Telematics insurance

A disruptive innovation
An opportunity for a new business model
In the UK, private motor insurance is a commoditised product in a saturated market. Customer loyalty is low, competition is intense and margins are slim. Telematics provides the motor insurance sector with an opportunity for a paradigm shift.

Telematics insurance uses data that describes how, when and where a vehicle is actually driven to calculate the risk presented by the driver. The data is collected by an electronic device fitted to the vehicle and is transmitted to the insurer via a telecommunications network.

Telematics could allow providers to differentiate their products and create competitive advantage. It could also improve profitability as a result of better risk segmentation and deliver higher levels of customer insight, improving relationship management and increasing retention rates.

It also has the potential to reduce price sensitivity and switching, and to lower the dominant influence of buyers as a competitive force. The disappearance of standardised pricing would ultimately challenge the price comparison website model – the biggest sales channel for private motor insurance in the UK and the main driver behind price hypersensitivity as experienced by the market.

Early pilots in the consumer market, and its application in the commercial fleet market, have provided evidence that telematics insurance improves driving and reduces accidents. Norwich Union for example, reported a 30 percent accident frequency reduction in its pilot in the consumer market and Pepsi reduced its fleet crash rates by 80 percent1. In addition, the granular event data that telematics creates enables the circumstances of accidents to be more accurately established, supporting efforts to reduce fraud.

Recent market research suggests that there is also a consumer appetite for telematics insurance. According to research conducted in 2012 by Gocompare.com, 57 percent of all UK drivers expect to switch to a telematics-based car insurance policy by 2017.2

Risks and rewards for the early adopters
There are a number of factors that lead us at IBM to believe that the rate of consumer adoption of telematics insurance in the UK is likely to increase exponentially. These include:

- **Clear relative advantages and benefits**: for many consumers, telematics offers advantages to the traditional insurance product including premium equity and the potential for value added location-based services.
- **Reduced privacy concerns**: the proliferation of social media is resulting in individuals being more comfortable with sharing personal data and more disposed to trade privacy for utility and lower prices.
- **Compatibility with existing consumer infrastructures**: telematics insurance uses data capture and transmission technologies with well developed, unobtrusive consumer applications including GPS and telecommunications networks and uses interfaces that are familiar and ubiquitous, such as the Internet and telephone.
- **Simple, easy to understand propositions**: early entrants have taken a consumer-centric approach to designing their products and processes and marketing their propositions and there is little evidence to suggest that lack of consumer understanding poses a barrier to adoption.
- **Low risk in adoption and ease of sampling**: there are few constraints for the customer in trying out telematics insurance and little cost or risk in switching back to a conventional product. And as telematics technology is safe and proven, the only material risk to the consumer is in revealing data about their whereabouts and driving habits.

Market analysts also predict an acceleration of product development as insurers clamour to be the first to market and secure the advantages of capturing early adopters.
In December 2011, Moody’s rating agency stated in its Credit Outlook report\(^3\), “personal-auto insurers at the forefront in offering usage-based insurance products will gain a significant competitive advantage in pricing and policy retention, while companies that don’t offer such products may face adverse selection in the future”.

Recent changes in legislation could also galvanise the telematics proposition. A recent ruling by the European Court of Justice banning the use of gender as a pricing factor from December 2012\(^4\) will lead to greater innovation and the use of alternative risk and pricing structures.

In addition, eCall, a European initiative intended to bring rapid assistance to motorists involved in a collision, will establish a telematics infrastructure that could be used as a platform for all sorts of services, including insurance.\(^5\)

The UK Government has also adopted a pro-telematics stance.

**“The UK government supports measures to reduce insurance premiums and tackle fraud… we support the telematics model and want to help it succeed.”**

— Pauline Morgen, Head of Insurance, Department for Transport, 2012 European Insurance Telematics Convention

We believe that a ‘watch and wait’ strategy, without any material investment in creating options that enable ramping up or scaling back as the market evolves, could leave an incumbent insurer exposed and losing out to more innovative competitors. The benefits of first mover advantage could be further amplified by the phenomenon of adverse selection: as telematics increases its foothold in the mainstream, ‘good risks’ may migrate from traditional products to telematics propositions and insurers choosing only to offer traditional products could lose market share and suffer a worsening claims experience. Ultimately, it is those providers who move first that will stand to gain the biggest rewards.

**A disruptive business model innovation**

Telematics insurance is a business model innovation. It is not a new product – it transfers the financial risks of owning a car from the individual to the insurer, just as non-telematics products do – however the way in which it does so is radically different. It is disruptive in that, in order to offer a telematics insurance product, incumbent firms will need to move away from previous ways of working and product delivery, and introduce significant change in their organisational activities across the value chain.

This hypothesis is supported by the reported experience of early market entrants across Europe and in the US. Mike Brockman, CEO of UK telematics insurance pioneer Insurethebox, points to stark contrasts between the traditional and telematics insurance business models and requisite organisational capabilities. Figure 1 summarises Mr Brockman’s key observations against a simple insurance value chain.
“New suppliers have entered the value chain. For example, we now have to manage the installation of telematics devices into customers’ cars and make sure that the fitters – motor mechanics – provide a customer experience consistent with our brand. We had to do a lot of smartening them up and educating them. Controlling our supply chain is one of our key success factors now.”

“The service model is completely different. The traditional model is to avoid customers; with telematics it’s the opposite. We worked out that we have 200 customer touch points in our business model. We are constantly monitoring where, when and how our customers are driving and interacting with them through their personalised web page about their individual driving behaviour and how they can make improvements. Building trust is paramount – customers are giving us private information and we are the guardians of that data – the relationship is far more intense and intimate than before. Getting it right is vital because retention is key in the telematics model – to recoup the initial investment and to benefit from our ability to understand who are the best risks.”

“Getting customers is vital to the economics. It’s a new and unfamiliar proposition and has to be sold. It’s all about product design and price – design is key and in this respect insurers are hopeless. They think about products from the perspective of an insurer – de-risking products so that they end up with products that customers don’t actually want. You have to start with a product design that people want and price it from there. We model ourselves not on the insurance business but on the retail business.”

“The claims process looks completely different. In the old model, we would often not hear about a claim until weeks after the accident had happened. With telematics, we know immediately and can start to manage the claim proactively from that point. For example, our system recently alerted us that one of our insured vehicles had experienced a 1G0 event – a very serious accident. Within minutes, we had been able to establish the precise coordinates of the vehicle, that it had left the road and rolled over and that its ignition was still switched on but the car was stationary. We called the cell phone of the driver and there was no response. We immediately called the emergency services, who were there in minutes. All four occupants of the car survived. Every detail of the real scenario correlated with what the data had told us. So our processes look completely different and our claims staff need to behave very differently too – that’s been one of the hardest challenges – teaching old dogs new tricks!”

“Telematics is all about the data. Collecting, storing and analysing masses of data is a new core competency and you need lots of people to do it.”

“Telematics is all about the economics. It’s a new and unfamiliar proposition and has to be sold. It’s all about product design and price – design is key and in this respect insurers are hopeless. They think about products from the perspective of an insurer – de-risking products so that they end up with products that customers don’t actually want. You have to start with a product design that people want and price it from there. We model ourselves not on the insurance business but on the retail business.”

“Getting customers is vital to the economics. It’s a new and unfamiliar proposition and has to be sold. It’s all about product design and price – design is key and in this respect insurers are hopeless. They think about products from the perspective of an insurer – de-risking products so that they end up with products that customers don’t actually want. You have to start with a product design that people want and price it from there. We model ourselves not on the insurance business but on the retail business.”

“The claims process looks completely different. In the old model, we would often not hear about a claim until weeks after the accident had happened. With telematics, we know immediately and can start to manage the claim proactively from that point. For example, our system recently alerted us that one of our insured vehicles had experienced a 1G0 event – a very serious accident. Within minutes, we had been able to establish the precise coordinates of the vehicle, that it had left the road and rolled over and that its ignition was still switched on but the car was stationary. We called the cell phone of the driver and there was no response. We immediately called the emergency services, who were there in minutes. All four occupants of the car survived. Every detail of the real scenario correlated with what the data had told us. So our processes look completely different and our claims staff need to behave very differently too – that’s been one of the hardest challenges – teaching old dogs new tricks!”

“Getting customers is vital to the economics. It’s a new and unfamiliar proposition and has to be sold. It’s all about product design and price – design is key and in this respect insurers are hopeless. They think about products from the perspective of an insurer – de-risking products so that they end up with products that customers don’t actually want. You have to start with a product design that people want and price it from there. We model ourselves not on the insurance business but on the retail business.”

“The service model is completely different. The traditional model is to avoid customers; with telematics it’s the opposite. We worked out that we have 200 customer touch points in our business model. We are constantly monitoring where, when and how our customers are driving and interacting with them through their personalised web page about their individual driving behaviour and how they can make improvements. Building trust is paramount – customers are giving us private information and we are the guardians of that data – the relationship is far more intense and intimate than before. Getting it right is vital because retention is key in the telematics model – to recoup the initial investment and to benefit from our ability to understand who are the best risks.”
Core capabilities of the telematics insurer

From this analysis of the impact to the traditional value chain, IBM has identified nine core capabilities that we believe are required in order to succeed with a telematics insurance proposition. These are illustrated in Figure 2.

Although not replacing many of the traditional capabilities of the insurance company, for most these core capabilities are likely to represent new challenges. Whilst all are necessary elements of the telematics insurance operating model, we believe that data management sits at its centre. We strongly agree with Mr Brockman’s assertion that:

“Telematics is all about the data. Collecting, storing and analysing masses of data is a new core competency.”
Based on several client engagements, IBM has developed a framework to help incumbent insurers create a data management strategy and implement a successful telematics insurance solution within its business. This framework also highlights what we believe are the key success factors to consider when doing so.

**The importance of a data management framework**

Insurers planning to introduce a telematics proposition will need to implement a data management framework to support the large volumes of data that will be streamed in near real-time into the organisation. Telematics data can be broadly classified as event data or GPS-based satellite data that is streamed from in-car devices via a network provider.

The average commute time in the UK is 61 minutes and a telematics device generates a data ‘record’ for each second a vehicle is switched on. This means that for the average commute a single vehicle will generate 3,660 records. Multiply this by the potential thousands of telematics equipped vehicles on the road and the number of records created on a daily basis soon reaches the hundreds of millions. In addition there will be multiple event records for actions such as braking, swerving and journey start and end.

*For the average commute a single vehicle will generate 3,660 data records.*

Traditional data management consists of overnight batch movement from line-of-business systems to business decision systems, but this will not allow the business to manage the high volume of data expected nor gain the benefits from the near real-time availability of this new data.

Insurance organisations could look to the telecoms sector as an example of how Big Data management is successful and where providers have been handling large volumes of data for many years. Telecoms organisations have developed sophisticated data architectures for dealing with real-time data, mainly for billing purposes, where systems retain call record data at the lowest level and for a short period of time before summarising and archiving it as it becomes out of date.

Insurers need to consider how they will manage this new data and integrate it into their broader data architecture in order to capitalise on its value in organisational processes, product offerings and in creating competitive advantage.

**The six components of a telematics insurance data architecture**

When an insurer introduces telematics to its business, it will need to consider how telematics data will integrate into the existing data architecture or how it will enhance the existing data architecture to allow for the new data.

Data architecture can be broken down into a number of key data points, as shown in Figure 3.
When developing the data architecture, insurers need to consider whether or not to manage the whole end-to-end architecture ‘in-house’ or to work with third parties.

Options to consider include:

• Whether to outsource the collection, staging and archiving of data and only bring the data required for action, analysis and exploitation in-house.
• Whether to outsource end-to-end architecture with a third party providing inputs only for action and exploitation.

• If the insurer decides to use a hosted service, it must then choose whether to use a:
  – Telematics infrastructure provider
  – Telco network provider
  – Data hub provider.
• Which technologies to deploy across the architecture. For example, at the data collection point the requirement is to support large volumes of near real-time data, whereas for data exploitation, lower volume, summarised data needs to be kept consistent to ensure accurate analysis. Analysis and enrichment often needs to be done pre-summarisation as outlined in Figure 4.

---

Figure 4: Data lifecycle for telematics insurance

---

<table>
<thead>
<tr>
<th>Volumes</th>
<th>Concurrency</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Near real-time</td>
</tr>
<tr>
<td>Low</td>
<td>Batch</td>
</tr>
</tbody>
</table>

---

1. Data collection

**Insurers need to be able to collect the raw near real-time data in an efficient, secure, timely and consistent manner.**

Organisations can chose whether to collect and store the data in-house or outsource this part of the process to an IT provider who acts as a “data-hub”: collecting, storing and processing the data before making it available to the business for exploitation. Whatever the insurer decides will depend on its IT strategy and whether it already has a policy or programme of outsourcing data services.

2. Action

There are certain business and consumer events that will require immediate action once the data is acquired. In order for these events such as accident management and theft to be automated and triggered in near real-time, the telematics data must be easily cross-referenced against customer and policy data.

The application of Big Data technology such as data streaming enables continuous analysis of the data as it arrives and the initiation of any required customer support activity required, such as a call centre contact, emergency services call or automatically generating an SMS message.

**Insurers can adopt “Big Data” technology to perform analytics on the fly to react to events as they are unfolding.**

This allows the insurer to provide premium accident management services or theft tracking services to customers and also to start claim processing immediately, thereby reducing claim processing times and optimising the use of the insurer’s claims supply chain.

3. Data enrichment

All telematics solutions are likely to require a degree of enrichment of event and GPS positional data after it is collected from the device. The level of enrichment will depend on the level of on-device data processing and summarisation, which in turn will be determined by the sophistication of the telematics proposition itself, including requirements for driver feedback.

Typical enrichment activities will include the augmentation of raw GPS data with GIS mapping data to identify, for example, journeys and their characteristics, road position for events that need to be managed, and entry into road congestion areas through use of geo-fences.

4. Data staging and archiving

The enriched data then flows through to a staging area. This can be handled as conventional flat files, a relational database or in new technologies such as Hadoop.

Sitting alongside the architecture decision on staging is when and how to archive the data. With large volumes of data, archiving needs to be addressed up-front as part of the data architecture and not as an afterthought.

Insurers will need to adopt a data archiving strategy that supports the business processes as some may need 12 months of raw data to price policies while some will require only three months. Once that data is used it should then be summarised in order to limit the amount of online storage required. This approach is standard among industries such as telecommunications for management of Big Data but is new to insurers.

5. Data storage

Since the rate of customer adoption of telematics insurance cannot be accurately predicted, the volume of data that will need to be collected over time is as yet unknown. Volumes will also fluctuate, reflecting vehicle usage patterns. Insurers therefore need a flexible storage solution that allows for rapid change to data volumes (school holidays, bank holidays and the influx of new customers adopting telematics devices) and has the ability to add additional storage quickly and with ease. Insurers should also consider the possibility of adopting a Cloud-based solution for data storage as this will provide the means to add additional storage quickly and seamlessly.
6. Data exploitation
Collection, enrichment and storage need to be properly addressed if the insurer is to exploit the data to its full potential.

Data exploitation is key to realising the insurer and consumer benefits of telematics insurance.

It can deliver:

- **Improved product pricing and customer retention.** The ability to process collected data, standardise it and feed it into a pricing solution using an automated data integration solution, is key to improving the management of risk and providing more equitable premiums. This in turn can lead to improved customer retention as more competitive premiums can be offered to good drivers.

- **Increased customer satisfaction.** Telematics insurance generates significantly higher levels of interaction with customers, both through the potential immediacy of contact in the event of a claim as well as through feedback on driver performance through customer portals. Just as it is proven that net promoter scores in insurance are highly correlated with contact through the claims process, so telematics provides a similar opportunity to build customer loyalty.

- **More streamlined claims processes.** Combining telematics data with customer and policy data at the point of collection will enable insurers to initiate claims processes early. If event information received from the telematics device is assessed as it is collected, it can be used to more effectively identify any immediate actions that are required.

- **A reduction in claims settlements.** Loss ratios in the UK motor insurance industry currently run at around 80 percent, with more than five percent of claims costs relating to indemnity settlements for injury claims. In 2010, there were more than 500,000 whiplash claims, resulting in approximately £1.5 billion being paid out by insurers. Data collected from telematics devices could assist insurers (and other interested parties) in assessing whether personal injury claims are valid or if the extent of injuries should be challenged.

- **More cross- and up-sell opportunities.** Immediate access to telematics data could allow insurers to create more opportunities for targeting customers with tailored propositions. For example, a travel insurance product can be targeted at customers whose vehicle usage and position data suggested they might be susceptible to such an offer. This provides the insurer with the opportunity to offer more customers more products via different channels such as sending an SMS and providing click-of-a-button fulfillment.

- **Increased support in the event of accident or theft.** When a vehicle is involved in an incident the onboard device will sense this through the change in status such as g-force or speed data, and generate an ‘event’ based on an algorithmic interpretation of the data. For each type of ‘event’, the appropriate action can be taken, from sending an SMS to the policyholder, notifying the police to start theft tracking, or deploying the emergency services.

As well as considering data architecture, insurers need to address the end-to-end management of their data. There are three key aspects to the management of telematics data that need to be addressed, as illustrated in Figure 5.

---

**Figure 5: Elements of telematics insurance data management**
**Data quality**
Data quality should be addressed at every stage, from collection to exploitation, to ensure that it is understood and believed when presented to customers in a summarised form. Any shortcomings in data quality, or its analysis and presentation, will quickly erode the consumer's trust and confidence, especially if this has a material impact on premium charges.

Data streaming technology needs to consider data checking as well as data action in looking for erroneous information as a product of an incorrect value being sent. Automatic processes also need to be in place to identify potential data irregularities.

Once data is enriched, staged and stored for exploitation, additional checks can be made to validate the quality of data downstream. A feedback loop can be established to improve the quality of the telematics data further if, following detailed analysis, poor data quality is found.

**Data privacy**
Although concerns around data privacy may be easing, the credibility of the telematics insurance proposition relies on insurers implementing and communicating data protection practices that sustain public confidence.

Customers must be clear about what they have agreed the insurer can and can’t do with their driving data and be confident that it falls within the scope of data protection legislation.

Insurers will also need to reassure customers that any data collected from telematics devices is for business purposes only and will not be sold or used for any other reason beyond this core business function.

**Data governance and standards**
There are currently no agreed industry standards for telematics data formats and records beyond those relating to raw satellite-based GPS data.

‘Events’ generated by the telematics device will be specific to an insurer’s proposition and there will be a range of visualisation and pricing approaches available to influence driver behaviour and usage patterns.

Different device manufacturers and telematics insurance providers are therefore creating their own structures for data within a broad canvas covering speed, braking, location, accident data, miles driven, duration of journey and so on.

There are two main reasons that we believe common data standards are important to the growth of this proposition:
1. In a competitive marketplace, where a significant number of policies are not renewed with the incumbent insurer, a common data structure would provide the customer with the ability to move to a different insurer and take their telematics ‘passport’ with them.
2. Insurers will need to be able to ‘onboard’ a customer who has previously used a telematics device elsewhere and provide them with an accurate quote based on their driving patterns rather than using traditional rating factors. Common data standards will be required to enable this. There is likely to be resistance to this from early adopters of telematics, but it will quickly become a necessity as the number of propositions in the market increases. It will also be critical to the aggregators in this market.
Summary
This white paper highlights that there are many questions that need to be addressed when considering telematics insurance data management and solution implementation. Getting this right is key if the benefits of the new business model are to be realised. IBM has helped organisations create business and data strategies that have enabled the successful embedding of telematics within their business operations. Such engagements have ranged from the design of business processes for on-boarding telematics customers, to the provision of telematics devices and development, hosting and support of the infrastructure required to manage and augment large volumes of telematics data from in-vehicle devices.

We can help insurers to plan and manage their entry into this important new market and to establish the new capabilities that are key to success.

- **Business strategy and operating model** to better understand the potential impact of launching a telematics proposition on an insurer’s business model and organisational capabilities, and how to plot a response that is aligned to broader strategic imperatives.
- **Business case** for implementing a telematics proposition that considers elements including run costs for the technology and the supporting operating model, and the impact on claims experience, business volumes and business retention.
- **Data management strategy** to determine the most appropriate data management pattern for a telematics proposition, considering options ranging from in-house to using a third party host solution or telematics partner.
- **Data and solution architecture** to provide a data architecture blueprint that highlights the key focus areas for implementation and a solution architecture that will deliver its requirements.
- **Planning and execution** through the development of a roadmap to implement the business, technical and data solution, and provide delivery and programme management capabilities to embed the telematics proposition.

About the authors

**Graeme Asquith**

Email: graeme.asquith@uk.ibm.com  
Telephone: +44 7736 599714

Graeme Asquith is an Associate Partner and heads IBM’s Telematics Insurance practice in the UK. A veteran of the insurance industry, Graeme is a leader within IBM’s Strategy and Transformation practice and a subject matter expert in Business Process Management.

**Stephen Mills**

Email: stephen.mills@uk.ibm.com  
Telephone: +44 7966 265804

Stephen Mills is an Associate Partner within IBM’s Business Analytics and Optimisation (BAO) practice. With a sole focus on the UK financial services industry, Stephen is IBM’s BAO strategy leader and a subject matter expert on Big Data, Data Strategy and Analytics.

**Sue Forder**

Email: sue.forder@uk.ibm.com  
Telephone: +44 7764 664310

Sue Forder is an Associate Partner and Executive Information Architect within IBM’s BAO practice. Sue is the analytics technical lead for the insurance industry and leads IBM’s Analytics Technical Community in the UK.

2. www.gocompare.com/covered/2012/04/telematics-set-to-be-a-big-deal

3. www.moodys.com

4. www.abi.org.uk/Information/Achats/What_does_the_European_ruling_on_gender_mean_for_me.aspx


6. Insure The Box Ltd, IBM analysis

7. Direct Line website