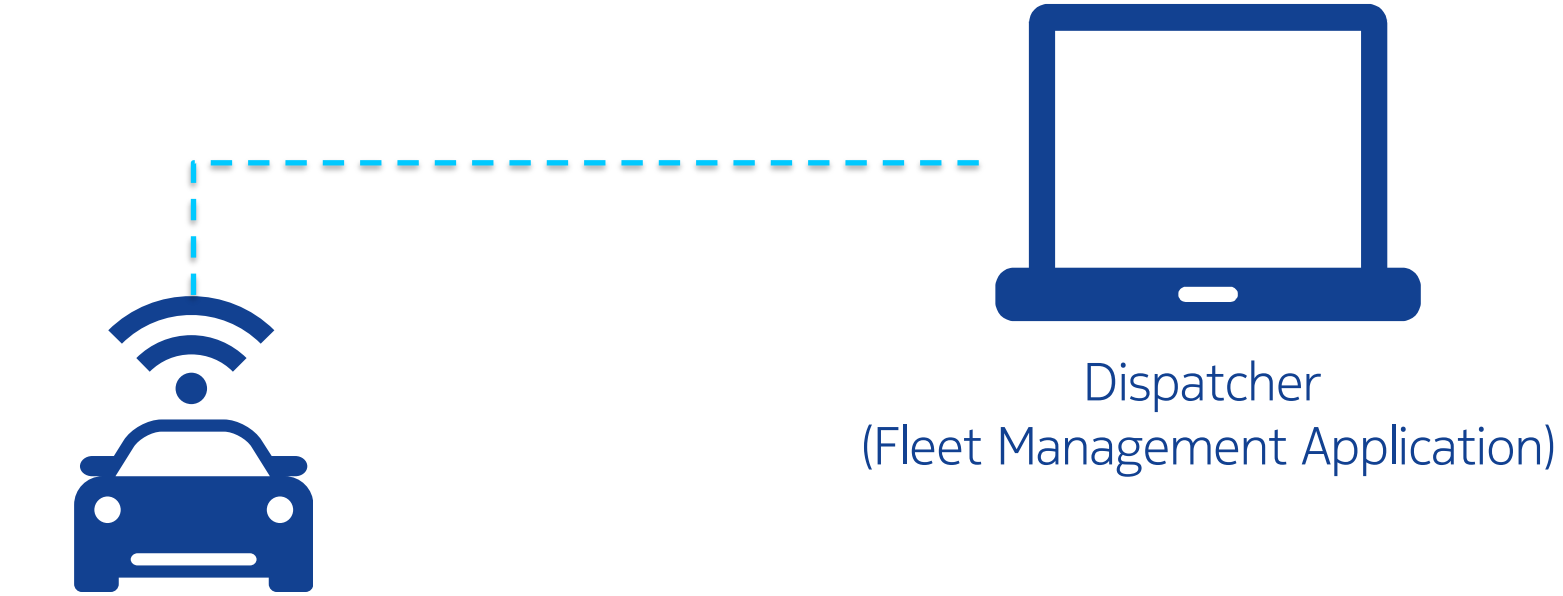
Experiences: rich interactive consumer experiences for Driving, Mobility and Enterprise

Platform: powerful essential location services -- computing the right answer on-the-fly anywhere

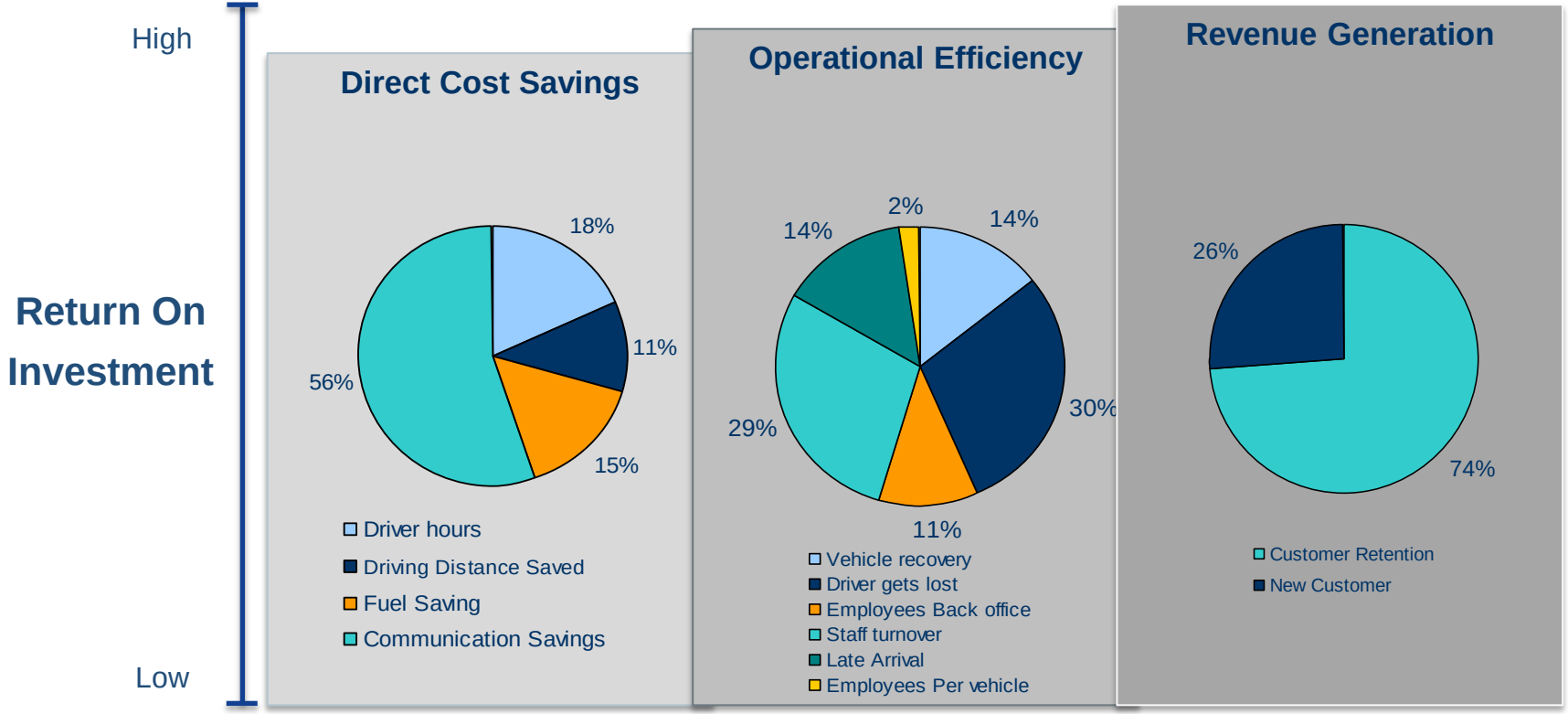
Index: capture a reference index of the Real World – precise and updated in real-time

Return On Investment for Navigation Solutions

Integrated Navigation Concept

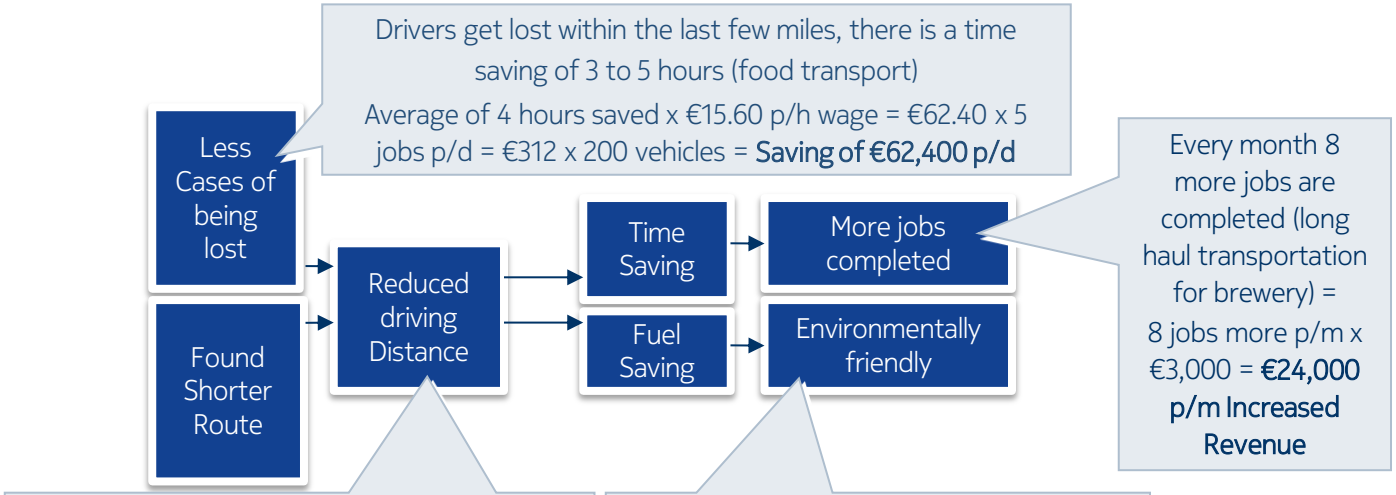


The 3 Overlapping Pillars of the ROI



Source: HERE/Frost & Sullivan, Integrated navigation study

Example: Scope for Completing More Jobs

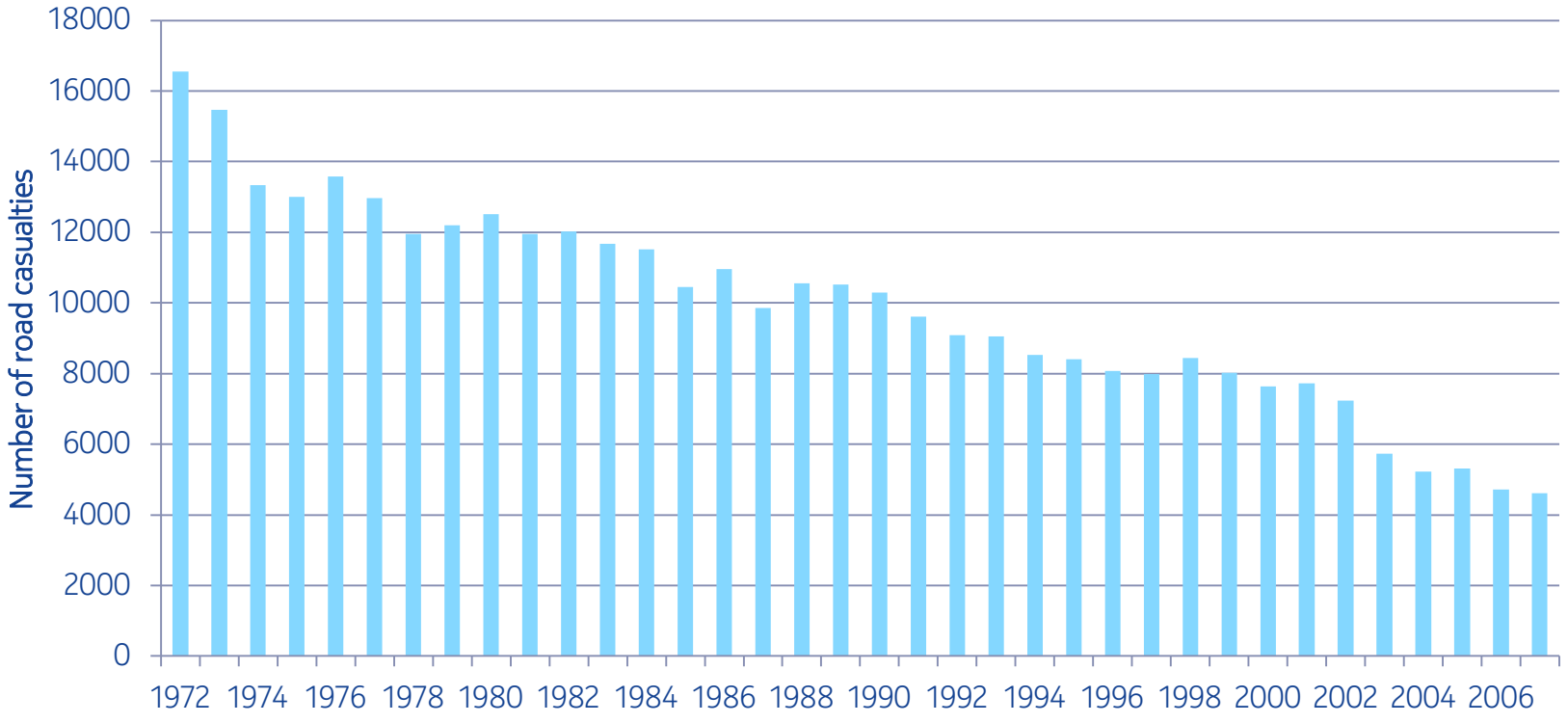


p/v = Per Vehicle
p/y = Per Year
p/m = Per Month
p/d = Per Day
p/h = Per Hour
Assuming Average Driver Wage = €30,000

Source: HERE/Frost & Sullivan, Integrated navigation study

Comfort & Safety

Road Casualties: Case of France



Source: Sécurité Routière

Biometric Research on Navigation

Each participant performed 3 drives of 20 minutes each:

- No alerts by clear daylight
- Safety alerts by clear daylight
- Safety alerts by reduced visibility (fog)

9 different types of alerts were tested during the drives:

Stop Sign


Sharp Curve


Lane Merge


School Zone


Pedestrian Crossing


No Overtaking


Accident Hazard


Camera Alert

Speed Limits

3 unexpected events occurred during each drive:

- Vehicle pulling out
- Vehicle braking
- Pedestrian pulling out

Source: HERE bespoke research on Safety features, 2013

Simulation Environment

Source: HERE bespoke research on Safety features, 2013

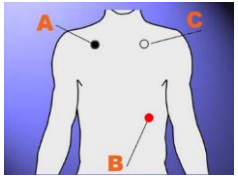
Data Captured

Driving Behavior

- Speed
- Lane position
- Time headway
- Reaction times

Biometric Data

- Heart rate
- Skin response



Post-Drive Interview and Questionnaire

Video Recording

Source: HERE bespoke research on Safety features, 2013

Danger Alerts Improve Drive Reaction Time

Objective 1: Quantify how much Camera Alerts, Speed Limits and Sign, Signals & Warnings increase drivers' safety & awareness

Behavioral Data (Reaction Times and Speed)

- Drivers' reacted to unexpected events 10% faster on average when using alerts in normal visibility

Physiological Data (Heart Rate and Skin Conductance)

- Overall workload was 2% lower
- Overall arousal/vigilance was 29% higher

Source: HERE bespoke research on Safety features, 2013

HMI can Optimize Impact of Alerts

Objective 2: Understand how these alerts can be **configured** to produce maximal safety benefits

Questionnaire Data

- All alerts were perceived as **not very distracting** and **not very annoying**
- Respondents thought the alerts were displayed **at the right time**
- **Beep and visual** was the preferred type of display for **speed limits and accident hazard**, **auditory description and visual** for **warning signs**
- Most participants would prefer to receive an alert or warning no more than once every 2 minutes

Source: HERE bespoke research on Safety features, 2013

Case of Speed and Lane Positioning

Objective 3: Compare relative effectiveness of the alerts

- The behavioral data shows that some types of alerts produce good improvements in driver safety and awareness. Two warning signs were especially positive: '**no overtaking**' (impact on lane positioning) and '**pedestrian crossing**' (impact on speed)

- The subjective feedback from the questionnaire shows that **speed limits and camera alerts** are perceived as **most useful** and are the **most liked** alerts

Source: HERE bespoke research on Safety features, 2013

Conclusion

- Navigation integrated with telematics solutions have direct impact on transport efficiency
- Optimised transport operations result in reduced CO2 emission in cities
- Latest generation navigation systems can also improve road safety and driver comfort
- Efficiency of driver and transportation assistance solutions is map and traffic data accuracy and human machine interface

Thank You

Benoît Vaillé