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IN 30 SECONDS

- The shift from products and mechanical differentiators to services and digital is forcing a change in business and operating models that impacts the whole supply chain

- The automotive industry is creating more data than ever before

- To make use of this data we need ways of combining it and getting it to the right places so it can be used in business processes or automated services

- There is a massive opportunity for a digital economy of data exchange

- The ability to monetize data depends on how easily that data can be shared and repurposed

Making big-data make a big-difference

Interview with Frank Tinschert, Vice President Telematics & Digital Solutions, RIO / MAN Truck and Bus AG

Frank Tinschert, Vice President Telematics & Digital Solutions, RIO / MAN Truck and Bus AG

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How can you monetise your data? Many recognise the value of digital ecosystems as one way of monetising data that otherwise would be left on the table, but how can you create such an ecosystem?

BearingPoint provides advice in the areas of connected cars, big data and analytics. The BearingPoint Institute has published several papers on these topics in the past: this paper brings these topics together using a combination of an interview with Frank Tinschert of RIO / MAN Truck and Bus AG on their plans to create an industry-wide "operating system" for digital ecosystem management, followed by a BearingPoint perspective on the major related trends.

We explain why firms need to recognise they are already participating in digital ecosystems – and that they need to plan how they will exploit those ecosystems effectively.

Connected Cars are generating vastly increasing amounts of data ranging from diagnostics to user behaviour and sensor data from increasingly sophisticated autonomous driving capabilities.

There are many ways of deriving value from data and many parties within auto-manufacturers and their supply-chain that want to get that data. In fact, the data is considered so valuable that third parties like Google and Apple have been executing strategies to break into the automotive data loop for years.

Digital Ecosystem Management (DEM) is one way to get a handle on the action and bring the producers and consumers of data together in a digital marketplace that can turn data into cash.

Even if cash is not your driver and insight is a bigger prize, part of the challenge with many new techniques like some Artificial Intelligence technologies such as Neural Nets and Deep Learning is that they need large amounts of data, preferably diverse data from different sources that has been reliably integrated. We explore the key challenges and techniques for joining the dots and connecting the data to the systems and services that can turn it into value of whatever kind you are looking for.

The race is on to create a shared data platform for Connected Vehicles. MAN has created the RIO platform with the idea of doing just that.

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Interview with Frank Tinschert, Vice President Telematics & Digital Solutions, RIO / MAN Truck and Bus AG

BearingPoint Institute (BEI): What do you see as the major areas of innovation in automotive today?

Frank Tinschert: There are a number of major areas of innovation that are colliding at the moment. Connected vehicles, electrification, autonomous vehicle features and mobility services are all drawing massive investment from automakers. These features and services are all either heavy users of data or heavy producers of data. Also, there is more and more car-sharing going on: Young people don't want to buy cars; they just want to use them. This makes the value proposition for selling cars quite different.

Manufacturer challenges are driven by product diversity, which itself is driven by consumer and commercial vehicle usage patterns.

For example, we need to differentiate B2B commercial vehicles from B2C vehicles. On the one hand, commercial vehicles need really to be fit-for-purpose, whereas for B2C it is more about creating passion with outstanding design. In both worlds, customers are looking for more connected features. Consumers want convenience and advanced features that improve their experience. Commercial vehicle operators want more data to be able to manage their fleets more efficiently and effectively.

Both worlds are looking to connected features to solve their problems; they just have different problems.

BEI: What do you see as the major innovations in Connected Cars and what are the big challenges?

Frank Tinschert: Let's break this down; the challenges are quite different for commercial vehicles than for private cars.

Commercial vehicle features are all about creating KPIs and insights for the business. Managers need to know who is driving where, when, in what class of vehicle, and with what capacity, to manage their resources effectively against whatever kind of schedule drives their business.

Commercial vehicle customers are often looking for a different kind of innovation – they need tools that can help them make an impact to the operation of their business, and data that gives them visibility within and across supply chains.

It's hard to build a relationship with the user of the vehicle because the customer is the manager of a fleet of vehicles. Their day-to-day business involves planning decisions, projections and predictions. They are trying to optimize the use of resources to achieve their business goals.

Often the telematics solution they are looking for needs to help them look beyond the borders of their organisation to connect across supply chains. This really requires the implementation of a more digital supply chain able to share data end-to-end across the usual boundaries of control or ownership.

People involved in buying decisions for these commercial vehicles are oftentimes uninterested in vision and innovation, as

Many of the changes happening now are fundamental to how we do business. We are moving away from just selling products to also selling services. This impacts business models as well as global supply chains, operations planning and distribution.

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you might see at a motor show. Rather, they are interested in what impact the wider solution can make to their business. Such 'features', if you can call them that, are usually not presented to the driver of the vehicle but are accumulated for use in the operational and logistical management of a fleet of vehicles.

Private car user-needs and expectations are changing. More and more people are car-sharing and looking for mobility services. This trend is driven by everyone with a smartphone who wants the convenience of flexible transportation without the hassles that come with owning a car. Those who do want to own a car expect more features and for those features to be updated with delivery of Software Over The Air (SOTA)[1], just as Tesla is doing with their electric vehicles.

For automotive manufacturers, coping with the shift to mobility services implies a change to the business model and the investment model. This means many new business offerings are conceived and provided as services rather than products. This needs to be vision driven, especially in areas where services were not delivered before – you can't just bolt additional features onto an existing product, or re-skin an old platform. Services are completely different in how they are consumed and how the business needs to manage them.

Generation Y digital natives have a different mindset. They want mobility services. These are likely to increase in availability especially in urban environments where demand is high, which may sharpen the contrast with the countryside. An operating model based on selling cars will have to be adapted.

The implications of this transition to more data-oriented services are far-reaching, as data can be created and shared in many places.

Private vehicle users are changing from wanting to own cars towards wanting to consume mobility as a service. They still want all the cool features but they don't want any of the hassle of private vehicle ownership.

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BEI: What are the important trends in related areas of industry for you?

Frank Tinschert: Consumer technology and IT in general changes much faster than automotive with its long engineering development lifecycles and vehicles that typically last ten years. Technology innovation is being exploited increasingly by automakers, even during the lifetime of a vehicle that originally was released before that technology existed. People want their cars – or mobility services – to meet the same level of expectations as their phone or other consumer electronics, which they may change every two years. Vehicles have a much longer lifespan, so there is pressure on the automakers to create vehicles that can keep-up-with-the-times despite their long lifecycle.

A challenge automakers are facing is how to ensure these updates can be incorporated into vehicles that will remain on the road for a long time. MAN is working on developing everything in an agile way, including getting customer feedback. We have developed a replaceable connectivity box that enables use of new upgradable technology. It's designed to be replaced every couple of years, providing a way to incorporate new technology and features or better performance into digital services even on older vehicle platforms.

Further monitoring over the air will be needed, which can be introduced using SOTA, and can enable services like predictive maintenance, uptime reporting and management, usability assessment and scheduled maintenance stop

BEI: What are your views on the major challenges and opportunities with connected cars? How can better use be made of data?

Frank Tinschert: Connected cars can produce a lot of data. If you add more sensors, like many auto-manufacturers are already doing, you can produce even more data. There are many stakeholders who want access to this data within the manufacturer and outside in the various service providers or users of the vehicles – be they commercial or private users.

You can get data from sensors but so what? What is needed is a way to securely manage and combine this data to provide the right views to the different stakeholders that need to access it.

MAN has created the RIO platform. RIO is an open cloud-based "operating system" designed for use by the entire transportation industry. It's a cloud-based platform that can collect data from any IoT device. It can collect information from vehicles, buses or cars. It can also collect from other devices like smartphones that could be used by someone on a delivery bicycle, for example.

The idea of the platform is to offer stakeholders involved in diverse business processes with relevant data from multiple angles depending on their

SOTA updates of the vehicle are growing in significance and becoming commonplace, as is the increased collection of data to monitor vehicle and driver performance both for commercial and private users.

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needs. RIO includes a rules engine that can interconnect all kinds of data and present it in a mix of forms as appropriate to different stakeholders.

A key challenge we face with connected vehicles is that, whilst it may be simple in principle to get more data off the car, the way this data needs to be formatted or combined varies significantly by business area. Pharmaceutical transport, large companies, and small-to-medium enterprises all have quite different needs and would use the data in different ways, sometimes driven by different legislative requirements.

RIO provides a smart micro-services platform that combines data from a variety of sources and makes it available via monetized data channels. It's an open platform that encompasses services from other parties. It includes both an engine and marketplace to create an ecosystem, enabling businesses to consume the micro-services they need, depending on their business drivers and the kind of data available from their specific telematics solutions. If the business decides it needs to augment its vehicle data with other data - for example, map layers, weather or real-time traffic information - it can buy additional data streams provided by third parties as micro-services.

BEI: What is your vision for the future of RIO? What kinds of services do you think will be offered?

Frank Tinschert: It's about adding intelligence. The idea is to provide predictive options for users so that we can use the combined data from many vehicles rather than just the data reported by a single vehicle over time. This will help answer questions like when will there be a traffic jam and where? Will this overlap with the planned route of the vehicle?

The logistics of managing commercial fleets can be quite complex due to the additional rules and regulations that must be factored in. For example, for commercial drivers, whose driving time is regulated by the number of continuous hours they can drive and the required rest period before driving again, route planning becomes more complex. Knowing which routes could cause delays that would overlap with the drivers permitted remaining hours before their required break could make a big difference to driver utilization. This kind of information could enable more options for routes to be provided with stop-overs built in that make best use of drivers' time, accounting for delays due to traffic and other circumstances.

Making use of all the data from connected vehicles is all about getting the right data to the right people in the right form so they can do their jobs more effectively. It's also about being able to combine data from different places that can answer more questions or make better predictions.

RIO introduced KPI based planning in 2017. The platform has 140 participants and is inviting more participants to join. We expect this to be in the market by mid-2018. This provides support for mixed fleets from different brands and transport types, enabling vision across firms and supply chain boundaries.

MAN trucks will line-fit the RIO embedded box so they are all RIO-ready. MAN will also fit other brands of telematics boxes and integrate with other vendor solutions. It's an open system.

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The vision is to build an open system to provide services and views of data that are tailored to each customer's point of view. The idea is simple but there are plenty of challenges.

We started building RIO from the ground-up in 2016, which has its pros and cons. It meant we could design something that would specifically achieve the vision we set out for RIO, but it also meant dealing with the details of catering for different customers with quite different expectations and requirements. For the system to be usable, it needs to fit into the customer's existing processes, which includes creating a billing engine that works with the full variety of customer use cases. We are talking about metering the consumption of micro-services to create a digital eco-system. Even the MVP [Minimum Viable Product] should support diversity in the connected user-base, but diversity creates complexity.

The trick is to hide the complexity in the platform. For users of the system, it will be just a question of finding the right micro-services to consume or the right channels for to dump their data into so they can themselves wrap them in micro-services, which can be shared as appropriate within their own organization or with partners, suppliers, or sold to customers in the digital ecosystem.

BearingPoint's perspective on big data and AI in automotive

There has been data flowing around inside vehicles ever since the 1977 General Motors Oldsmobile Tornado, which had an electronic control unit (ECU) that ran embedded software managing electronic spark-plug timing. See our BearingPoint Institute paper How can vehicle manufacturers fit into the new connected car ecosystem[2] for more details on embedded software and connected cars.

Since then, many more ECUs have been added to vehicles, as auto-manufacturers discovered software was often a more effective engineering solution than traditional mechanical engineering. Most of these ECUs are collecting data. Once cars became connected, some of that data has been sent off-vehicle to help with diagnostics (working out why something went wrong) or prognostics (predicting what is about to go wrong) or to provide services like tracking a stolen vehicle.

The number of different parties already using vehicle data has spread far beyond the auto-manufacturers themselves, with many connected cars offering owners smartphone apps that show a view of the

Whilst remote data collection has been present in the industry for over a decade many manufacturers still have not developed this level of remote diagnostics.

vehicle dashboard, and commercial fleet managers having an even more detailed view of vehicle and driver performance.

New innovations are often built on patterns that have been established by firms again and again realizing that certain ways of solving problems are more effective or efficient in certain scenarios. Originally, mechanics would listen to the engine and pop the hood to 'take a look'. For a long time now, service engineers have been plugging into the On-Board-Diagnostics port to access diagnostic data collected by the various ECUs in the vehicle whilst the customer has been driving it around. Some automakers stream diagnostic and other data over the air to the service

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engineers so they can contact customers in advance of component failures to prevent problems from occurring.

Whilst remote data collection has been present in the industry for over a decade many manufacturers still have not developed this level of remote diagnostics. With heightened attention on connected features and legislative mandates, such as the EU-ECALL emergency call requirement obliging vehicles to send data automatically in the event of a crash, many manufacturers are fitting units capable of communicating off-car over the mobile networks. Whilst they are at it, they have made use of the connectivity to boost their data collection frequency. It's difficult to predict and prevent component failures when data is only collected at each vehicle service every so many months or thousands of miles. Collecting data over-the-air makes prognostics and problem prevention a real possibility, which could save the

manufacturers millions and make a big improvement to vehicle reliability and customer experience. This use of data is just the tip of the iceberg.

On one level, everyone is doing the same thing with the data, more or less. However, manufacturers and service providers typically look for ways to differentiate themselves so they can sell more than their competitors. This leads to differences in the details of how things work. Eventually, features or services become commonplace (remember when electric windows and central-locking were options?). At some point, it becomes useful to standardize things so all parties can benefit from economies of scale in the shared supply chain. This is what needs to happen in the digital data-driven ecosystem. Data is needed in many places right across the supply chain and throughout the constellations of providers of connected vehicle services.

BearingPoint's research on Digital Ecosystem Management (DEM)[3] estimates the fourth industrial revolution, as the World Economic Forum calls it, will create a new addressable market worth $8 trillion by 2025. Smart services, artificial intelligence, machine learning and digital monetization platforms will be the way businesses will capitalize on this growing opportunity.

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Data in modern connected cars now serves many purposes. In-vehicle infotainment systems may connect to many cloud-based information or service providers to get traffic data, weather, parking locations, flight details, news and more. Yet data can flow in both directions – cars can share their location, diagnostic data, user behaviour, any of a myriad of sensor output from autonomous driving features. Manufacturers are striving to introduce new connected features as quickly as possible to stay ahead of the competition. Many service providers are innovating in this space both in terms of the services offered and the ways in which data is collected, combined and integrated. The ecosystem is already forming. Now it needs to be digitized.

Many services use different forms of artificial intelligence (AI) to automatically tailor the experience to the user. Machine learning can provide insights to product design teams and engineers to enhance the quality of services.

Often services come from many different suppliers and provide a more compelling solution for customers when combined. A simple example is a navigation system that includes additional layers for different points-of-interest or services such as petrol stations, charge points, hotels. Often these data sources are curated but sourced from different parties.

For consumers receiving a well-implemented, easy to use, and seamlessly presented set of features, this can be an impressive experience, providing convenient access to information or features that would otherwise be clumsy to get at. In short, it is an experience worth paying for. The challenge for those implementing such services, built from many third party micro-services, is how to manage all the various licensing and charge models. This involves ensuring the complex mixture of consumed services and fees reach the right places and add up at the end of the day – whilst keeping it simple for the user.

The task of coordinating the use of third party micro-services and managing the licensing and monetization channels requires a platform, if this is to be done well. BearingPoint's DEM solution addresses this need by enabling rapid adaptation as new data or services become available or new trends in consumer demand prevail.

Money used to make the world go around. Now, data makes the world go around. Data represents power, influence and the capability to improve services or respond to problems quickly and effectively. Recognising the value of a digital economy not based on bitcoins but based on the data itself, and the micro-services platforms that enable sharing of that data, will be core to the future of technology innovation.

We innovate to create value, technology is increasingly generating data and moving it from where it was sensed via one of billions of Internet of Thing (IoT) type connected devices to cloud based

The connected car has become a hub for a digital ecosystem of content, services, autonomous agents and AIs of various kinds. These algorithms need lots of data – the more data they have, the more effective they can be, and the more reliable and far-reaching insights can be generated. All the ingredients for a digital market-place are present.

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services or data centres that crunch the data by combining and analysing it and using it to do things, be that sell fuel or burgers based on location, or save lives by automating driving and moving us closer to a world of safer more economical mobility services.

Different people want to use data for different purposes. Digital Ecosystem Management platforms like RIO and Infonova R6 provide a general purpose way for everyone to get what they want out of a common solution that provides users with an all-you-can-eat menu of services driven by data consumed from potentially every part of their digital life. ●

RECOMMENDATIONS

1. Consider using a DEM platform if you have a product or service that provides as part of its function access to other third party services and content. Use this to:

a. Manage the monetization of micro-service usage in a clean and standard way

b. Provide automated billing and payment transactions for customers, suppliers and partners

c. Provide reports so you and your partners and suppliers can see which services are used

2. Once you have a DEM platform consider which partners you want to bring on-board to provide micro-services and content to add richness to the customer experience, and decide whether your platform will be open to all or comprised of a closed set of specifically selected partners.

3. Select partners to provide digital services based on a number of criteria:

a. Suppliers with services that make sense to your customers

b. Suppliers that complement other suppliers in your digital ecosystem

c. Suppliers that would be prepared to work together to create digital product and service bundles that provide more value to the customer

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KEY TAKEAWAYS

- There is an increasing amount of data available from connected vehicles, and even more parties wanting to make use of it. Data needs to span different kinds of vehicles and use cases ranging across personal, shared and commercial vehicles.

- Some value is being generated; however, lots of value is being left on the table. Fully exploiting the data is often even more challenging than getting hold of the data in the first place. Even so-called big data has no real value out of context. Managing context is itself a challenge.

- Often the context that gives rise to value comes from the merging of big data sets owned by different parties and presenting it in a relevant way to those who know how to interpret it.

- It's only when data is integrated into business processes or service automations, or presented to knowledge workers in a way that is appropriate to them, that true insight or value is generated.

- Sharing data across organizational boundaries and throughout the extended supply chain can generate even more value. Integrated data of this kind can be monetized.

- Sharing data requires either standards or shared services that bridge the different worlds of data formats, frequency, meaning, interpretation, personal data privacy laws, individual processing requirements and the needs of all the different consumers of that data.

- For all of us to fully benefit from the data we are collecting we need to work together to combine it and turn data into information by adding context, which enables insight to be generated.

- Digital ecosystems have been around for a long time. There are plenty of successful App platforms in the consumer world, for example. B2B digital ecosystems have also been around in various forms for a long time but now they are massively growing in value.

- Digital Ecosystem Management platforms are emerging as the mother ships of data and services-based communities and collaborations. Digital Ecosystem Management is the new way to grow in the platform economy.

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ABOUT THE INTERVIEWEE

Frank Tinschert, Vice President Telematics & Digital Solutions, RIO / MAN Truck and Bus AG

Since March 2016, Frank Tinschert has been Vice President of Sales and Marketing for RIO / MAN Truck & Bus AG in the new business division Telematics & Digital Solutions. Previously, he led the logistics department at the Supply Chain Optimizer Quintiq. Frank Tinschert has more than 15 years of professional experience in the fields of telematics and complex transport and logistics solutions. During his career, he focused on the automotive and aerospace industries as well as postal and express services.

Acknowledgements

Mark Burnett conducted the interview and provided the BearingPoint industry perspective on big data and AI in automotive.

Mark Burnett is Head of Innovation and R&D at BearingPoint UK. He has over 20 years experience in technology and innovation. He has published articles on technology trends, innovation and problem solving techniques and spoken at and facilitated discussions at various conferences. His background is in solution design, enterprise architecture, strategy and innovation. Mark champions the use of Artificial Intelligence and Machine Learning to augment our understanding of the world from big data and drive the next technical revolution towards more integrated human-machine partnerships.

Notes

1. Software Over The Air (SOTA) is a way of delivering software or firmware updates to vehicles or other devices in much the same way as mobile phones are updated. This enables owners to benefit from new features or bug fixes in a way that is convenient for them. Without SOTA owners have to take their cars to their dealers to get updates or fixes.

2. *"How can vehicle manufacturers fit into the new connected car ecosystem"* https://www.bearingpoint.com/files/connected-car-ecosystem.pdf

3. *"Digital Ecosystem Management Overview"* https://www.bearingpoint.com/files/BearingPoint_DEM_Ireland_Service_Overview.pdf

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At the BearingPoint Institute, our ambition goes beyond traditional 'thought leadership'. We aim to contribute original ideas to the science of business management whilst equipping decision makers with practical advice gained in the field and through our research projects.

www.bearingpointinstitute.com

About BearingPoint

BearingPoint consultants understand that the world of business changes constantly and that the resulting complexities demand intelligent and adaptive solutions. Our clients, whether in commercial or financial industries or in government, experience real results when they work with us. We combine industry, operational and technology skills with relevant proprietary and other assets in order to tailor solutions for each client's individual challenges. This adaptive approach is at the heart of our culture and has led to long-standing relationships with many of the world's leading companies and organizations. Our global consulting network of 9700 people serves clients in more than 70 countries and engages with them for measurable results and long-lasting success.

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