



The Actuarial Profession

making financial sense of the future

General Insurance Pricing Seminar
Tony Lovick



Insurance Telematics

Understanding risk with technology

21st June 2011

Agenda

Motor Insurers Market

What is Usage Based Insurance

Benefits

Technology Developments

Transforming Technology to Data to Profits

Collecting Data

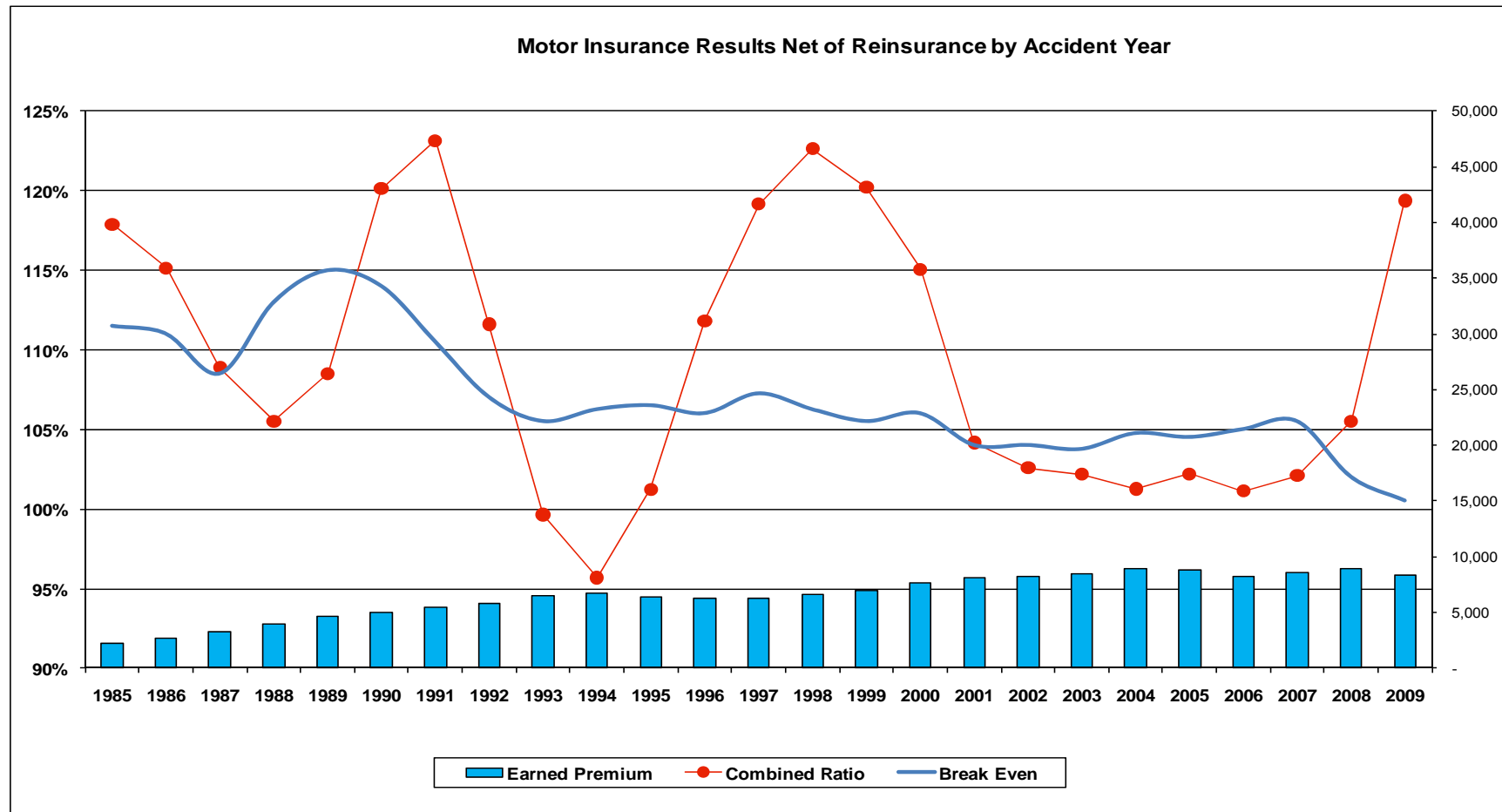
Rating Factors

Conclusions

Motor Insurers Market

Motor Insurance Market

- Some would question why motor insurers persist?



Motor Insurance Market

- Rapidly escalating third party claims cost
- Underwriting factor veracity in internet distribution
- Increased commodisation
 - Consumers like price comparison sites
 - Cashback culture
 - Discount, save money messaging
 - Little contact with customers – claim, renewal
 - Reduced loyalty

Motor Insurance Market

Can Telematics help young female drivers?



February 28, 2011

Gender Directive could require UK insurers to raise almost £1bn

The European Court of Justice's ruling on the Gender Directive, due 1st March, could mean that the UK insurance industry will need to raise nearly £1 billion in additional capital.

Taking motor insurance as an example, Open Europe estimates that, on average, a 17-year-old female driver would have to pay an extra £4,300 in insurance premiums by the time she is 26, as a consequence of an unfavourable ruling.

The body's research director, Stephen Booth, says: "This is a perfect illustration of how giving ever greater powers to unaccountable EU judges does not only come with a democratic cost, but can also have massive economic costs for individual consumers and the wider UK economy."

<http://www.insurancedaily.co.uk/2011/02/28/gender-directive-could-require-uk-insurers-to-raise-almost-1bn/>

UK insurance sector fears EU gender directive

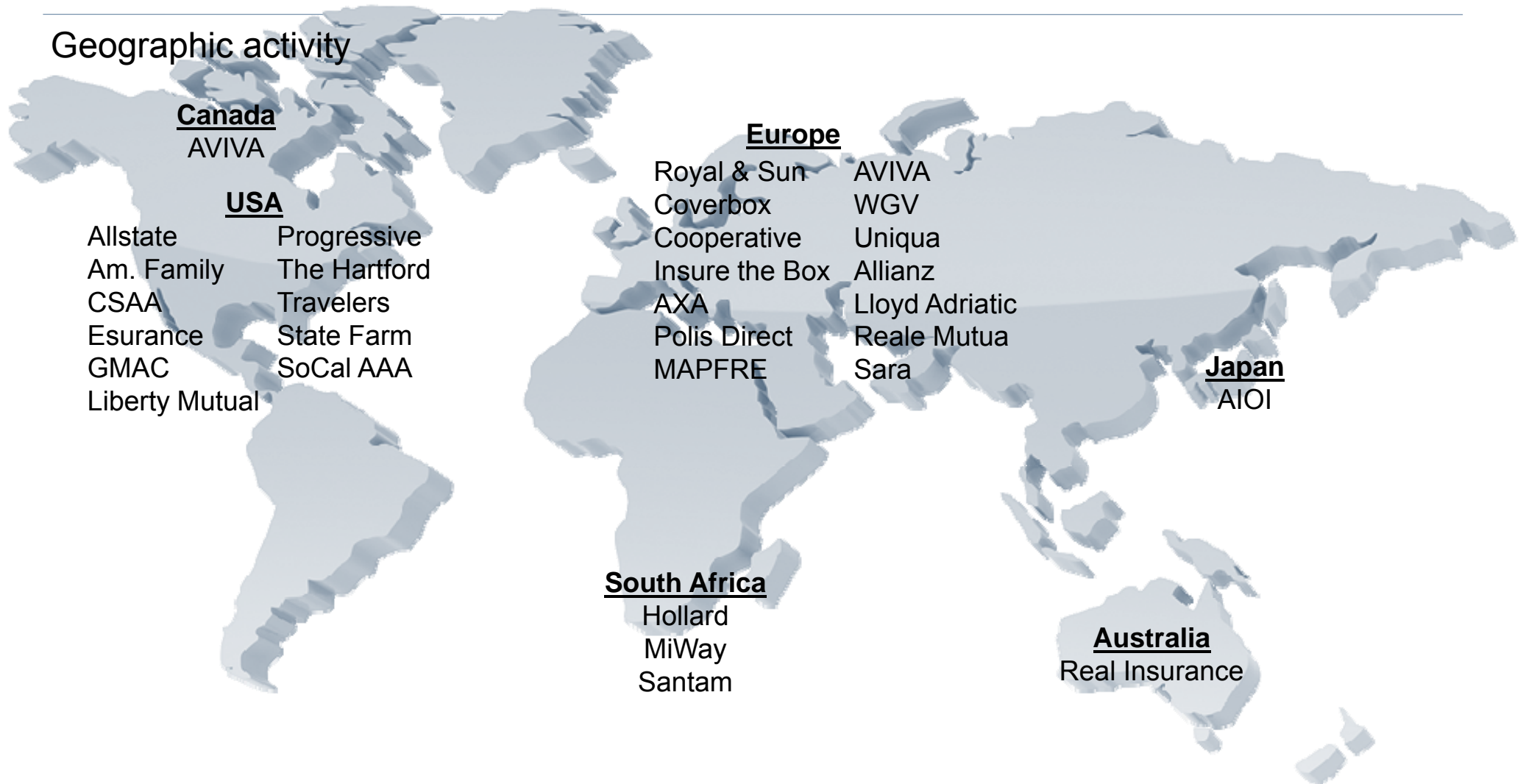
LONDON, UK - The UK government looks set to endorse a controversial gender directive from the European Commission that will make it illegal for insurance companies to take into account differences in sex when setting insurance premiums, according to This is London.

<http://www.moneynews.co.uk/79/uk-insurance-sector-fears-eu-gender-directive/>



Telematics in the personal motor insurance market

Geographic activity



UK: Co-operative Launch March 2011

Motoring News

[Home](#) » [News](#) » [Tax, Insurance and Warranties](#) » [2011-03](#) » [Black box](#)

Co-op Insurance Launches Black Box Scheme For Young Drivers



[Honest John](#)
Wed, 16 Mar 2011

The Co-operative Insurance has today launched a new Young Driver motor insurance product, which calculates premiums based on the driving behaviours of 17 - 25 year olds.

Young drivers will be rewarded for safer driving. 'Pay How You Drive' will be on average £328 cheaper than competitor prices, and over three quarters (82%) of young drivers could make a saving.

The launch comes as young drivers face higher motor insurance premiums, due to accident management and credit hire scams and the recent European Court of Justice (ECJ) ruling that banned companies from using gender to set insurance premiums.

David Neave, Director of General Insurance at The Co-operative Insurance, said: "It is a fact that many young people are simply being priced out of owning a car due to the escalating cost of motor insurance for young drivers. To ensure we do not end up with an entire generation priced out of car ownership we are giving them a chance to prove themselves as responsible drivers, and dispel the assumption that all young drivers will drive badly and have accidents."

See also

- [Cheaper Young Driver Insurance in Monthly Instalments](#)
- [Moves Afoot to Curb Spiralling Cost of Motor Insurance](#)
- [AA Blames 'Accident Management Specialists' For Huge Rise in Car Insurance Premiums](#)
- [Years Free Insurance On Corsas](#)
- [Row Builds Over Winter Tyre Insurance](#)



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The Co-Op's Smartbox - GREAT, will others follow?

MONDAY, 11 APRIL 2011 10:00 ADMINISTRATOR HITS: 118



The co-operative insurance

A GREAT idea! Last month, as you may know, the co-operative launched a Smart Box for young safe drivers. They claim that "this new Young Drivers policy will

help make UK roads safer by persuading them to drop dangerous habits", which we believe is fantastic!

Similar to [Insurethebox](#), it uses data transmitted from a Smartbox, fitted into the policyholder's car, via satellite technology, the following behaviours can be used to calculate premiums:

Braking and Acceleration ·

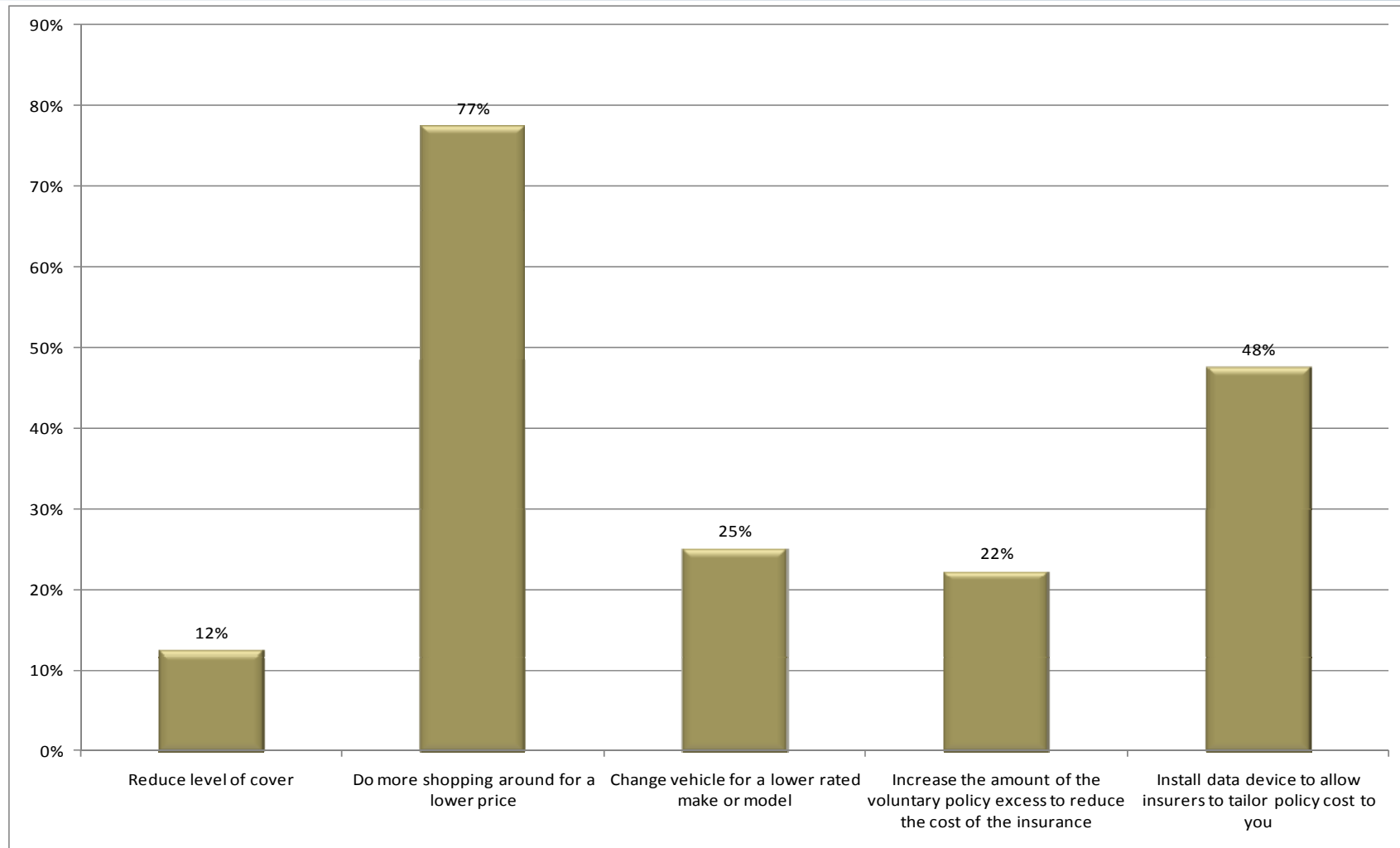
Cornering ·

Speed ·

Time of driving (e.g. day time, night time etc)

Consumer research: April 2011

Q. What measures might you take to reduce the increasing cost of your car insurance?



What is Usage Based Insurance

What is telematics?

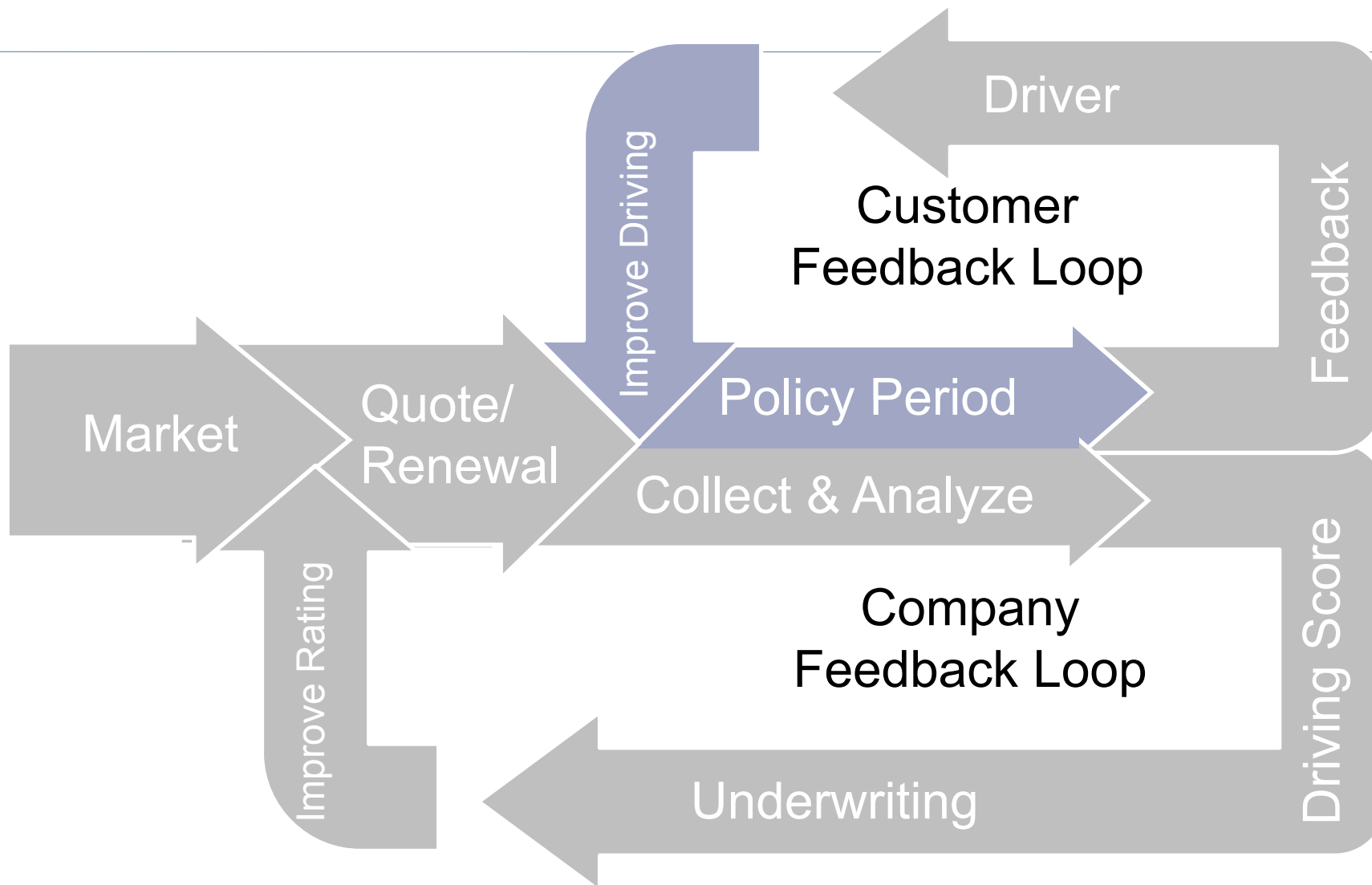
*“The technology of sending, receiving and storing information via telecommunication devices in conjunction with effecting control on remote objects” **

- Term has involved to refer more specifically to the use of GPS systems in vehicles to provide remote diagnostics
- GM’s OnStar was the first widespread application
 - Focused mainly on emergency response
 - Standard on most vehicles beginning in 2007
- The emerging market includes tracking services, web portals, fleet management and *insurance pricing in personal and commercial auto*
 - *Considered a “hot topic” for insurance pricing since 2004*
- Alternative names: usage based insurance (UBI); pay as you drive (PAYD); pay how you drive (PHYD); pay as you go (PAYG)

* Wikipedia, The Free Encyclopedia, Telematics



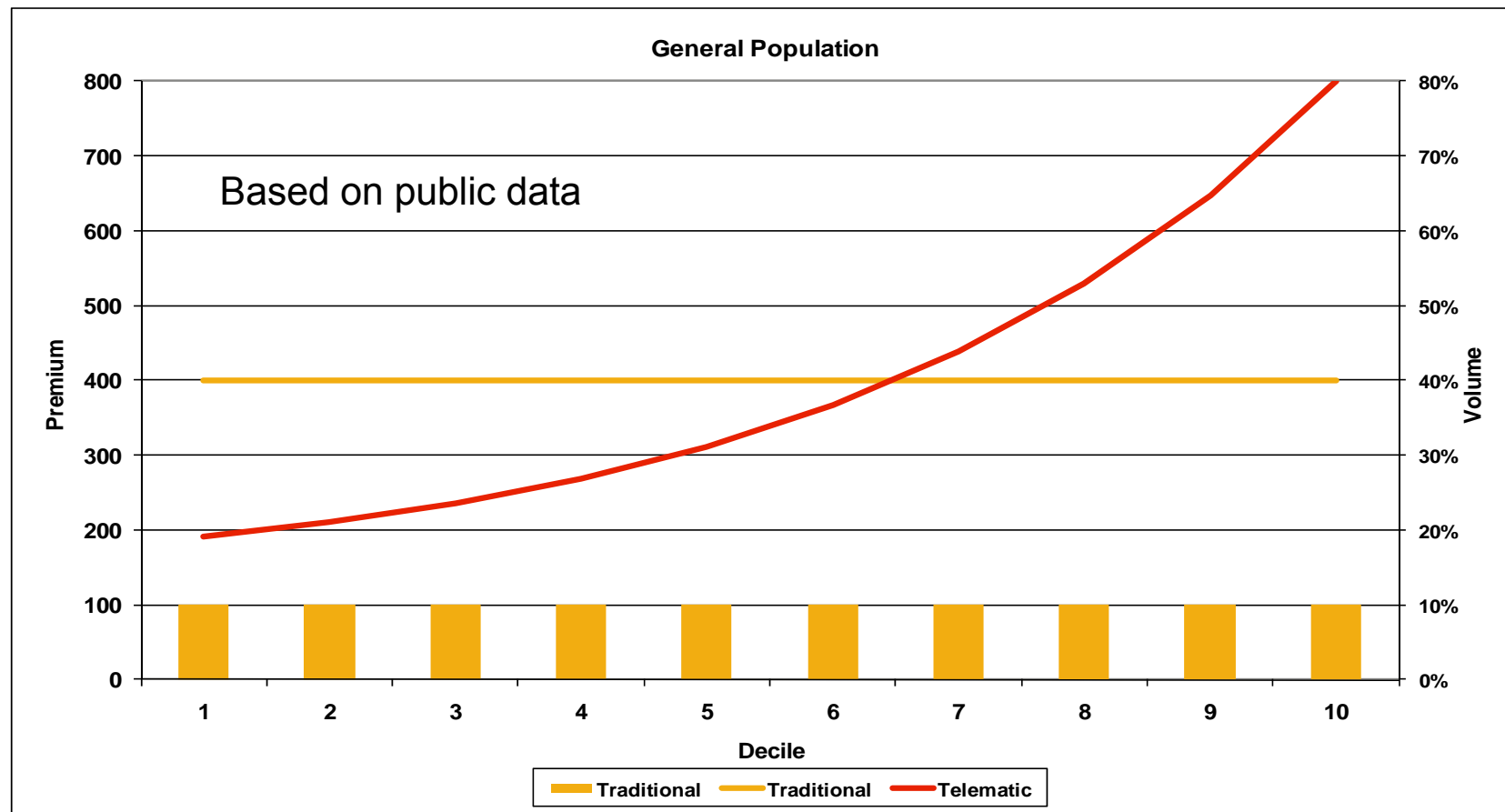
How does UBI work?



Benefits

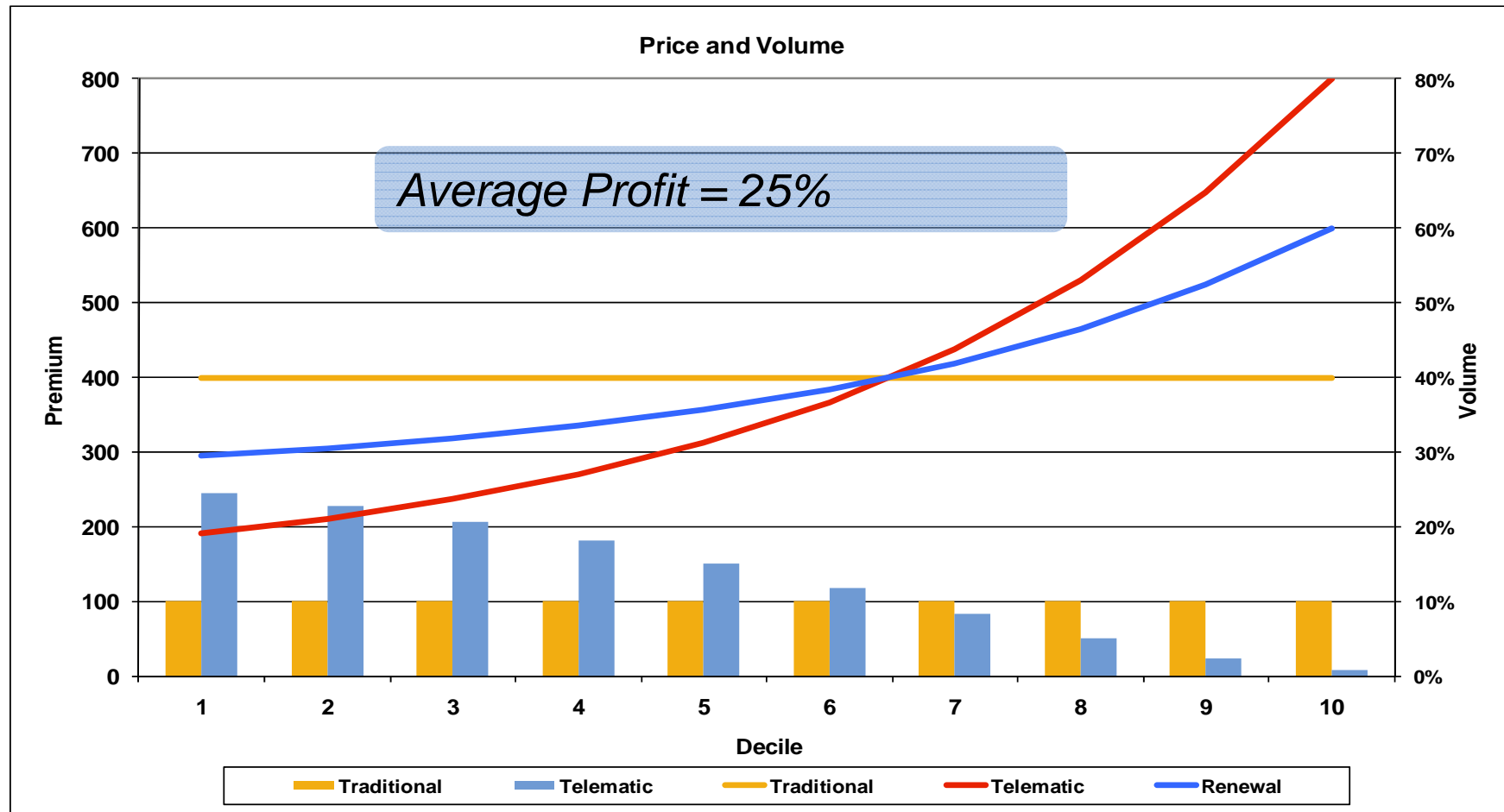
Telematics Predictive Power

Using detailed telematics data can generate a factor of this size compared to the traditional model



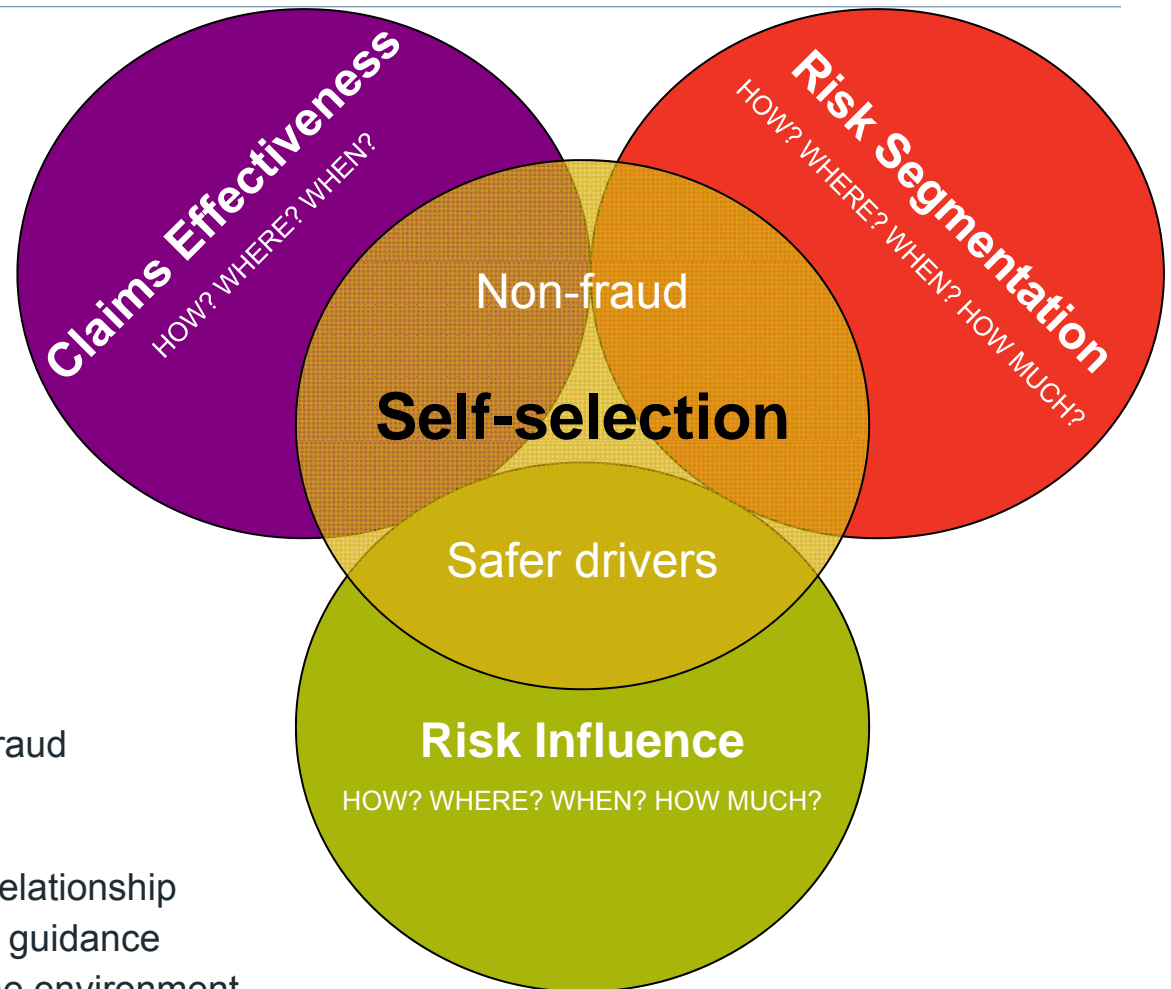
Telematics Predictive Power

Discounting safe drivers improves volumes where profitable



Benefits from Telematics

- **Risk Segmentation**
 - Deriving risk factors from the data, and applying loadings / discounts to customers to enhance selection
- **Risk Influence**
 - Customer feedback on behaviours
 - Reducing Vehicle usage overall, and especially higher risk miles
- **Claims Effectiveness**
 - Informing the claims process
 - Use of telematic data as evidence
- **Self Selection**
 - Reducing underwriting and claims fraud
- **Customer /society**
 - Step change in potential customer relationship
 - 'Fair' pricing proposition and driving guidance
 - Shows commitment to safety and the environment



Added Value Services

Emergency Call

- Use 3D-Accelerometer and OBD speed to detect significant impacts
- Use Cellular connection to post an SMS with details
- Require a back-end real-time service to pick up event and dispatch help

Breakdown Service

- Ability to trigger a “Where am I” SMS message from the server, to assist a customer breakdown call

Limited Phone capability

- To pre-defined numbers for call centre support

Satellite Navigation

- If linked to a PND screen in car

Business Trip Log

- Identify business / personal trips

Subscription services could help subsidise the costs

Added Value Services

Theft Service

- Detect motion without ignition start up
- Tracking and call for help, (in extreme implementations, disable the car)

Remote Safe mode activation

- Activates Geo-fence and other driving thresholds via an SMS message

Geo-fence Service

- Detect location outside boundary zone
- Trigger notification, (in extreme implementations, disable the car)
- Notification of driving exceeding other thresholds (speed, braking)

Driver Feedback

- Real-time buzzer in car facility
- Reports and mapping in customer portal website

Subscription services could help subsidise the costs

Why now?

Push

- Anti-discrimination laws
- Veracity of conventional rating factor declaration on the web
- Rapidly escalating claims costs
- New business premiums increased by around 40%
- Political issues around availability and affordability

Pull

- Momentum to a more technology driven society
- Reducing technology costs
- Be ready for inevitable UBI viability
 - Gain learning to develop full launch proposition
- Build portfolio of customers with known driving scores

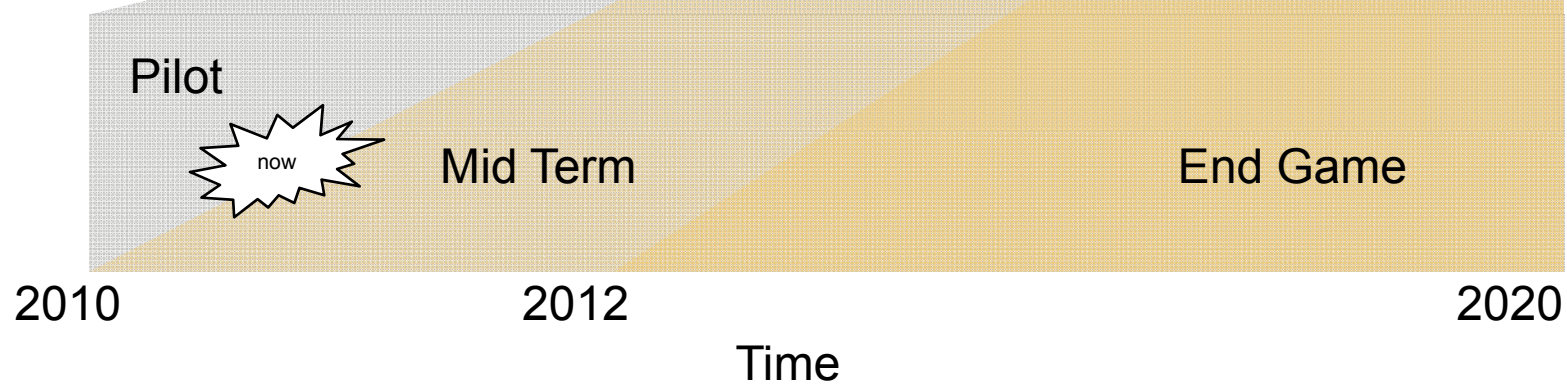


Technology Developments

Device Evolution

- **Pilot** – Standalone self install devices required
- **Mid-Term** – OBD Bluetooth add-on required
- **End-Game** – Smartphone or SatNav app/link provides connectivity and data

Device Market



Present Options

- Sometimes we see standalone duplication, to achieve connectivity



OBD Port



Connectivity Evolution

- Car manufacturers move to provide Bluetooth. Mid-term this can be retrofitted.



Mid-Term Solutions

➤ GPS Data Logger

GPS Dongle: Data Logger GPS Receiver (USB, Data Logger with Google Earth Integration)

by [FollowUs](#)

★★★★☆ (1 customer review) [More about this product](#)

Available from [these sellers](#).

1 new from £29.99



Bluetooth®



Micro Bluetooth USB Dongle EDR Version 2.0

by [Pama](#)

★★★★☆ (115 customer reviews) [More about this product](#)

Price: £1.63

In stock.

Dispatched from and sold by [Zdayshop](#).

[amazon.co.uk](#)

Standalone GPS tethered to phone

Car Connectivity Consortium



The Beginning of the End-Game

The New York Times

Wednesday, April 20, 2011

March 30, 2011, 6:00 AM

Nokia Wants a Standard for In-Car Telematics

By STEPHEN WILLIAMS

While Terminal Mode may sound like a death-ray setting in a bad science-fiction novel, its aims are far less dastardly. It is the name of a unified standard that would connect drivers and their smartphones to the swirling proliferation of in-car infotainment systems.

The idea was introduced about a year ago by Nokia, the mobile-device manufacturer, to be an open-standard technology that would eliminate the confusion and inefficiency of multiple, incompatible telematics systems. Such a standard, Nokia argued, would also make in-car components that control calling, texting, music and navigation content more universally intuitive to use.

The concept took a step forward earlier this month, when Daimler, General Motors, Honda, Hyundai, Toyota and Volkswagen signed up to the Car Connectivity Consortium. The membership also includes the electronics companies LG and Samsung, Alpine and its charter member, Nokia.

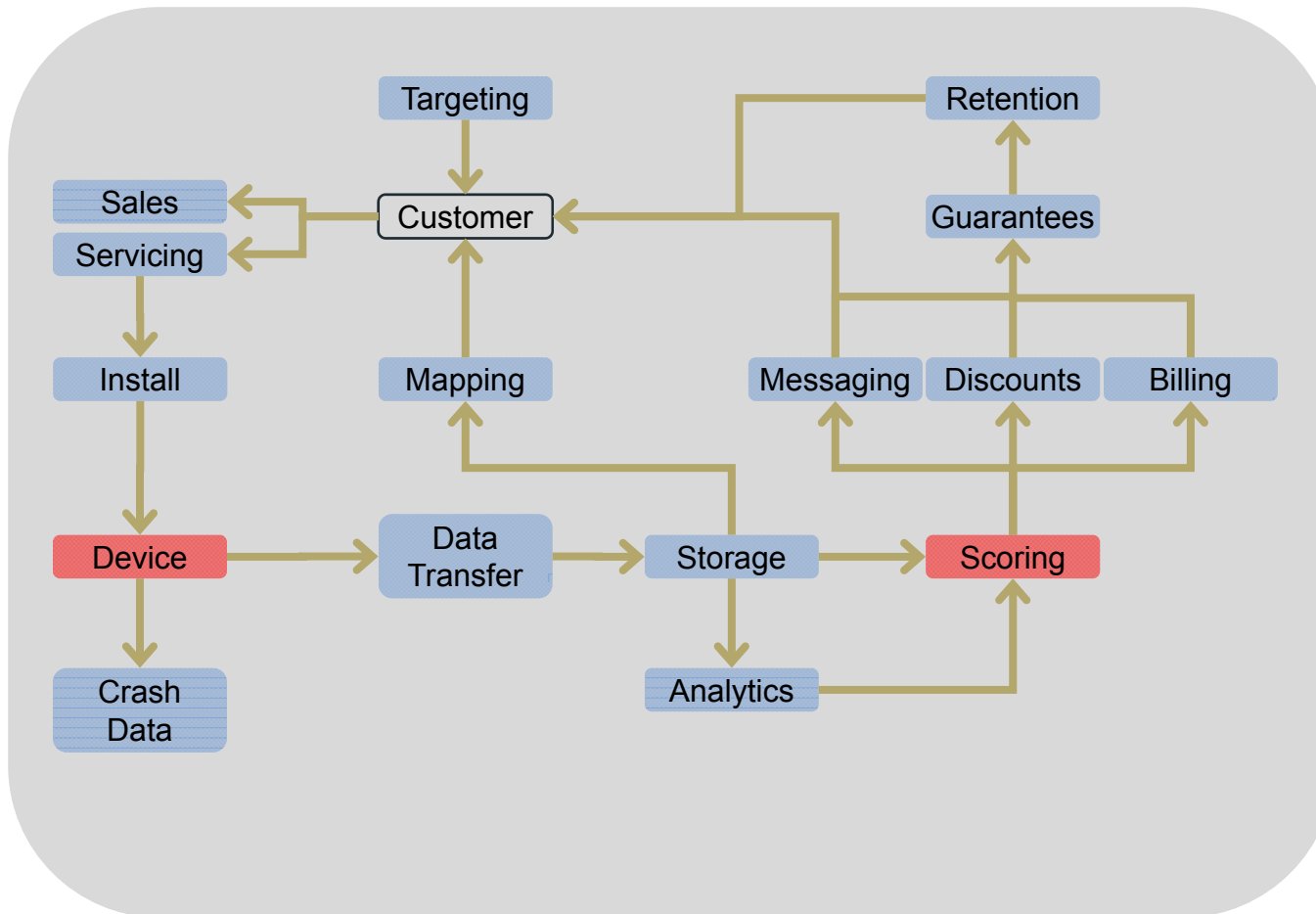


Represents :
60% of vehicles sold 2009
50% of mobiles sold 2010

*Seamless, safe, effortless and
delightful user experience when
using a Smartphone in a car*

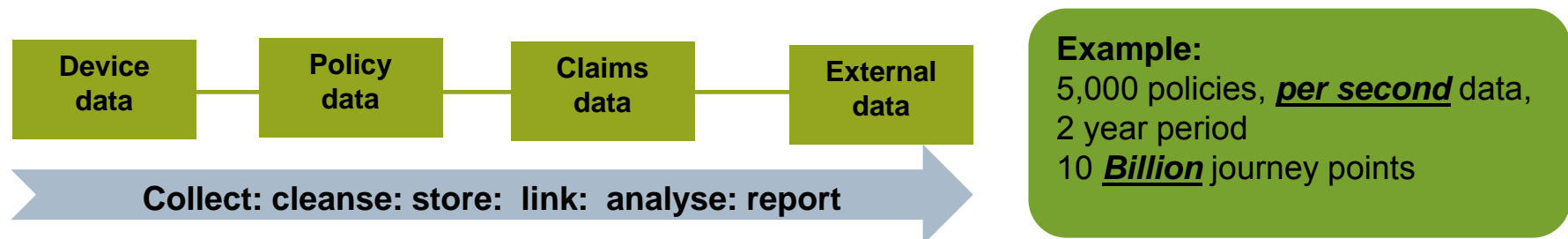
Transforming Technology to Data to Profits

Telematics: Infrastructure



Challenges to overcome – data, data, data

- The sheer volume of data is an obvious challenge – pressure to reduce volumes
- Case for granular data:
 - Data always needs cleansing; granular data allows more effective cleaning
 - Driving behaviour cannot be observed effectively in minute/hourly intervals
 - “Average” driving over policy year does not pinpoint risky behaviour
 - Beware pre-defined event counters that are uncalibrated
- Data transmission costs can be reduced by deployment of a compression algorithm
- Data storage and effective analytics can be achieved by an appropriate logical data model
- Automated & secure processes with exception reporting can be set up



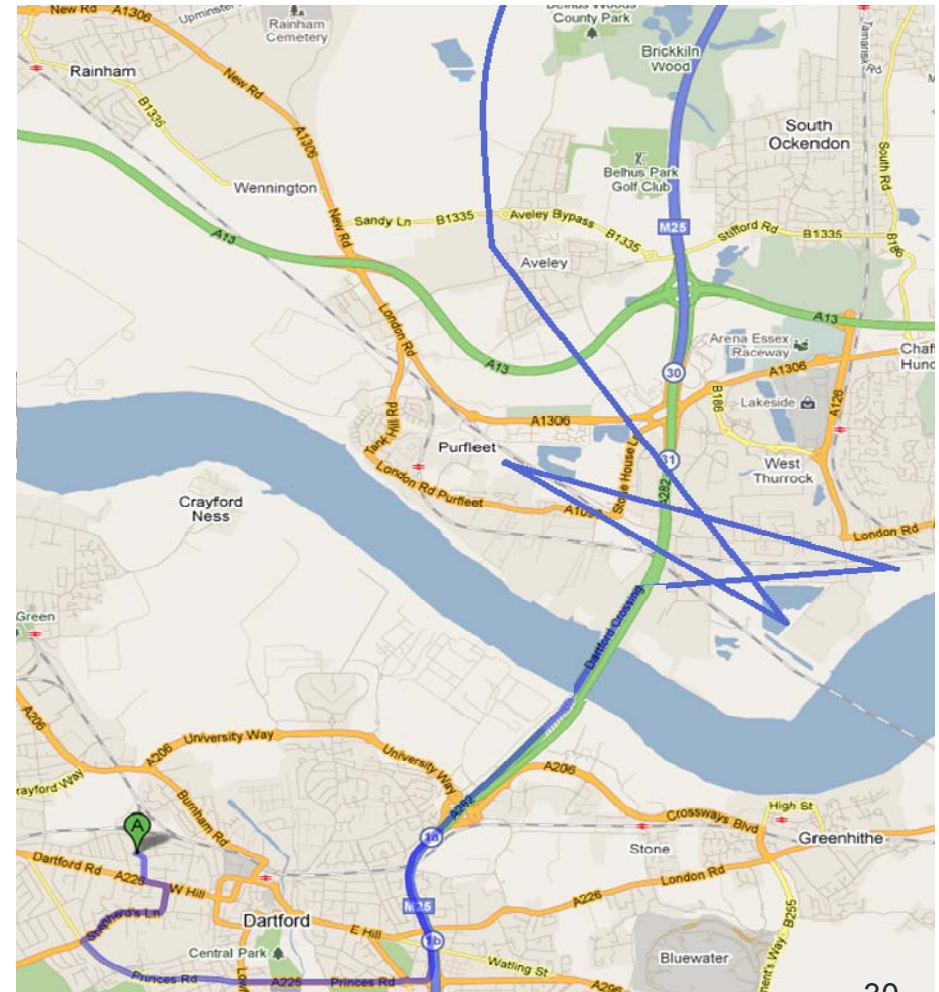
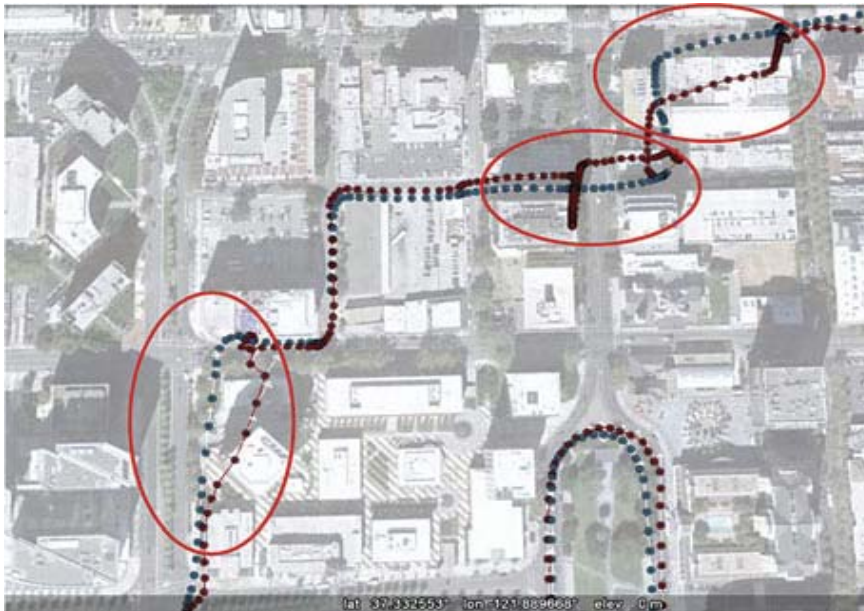
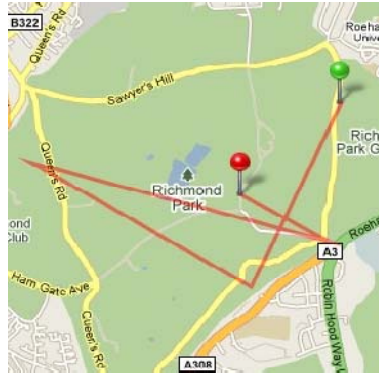
Data is unlike typical actuarial data

| | Without Telematics | With Telematics |
|--------------------|--------------------|------------------------------------|
| Update frequency | Annual | Real time, trip, daily |
| Data quality | Renewal UW | Daily scrubbing |
| Variables | Pre Defined | Manufactured |
| Records per policy | Few | A Million per Year |
| Data size | Gigabytes | Terabytes (when Uncompressed) |

Collecting Data

Delivering Clean Data

- Location alone is insufficient

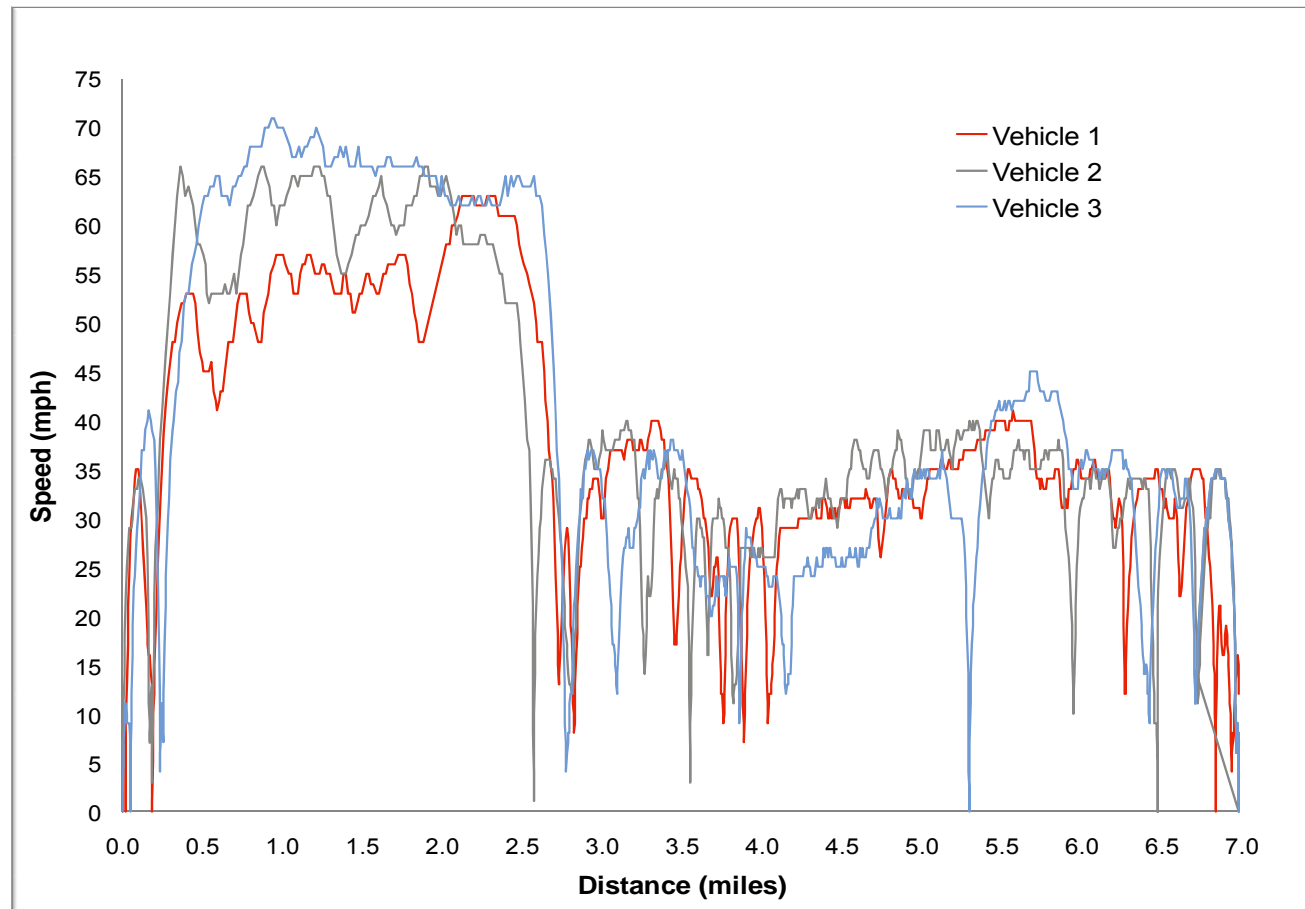


Simple example data for 2 ½ minute trip

| | | | | | | | | | | | | | | | | |
|---------|--------|--|---------|-----|--|---------|-----|--|---------|-----|--|---------|-----|--|---------|-----|
| TRIP: | 1 | | | | | | | | | | | | | | | |
| DATE: | 12-Jun | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Time | MPH | | Time | MPH | | Time | MPH | | Time | MPH | | Time | MPH | | Time | MPH |
| 0:00:00 | 2 | | 0:00:25 | 12 | | 0:00:50 | 9 | | 0:01:15 | 2 | | 0:01:40 | 0 | | 0:02:06 | 30 |
| 0:00:01 | 2 | | 0:00:26 | 11 | | 0:00:51 | 12 | | 0:01:16 | 0 | | 0:01:41 | 0 | | 0:02:07 | 32 |
| 0:00:02 | 0 | | 0:00:27 | 10 | | 0:00:52 | 14 | | 0:01:17 | 2 | | 0:01:42 | 0 | | 0:02:08 | 32 |
| 0:00:03 | 0 | | 0:00:28 | 9 | | 0:00:53 | 15 | | 0:01:18 | 5 | | 0:01:43 | 0 | | 0:02:09 | 33 |
| 0:00:04 | 0 | | 0:00:29 | 9 | | 0:00:54 | 14 | | 0:01:19 | 7 | | 0:01:44 | 0 | | 0:02:10 | 33 |
| 0:00:05 | 2 | | 0:00:30 | 9 | | 0:00:55 | 12 | | 0:01:20 | 9 | | 0:01:46 | 0 | | 0:02:11 | 34 |
| 0:00:06 | 6 | | 0:00:31 | 9 | | 0:00:56 | 12 | | 0:01:21 | 11 | | 0:01:47 | 0 | | 0:02:12 | 35 |
| 0:00:07 | 7 | | 0:00:32 | 10 | | 0:00:57 | 11 | | 0:01:22 | 13 | | 0:01:48 | 0 | | 0:02:13 | 35 |
| 0:00:08 | 9 | | 0:00:33 | 11 | | 0:00:58 | 9 | | 0:01:23 | 15 | | 0:01:49 | 0 | | 0:02:14 | 35 |
| 0:00:09 | 9 | | 0:00:34 | 12 | | 0:00:59 | 8 | | 0:01:24 | 17 | | 0:01:50 | 0 | | 0:02:15 | 35 |
| 0:00:10 | 8 | | 0:00:35 | 12 | | 0:01:00 | 6 | | 0:01:25 | 18 | | 0:01:51 | 1 | | 0:02:16 | 35 |
| 0:00:11 | 8 | | 0:00:36 | 14 | | 0:01:01 | 5 | | 0:01:26 | 19 | | 0:01:52 | 7 | | 0:02:17 | 33 |
| 0:00:12 | 7 | | 0:00:37 | 14 | | 0:01:02 | 5 | | 0:01:27 | 19 | | 0:01:53 | 11 | | 0:02:18 | 30 |
| 0:00:13 | 7 | | 0:00:38 | 15 | | 0:01:03 | 5 | | 0:01:28 | 17 | | 0:01:54 | 12 | | 0:02:19 | 28 |
| 0:00:14 | 7 | | 0:00:39 | 14 | | 0:01:04 | 4 | | 0:01:29 | 15 | | 0:01:55 | 13 | | 0:02:20 | 24 |
| 0:00:15 | 7 | | 0:00:40 | 12 | | 0:01:05 | 4 | | 0:01:30 | 14 | | 0:01:56 | 13 | | 0:02:21 | 21 |
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| 0:00:17 | 8 | | 0:00:42 | 10 | | 0:01:07 | 4 | | 0:01:32 | 11 | | 0:01:58 | 12 | | 0:02:23 | 14 |
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| 0:00:19 | 12 | | 0:00:44 | 9 | | 0:01:09 | 4 | | 0:01:34 | 3 | | 0:02:00 | 15 | | 0:02:25 | 7 |
| 0:00:20 | 13 | | 0:00:45 | 7 | | 0:01:10 | 2 | | 0:01:35 | 0 | | 0:02:01 | 18 | | 0:02:26 | 5 |
| 0:00:21 | 14 | | 0:00:46 | 7 | | 0:01:11 | 2 | | 0:01:36 | 0 | | 0:02:02 | 20 | | 0:02:27 | 3 |
| 0:00:22 | 15 | | 0:00:47 | 6 | | 0:01:12 | 3 | | 0:01:37 | 0 | | 0:02:03 | 23 | | 0:02:28 | 0 |
| 0:00:23 | 15 | | 0:00:48 | 6 | | 0:01:13 | 4 | | 0:01:38 | 0 | | 0:02:04 | 26 | | 0:02:29 | 0 |
| 0:00:24 | 14 | | 0:00:49 | 7 | | 0:01:14 | 5 | | 0:01:39 | 0 | | 0:02:05 | 28 | | 0:02:30 | 0 |

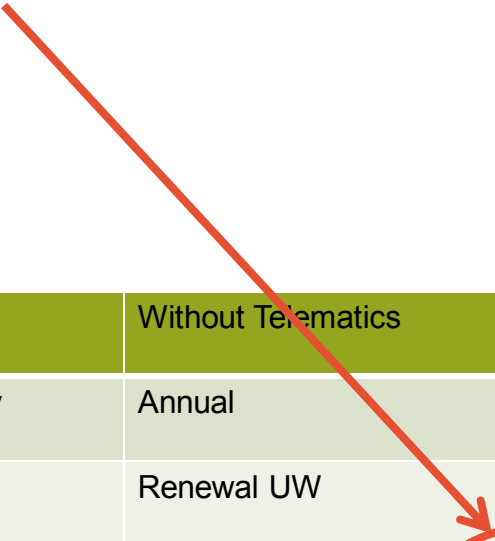
Collecting Data

- Roads, driver behaviour and traffic all impact on the patterns



Data is unlike typical actuarial data

- Self Fulfilling Factors
 - Consider a Harsh Brake Manoeuvre
 - Clearly these precede almost all claims
 - Therefore harsh braking is not a valid independent factor to predict the claims response



| | Without Telematics | With Telematics |
|--------------------|--------------------|------------------------------------|
| Update frequency | Annual | Real time, trip, daily |
| Data quality | Renewal UW | Daily scrubbing |
| Variables | Pre Defined | Manufactured |
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Collecting Data

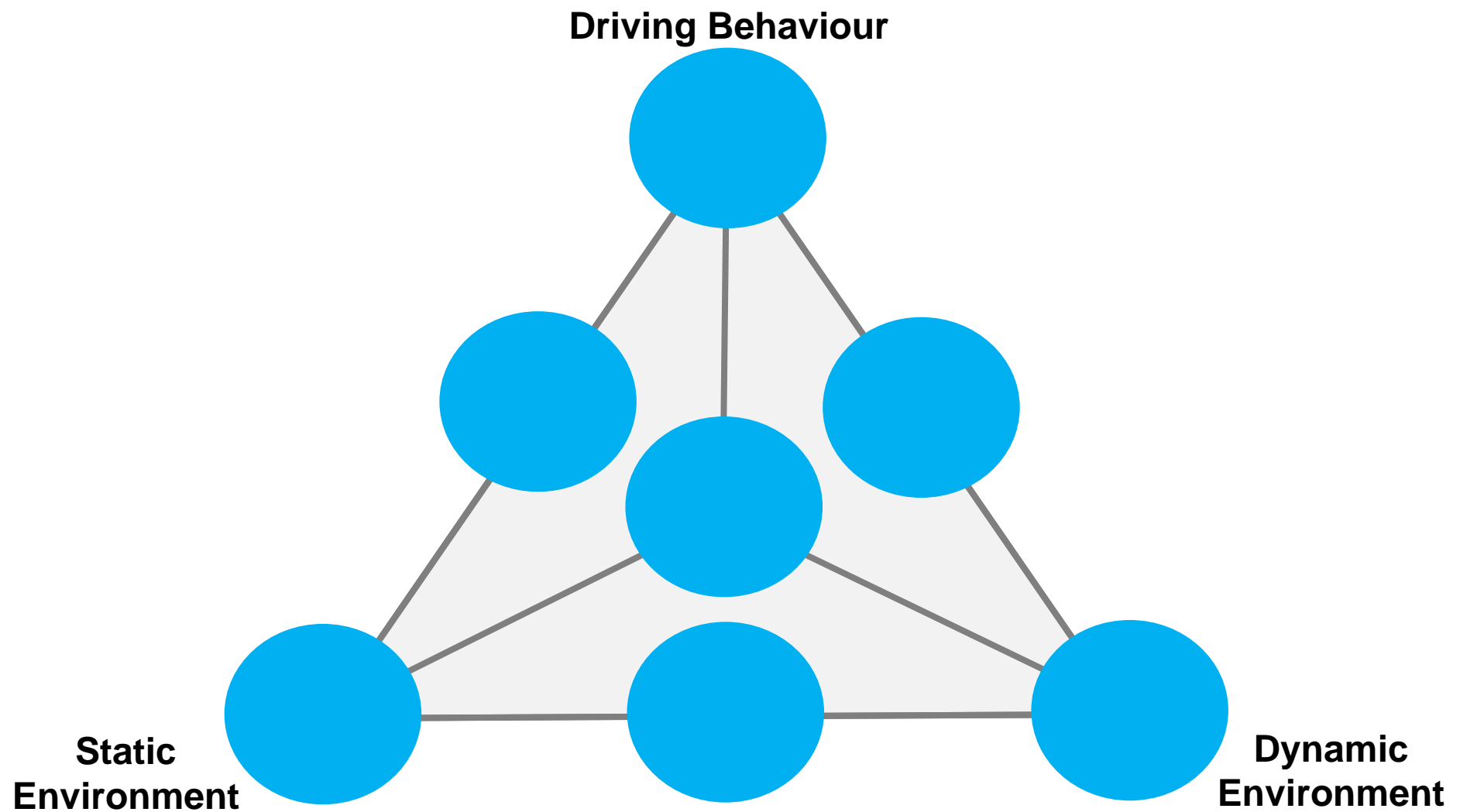
The value is in the detail, not a few predefined event counters

- GPS
 - Time
 - Location
 - Motion
 - Quality
- OBD
 - VIN Number
 - Time
 - Speed
- Accelerometer
 - 3-Axis G-force readings

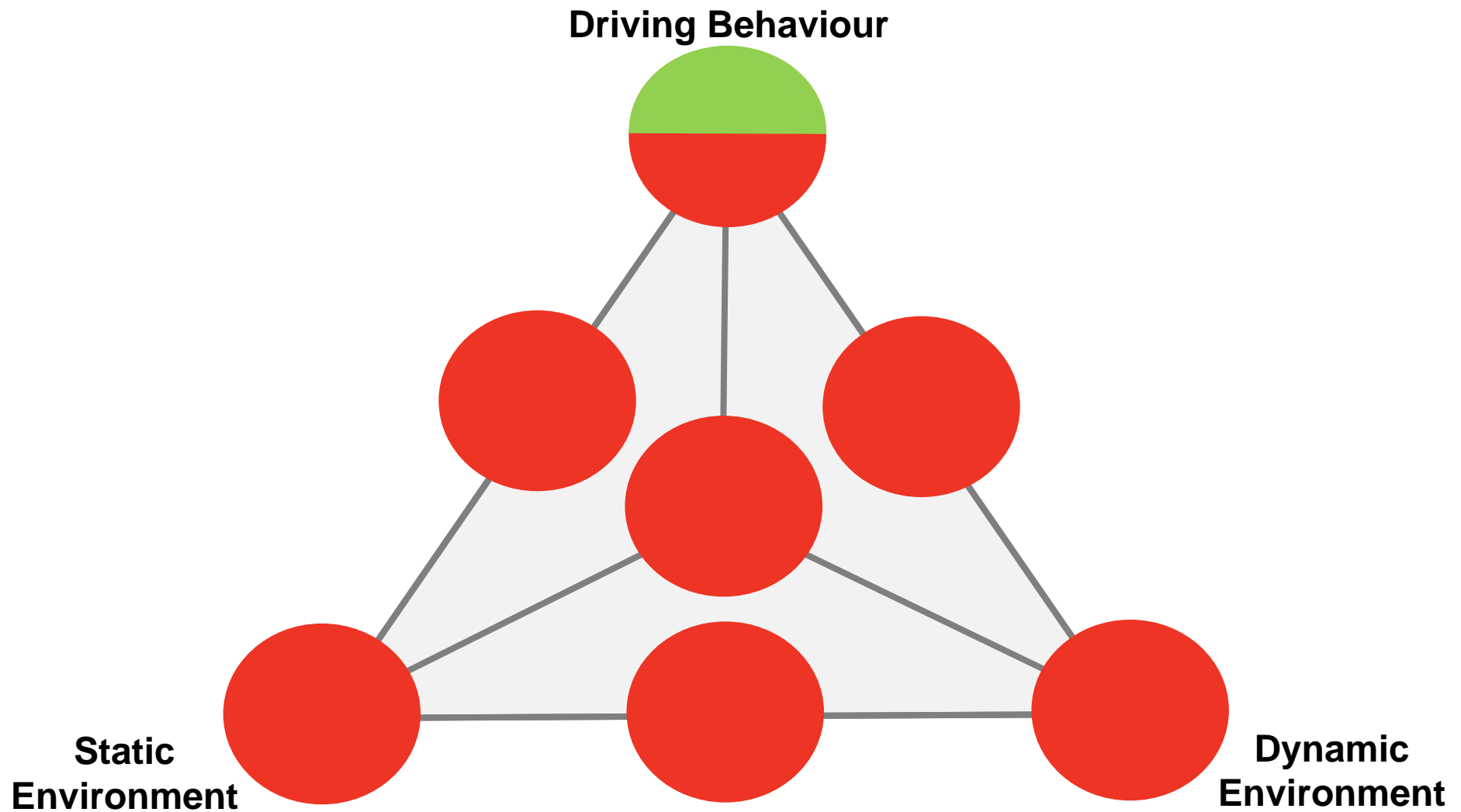


Benefits – Rating Factors

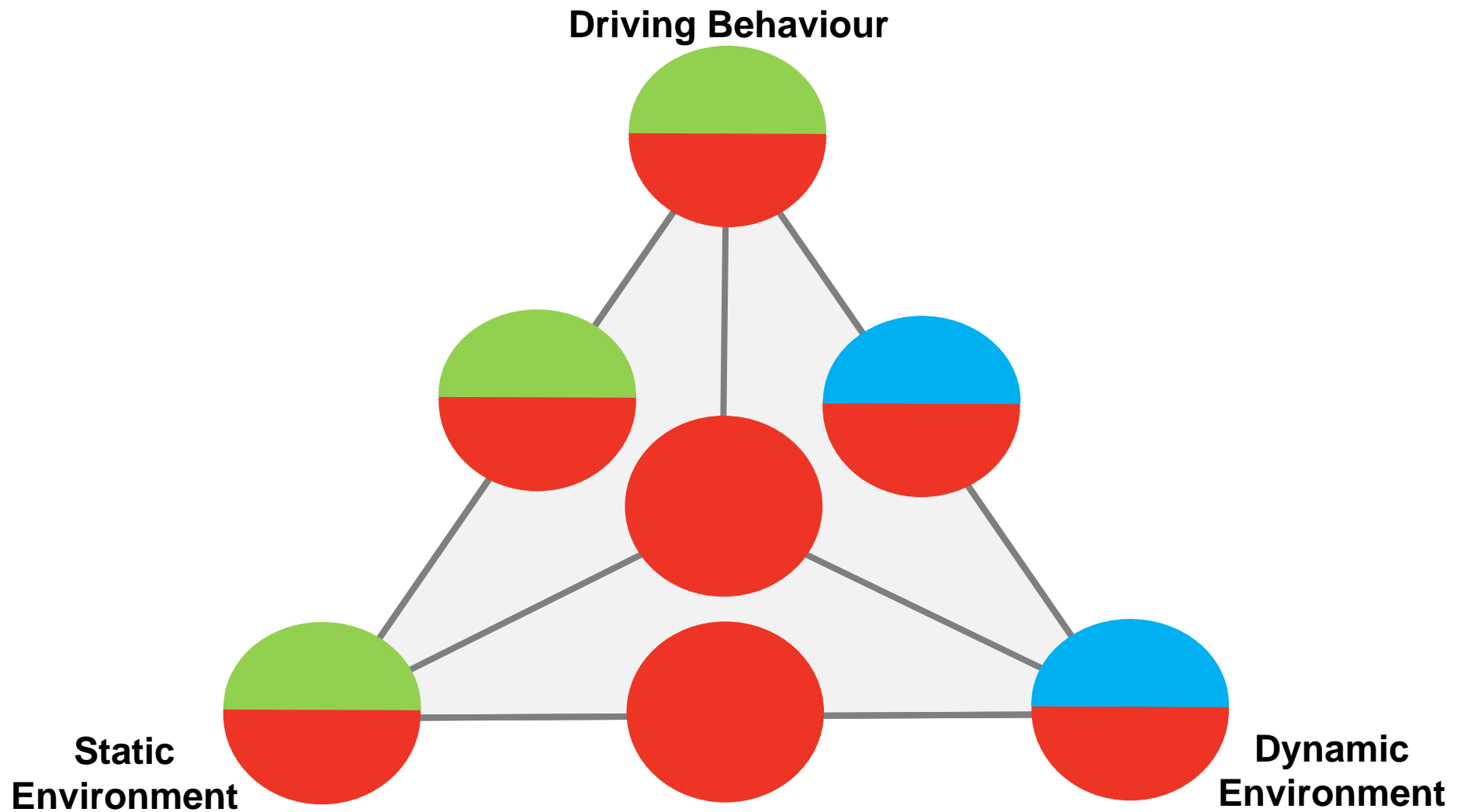
Benefits – Rating Factors



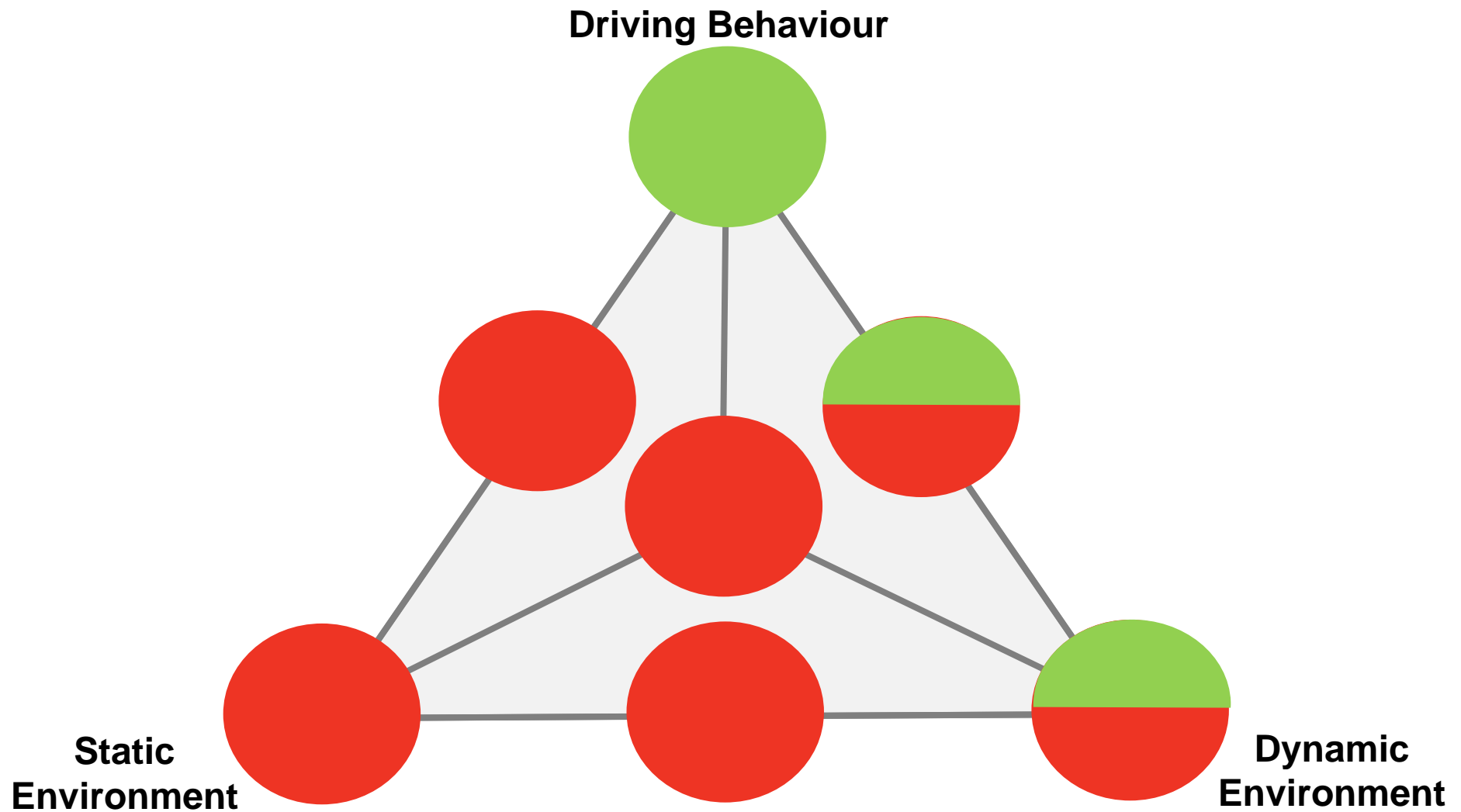
Benefits – Simple Device



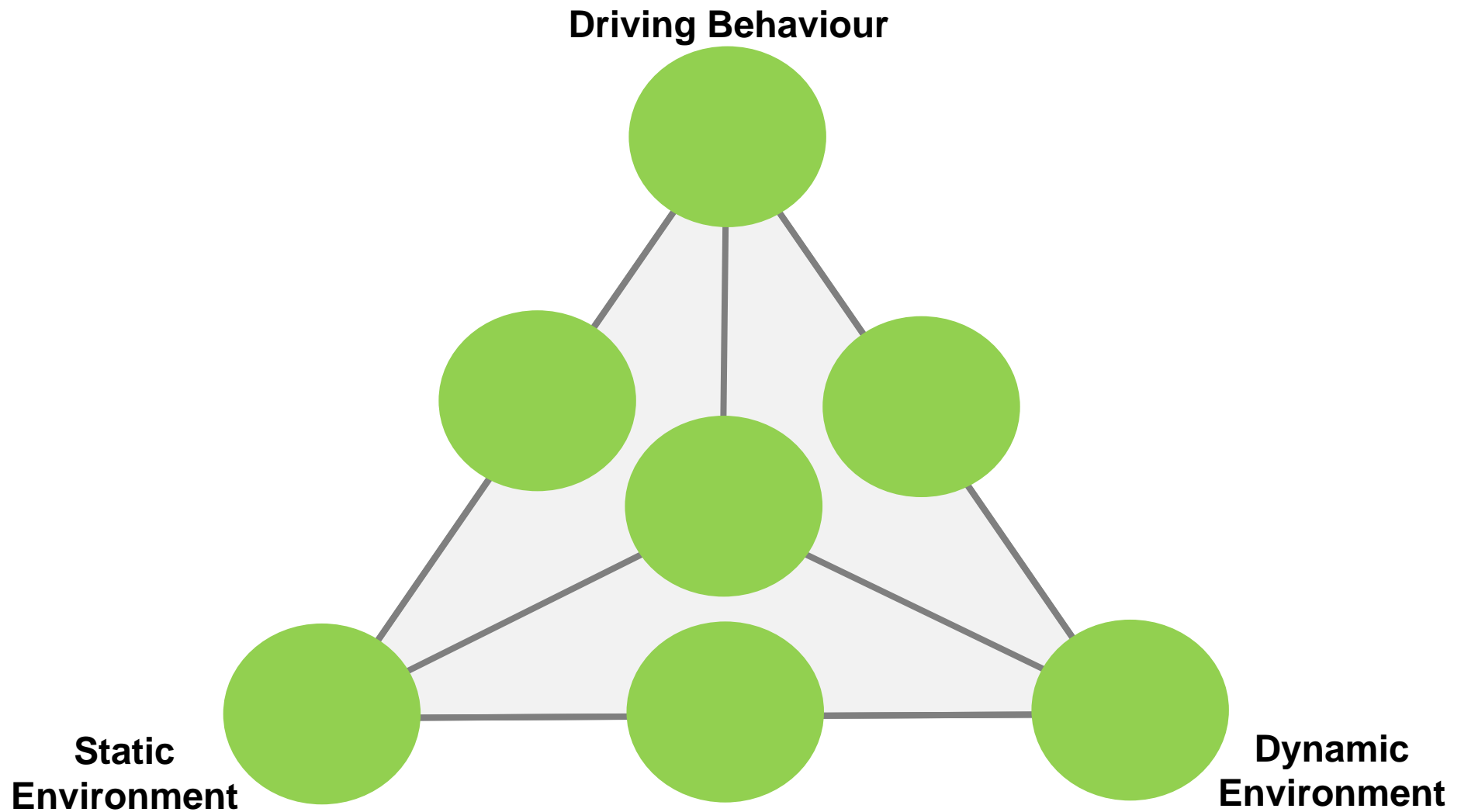
Benefits – Common Fleet Device / Map Matching



Benefits – Granular Data Pilot Device



Benefits – Granular Data Device / Map Matching



Conclusions

Conclusions

- Essential to have a contingency plan today to address the emerging telematics market
- As benefits tip the balance over costs, using telematics will become a 'no brainer'

Benefits

Risk Selection

- ✓ Claims Savings proven
- ✓ Shared with customer

Customer Relationship

- ✓ Retention Benefits
- ✓ Social benefits

Decommoditisation

- ✓ In an increasingly commoditised market

Challenges

Device

- ✓ Technical specification
- ✓ Data capability
- ✓ Operating options
- ✓ Distribution

Data

- ✓ Requirements for rating
- ✓ Granularity
- ✓ Volume
- ✓ Storage

Costs

Device

- ✓ Rapidly becoming cheaper

Installation

- ✓ Self install options -

Communications

- ✓ Customer Upload free
- ✓ Compression reduces data volume

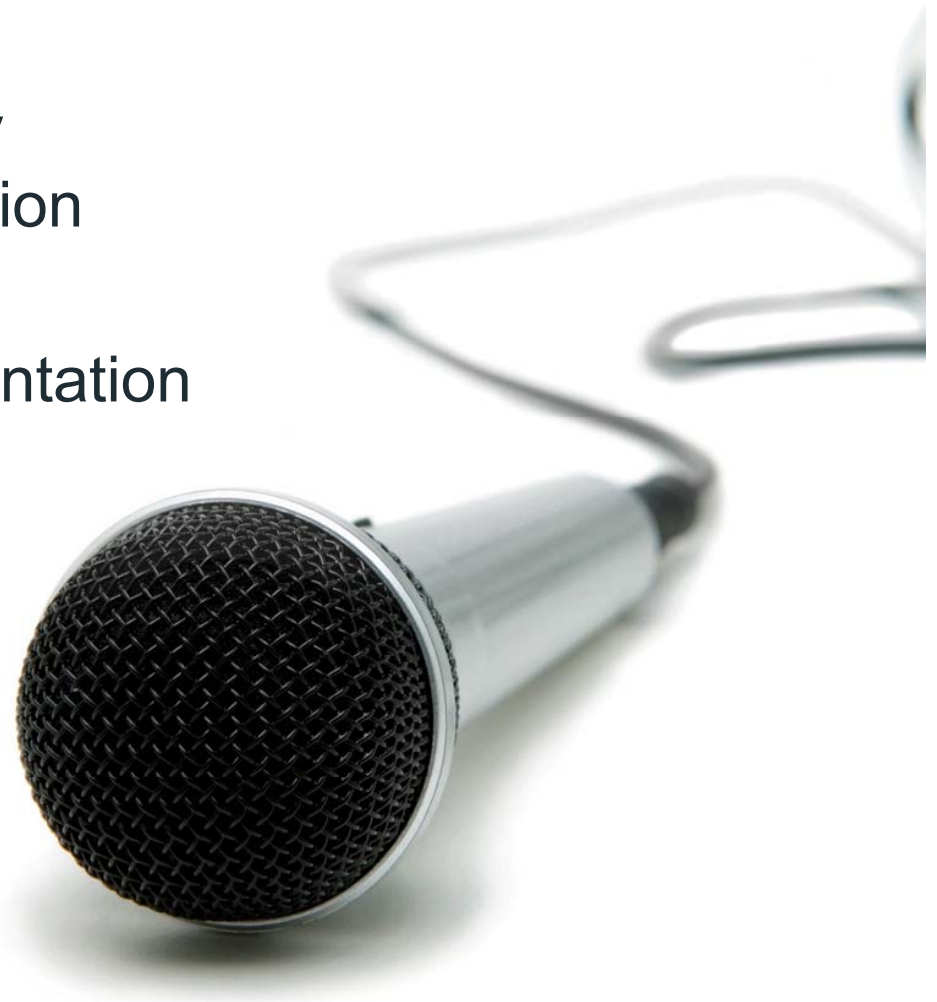
Admin. system integration

- ✗ IT budget "Bear Traps"

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenter.





Tony Lovick, MA FIA Pricing Actuary, EMEA

- Tony graduated in Mathematics from Oxford University in 1987, and qualified as a Fellow of the Institute of Actuaries in 1994. He spent twenty one years with Aviva Group, before joining EMB, now Towers Watson, as a Senior Consultant.⁽¹⁾
- Tony is interested in innovative actuarial research and its delivery through pragmatic systems development.
- Within Towers Watson, Tony is the lead Architect for the Usage Based Insurance project serving a number of insurers
- Latest research from Tony improves pricing models with a noise reduction technique to take account of uncertainty.⁽²⁾ Last year EMB filed a patent application for this innovation.⁽³⁾
- Tony undertook a number of roles within Aviva, most recently as Price Optimisation Actuary, “Pay as you drive” Actuary and Head of Statistics and Development, in the Personal Lines Pricing Division of Norwich Union.
As Price Optimisation Actuary he undertook the client side pricing and architecture design, concluding in a successful Motor Renewal pilot.
As the actuary leading the research for Pay as you drive, he helped inspire the analysis, build of the data warehouse systems⁽⁴⁾, and launch of the product to market. As part of this project Aviva prepared two patents with Tony listed as the inventor, one of which is now granted⁽⁵⁾.
As Head of Statistics he led the implementation of full postcode risk cost models for motor and home insurance, pioneering the introduction of external data to Aviva rating systems.

(1) <http://www.linkedin.com/in/anthonylovick>

(2) <http://www.actuaries.org.uk/research-and-resources/documents/redefining-deviance-objective-generalised-linear-models>

(3) <http://www.ipo.gov.uk/types/patent/p-os/p-journal/p-pj/p-pj-ukappfiled.htm?startYear=2011&startMonth=January&startDay=12th+-+6347&endYear=2011&endMonth=January&endDay=12th+-+6347&filter=EMB&perPage=10&sort=Publication+Date>

(4) <http://www.silicon.com/financialservices/0.3800010322.39169285.00.htm>

(5) <http://v3.espacenet.com/textdoc?DB=EPODOC&IDX=GB2436880&F=0>



Peter Lee FIA Director

- Peter Lee is a Director at Towers Watson and global lead in pricing innovation with over twenty years experience in non-life insurance. Prior to joining EMB Peter worked at Allianz UK as the Personal Lines Actuary.
- Whilst at EMB, Peter worked for a large number of insurers throughout the world in different regulatory regimes, advising over a broad spectrum of areas and products ranging from claims reserving to pricing and the design of management information. Throughout his career Peter has been at the forefront of innovation, being one of the pioneers of the application of statistical modelling to personal lines pricing and then extending these techniques to commercial lines.
- More recently Peter developed EMB's price optimisation solution which has now been implemented in many of the largest general insurers in the world. Much of Peter's work involves embedding technical analysis and demand-based pricing into a wider pricing process, allowing these enhanced capabilities to be more effectively leveraged. Peter is now working with clients to link pricing and marketing to provide an enhanced framework for managing customer value.

Towers Watson is represented in the UK by Towers Watson Limited, Towers Watson UK Limited and Towers Watson Capital Markets Limited.

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