

# Telematics

Watching Your Every Move!

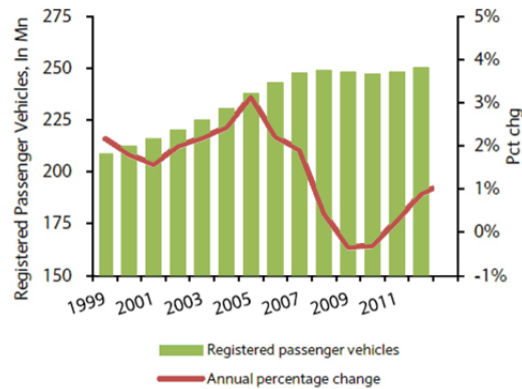
White Paper



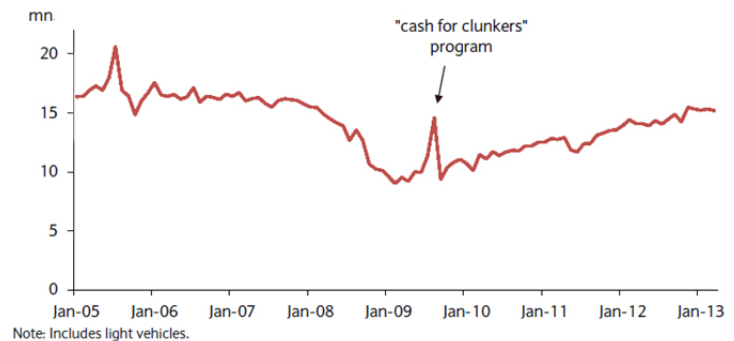
## Introduction

After years of recession, the US economy has recently been showing signs of recovery. The number of registered vehicles on the road, as well as new passenger cars, has been increasing over the last few years [Figure 1, 2]. It is expected that in next 2 years, new car sales will return to pre-recession levels.

**Figure 1: U.S. Registered Passenger Vehicles**



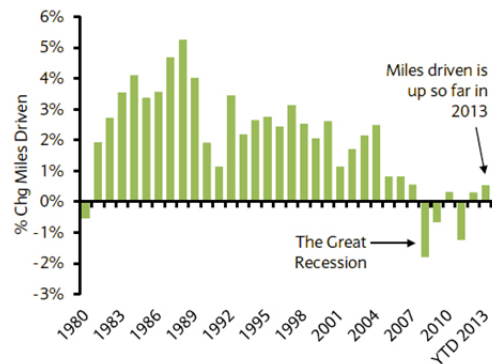
**Figure 2: New U.S. Passenger Car Registrations**



Source: Bureau of Transportation Statistics

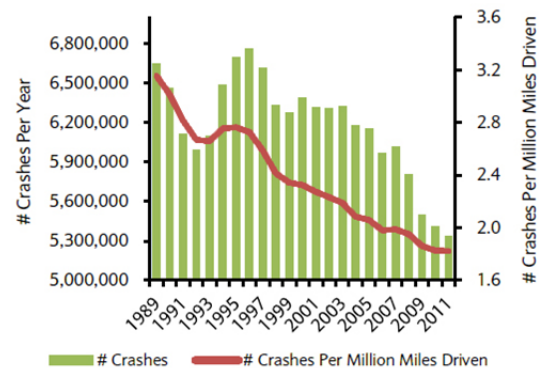
Associated with this economic recovery, miles driven have also been showing a positive trend lately [Figure 3]. What does all this mean? More cars, more miles, and more traffic on the road – all put together – it means more crashes! It’s no surprise that the total number of vehicle crashes has recently shown a halt in a declining trend of several years [Figure 4], and is expected to begin to rise again.

**Figure 3: US Miles Driven**



Source: US Department of Transportation

**Figure 4: US Motor Vehicle Crash Frequency**



Source: Federal Highway Safety Administration

More crashes imply more claim costs for auto insurers. As it is, with increase in loss cost inflation and constraints in further hikes in premiums, there is already pressure on insurer profit margins. With additional claims coming in, profit margins are going to be hurt even more. This, coupled with other factors, is driving insurers to go on a cost cutting spree.

A key mechanism for auto Insurers to reduce their claims costs is to leverage telematics to improve their risk assessment accuracy of drivers. Telematics helps in not only assessing risk, but also actually altering driver behavior and reducing risk of crashes. Some of the top auto insurance firms in US have started calculating the premiums using telematics data, assessing risk based on actual driving behavior.

## What is Telematics?

Telematics technology tracks vehicle location and movement. It sends, receives, and stores driving data via telecommunication devices in vehicles using advanced sensors installed in vehicles. Akin to smartphones, the sensors gather data on when and where an individual drives, location, driving actions with time stamps. The devices transmit the data to insurer or telematics service provider via cellular or satellite connection. This data is then used by statisticians and actuaries to assess the accurate risk profile of user. This practice is having several names - pay as you drive (PAYD), pay how you drive (PHYD), usage-based insurance (UBI).

To get a better perspective, one needs to understand how, traditionally, auto insurers 'price' their products. So far, auto insurers would rely on market studies and past data to derive insights, such as:

- Teen drivers ages 16-19 are four times more likely to crash than older drivers<sup>1</sup>
- There is an 89.2% chance of crashing within the first three years of driving<sup>1</sup>

Information and data as above would then be modeled into calculating Loss Ratios and deriving Class Plans or Rating Manuals. The challenge has traditionally been that the information has never been granular enough for the actuaries to create more 'customized' or 'personalized' product price points. With the emergence of this technology, auto insurers now exactly know how many times the driver is doing any of the following:

- Speed violations
- High speed tailgating
- Risky turns
- Frequent lane changes
- Violent braking or avoidance maneuvers

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<sup>1</sup> Source: National Safety Council, Injury Facts, 2009, CDCP & NCIPC, 2009

This not only helps them really understand their customers, but also helps them ‘customize’ their pricing based on the driving patterns of the individual - something that has never been possible earlier.

Consider this scenario: Two individuals, living in the same neighborhood, having similar educational background, credit scores and age, but their driving habits are very different: one is more aggressive than the other (higher speeds, harder acceleration and braking, more frequent lane changes). The kinds of roads they use while traveling to and from work are different (although the total number of miles driven are the same). Their accident histories are not too different. Under typical, legacy pricing models, these two individuals would pay similar premiums. But when Telematics data is used, the lower rate is offered to the defensive driver using safer roads.

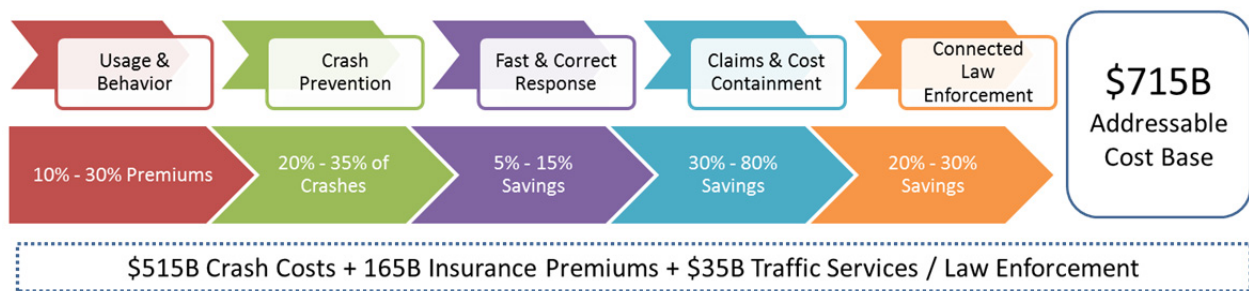
The above scenario shows how accurate their pricing (underwriting) of policies can become with this intelligence about the driver.

Secondly, this is also creating an opportunity for auto insurers to offer a set of consumer services related to teen safety, automatic notification for emergency assistance, theft tracking, driver performance coaching, and many other applications that are in high demand in select markets.

Lastly, auto insurers are able to offer positive incentives through discounts for following safety protocols, thereby encouraging safe driving behavior and reducing probability of crashes.

No wonder one recent study estimated Telematics having the potential to create an impact of **\$715 billion** of savings on insurance value chain, as shown in chart below.

**Figure 5: UBI Ripple Effect**



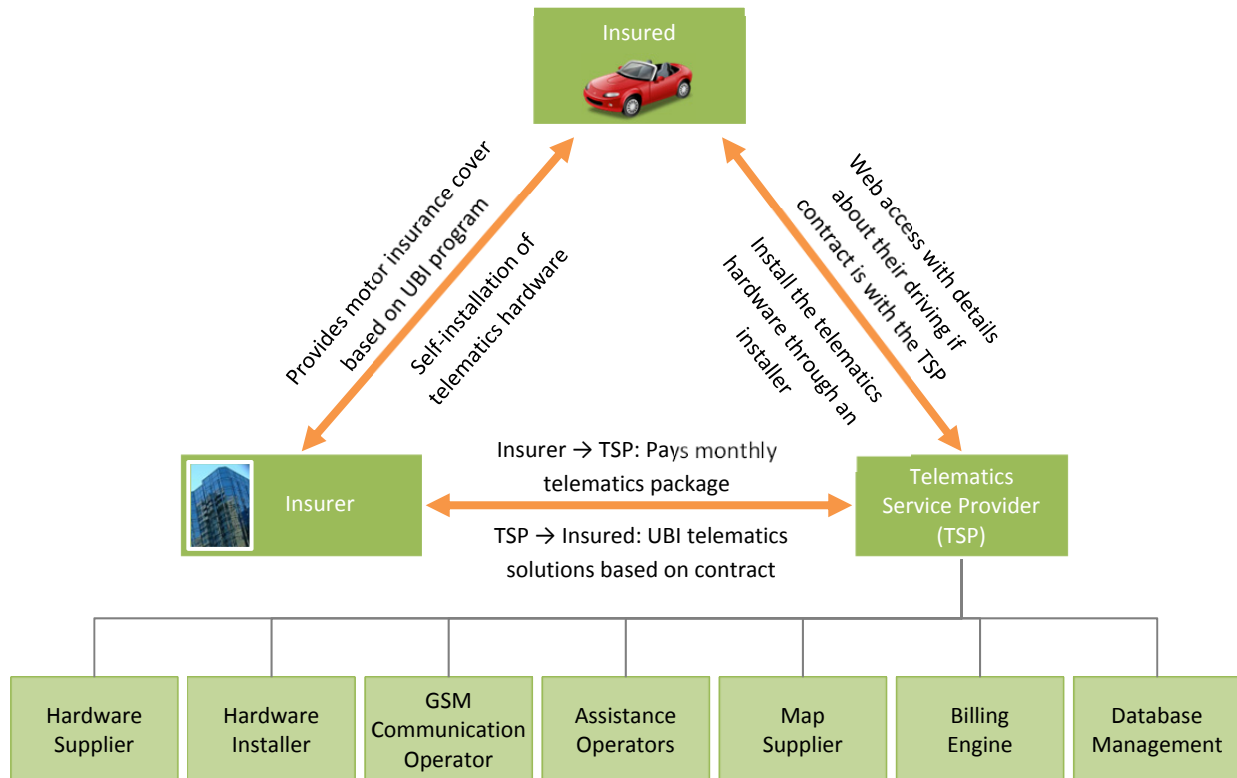
Source: CISCO IBSG estimates, 2011

At Axtria, we believe there is a real disruption coming in through Telematics. However, there are some structural and infrastructure challenges which have prevented any explosion in its adoption to date. Before we discuss those, let us first understand how this technology comes alive – what is the value chain of Telematics? Who all are involved?

## Telematics Value Chain

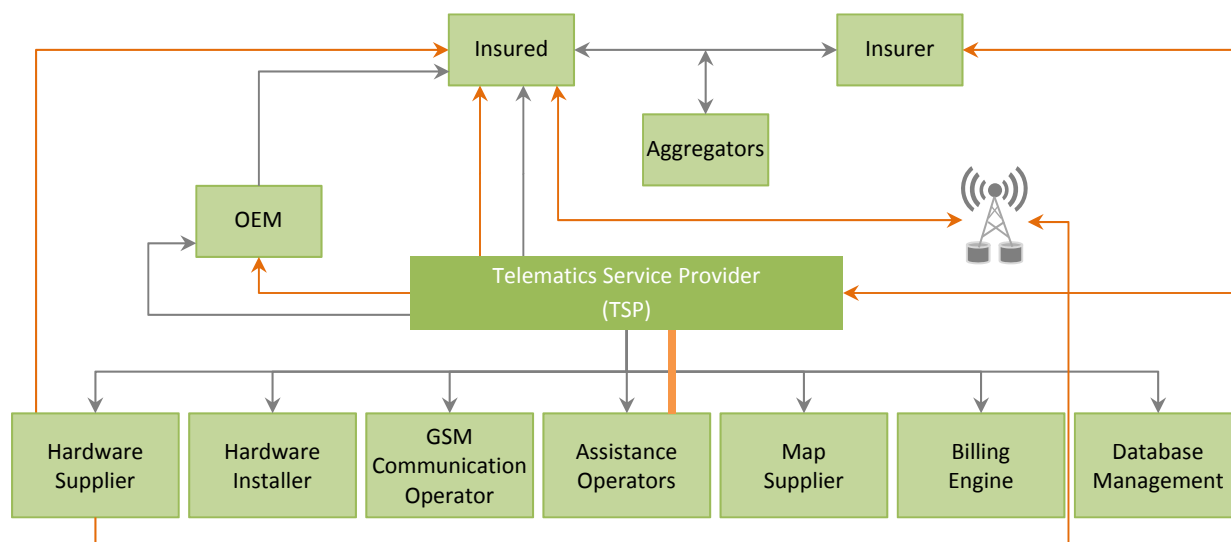
The telematics solution is primarily provided with the assistance of different third party providers. The current market is controlled and driven by insurance companies with the services being leased / rented to Third Party Service Providers (TSPs) on a contractual basis, as can be seen in the Figure 6 below:

**Figure 6: Telematics Value Chain**



Given the ‘lop-sided’ nature of the current value chain, with the TSP having a wide span of control, we believe the current value chain will evolve and disinter-mediate. Future will see more involvement from both Original Equipment Manufacturers (OEMs) and mobile network operators (leveraging already existing strong B2C relationships). We expect OEMs to start installing the hardware in the car as a factory fitted system ,and will partner with TSPs for telematics services (related to not just driver behavior but also vehicle diagnostics, planned vehicle maintenance, and emission management). The future Value Chain is likely to be as shown below:

Figure 7: Envisaged Future Value Chain



Source: Frost and Sullivan, Axtia Analysis

As the value chain evolves, the horizon of telematics technology would also broaden. It would open more technology versions of technology that would be easy to integrate with the existing legacy systems of auto insurers, which is a major challenge for successful implementation. How do you integrate telematics technology with the existing IT infrastructure of auto insurers? Let's look at that aspect in the next section.

## Implementation Challenges

Telematics, though introduced in the market in early 2000's; has still not achieved its full potential. Why? We believe the major challenges that prevent the technology from scaling up and witnessing industry wide adoption are as follows:

1. **Is the business case really sound?** Several questions remain unanswered yet - lack of publicly available vehicle operation data correlated with actual loss costs has encouraged skepticism about the full segmentation power that telematics data provides. Also, is the discount given to good drivers recovered well from bad drivers? Will giving discounts without full recovery result in reduction of profit margins?

2. **Inconsistent data collection and database integration:** The data strategy in telematics is not yet well evolved. Questions as basic as– What data is needed? Which elements will help actuaries? What is the data format? What is the regulatory requirement across each state? – still remain ill-answered and unstructured. The biggest challenge: the volume of data is truly enormous. One month of information on drivers could be creating datasets of many millions of rows – a given telematics technology could theoretically be beaming location, speed and direction information for every second of vehicle usage. While not especially large compared to other business applications generating millions of transactions per minute, this is still orders of magnitude greater than most insurers are typically now prepared to deal with. How do insurers create an infrastructure to absorb this volume?
3. **Privacy concerns:** Are people really willing to let TSPs observe them so granularly? Will people allow a third party to monitor their personal lives to this extent? Insurers and TSPs will need to instill confidence in people that all information gathered would be kept confidential and would not be used against them. Being monitored every second by its nature may be strongly resisted by people.

Note: this is a fast-moving area of social evolution. Recent revelations (as of 2013) of pervasive governmental observation of communications have been largely shrugged off by the American public as a non-issue. Does this acquiescence to an observational presence indicate greater acceptance of the sort of monitoring implicit in telematics- which at least might offer a discounted insurance rate in return?

## What Needs to Be Done by Insurers?

In order for telematics to reach its potential, the insurers need a four-phased approach to address the identified implementation challenges. At the very minimum, any insurance carrier thinking of implementing a telematics program needs to address these issues.

**Phase 1 - Define overall strategy:** This would involve identifying options, guiding principles, delineating tomorrow's underwriting practices etc. Essentially, align everyone on how telematics will be a component of the future business models and processes. This is the first building block. Its business case needs to be well established and aligned to.

**Phase 2 - Identify critical data and develop core metrics:** Assess critical data that is going to be needed through telematics. This would need auto insurers to run pilot programs, collect data points build rough cut segmentation schemas, and evaluate if the data created additional value. This would help establish the business case for the technology.

Once the data that is relevant has been identified, it would be easier to address privacy concerns as well, since auto insurers will be able to publish precisely what information they are using and sensitize people around its usage. This would also help in managing the volume of data that needs to be absorbed by the IT infrastructure of Insurers.

As an example – how does one define rash driving? How is that differentiated from normal driving behavior? Appropriate behavioral metrics would need to be developed to identify how hard does a driver accelerate and brake, and what frequency of hard braking constitutes “bad driving”; what is the variation in direction of motion while driving at different speeds, etc. Defining these metrics would be critical in extracting value from the data and narrowing the volume of data to be managed in the systems.

**Phase 3 – Tune IT infrastructure to ‘absorb’ telematics data:** This is where a large bulk of effort would need to go in. This will require architecting appropriate level of abstraction in the systems to be able to absorb data from varying telematics technologies. It will require rigorous data integration initiatives for actuarial and policy administration systems. The IT systems would need to be upgraded to handle the giant volume of data. If not done adequately, any analytics or subsequent processing of this data would be very time-consuming and outside the capabilities of existing infrastructure.

**Phase 4 – Bake new data into predictive / actuarial science functions:** Once the critical data has been identified through pilots, and critical metrics identified, they would need to be rolled systematically into the existing actuarial processes and pricing models. This would need re-building of models, loss tables, reserve forecasts, etc. after incorporating new data elements and critical metrics. The incorporation of these metrics would not only result in deriving usage-based insurance, it would actually assist in advanced risk exposure calculations, based on individual driving styles.

*We truly believe the stage of evolution where telematics is today warrants a thoughtful and well-planned approach with clear strategy and a commitment to invest in IT infrastructure. We hope and wish this paper helps you get some perspectives and ideas to make a thoughtful roadmap in your telematics journey. Good luck!*

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