Telematics insurance: the safer you drive, the less you pay

Telematics technology – the integrated use of telecommunication and informatics – may fundamentally change the car insurance industry by allowing insurers to base their prices on the real driving behavior instead of on traditional policyholder characteristics and historical claims information. Telematics insurance or usage-based insurance (UBI) can drive down the cost for low-mileage clients and good drivers.

Using telematics technology in commercial vehicles enables to transmit and receive information that allows an insurance company to better assess the accident risk of drivers and adjust the premiums accordingly. A small black box device, containing a GPS system, electronics that capture hundreds of sensor inputs, a SIM card and some computer software, is installed in your car. It monitors your driving behavior directly and shares this information with the insurer. Simply put, the less and the safer you drive, the less you will pay.

Car insurance is traditionally priced based on self-reported information from the policyholder, most importantly: age, license age, postal code, engine power, use of the vehicle, and claims history. However, these observable risk factors are only proxy variables, not reflecting present patterns of driving behavior, such as temper, skill, and aggressiveness behind the wheel. Hence, a lot of heterogeneity between drivers remains. Over time, insurers try to refine this a priori risk classification and restore fairness using no-claim discounts and claim penalties. This so-called bonus-malus system differentiates based on the historical claim pattern rather than present patterns of behavior.

It is expected that these traditional methods of risk assessment will become obsolete. Your car usage and your driver abilities can be better assessed based on telematics data collected, such as: the distance driven, the time of day, how long you have been driving, the location, the speed, harsh or smooth breaking, aggressive acceleration or deceleration, your cornering and parking skills … Furthermore, the data collected from your car can be enriched with other sources of data, for example road maps (and corresponding speed limitations), weather and traffic information. This high dimensional data, collected on the fly, will force pricing actuaries to change their current practice.

New statistical models will have to be developed to adequately set premiums based on individual policyholder's motoring habits instead of the risk associated to their peer group.

The drivers most likely to benefit are those the standard insurance market is currently overpricing. Infrequent drivers will receive a fairer premium, making vehicle ownership more affordable. Young drivers and drivers in other high risk groups, who are typically facing hefty insurance premiums, can be judged based on how they really drive. Women under the 2012 EU ruling, banning price differentiation based on gender, may be able to confirm through telematics that they really are safer drivers.

Through this form of pay-how-you-drive insurance, fairness will be increased and cross-subsidization reduced. This improved customer segmentation will allow insurers to dynamically align insurance policies with actual risks.

Clearly some positive side-effects are to be expected. Telematics insurance gives a high incentive to change the current driving pattern and stimulates more responsible driving. Gamification of usage-based insurance can further enhance the customer experience by making it more interactive, gratifying and even exciting. Less and safer driving is rewarded, leading to improved road safety and reduced vehicle travel with less congestion, pollution, fuel consumption, road cost, crashes…

Governments could set taxes based on actual car usage. Toll operators could automatically apply road usage charging. Car sharing services could evaluate personalized car care. Automated emergency response, immediate crash or break-down assistance, theft tracking, geo-fencing, no texting while driving, accident reconstruction and scam identification can also be achieved thanks to the black box.

The choice for the kind of tracking device to be used is a raging ongoing debate. Professionally installed black boxes are the most reliable, but also the most expensive UBI solution on the market. Alternatives are self-installed onboard diagnostics devices, smartphone solutions, embedded factory-installed solutions and some sort of hybrids, which all have their strengths and weaknesses.

Telematics insurance still seems a niche market. Even though the technology first surfaced more than 10 years ago, the high implementation costs of the device and its complexity limited its success. Technology and telecommunications advances have however improved the cost substantially. Early adopters of UBI were seen primarily in North America, Italy and the United Kingdom due to the higher premiums, particularly for young drivers, and a higher incidence of fraudulent claims and vehicle theft. Monti's decree of 2012, mandating Italian insurers to provide a telematics option, has made Italy the most active country in Europe in telematics insurance, with the overall penetration level approaching 5%.

In other European countries, with less insurance fraud and theft issues, premiums have always been much lower, yielding a smaller margin to pay for such technology. Yet, the European Court of Justice, ruling that gender is prohibited as a rating variable, might further limit the use of proxy variables, such as age and postal code, when pricing insurance risk. Moreover, the European eCall initiative, which is scheduled to come into play by the end of 2017 or early 2018, forces all new-model passenger cars to install a telematics device that will automatically dial 112 in the event of an accident, providing precise location and impact data. Insurance companies could easily jump the wagon by expanding the device capabilities towards telematics insurance support, rendering the current device debate obsolete on the long term and driving increased usage of telematics in insurance.

Potential sources of resistance include privacy concerns, data ownership and data security. However, many consumers value the benefits more versus the loss of privacy in the growing use of smartphones and tablets, social media networks, GPS systems, electronic toll collection devices, search engines personalizing adverts based on data mining, online retailers analyzing shopping patterns... In insurance, the notion of trust has always been a key factor in the relationship as insureds share a lot of sensitive information. If the potential savings on their car insurance are significant enough and they trust their data is relatively secure, consumers will be more willing to make the trade-off. Lingering concerns about personal privacy can be mitigated by aggregating driver's data and moving away from continuous tracking.

Anyway, insurance companies are challenged to come up with new business models based on the upswing of telematics, complying with existing and forthcoming legislation and regulations. The industry sector realizes the urgency. The winners might be those who act fast and attract the better risks, leaving their competitors to lose profitable policyholders and to insure only the most risky drivers. Rating agencies have therefore already recommended the shift towards telematics insurance. Much is still to be investigated, creating many opportunities for scientific research, in which the joint efforts of the research groups in Insurance and Business Statistics at FEB can play a role.

Meanwhile car manufacturers, telecom and internet companies invest a lot in connected car systems and driverless vehicles. Even though still in an early stage, this could phenomenally reduce the accident rate and require an even more drastic reinvention of the car insurance industry of the future.

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