

FUTURE CRASH ANALYTICS AND CLAIM SERVICES, AVAILABLE TODAY



1. Introduction



Every year there are approximately 1.5 million motor accidents with injuries resulting in more than 25 thousand road deaths in Europe¹ and approximately 6 million motor accidents resulting in 37 thousand road deaths in the United States². While accidents with injuries has seen an overall decline, trends differ immensely by country.

As industries and governments strive towards reducing the impact of accidents, aggressive targets are being proposed, such as the EU Commission that targets zero fatalities from road transport accidents by 2050. Unfortunately, there is already a widening gap between the actual and desired progress towards the EU 2020 milestone target of a 50 percent reduction in fatalities. To help bring

progress back on track, there are several future trends that play a key role. These include:

- ▣ Public sector and government action will continue to put pressure on. There are calls to supplement targets with additional goals, such as reducing the number of serious injuries from road accidents.
- ▣ Helped by independent test centres like NCAP (New Car Assessment Programme) and Insurers recognising active safety features, car manufacturers are finding business models that allow them to equip vehicle as standard with accident prevention systems, accelerating penetration across all vehicles in use.

¹ OECD

² NHTSA

▣ With a vested interest to reduce claims caused by accidents, Insurers play a pivotal role in promoting safer driving. This can be in the form of premium discounts, driver training and rewards that can easily be achieved through telematics. In fact, based on the experience of existing insurers, telematics based insurance policies have shown an 18 percent reduction in the number of claims.

While efforts for accident reduction continues, for the foreseeable future, we will continue to see crashes and the need for insurance claim services. This is in the new context of the consumer being empowered by data and exploring more customised services as a consequence of IoT³. Now is the time for insurers to transform their claims process and embrace the age of IoT for insurance.

In this paper, we aim to address the following:

- Understand the business benefits of a more efficient crash and claims process.
- Highlight the best practices in a telematics based solution.
- The importance of historical data and relevance in 'best in class' crash analytics.

³ Internet of Things

2. Challenges of the Insurer



Up to 76 percent of the gross written premiums collected by motor insurance companies are applied towards the payments and expenses associated with claims, with fraud representing between four percent and 15 percent of the claim value, depending on the country. In the event of an accident, the key contributing factors towards the underlining challenge of managing the combined ratio and therefore the profitability includes:

First Notice of Loss (FNOL) and Fraud

With a direct and indirect impact on the Loss Ratio, delayed FNOL and inaccurate crash reporting are the initial challenges an insurer faces when a policy holder is involved in an accident. Delays in FNOL

can result in missed opportunities for reducing the size of the settlement as the policy holder may be directed outside of the insurers recovery and repair network. Furthermore, delays in FNOL have shown an increased risk of fraud. In fact, the insurance pay-out is typically 33 percent higher if reporting is delayed more than a day after the event.

Crash Reporting

Inaccurate crash reporting provides little clarity towards identifying liability and potentially draws out the claims process. The current European Accident Statement, a form that is to be completed at the scene of an accident, contains more than 30 questions including what the weather conditions are, the speed of the vehicles involved and the type of road

in which the accident occurred. Considering the stress and frustration levels of the driver, in which a study conducted by MIT⁴ shows is at the highest peak in the event of an accident compared to all other driving activities, the expectation for an accurate crash report in which the insurer can confidently act upon is a key challenge.

Claims Management

With a direct impact on the insurers' Loss Ratio, the ability to quickly and accurately address claims before the involvement of third-parties is a major challenge. These third-parties, for example, can include no-win-no-fee legal services or vehicle rental companies that provide a courtesy car while the accident vehicle is being repaired.

Furthermore, poor claims management also indirectly impacts the Expense Ratio in relation to new customer acquisition. Companies like Which?, Clearsurance and J.D. Power that provide an independent reviews of insurance companies, include claims services as part of their ranking.

⁴ The Massachusetts Institute of Technology

3. A Better Way with Telematics



Since 2013, the value of using telematics has been realised by the European Commission under the EU-wide eCall⁵ directive. In which all new cars from April 2018 must be fitted with telematics able to automatically communicate the vehicles location and direction of travel in the event of a serious accident. This will help speed up emergency response times by 40 percent in urban areas and 50 percent in rural areas, potentially saving up to 2,500 lives a year⁶. Recognition of the benefits of this single telematics service has dispelled any concerns over data

privacy when in exchange for potentially lifesaving services.

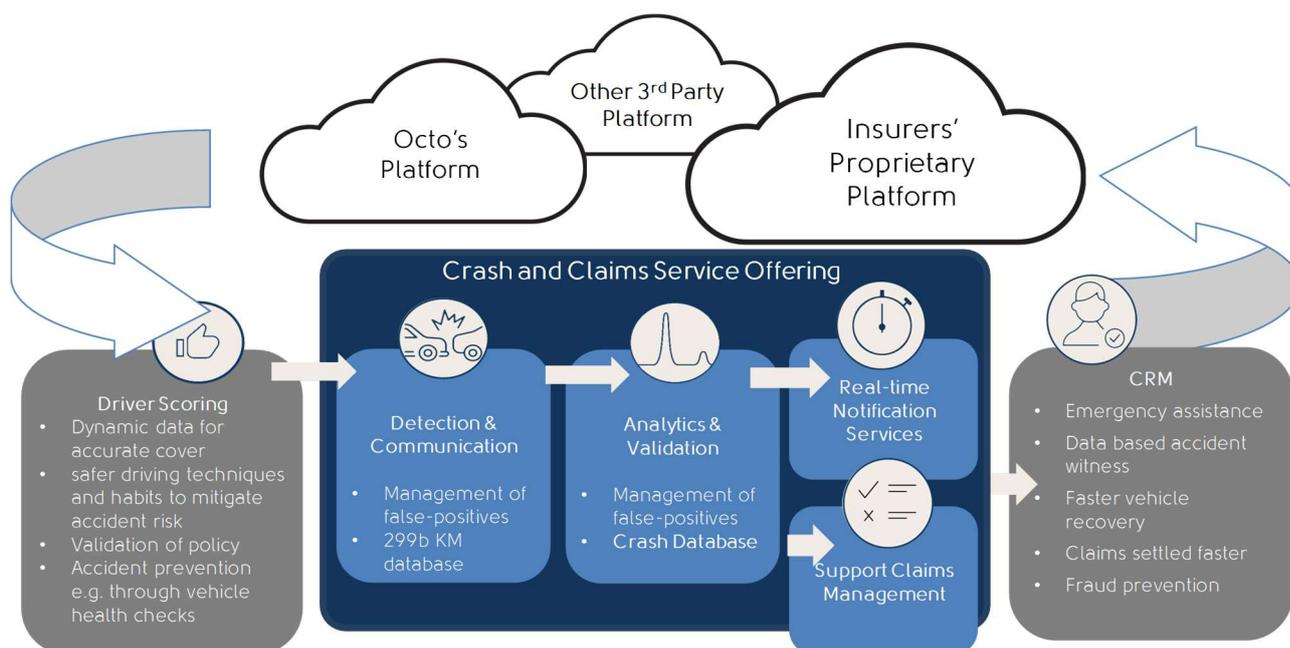
In fact, while insurance telematics is better known for the proposition of insurance premium discounts, the hidden gems of insurance telematics shine through for both the policy holder and insurer in the event of an accident. The same eCall benefits have long since been realised for the insurance telematics policy holders, as well as additional value-add services such as stolen vehicle recovery and breakdown assistance.

In the context of an accident, insurance telematics provides a far more comprehensive service far beyond eCall.

⁵ Emergency Call

⁶ EU Commission

Figure 1: Octo Telematics Crash and Claim Service



Source: Octo Telematics

For example, based on sophisticated crash algorithms, crash notifications can be triggered for all types of accidents, not just serious ones. The appropriate level of assistance can then be provided to the user in almost real-time, within the 'golden hour' - when emergency treatment is most likely to be successful. Quicker assistance can also result in a faster clearing of the accident scene, that can dramatically reduce the risk of 'secondary accidents' and traffic disruption.

"Not all Crash and Claim services are the same, the best in class must be constantly evolving to real-world situations"

Crash & Claim Product Director, Octo Telematics

Furthermore, while eCall relies on 112, Europe's single emergency number and transmits basic location and direction information, the insurance telematics system can transmit extremely concise information about the crash, optimized and transmitted over multiple GSM data

services for immediate handling by dedicated control rooms.

Due to the high significance towards passenger safety and high potential improvements to the loss ratio of any insurer, the best practice and unique traits of the crash and claim services offered by Octo, includes:

Independence

The crash and claim service offering is an independent service offered outside but enhancing different platforms. This includes Octo's own Next Generation Platform (NGP) that features Crash and Claims as a key module in the Insurance vertical, as well as any third-party such as the insurers' own proprietary platform.

As show in figure 1, the crash and claims service offering provides:

▣ Detection & Communication

The Detection Algorithm records any anomalous event which could be related to a vehicle impact. It must consider the right sensitivity balance, as even a small

impact could generate a claim. But the algorithm must be sensitive enough to capture all events, yet limit the number of false events to avoid excessive data processing and transfer. In the event of an accident, the algorithm must also be adaptive enough to record the right level of information to support more serious accidents and therefore larger potential claims. For example, the higher the impact energy detected, the longer the period of time is recorded before and after the event.

▣ Analytics & Validation

Data transmitted to the Octo data centre are analyzed through complex algorithms, to filter events caused by mechanical stress not generated by an accident, preventing any false alarms. This forms the backbone of the validation algorithm that has been developed for

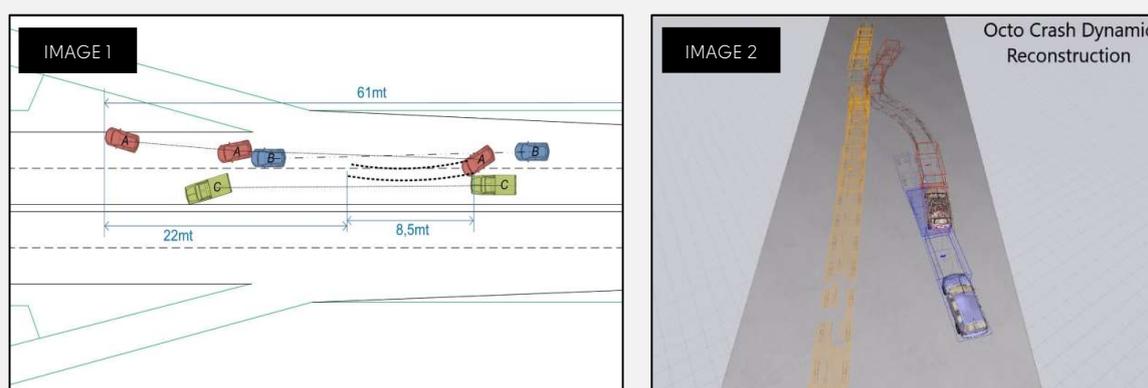
over a decade and continues to evolve. The algorithms are mainly based on acceleration analysis and the evaluation of the 'shape', based on the analysis of historical crash data, frequency, phase, energy and relevant physical dimension analysis such as speed and Jolt. Behavioral parameters, based on the analysis of Octo's crash data base, can also be used for further validation.

▣ Real-time Notification Services

In traditional claims management, the policyholder would manually trigger the claim process via a passive FNOL (inbound) process. The Policyholder therefore controls the moment in which the claim process starts. With automatic near real-time notification of FNOL, the insurance company can proactively react to an accident, contacting the Policyholder to collect and "freeze" the

Figure 2: Forensics Case Study

Image 1 shows an accident reconstruction done by the police, based on limited data from road markings and an interview conducted with the driver of vehicle B. In the reconstruction, vehicle A appears to drive into the side of vehicle C, causing both to veer off and lose control, whilst vehicle B ends up hitting the back of vehicle A as a result. In this reconstruction, the verdict is that vehicle A was at fault and the primary cause of the accident.



However as shown in Image 2, through the use additional data gathered from telematics present in vehicle A, the accident reconstruction created was different to the initial account of events. Telematics data gathered at the point of impact showed that vehicle B had in fact driven into the back of vehicle A, causing a loss of control from the driver, who consequently drove into the side of vehicle C, leaving all vehicles placed as they are in Image 1. Through granular crash data gathered by telematics, the (correct) verdict is that vehicle B was at fault.

scene, gathering information to minimize the risk of fraud or third-party intervention in the claim process.

■ Support Claims Management

To manage the incident and support the claims process, a crash report (dossier) is provided to the insurance company. This provides a summary of the most relevant information about a crash and can even include different categories of data like raw acceleration, enriched data sets or a complete crash reconstruction.

Extended services in claims management include:

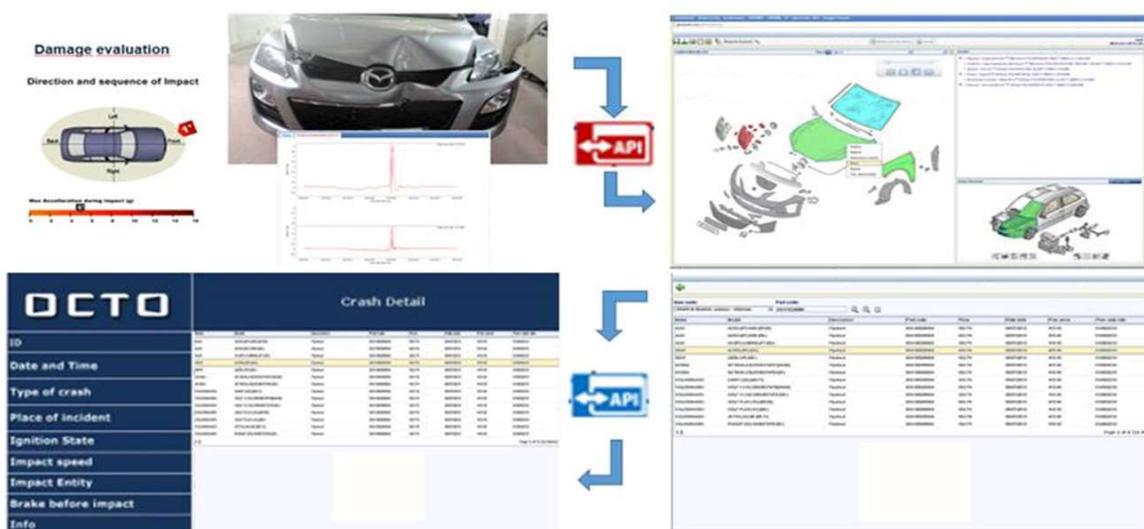
Data forensics for accident investigations which has been proven to be more reliable than reports based on limited data available at the scene. Figure 2, provides a case study of how telematics data gathered during an accident provided enough forensic information for a dynamic reconstruction to be produced. This subsequently resulted in a change in verdict towards the real cause of the accident.

Detailed damage evaluation which can be integrated with any spare parts catalogue via Application Programming Interface (API), to obtain an evaluation of the repair costs (parts and labour) and to trigger the shipment process. As show in figure 3.

With insurance telematics providing a number of value-add services including Driver Scoring and Customer Relationship Management (CRM), while available as an independent service offering, Crash and Claims must be complimentary to the complete insurance telematics program. Successful implementation will help insurers mitigate the risk of accidents in the first place, by incentivising safer driving behavior and habits. Pricing policies using dynamic data will also help reduce the risk of being under or over insured, benefiting both consumers and insurers should a claim take place.

On the other side of the Crash and Claim journey, CRM provides opportunities for further up or cross sell and as highlighted as a key challenge for insurers, the way in which insurers provide claims management and assistance is

Figure 3: Crash Report and Damage Evaluation



Source: Octo Telematics

fundamental to customer satisfaction and customer retention.

Dedicated Crash Data

As the largest provider of insurance telematics services, Octo hold the largest database of validated crash incidents. By validation, this refers to real world crashes that have been fully analyzed as qualified claims. Today this database contains over

Figure 4: Accident reconstruction, as viewed by the claims manager



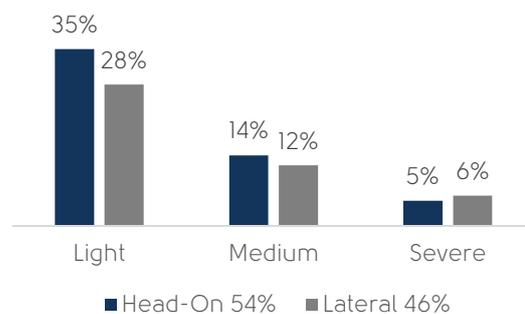
Source: Octo Telematics (concept view)

442,000 crashes and continues to grow daily. With such dedicated data sets and advance analytics, a complete dossier of events can be provided. As seen in Figure 4, this can include detailed accident reports, a 3D video reconstruction of the event, and full forensic support, should the event need further investigation.

Furthermore, based on data collected by Octo in 2017, multiple segments by intensity and position, as show in Figure 5 can be analyzed. Such information combined with repair cost data is proving invaluable for the future assessment of loss ratios. For example, head-on collisions account for the majority of accidents at 54 percent. But when broken down by severity, lateral collisions are just as apparent in severe accidents which will have a very different parts and labour repair profile.

When considering this data in the context of automotive technologies, such accident avoidance technologies like AEB (Autonomous Emergency Breaking) will have a direct impact on the future repair of vehicles, by reducing light head-on accidents. Another parameter to consider

Figure 5: Accident Intensity and Position



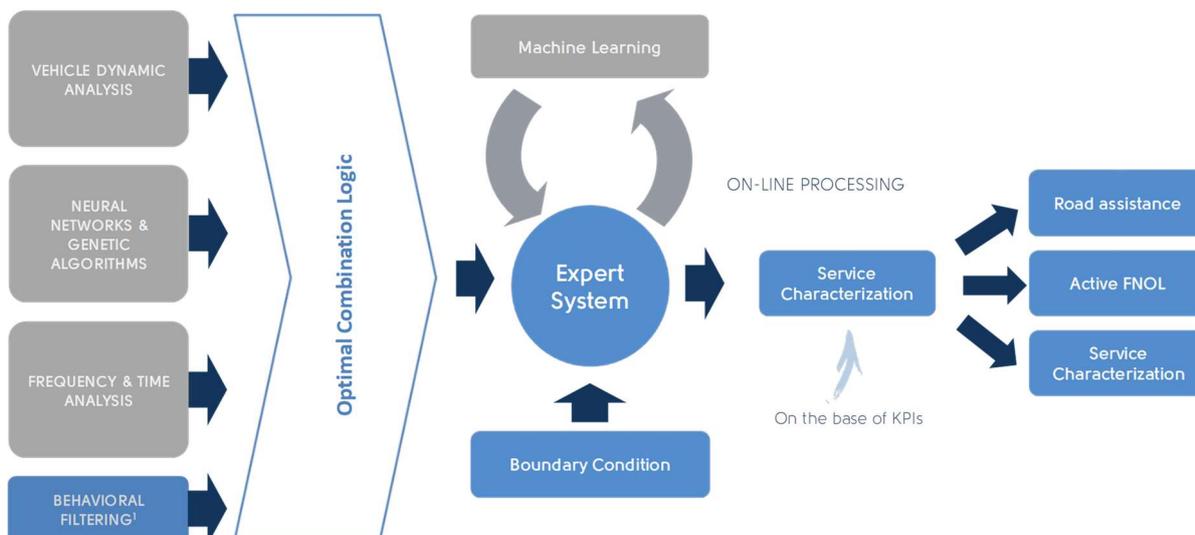
Source: Octo Telematics

will be the additional cost of repair when a head-on collision does take place causing damage to the AEB sensors.

Expert System

Octo’s Expert System draws on various models and methodologies for decision making. It was initially setup with the big data available to Octo as highlighted earlier. However, by drawing on new techniques enabled by new technologies, the ‘engine’ is self-learning, evolving progressively and adapting itself to the various configurations present in the field. As show in Figure 6, the system draws on vehicle dynamics (space state corridors), neural networks and genetic algorithms, frequency and time analysis as well as supplementary logic taking into account the typical driver and vehicle behavior after a real crash event.

Figure 6: Expert Systems Architecture



Source: Octo Telematics

The 'learning' mechanism of the system, which supports the evolution of the algorithm relies on machine learning. This works by continuously updating the 'golden sample' with a selection of new qualified data sets, providing a measurement tool for identifying true or false events as well as a training tool for the algorithm. This is done at minimum on a monthly cycle to consider the changing real-world environment that is provided by Boundary Condition inputs such as the weather, traffic conditions, known black spots and even changing vehicle specifications.

"False positives are as important as a real positive when creating a golden sample. This sample is not static, but to remain golden must continue to learn"

Crash & Claim Product Director, Octo Telematics

Qualified outcomes of the expert system are then characterised against base level KPIs before the appropriate service is identified and offered to the policy holder through their insurer. In the case of a qualified crash event, a two-stage service characterisation process offers more

granular details related to the crash event, such as forensics for accident reconstruction, estimation of repair costs, etc.

4. Summary



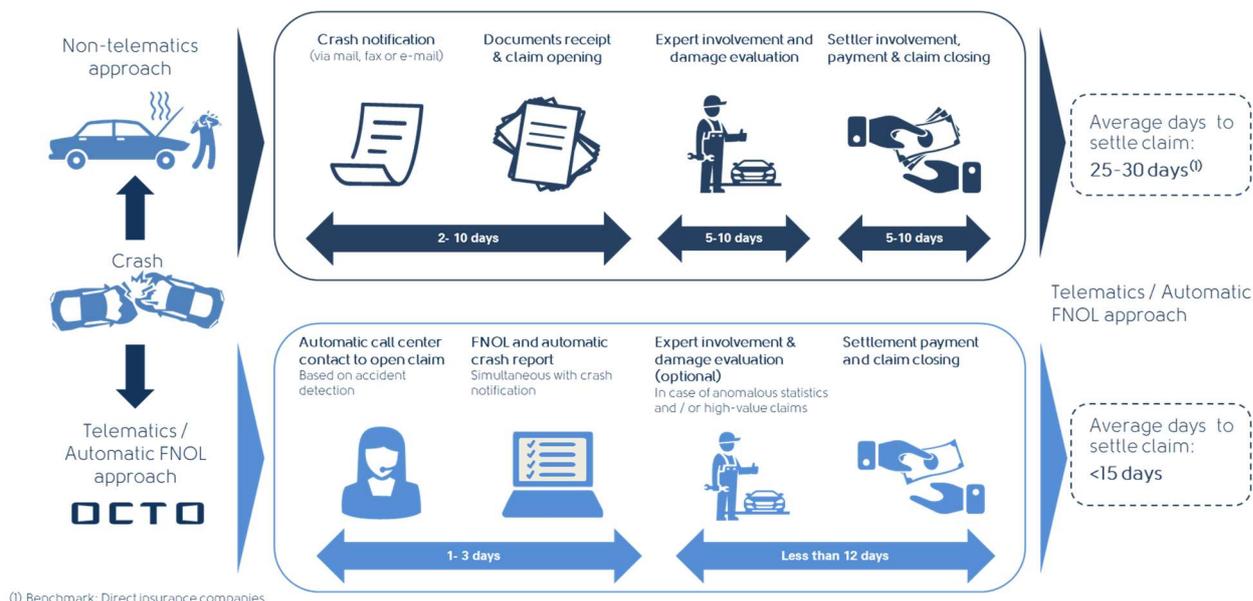
Digitalization is helping to address the challenges of the insurer, while being the enabler for a number of business benefits such as new products, services, business models and value propositions across the value-chain. For any insurance company hoping to realize these tremendous opportunities, telematics must be at the forefront of their strategy.

In section two, we highlighted some of the key challenges faced by insurers in the event their policy holders are involved in an accident. These included timely FNOL, fraud detection, accurate crash reporting and efficient and effective claims management. In section three, we

subsequently discussed how using telematics can significantly improve the complete crash and claim experience for:

- ▣ The policy holder that benefits from immediate assistance at their time of need, including eCall, fraud protection and a quicker settlement of their claim as shown in Figure 7. A positive experience can then lead to customer retention, with a greater opportunity for cross and up-sell of other services. Positive Net Promoter Scores (NPS) can also provide a mechanism for lead generation and new customer acquisitions.

Figure 7: Claims Process Improvement



Source: Octo Telematics

▣ The insurer that equally benefits from fraud protection and improvements to their Loss Ratio, due to a quicker claim settlement. Based on a simple claim, by using telematics, the insurer can save on average 11 percent, with significant savings gained from reduced vehicle storage, shortened use of a courtesy car and proactively managing the claims with

preferred partners. Figure 8, shows several best-case improvements to the business based on the real experience of insurers that have fully integrated telematics as part of their crash and claim process.

Figure 8: Business Process Improvement

✓ Reduction of the average Claim cost	- 11%
✓ Reduction of the number of frauds	- 50%
✓ Reduction of whiplash claims paid	- 32%
✓ Reduction of lawsuit	- 34%
✓ Reduction of managing time	- 15%

Source: Octo Telematics

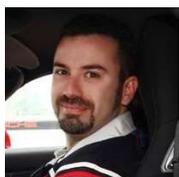
Conclusion

The Insurance market is seeking disruptive, technology-driven innovation. Customers are expecting more from their connected insurance policies and insurers can exceed this expectation with capabilities such as machine learning and artificial intelligence (AI), that can potentially prevent an accident before it happens. While the prospect of a zero-accident society is aspirational, for the foreseeable future, accidents will continue to happen and the introduction of new technologies also bring new complexities.

When accidents do happen, as we have shown, telematics is the starting point for

improved crash and claim services. By drawing on rich data, advanced analytics, all orchestrated seamlessly on a robust platform, opportunities are now available for further improvements to the combined ratio. Digitization for the insurer has arrived.

Key Contributors:



Marco Amendolagine,

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During his studies at the College of Engineering, Marco's passion for motoring led him to collaborate with several Italian car magazines, publishing numerous articles. Once graduated, he began his career as a mechanical designer and technical expert in the automotive field. In this period, he worked as a consultant for vehicles manufacturers, specializing in kinematic reconstructions and identifying the root cause of road accidents.

In 2007 he joined Octo Telematics, embracing the company mission to improve road safety. He actively spread the penetration of "black boxes" across Europe and the USA participating in several conferences around the world as a lecturer and promoting technical studies in collaboration with insurance authorities such as Thatcham (UK), Centro Zaragoza (ES) and Ania (IT). Over the years he has collaborated with insurers around Europe to build an innovative and more efficient model for claims management which integrates the telematics data as a "process driver". Today, he continues to focus on the evolution of the crash detection, classification capability and the development of new tools to improve the claims journey.

About Octo Telematics

Octo is the number one global provider of telematics and data analytics solutions for the auto insurance industry. Founded in 2002, Octo is one of the pioneers of the insurance telematics industry. Today, Octo is the largest and most experienced insurance telematics company in the world, transforming auto insurance through behavioral, contextual and driving analytics for more than 100 insurance partners. Octo has more than 5.6 million connected users and the largest global database of telematics data, with over 207 billion miles of driving data collected and 447,000 crashes and insurance events analyzed (as of 30 June 2018). Octo applies proprietary algorithms to this market-leading database to deliver powerful new insights into driver risk, informing solutions that benefit both auto insurance companies and policyholders. The company is headquartered in Rome, with offices in Boston, London, Stuttgart, Madrid, and Sao Paulo.



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