Telematics Industry Insights by Michael L. Sena

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THE APRIL 2023 ISSUE IN BRIEF

I watched the TESLA Investor Day event that was held on the 1st of March from the company's new headquarters in Austin, Texas. It was, in a word, subdued, and the most subdued of all was Elon Musk. He let his minions do most of the talking, but he opened the day with the words: "Alright. Master Plan Part Three." MPP One was in 2006, and I wrote about that one extensively in the November 2022 issue of THE DISPATCHER. MPP Two was in 2016. He also said at the outset that "there is a clear path to a fully sustainable earth--with abundance". There are enough raw materials to electrify everything, not just transport, he claimed. "The more you look, the more you find," he assured us. I thought he was about to give coal and oil as examples, but he left it to us to believe him without any further proof than his word. "Demand for Teslas is essentially infinite," he told us. "The only obstacle to buying one is their cost," he said. He has used this 'exclusive club' ploy before, especially in MPP One, when he said that the rich actually had a duty to buy TESLAS so that the company could afford to build cheaper models for everyone else. Musk also said that it is the combination of electrification and "autonomy" that will make more people want to buy TESLAS. Musk made it clear that without self-driving, there is no future for TESLA—or any car company for that matter.

But it was the last few minutes of the event that proved to be most noteworthy for me and for this issue of *THE DISPATCHER*. Someone asked him: "How do you see AI helping TESLA make cars?" Everyone on stage looked at Musk. Musk hesitated. Nodded his head. Hesitated some more. Then he said: "I don't see AI helping us makes cars anytime soon. I'm a little worried about the AI stuff. We need a regulatory body to do something to make sure AI operates in the public interest. "Some is useful, like what we do with self-driving. Not AGI (Artificial General Intelligence). I'm afraid I did something to help it get going." He was referring to his original investment in ChatGPT. And then the event was over.

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ITU/UNECE 2023 Future Networked Car Symposium



Automotive Artificial Intelligence Focus THIS WAS THE EIGHTEENTH *ITU/UNECE FUTURE NETWORKED CAR SYMPOSIUM*, the first one taking place in 2005. The next year was skipped, but from 2007 until this year the event has been held every year. For the third year running, the *SYMPOSIUM* was held virtually over the course of four days with one three-hour session each day. Pre-COVID, the *SYMPOSIUM* was held in Geneva, Switzerland on a single day in conjunction with the *Geneva International Motor Show* (*GIMS*). In 2020, *GIMS* was cancelled due to COVID, and it has not been held since. The *SYMPOSIUM* went on in Geneva in 2020 with the INTERNATIONAL TELECOMMUNICATIONS UNION headquarters as the venue, but starting in 2021, it has been held as an online meeting.

Each Symposium session is devoted to a specific topic area. The first session is dedicated to government activities and initiatives in intelligent transport systems and vehicle communications. The second session covered vehiclerelated cybersecurity beginning in 2019, when I first served as a session moderator, until last year when I moderated the first session on Automotive Artificial Intelligence (AAI). The third session has been where advanced driving systems and automotive infotainment developments have been discussed, and that is moderated by Roger Lanctot, Director of Global Automotive Practice at STRATEGY ANALYTICS. During the fourth and final session the topic of vehicular communications has been the focal point, and that is moderated by T. Russell Shields. The Symposium organizers decided to replace the cybersecurity topic in favor of a session devoted to artificial intelligence because standardization work on UN Regulation No. 155: Uniform provisions concerning the approval of vehicles with regards to cyber security and cyber security management system had been completed in 2021.

During this year's *Symposium*, all four sessions covered applications of a. This is because UNECE's GRVA is

organizing the *SYMPOSIUM* with ITU. GRVA¹ is UNECE group responsible for preparing draft regulations, guidance documents and interpretation documents for adoption by the parent body, WP.29, related to safety provisions for the dynamics of vehicles (braking, steering), Advanced Driver Assistance Systems (ADAS), Automated Driving Systems (ADS) as well as Cyber Security provisions. In March 2022, GRVA organized a technical workshop focusing on definitions for Artificial Intelligence relevant for GRVA activities. It also explored the potential role of vehicle regulations and guidance documents with regard to AI. This workshop was followed by a second workshop in May 2022 in which AI use cases were assessed.

So, in addition to presenting the full content of the *Automotive Artificial Intelligence* panel, I will include those parts of the other panels that touched on the *AAI* topic.

Session Two: Automotive Artificial Intelligence

This was the second year for a FUTURE NETWORKED CAR SYMPOSIUM panel which I moderated to discuss the topic of *automotive artificial intelligence*. Last year, we chose to start with the most comprehensive application of AI, which is Artificial General Intelligence (AGI). This is AI that has the hypothetical ability of an intelligent agent to understand and learn any intellectual task that a human can. It possesses the ability to analyze a situation on its own and take a calculative decision without being programmed in advance.² The conclusion of last year's panel was that AGI was not on the horizon, especially not for cars being driven without drivers in unrestricted operational design domains.

During this year's panel we presented and discussed views on the current status of *Automotive Artificial Intelligence (AAI)*, and the different scenarios and timelines for their implementation.

 For those who are working on policies and standards related to driverless vehicles, to further their understanding of the issues of the issues automotive AI-based applications raise over and above driver assistance systems that do not use AI, including data privacy, liability, and the development of effective standards. ITU 2023 Future Networked Car Symposium 13-16 March 2023 Virtual Event Session 2: Using Automotive Artificial Intelligence to Improve Vehicle Safety, Services and Transport Management 14 March – 13.00-16.00 CET

For some, the goal of Automotive Artificial Intelligence is to remove the human from the driving task under some or all conditions. For others, it is to supplement and improve the human driver's abilities to make driving safer, offer new and better services, and increase the effectiveness of transport management. This has proven achievable with AI that accomplishes one or a limited set of objectives. This panel will present and discuss views on the current status of vehicle-related applications of artificial intelligence, different scenarios and timelines for their implementation, and concerns for how humans interact with Automotive AI.

Moderator: Michael L. Sena, Editor of The DISPATCHER

Keynote Speaker: Missy Cummings, Ph.D. – George Mason University (USA)

Panelists:

Bryn Balcombe – Autonomy Systems and Regulatory Expert, Ox-BOTICA (UK)

Junichi Hirose – Highway Industry Development Organization (Japan) Jenny Lundahl – RISE RESEARCH INSTI-TUTES OF SWEDEN

Jan Lühmann – Organisation Internationale des Constructeurs d'Automobiles (OICA). Vice Chairman of the OICA Technical Committee

¹ GRVA – *Groupe de Rapporteurs Véhicules Automatisés* – Working Party on Automated/Autonomous and Connected Vehicles

² AGI - https://www.mygreatlearning.com/blog/artificial-general-intelligence/

- For those who will develop solutions for highly automated and driverless vehicles, to further their appreciation of how automotive AI-based applications will interact with humans, including drivers, passengers and people outside the vehicles.
- To attempt to identify the factors that are standing in the way of wide-spread adoption of automotive AI

Automotive Artificial Intelligence, or AAI, is a term that has different meanings, depending upon who is using it. For some, it means completely removing the human from the driving task and turning over control of the vehicle to software and sensors. For others, the goal of AAI is to supplement and improve the human driver's abilities in order to make driving safer, offer new and better services, and increase the effectiveness of transport management. The latter goal, improving the driving experience, has proven achievable with AI that accomplishes one or a limited set of objectives. The former goal, removing the human from the driving task, has proven to be devilishly difficult because the car needs to drive at least as well as a human.

Session Two opened with a keynote presentation by Professor Missy Cummings. She was followed by Points-of-View presentation by each of the four panelists, and then we had a ninety-minute panel discussion in which we discussed the points made by everyone.

Missy Cummings

MISSY SPENT two years as the Senior Safety Advisor to *NHTSA*. She said she learned a lot during that time. One insight: "No one wears their seat belts, at least not in the U.S." She shared with us her five principal lessons learned at *NHTSA* which have a direct impact on the development and introduction of *automotive artificial intelligence*.

1. There are too many simple coding mistakes being made by inexperienced or careless programmers that wind up in vehicles that are sold to real people who drive them on real roads. "You wouldn't believe how common it is that people doing coding on these systems don't even have a driver's license," she said. (Actually, I would believe it because it is the same experience I have had.) If the current tendency toward coding vehicle systems like they were gaming apps for teenagers extends into the code for controlling artificial intelligence-based systems, the results could be catastrophically bad.

2. The software modules being put into cars—both production cars with ADAS and the test cars with driverless functionality—do not have defensive driving capabilities. Defensive driving requires

Session Two Participants

Missy Cummings – Missy is a Professor in the George Mason University Mechanical, Electrical and Computer Engineering and Computer Science departments. She is an American Institute of Aeronautics and Astronautics (AIAA) Fellow, a former U.S. Navy officer and military pilot, and recently served as the Senior Safety Advisor to the U.S. National Highway Traffic Safety Administration (NHTSA). Her research interests include the application of artificial intelligence in safety-critical systems, assured autonomy, human systems engineering, and the ethical and social impacts of technology.

Bryn Balcombe – Bryn is Autonomy Systems and Regulatory Expert at Oxbotica. He is the founder of the Autonomous Drivers Alliance and previously served as Chief Strategy Officer for Roborace, a motorsport competition for human and Al drivers. He is the Chairman of the ITU-T Focus Group on Al for Autonomous and Assisted Driving (FG-AI4AD).

Junichi Hirose – Junichi is a Principal International Research Fellow and Senior Researcher at ITS CREATE Division of HIDO, the Japan Highway Industry Development Organization. He has been working on creating several international standards in the area of ITS within ISO/TC204 since 2003. Currently he is the Convenor of ISO/TC268/Subcommittee 2/Working Group 2 – international standards for sustainable cities and communities, sustainable mobility, and transport.

Jenny Lundahl – Jenny is a senior researcher and legal expert at RISE Research Institutes of Sweden in the Mobility in Transformation Unit. She works with many issues related to policy and regulatory innovation for mobility and systems where AI applications for vehicles and transport systems is one part.

Jan Lühmann – Jan is the Regulatory Affairs Coordinator for automated driving at Volkswagen and is Vice Chairman of the International Association of Automobile Manufacturers Technical Committee. Since 2020, he represents the international automotive industry in the areas of ITS, AI, data and vehicle communications within the UNECE. imagination, which humans have plenty of and algorithms don't. Rules-based software does not accommodate imagination. This topic needs much more focus among those developing both ADAS and driverless functionality.

3. There should be no possibility for remote driving of a vehicle. Missy called this "the elephant in the room". Remote driving is when someone sitting somewhere outside the vehicle steers the vehicle in real time, as a remote pilot sitting at a console in Boise, Idaho might steer an uncrewed aerial vehicle (aka a drone) flying over the Black Sea. Latency in communications between the onboard systems and the offboard controller, even if it is just milliseconds, can be deadly. Remote assist, in which a remote monitor sends an instruction to the vehicle which executes the driving function, is acceptable. One other requirement should be that anyone communicating with a vehicle should have a driver's license for the type of vehicle he/she is monitoring.

4. There is a general absence of a safety culture among the new entrants to the automotive scene. These are the startups operating or funded by Silicon Valley. Software should not be released unless it has been thoroughly tested. If you think it is okay to have your software tested by your customers, you do not have a safety mindset (ED:Even if your cars receive high marks in crash tests.).

5. NHTSA is not the enemy. It is there to help companies.

Missy posed and then answered her question: What should we be doing instead of what we are doing now? Self-certification is not an acceptable way to ensure that cars being sold to consumers are safe. It not effective for current ADAS-equipped vehicles, and it will certainly not be effective for cars that have driverless capabilities operating with *AAI* functionality. She suggested that *NHTSA* consider moving to a type approval system, but found little or no support for such a change among *NHTSA* staffers. In fact, the response to the suggestion was negative. Nevertheless, she feels strongly that a type approval approach with precertification is what will be needed if cars are not going to cause unnecessary accidents and deaths.

Second, she believes the six SAE levels have more than outlived their usefulness. There should be only two levels:

- 1. A human is driving; or
- 2. A human not driving.

I asked Missy if there is a forum where lessons learned by everyone could be shared and discussed. TRB³ could be a possible forum, she said, but it is not serving that purpose today. Many of those who are working with automotive software development are not engaged with the traditional automotive transportation organizations, and those who are do not always have the ability to affect policy set at the executive levels.

Bryn Balcombe

BRYN HAS been working on the question: How safe is safe enough for systems using artificial intelligence in automated driving? Those regulation and standardization activities in which Bryn has been involved have identified two parts to the answer to the questions. First, the 'predictability' of the <u>intended behaviour</u> of the entire system must be authorized through testing and simulation. Second, the 'explainability' of the <u>actual behavior</u> in in operation must be evidenced by on-road, in-use monitoring. All of the work that is being done on modifying and expanding the currenty component and whole vehicle type approval process addresses the 'predictability' component. Bryn explained what is being done on the 'explainability' components.⁴

Explainability comprises three components:

- Situational awareness Did the automated driving system understand the circumstance and situation? Expect recall of the time and location of a collision and speed at collision to 99-98%.
- Hazard awareness Did the AD system understand the hazards? Expect recall of when the risk was identified, if the person/object was detected, when the detection occurred, if the it was a human that was detected, and when it was detected as a human to 90-96%.
- Mitigating action Did the AD system execute the risk mitigating action for the hazard successfully? Was mitigating action taken, when was it taken, and what action was taken to 96-98%.

I asked Bryn if countries that do not have the type approval process, such as the U.S. and China, are participating in these activities. The answer is yes.

³ TRB – Transportation Research Board is a division of the National Academy of Sciences, Engineering, and Medicine, formerly the National Research Council of the United States, which serves as an independent adviser to the President of the United States, the Congress and federal agencies on scientific and technical questions of national importance. It is jointly administered by the National Academy of Sciences, the National Academy of Engineering, and the National Academy of Medicine.

⁴ A common format for a world model is being developed within UNECE WP.29 GRVA.

Junichi Hirose

Junichi has been working in the *ISO/Technical Committee 204 Working Group 19 (Mobility Integration)*. The *Working Group* has been examining the safety environment for low-speed automated driving services (LSADS) under conditions where there is no driver and no back-up driver. The *Working Group* has

determined that safe operation under low-speed conditions should be maintained by using support from on-board artificial intelligence systems in cooperation with a back-office AI service. The back-office AI service would be able to override on-board AI services when human judgment intervenes and determines that the override is necessary.



Design of the on-board systems should be such that the on-board AI requests supplemental support from the back-office AI when it cannot resolve a situation. For the decision-making by the backoffice AI, supplemental infrastructure sensor data is necessary. Each vehicle's internal AI sends data to the back-office AI.

Jenny Lundahl

Among the many research activities in which Jenny is involved at RISE, one is **AI Aware Scale Up**.⁵ This project is developing an AI algorithm for accident risk prediction. The objective of this research is to use AI to predict events in traffic and prevent accidents from occurring. What if it were possible to predict a traffic accident using available data, and to take preemptive measures to avoid the accident or at least mitigate their impact?

The AI Aware project team is establishing solutions for data collection and data fusion to feed an AI algorithm to issue accident risk alerts. These alerts would be dispatched in real time to organizations (not immediately to vehicles) that would evaluate whether the information should be delivered to drivers. Tests are being prepared now that will take place in both Sweden and California California has come in as a partner via Volvo Cars' research center located in Silicon Valley.

Jan L<mark>ü</mark>hmann

Jan described a process for introducing machine learning into the Type Approval Process for using over-the-air (OTA) software

⁵ Information about the project is available at https://www.drivesweden.net/en/project/ai-aware

updates. According to the Type Approval regulations, in order to deliver OTA, both UN-Regulation 155 Cybersecurity and UN-Regulation 156 Software Updates must be followed. According to these Regulations, software code, which is currently produced by human programmers, must comply with the Regulations and must be tested accordingly. When the tests are complete, an authority grants a system certificate and the software can be placed into vehicles using the OTA process. When new information determines that a new update is required, of if the vehicle manufacturer decides that an update is desirable, the process for obtaining a new type approval is followed.

Type Approval

Coverage of Technical regulations UN-R156 Development of Function by se Testing according to Laws, Regulation Technical Servic Grant of Type (e.g.UN-Rxy), Standards and policies Testing applying UN-Rxy Approva UN-R15 SMS Certificate This process is monitored by both a cybersecurity and a software update management process according to UN-R155 and UN-Software Update Management System R156. Vehicle RxSV 9 ++ ng vehicle on th TAR? CSMS: Cyberse fanagement Syste itself by collecting usage SUMS: Software Updat data Update Management Sy TAR: Type Approval Relevan WIN: Software Ide r according to UN-R156 Finding is Cybers Vehicle reports findings Discard Finding to OEM

What if there is a machine learning algorithm writing the software updates? Do the *UN-Regulations* have to be modified or replaced. According to Jan, the answer is "No". What needs to happen is cybersecurity and software update management systems must be put into place with testing corresponding to the Regulations. This is illustrated in the diagram above.

Type Approval

Vehicle type approval is the confirmation that production samples of a design will meet specified performance standards. Traditionally, there are two systems of type approval in Europe. The first one is based on the EC directives and regulates the approval of whole vehicles, vehicle systems, and separate components. The second one is part of the United Nations Economic Commission for Europe regulations (**UNECE**) and also regulates the approval of whole vehicles, vehicle systems, and separate components. Recent changes to the requirements have seen the General Safety Regulation (GSR) EC661/2009 amending Directive 2007/46/EC by

substituting the equivalent UNECE regulations in place of the EC directives. In effect the directives are being replaced by UNECE regulations. This now makes compliance with the UNECE regulations for type approval submissions compulsory from 1 November 2012 and compulsory for all vehicles entering to service from 1 November 2014.

Session Two panel discussion

Missy had said in a recent interview with Princeton Professor Alain Kornhauser that automated systems are "up against the cognitive limits of humans". She said that drivers will not pay attention if they think the car is doing a "good enough job". Even though they have their eyes on the road, their minds are elsewhere. I asked Missy how AI applications should interact with humans to ensure that the humans are engaged in case they have to take over the driving task. What should be the guidelines and the defined limits? As it turned out, this question permeated the entire ninety minutes of the panel discussion. Either the human is in the loop or he/she isn't. A driver has a ½-second response time, while a computer can respond within 1/10 of a second. The main problem, said Missy, is when a car that is being driven by a human meets one that is being driven by a computer. They have different reaction times. The response times are out of sync, and rear-end collisions are one likely result.

How does this relate to Junichi's presentation of work being done in the standards community, where the human must always be at the top of the decision-making process? It seems that there is a division between when a human could and should interact with a vehicle and when it shouldn't and probably cannot. In the latter case, if the AI is driving, there will be no time for the robot to ask a driver if it should swerve to avoid hitting a child running into the street after a ball. In the former case, there should be enough time for the driver robot to ask someone, whether it's an on-board human or an off-board one, whether it would be acceptable to drive across a double line to pass a dump truck.

I put the question to Bryn of where automotive artificial intelligence is being used today, outside of the testing being done by companies like Waymo and the restricted ODD applications like Roborace. The principal application of *AAI* is in driver monitoring, where AI-assisted image processing attempts to determine if the driver is ready to take over the driving task.

I asked the panelists what is not being done at the present time with automotive AI, or at least not receiving the intention that it

You can see the presentations from Session Two at:

<u>htaid=781</u>

should. Junichi said there was not enough work being done on security, especially in connection with ensuring that messages being sent to vehicles that would be interpreted by an on-board AI system and affect the driving task are correct. Bryn feels that there is not enough collaboration between the different actors, either out of concern for giving away secrets or because of fear that authorities will accuse them of collusion. Jan said that there is already considerable work being done in AI-generated software code that could be incorporated into the OTA process. This is a good application because there are a considerable number of testing and validation points to ensure that the code is correct.

Safety guidelines and regulatory developments

The World Forum for Harmonization of Vehicle Regulations (WP.29) has set a priority of extending the automotive regulatory framework to cover automated driving systems (ADS). In 2018, WP.29 created the Working Party on Automated/Autonomous and Connected Vehicles (GRVA) to provide a global focus for technical regulation in this rapidly evolving area. Since 2018, the work of GRVA has been instrumental in providing the platform for **WP.29** to adopt provisions for the type approval of Advanced Driver Assistance Systems (ADAS), regulations covering software updates (UN Regulation No. 156), the cyber security of road vehicles (UN Regulation No. 155), and UN Regulation No. 157 covering systems providing conditional automation on motorways. These new regulations are setting the international baseline for the implementation of these new technologies. WP.29 and its GRVA subgroup continue to help the safe implementation of automated vehicles and systems.

Session One of the 2023 FUTURE NETWORKED CAR SYMPOSIUM is intended to look at the safety related guidelines and regulatory developments. In this year's session, it was decided by the program organizers that speakers should discuss artificial intelligence, titling the session "Will AI-controlled vehicles be safer for road users?" Moderator for the session was Ian Yarnold, Head of International Vehicle Standards Division, UK DEPARTMENT FOR TRANSPORT. There were presentations by representatives from ERTICO, FIA, and the WORLD ECONOMIC FORUM. They each provided their respective organizations' views on the question in the session's title. Their organizations all have initiated programs to study AI and make recommendations to the appropriate bodies.

Barnaby Simkin, Head of Regulatory Affairs for NVIDIA, provided an excellent description of how the vehicle Type Approval process You can see the presentations from Session One on the webcast of the session at: https://itu.zoom.us/rec/play/ yaYBj-

<u>YturBFJ41NDRz5UZ-</u> <u>CRDGDXa6NmzNQ6HPBqsQ-</u> <u>G09DaCNN7qY5hzcKN7ukdw7d CRyw</u> <u>d7VZ5k.ewdJU1nYqO26x1sf?start-</u> <u>Time=1678708845000& x zm rtaid=</u> <u>Huqk2PMXSUmbh-</u> 1FC3BDw.1679306731267.aea9a6e8

is evolving to stay in step with impacts of AI. His work involves supporting the development of regulations and test protocols at UNECE, EU and Euro NCAP. In these forum's Barnaby helps lead the discussion on key technologies for the future, like virtual testing and direct driver monitoring.

Today's vehicle Type Approval process is based on fixed requirements and fixed scenarios. Vehicle systems and whole vehicles are subjected to track tests using these fixed requirements and scenarios. Adding the functionality of vehicle systems in which AI is employed requires new testing processes. The operational design domain (ODD)⁶ must be taken into consideration. There will need to be real-world tests, rather than simply test track tests, because the systems will have to show that they can adapt to the changing conditions of the designated ODD. Virtual tests will be very useful for supplementing both track tests and real-world tests. The overall objective of the new Type Approval process is to demonstrate the "trustworthiness" of the AI-based systems within the vehicle systems. This is illustrated in the diagram shown by Barnaby during his presentation.



Automated driving systems

"Full automation of the driving task appears tantalizingly close," claimed Roger Lanctot in his opening statement. Roger is Director, Automotive Connected Mobility, STRATEGY ANALYTICS, and once again moderated **Session Three**. Multiple use cases are emerging

⁶ Operational Design Domain (ODD) for a driving automation system is defined as "Operating conditions under which a given driving automation system, or feature thereof, is specifically designed to function, including, but not limited to, environmental, geographical, and time-of-day restrictions, and/or the requisite presence or absence of certain traffic or roadway characteristics." (SAE J3016 (2021)

simultaneously, revealing potential paths to market adoption and consumer acceptance. The evolution of these use cases will determine the future of ADS. This panel will review the emerging ADS applications—consumer vehicles, commercial vehicles, delivery vehicles, shuttles, robotaxis—to better understand the challenges and opportunities associated with ADS technology and the state of development and market adoption.

In spite of the fact that the session included representatives of four companies that are developing and testing driverless functionality in vehicles (CRUISE, AURORA, EINRIDE, and OTONOMY), there was no discussion of *Automotive Artificial Intelligence* in this session. Much of the panel discussion was dedicated to what was called "teleoperation", or remote driving, and whether the companies did it and, if so, under what conditions. Edward McGlone of EINRIDE clarified a point about EINRIDE on which it seems there has been considerable misunderstanding. Their trucks are not being driven remotely except at low speeds in limited areas close to origins and destinations. The majority of the driving is done by driverless software without any input from off-board services, either human or automated. Neither CRUISE, AURORA, nor OTONOMY are remotely driving their vehicles.

Wireless communications

For decades, a segment of automotive and other transportation stakeholders has envisioned vehicle safety communications via direct communication technology, including vehicle-to-vehicle, vehicle-to-infrastructure, and vehicle-to-others outside of a vehicle (V2X). In some parts of the world, most notably in China, this vision is starting to materialize. In most global regions, the vision remains just that, a vision, with limited deployment. In **Session Four**, moderated by T. Russell Shields, the panelists discussed three main issues:

- Public and private sector perspectives that led to the state of play;
- Roles of governments, regulators, and the public sector; and
- Services and associated business investments needed for this vision of vehicle safety communications to reach wide-spread implementation.

Unlike in *Session Three*, I would not have expected any discussion of *Automotive Artificial Intelligence* in a session dedicated to wireless communications, and there was none. What all of the panelists emphasized was their strong belief that V2X would deliver major improvements in driving safety, resulting in a You can see the presentations from Session Three at:

https://itu.zoom.us/rec/play/vXD6es2 OIXLOku t392scA63bVEJbo XIPvXYwQ0qk89 BQOieqXS6kO4rCBLLXUDLitKn3I3vIcP26.LdG2id5gFAFyUEVr?start-Time=1678881628000& x zm_rtaid= Huqk2PMXSUmbh-_1FC3BDw.1679306731267.aea9a6e8 da6fb42967f79bef2ea97121& x zm_r htaid=781 significant reduction in deaths and injuries. I have not heard any disagreement with this supposition during the past twenty-fiveplus years that V2X has been discussed, but the fact remains that V2X has not been mandated anywhere. The reason is that "there is no agreement on how to achieve the widespread deployment of specialized vehicular communications for road safety," in the words of session moderator, Russ Shields.

My takeaway from this session is that there still is not enough consideration being given by regulatory authorities to the simple fact that putting any type of device in a vehicle comes with a commitment to be able to repair or replace that device for a period of time that is regulated by the country in which the vehicle is sold. If you put in a one-trick horse, like the European eCall devices that can only make a phone call to the 112 services, that device becomes useless when the mobile networks close down their 2G and 3G networks. Installing a communications device in a vehicle that will be integrated with on-board systems that will interpret messages being received is not the same thing as putting in a portable DSRC device that will be used for road tolls. Singlepurpose communications devices, like the ITS-G5 proposal from the European Commission, should be non-starters. The U.S. has basically made this decision. China figured it out a few years ago and is acting on it. The EUROPEAN COMMISSION needs to stop holding up the vehicle communication by holding to a outmoded technology.

The Future of the Future Networked Car Symposium

There is no entrance fee for the audience; there are no speaker fees or expenses paid to the session participants or the moderators; company pitches are strongly discouraged, so it is difficult for companies to justify participation as a promotional expense; and there are no special sessions for VIPs, either from the government or private sectors. The *SYMPOSIUM* covers all of the topics which are currently important for improving vehicle safety and performance. Panelists are selected on the basis of the knowledge and experience they can share, and people listen to them in the belief that they will learn something which is important for their work. The *SYMPOSIUM* has served an important function since it was started eighteen years ago, and it will hopefully continue to perform an important function in the future with new topics, new audiences, new panelists, and new moderators.



https://itu.zoom.us/rec/play/sM95BP HBb2Mf39nTalWu7TfFuMqTH-BSi18MqxhAqu5tk6RYjWOI9SAT7HNUVFPQE6b6 z2y1Vu-GTnSh7.LFrgZnUeqPRfMt8Q?start-Time=1678967977000& x zm rtaid= Huqk2PMXSUmbh-_1FC3BDw.1679306731267.aea9a6e8 da6fb42967f79bef2ea97121& x zm r htaid=781

You can see the presentations from

Dispatch Central



Kansas City Strip Steak is also known as New York Strip Steak. Both are cut from the short loin of beef cattle.

NYC's mayor takes on Topeka, Kansas

I AM NOT the only one offering advice to New York City Mayor Eric Adams, as I did in the March issue if *THE DIS-PATCHER*. Topeka, Kansas Mayor Michael Padilla suggested that his Big Apple counterpart learn a little humility. It seems that Mayor Adams has a zealous streak, and this has become evident as he attempts win points for his city on what he sees as a zero-sum war with other cities for residents, businesses, and tourists. Oddly, he chose to plead his case against Topeka, the 125,000-citizen capital of the proud State of Kansas, which is the home of the 2023 Super Bowl Champion Kansas City Chiefs.⁷

It was less of a brawl and more of a shouting match between the two contestants as they sat in their respective corners of the boxing ring. Adams started it by using Topeka to make a point.

"God said, 'I'm going to take the most broken person and I'm going to elevate him to the place of being the mayor of the most powerful city on the globe'," declared Mayor Adams. "He could have made me the mayor of Topeka, Kansas. He could have made me the mayor of some small town or village somewhere." Luckily for the Mayor, he didn't reach for Scranton, PA; he would have had President Joe Biden standing over him ready to fight if he had,

Mayor Padilla didn't leave his corner, but suggested that Mayor Adams "could make his points without trying to diminish our great city, and I wish he would. As Topeka's mayor, and as a lifelong member of this community, I am so proud of who we are, and what we stand for."

Apparently, Mayor Adams has a thing about Kansas. In September, during a press briefing, he stated that one of New York City's virtues was that it has a brand name, <u>unlike Kansas</u>. *"Kansas doesn't have a brand,"* he claimed. *"But New York has a brand, and that brand means diversity. That brand means we care. That brand means we are compassionate."*

⁷ This story was reported in the March 2, 2023 issue of The New York Times.

Well, while these might have been taken as fighting words, the Governor of Kansas, Ms. Laura Kelly, decided to win over the obstreperous mayor with kindness. She asked some of her family members who live in New York to personally deliver a gift basket containing a prime Kansas strip steak and other state goodies to Gracie Mansion, the home of the mayor of New York City. She didn't know the mayor is a vegetarian, but it was the thought that counted.

"One of the best lessons I've learned in my tenure as mayor is the value of humility," said Mayor Padilla. "I've personally visited New York City on numerous occasions, and have always spoken highly of New Yorkers—never stooping to assumptions or stereotypes. I'd invite the mayor of New York to get to know our beautiful city and its people before casting judgment on a community he seems to know little about."

If Mayor Adams had taken just a few minutes to have a look at a map of Kansas, he would have found that the town of Manhattan, nicknamed The Little Apple, and home of Kansas State University, which has one of the nation's best college football and basketball programs, is just a short 90 kilometers away. Even *THE NEW YORKER* magazine gave Kansas a place of honor on its world view from New York City map. Let's hear it for Topeka and for Kansas: Hip hip hooray!

Building car OSes is not for the faint of heart

PURPOSE-BUILT BUT open to partnership. That's how Mercedes-Benz CEO Ola Kallenius described the company's *MB.OS*, which stands for *Mercedes-Benz Operating System*. He made this statement at a media event in Sunnyvale, California, not in Sindelfingen where it has its Technology Center. The company says *MB.OS* "combines in-house software development with technology collaborations to improve four key areas: infotainment, automated driving, body and comfort, and powertrain systems." The plan is to introduce it in 2025 on the new "electric-first" *Mercedes Modular Architecture Platform*. This will be used for the future compact and midsize electric cars, with the next A-class scheduled to be the first car to have the OS on board.

"Purpose-built but open to partnership" sounds like married but single. What does it mean in practice? This is how Kallenius tried to explain it: "*If you are an architect, you do not have to lay every tile yourself or put up every single beam,*" he said. "*That is why we have carefully selected a set of partners.*" It's a bit of a strange





Mercedes-Benz CEO Ola Kallenius introducing MB.OS

analogy (especially to someone who, in a former life, was a registered, licensed architect) because in building projects where an architect is involved, the owner of the eventual project hires the architect to coordinate all design and engineering aspects, a contractor to hire all the tradesmen to perform the actual building and to coordinate all of the sub-contractors (like the tile layers and beam raisers), and sometimes, a clerk-of-the-works to serve as the building project manager and keeper of the budget. But we understand what he means. MB is the client, the architect, the contractor and the clerk-of-the-works, and both hires and coordinates the work of the subs, like NVIDIA and Google.

The leader of the *MB.OS* development team is Michael Hafner. He was quoted in an interview with *AUTOMOTIVE NEWS* who covered the media event as saying that MERCEDES-BENZ "needs to own the complete chain". What they are trying to prevent is the takeover of their cars by Big Tech. I discussed this back in the <u>December 2019 issue of The Dispatcher</u>, *Turning Over Vehicle Infotainment to the Tech Titans*. MB has decided to do what TESLA has done, and that is to keep the outsiders outside and to control everything going on inside themselves. It will not do what, for example, VOLVO CARS has done by inviting Google inside and using Google Android Automotive Operating System, or to take an operating system developed by another third party, such as ELEKRTOBIT, or to invite APPLE or MI-CROSOFT inside the fortress.

Building an operating system from the ground up is not for the faint of heart—or for companies that are light on extra cash. MB has decided to do it all themselves with the *MB.OS* built on in-housedeveloped hardware and software. It will access services and content from outsiders, but on its own terms. For example, it claims it will create its own branded navigation system based on in-car data and navigation capabilities from the Google Maps Platform. The idea will be to combine Google's real-time and predictive traffic information and automatic rerouting technology with vehicle data that its own systems extract. It will further work with NVIDIA and LUMINAR (vision-based LiDAR) on its Drive Pilot automated lane keeping assist system and integrate it even more with the new MB.OS.

MB can learn take a lesson from its country cousin, VW

MERCEDES-BENZ is not alone in its desire to accomplish what so far has been done only by TESLA. In 2020, VOLKSWAGEN founded CARIAD to transform VW into a "software-driven car company". The company said at the time that it needed to transform itself from a company that mostly writes specifications to a company with skills, employees, and talents who want to develop more software themselves. It stated that by 2025 it intended to increase VW's own share of software in its cars to 60%, and that <u>it would develop its own operating system, VW.OS</u>.

CARIAD quickly ran into trouble. It probably over promised, but it was not able to deliver on software for Porsche, Audi, Bentley rollouts, and postponed the debut of VW's ID models. In December 2021, Herbert Diess, CEO of VW Group since 2018, was given direct responsibility for CARIAD, replacing Audi CEO Markus Duesmann who had that role. At the same time, his operational responsibilities were distributed to other executives. Six months later, in June 2022, Herbert Diess was informed that he was out, both as VW Group CEO and as the head of CARIAD. He was replaced as CEO by Porsche boss Oliver Blume, while Dirk Hilgenberg took over at CARIAD. Some say his constant references to TESLA as the leader in all ways did not help his career. It was Diess who committed VW to making battery electric vehicles in the wake of the Dieselgate tsunami that was close to drowning the entire VW Group.

"They should have head-hunted the best people from Silicon Valley," one pundit said. "You can't lead on software with automotive people." Oddly, some boards think it is perfectly fine to hire someone as a CEO of an automotive company who has no prior automotive experience.

Tesla's Sentry Mode modified

TESLA'S SENTRY MODE is TESLSA's form of anti-theft system. As is usually the case with TESLA, it is never satisfied doing things the way others do it. They have to build something that is "cool", even though what comes out to customers on the first try is not ready for prime time. An example of this is TESLA's *Sentry Mode*.

Car theft systems that have been on the market for over twenty years are based on motion sensors. When the car's alarm systems is set, moving the car in any way, breaking a window, opening a door even with a stolen key, will trigger the alarm. If the alarm system is connected to an alarm center or to the owner's mobile phone, a theft notification message is sent to the alarm center or the phone. If it is not connected to an alarm center, the car will create a nuisance with its horn honking, lights flashing, a siren blaring.⁸

TESLA'S Sentry Mode is based principally on cameras that take videos all around the vehicle. Once it is enabled by the driver, it is put into a 'standby' state. This activates the cameras on the vehicle. If someone approaches the car, this is judged by the 'Sentry' to be a minimal threat. The car switches to 'alert', displays a message on the in-car touch screen with the text SENTRY ACTIVATED. If the person outside the car escalates his actions, like leaning on the car, trying to open a door, pulling out a screw driver to carve his initials into its frunk lid, the 'Sentry' moves to 'alarm' state, which activates the car alarm, pulses the headlights, increases the brightness of the display, plays music to the max on the car's audio system (I wonder who chooses the song?) and sends a message to the owner on his Sentry Mode App. The owner is able to download a video showing the ten minutes before the alarm and what is happening in real time. This requires that the owner has plugged in a USB that is used to store the video images. Also, the battery must be at least 20% charged for Sentry Mode to work.

There was only one not-so-small problem with this nifty system: It violated the EU's *General Data Protection Regulation (GDPR)* by not obtaining the permission of the person being filmed before starting the cameras rolling. This was brought to Tesla's attention by the *DUTCH DATA PROTECTION AUTHORITY*, which supervises the processing of personal data in The Netherlands to ensure compliance with GDPR. It informed Tesla that unless it made changes to its system, it would not be legal to use it within the EU, and if it persisted in selling the feature, it would be fined. So Tesla made changes. At the 'alert' stage, before it sets the cameras rolling, the car flashes its headlights and flashes the screen message. It is at this stage that a message is sent to the customer saying that the 'alert' stage has been triggered, and the customer must confirm that filming can be started. What this does is put the legal responsibility for filming on the driver, taking it off Tesla.

So the driver is now the potential subject of a GDPR violation if an individual determines that he or she has been captured on a video which can be watched by the owner. I'm not sure I would want to be in that position, and it is not clear how the customer is going to be able to understand all the ramifications of using the feature.



⁸ https://www.hotcars.com/tesla-sentry-mode-everything-you-need-toknow/

There are similar problems with individuals setting up cameras around their houses and filming passers-by on public sidewalks and roadways. Dashboard cameras are also problematical. In Germany, public footage must obscure/blur personal imagery to protect privacy. They are totally illegal in Portugal, Switzerland, and Luxembourg, and restricted in many EU countries, including The Netherlands.

Wouldn't it have been better if TESLA had researched all of this before putting its system on the market? Wouldn't it have been even better if the regulators had established clear guidelines for the use of such systems, with a requirement that video images be uploaded to a secure operating center, rather than to the owner? Yes, this would have involved more cost, but this is what reputable car companies do with their theft notification systems. They send the theft notifications to people who are certified to handle security matters. I guess that's not so cool.

EU Big-3 countries want to freeze the ICE ban

AGAINST THE LEVIATHAN. That is where Germany, Italy, France, Poland, and Bulgaria are at the moment on the subject of outlawing the sale of new gasoline and diesel cars by 2035 within the European Union. Twenty-two of the twenty-seven member Union thought the issue was all wrapped up. In early June of 2022, the *EU PARLIAMENT* had voted with a 90-vote majority of the 705 members of *PARLIAMENT* had agreed to stop the sale of cars that burn fossil fuels by 2035. Later in the same months, all but one of the 27 *COUNCIL OF MINISTERS* agreed to the decision. Bulgaria abstained. ⁹

When everyone returned from their summer holidays, the *Com-MISSION* began the process of drafting a final *Regulation* that would be presented to both the *COUNCIL OF MINISTERS* and the *PAR-LIAMENT*. A compromise agreement was reached in October which supposedly all countries would vote for. The *PARLIAMENT* voted 'Yes' in February. Next up were the *MINISTERS*. Then the grumbling started, first in Italy then in Germany, France, Czech Republic and Poland. Bulgaria had not changed its objection. Italy's Industry Minister, Adolfo Urso, called the proposed Regulation "suicide"



Graphic from CARSCOOPS: https://www.carscoops.com/2023 /03/germany-and-italy-mightblock-europes-2035-ice-ban/

⁹ Council of the European Union, known informally as the Council of Ministers, consists of government ministers from each EU country. They meet to discuss, amend and adopt laws, and coordinate policies. The ministers have the authority to commit their governments to the actions agreed on in the meetings. Together with the European Parliament, the Council is the main decision-making body of the EU.

and a "gift to the Chinese" (Has he been reading *The Dispatcher*?). He said the EU risked going from "energy subjection" to Russia for fossil fuel suppliers to an even more serious dependency on China for green technologies and raw materials. He said that Italy would lobby for a broader revision of the "stages of modalities of the ecological transition" in 2026 when the *EUROPEAN COMMISSION* is due to review progress made towards the 2035 target of achieving zero emissions from new cars and vans. A final vote was supposed to have taken place in the second week of March was cancelled because it would not have passed.

Urso called on the *COMMISSION* to take a "pragmatic, concrete, non-ideological" approach to climate change laws. He reached out to Germany, and Olaf Scholz, Germany's Chancellor, who grabbed his hand. Together, the countries opposing the strict ban comprise the necessary 35% of the EU residents so they can block any proposal for a new Regulation. The auto industry in Germany employs around 800,000 people and has revenue of approximately €411 billion per year. It is not an insignificant force, and the Chancellor knows it.

These countries are not, however, exactly on the same page when it comes to how they might agree to move forward to a change of scope on the part of the *COMMISSION*. Italy, Poland, and Bulgaria want to eliminate the 2035 ban altogether. They see no advantage to their economies or their citizens, and they see only disadvantage in the EU with its competitive position vis-à-vis China. Germany would most likely give up gasoline and diesel if it gets so-called 'electrofuels' or 'e-fuels', which are synthetic fuels that work in ICE vehicles but are CO₂ neutral overall. They are manufactured using captured carbon dioxide or carbon monoxide together with hydrogen that is produced using electricity sources that are also not based on burning fossil fuels, including wind, solar, AND nuclear power. Burning the e-fuel releases CO₂ into the atmosphere, but because the amount released is equal to the amount taken out to make the fuel, it is evens out.

On Monday, the 13th of March, eleven countries that have a significant automotive industry met in Strasbourg, France to discuss possible ways forward. (In spite of the fact that Sweden has three companies directly affected by the outcome of this issue, it was not invited to this meeting because for some reason its current presidency of the *COUNCIL OF MINISTERS* does not allow it to attend such meetings.) The ministers met the day before and announced



The Leviathan's Outpost in Strasbourg where EU transport ministers met on the 12th of March to discuss what kinds of cars should be driven inside the EU in 8-12 years' time.

at the meeting on the 13th that they would consider proposing "a possible role for e-fuels" in conjunction with a 2035 ban.

On the 22nd of March, the EC and Germany were still talking. "We are talking about regulation for the year 2035. I do not understand why we cannot take our time now to take a closer look at things," Germany's Transport Minister Volker Wissing told the press. He rejected calls for a quick agreement with the Commission. "We need time to agree on a legally secure basis for the approval of new combustion engine cars powered by e-fuel after 2035."

Italy, not to be outdone by its northern neighbor, has told the Commission that it will only support a solution to unblock the EU's planned phaseout of ICE vehicles by 2035 if it allows the sale of cars running on biofuels to continue after that date. Biofuels are fuels that are derived from biomass, like plants. Italy's ministers of transport, environment, and enterprises sent a joint letter to the Commission dated the 21st of March stating their position.

Beyond the politics and posturing by amateur climatologists

Everyone who opposes any change to the *COMMISSION*'s position points the finger at PORSCHE and says it is to blame for this sudden change of heart by the Germans. Why PORSCHE? PORSCHE CEO, Oliver Blume, made his company's position on e-fuels very clear during at its annual press conference on the 13^{th} of March. "The 911 will be offered as a car with an ICE as long as it is possible. I'm sure that the owners of the 911 and other vintage cars will be very happy about an offer like this, using them with e-fuels with very low CO₂ emissions."

What's the alternative? ICE vehicles are not going to disappear overnight. They are not going to go up in smoke on the 31st of December 2034, unless there is a worldwide revolution of climate activists who blow them all up on that day. Even if they managed to do it in North America and Western Europe, they are not going to do it in the rest of the world. There will be petrol and diesel fuels readily available for the vast majority of cars on the road that will still be running with internal cumbustion engines. What is at issue here is whether <u>new cars built after 2034</u> will be allowed to be built with ICE. The proposal from the EC says NO. Germany and the other countries are asking that the NO be changed to YES, if they run on e-fuels. What PORSCHE and other car companies are saying is that they want to continue to build ICE vehicles that will run on e-fuels.



2023 Porsche 911 Coupe

Supporters of e-fuels (I count myself among them) say that efuels offer a route to cut CO_2 omissions of the existing passenger car fleet. People will continue to buy ICE and hybrids (we just bought a new hybrid) until they can't. Why doesn't it make sense to let them run on a fuel that is omissions neutral? Yes, they are expensive now, but if the market is larger, the costs of producing them will come down. If we can hand out several thousand dollars to people who don't need a handout to buy an electric car, why now subsidize people who can't afford an electric car to burn a clean fuel?

On the 26th of March, the EU announced the deal reached with Germany and the other countries opposing the 2035 outright ban on new ICE vehicles. As usual (Sorry, but EU bureaucrats can never just say, "You won; we lost") the EU gets its original ban passed. So the news airwaves were filled on Sunday night with "...as expected, Germany gave in to European demands to stop production of ICE vehicles in 2035". BUT, the EU has promised that as soon as everyone votes for their proposal, the Commission will introduce a new Regulation allowing automakers to register a new type of vehicle that can run only on carbon-neutral fues (i.e., e-fuels). In this new Regulation, the Commission will specify how these cars "can contribute to the 2035 target", whatever that means. What happens if this new Regulation is not passed? The Commission has further promised that it will "follow another legislative path" to allow e-fuel car sales.

On yet another front in the on-going battle between the EC and the European automotive industry, AUDI CEO, Markus Duesmann said during Audi's annual news conference in March that the mid-2025 deadline to implement the pending *EURO 7* pollution guidelines should be pushed back. "Simply not enough time." The *EURO 7* proposal, which governs tailpipe emissions of pollutants such as carbon monoxide and nitrogen oxide, as well as fine particulates, won preliminary approval in the EU in November 2022. For the first time, the EU proposes to regulate particulate emissions from brake pads and tires. It replaces Euro 6 which went into effect in 2015.

The automotive industry has portrayed *Euro* 7 as an unnecessarily distraction that will divert resources from the ultimate goal of electrification.

Quick Transactions

There's always room for another hot dog joint-or car dealership

ONE OF THE first lessons I learned in my graduate school transport planning class was why car dealers are almost always clustered in one part of town and often on the same streets. Walter Christaller's *Central Place Theory*¹⁰ was one of the basic readings. The main idea in *CPT* is that there is a hierarchy of goods where the higher order of goods are those which are purchased on a less frequent basis, and a lower order of goods which are purchased often. The latter include certain foodstuffs that are consumed daily, and the former are products like cars or appliances. All things being equal, people

are willing to travel farther to shop for goods that are not purchased very often, so rival car dealerships and appliance stores decide it makes sense for them to locate themselves close to each other to make it more convenient for those who will travel to their stores.

A Texas wiener might not be in the same price class as a car or a dishwasher, but folks have been known to make a day-trip out of the quest for a great taste experience. So why not have the two best Texas wiener destinations almost next door

to each other? That's what the current owners of the original Coney Island Texas Lunch and the new Coney Island Lunch say happened. Steve Karampilas, grandfather to Pete Ventura, owner of Coney Island Lunch on Lackawanna Avenue, opened the original Cedar Avenue location one hundred years ago, and brought the name 'Coney Island Texas Wieners' to Scranton. This was the one and only location for the first sixty-five years. When Steve Karampilas died in 1972, his two sons, Ted and John took over the restaurant. John retired in the late 1980s and Ted continued the business with a new partner.

In 1988, John Karampilas (the brother who retired) decided he would help his step-sons, Pete and Bob Ventura, open a new restaurant just a couple of hundred feet away. Brendan Bell took over from Ted Karampilas about ten years ago. The two restaurants are not affiliated in any way, but there doesn't appear to be any rivalry between the owners. In an interview with the local National Public Television station, WVIA, Brendan Bell said: *"Pete has a great product, we have a great product and people just choose. There's*



Pete Ventura ladles Texas chili onto an order of hot dogs. When his father ran the shop there was only one way a hot dog could be served: his way.

¹⁰ Christaller, Walter. http://www.thinkgeography.org.uk/AS%20Human%20Settlement/cpt%202.pdf

enough people to take care of both of us." Having tried them both many times, I agree one hundred percent.

Pete Ventura says the "signature taste" of Scranton's unique Texas Weiners comes down to three things: the chili, the mustard, and the onions on top of each all-beef Berks hotdog they serve. "The chili can't be sweet. It's got to be spicy, there's no sugars. If they put sugar in it, they're hiding something. Greeks always use a Düsseldorf mustard. We use Spanish onions or Texas onions. You want a sweeter onion."

At The Original Coney Island Texas Lunch, Brendan Bell says it's the wiener itself that makes a lot of difference. "A wiener is basically a type of sausage, so hotdogs are longer and wieners are small," he said. "Ours are made from GUTHEINZ which is down the street (literally, and it's been there longer than Coney Island Texas Lunch), and they've been doing that for us forever."

"I won't go to a place that has a hot dog cooked in the back," Ventura said. "I want to see them make it, and that has worked for us all these years." Both Bell and Ventura agree, simplicity has helped keep customers coming back. "It's an establishment in Scranton, it's a place people have always come back to," Bell said. "It's gone through some changes, but it's simple. You know you're coming here to get a wiener or a burger." Both establishments are celebrating 100 years since they both have the same roots. That's sharing.

Update on access to vehicle data in the EU

I FEEL LIKE the uncle whose nephew wants him to read only one bedtime story. It's bedtime again, and the vehicle data saga is right there on the bedside table. I featured the vehicle data topic in a February 2020 issue of THE DISPATCHER with the lead article, <u>Open Data Access Challenges Entire Car Ecosystem</u>. I explained the issues on both sides of fence as I saw them at the time, as viewed by the automotive OEMs who want to continue to control the data flow and the service providers who want the OEMs to allow the data to be directed by the car owners with no control by the OEMs. I have periodically returned to the issue whenever there seems to be a chance for a breakthrough by one side or the other.

Nothing new has happened, and that is why the "We Want the Data" lobby is trying to create news. Representatives from the groups that have been pushing for data access, including car insurers, car leasing companies, car repair shops, motor clubs that



The Next Generation



This is where those great wieners are made, a hop, skip and a jump away from where they are cooked and eaten. They were the only brand of hotdogs that my mother ever bought for our cookouts.

provide roadside assistance, among others, are worried that this term's Parliament members will be replaced in the 2024 elections with new members who will have different agendas that may not be at all sympathetic to the data sharing consent. They have been trying everything to bring the issue to center stage, including writing personal notes to the EU's trust-buster boss, Martgrethe Vestager, and *COMMISSION*'s President, Ursula von der Leyen, who has her hands full with keeping Ukraine from being bombed out of existence by the big bad bear in the north.

The *Commission* is working on its proposal for the *Data Act*, which was first put forward by the *Commission* in late 2021, and formally issued in February 2022. The proposal is for "regulation and harmonized rules on fair access to and use of data". It is not specific to the automotive industry, and this is what the supporters of a specific vehicle data access regulation want to change. THE EURO-PEAN AUTOMAKERS ASSOCIATION, ACEA, say that if the *Data Act* is passed it will guarantee fair access to in-vehicle data. The data lobbyists don't agree. It's not a given that the *Data Act* will be passed because there are substantial disagreements with the idea that governments should be legislating on how data flows.

Where you stand on this issue—if you even think it's important to have an opinion-depends on what side of the automotive industry fence you stand on. If you are making and selling cars, and you have invested oodles of money in equipping your cars with sensors and data processing systems to improve safety and performance, and spent gobs more in setting up a communications infrastructure, you want to be able to do all you can to generate as large a return as possible on those investments. If you are on the service side of the fence, and your business is increasingly based on the data that vehicles generate, you want to be on the front line of that data. You want to be able to market your services directly to customers who will use them, not hang around on a street corner like a day laborer waiting for the crew boss to come by and hire you for a day's job at an unnegotiable rate of pay. I have worked on both sides of the fence, and I sympathize with both points of view. I do not believe the answer is for government to insert itself into the picture and pass laws that regulate how either car companies or service companies should design their products. Focus should be on customer value.



Musings of a Dispatcher: Mind Your Own Business



Grand Central Terminal New York City Opened in 1913

But know who your customer really is

"The railroads did not stop growing because the need for passenger and freight transportation declined. That grew. The railroads are in trouble today (1959) not because that need was filled by others (cars, trucks, airplanes, and even telephones) but because it was not filled by the railroads themselves. They let others take customers away from them because they assumed themselves to be in the railroad business rather than in the transportation business. The reason they defined their industry incorrectly was that they were railroad oriented instead of transportation oriented; they were product oriented instead of customer oriented."

Theodore Levitt, *Marketing Myopia*, HARVARD BUSINESS REVIEW (July-August 1960)

IF YOU EVER wondered where the *"We're in the railroad business"* cliché came from, you now have your answer. In this *Musings* I am going to discuss what Professor Levitt got right and what he got wrong about railroads, why it matters to car company executives who declare that their companies are now in the mobility services business and not in the car-building business, and how the state of the nation you are in affects to a very large extent what business you should be in and who your customer actually is.

Theodore Levitt was an academic, not a railroad man

Railroading is the industry that is most often used to illustrate bullheaded thinking about what business a company is actually in versus what the people who operate it believe it is in. Whether Theodore Levitt was first to make this statement or just first to put it into a readable form is not important. From the time it appeared in the *HARVARD BUSINESS REVIEW* (*HBR*), he became famous for the phrase "What business are you in?"

Levitt was born in 1925 in Schlüchtern-Vollmerz, Germany. In 1935, he and his family left Germany because of the growing persecution of Jews, and immigrated to Dayton, Ohio. He served in the U.S. Army during World War II, enlisting before he graduated from high school. After he returned home, he received his high school diploma through correspondence school, earned a bachelor's degree at ANTIOCH COLLEGE in Ohio, and then completed a Ph.D. in economics at the OHIO STATE UNIVERSITY. His first teaching job was at the UNI-VERSITY OF NORTH DAKOTA. He distinguished himself as an insightful writer, and in 1959 he joined the faculty of the HARVARD BUSINESS SCHOOL at the same time as his seminal article appeared in *HBR*. Between 1985 and 1989, he served as the Chief Editor of *HBR*, retiring from the magazine and teaching in 1990. He died in 2006 at the age of 81.

Levitt was not a railroad man. He wasn't an "any business" man. He was an academic. An observer. An analyzer. A fly on the wall, or sometimes a mosquito, stinging when he felt it was needed. *Marketing Myopia* has been described as a manifesto, more than simply an article. His argument was that companies should stop defining themselves by what they produce and instead reorient themselves toward customer needs.¹¹ Levitt wasn't picking on railroads per se when he wrote. They were just a handy example of an industry with which everyone was familiar, or thought they were. They were long past their prime in 1959; the world of business had moved beyond railroads. The five largest companies in the world at the time were, in rank order, GENERAL MOTORS, EXXON MOBIL, FORD, GENERAL ELECTRIC, and U.S. STEEL. AT&T was #10 and CHRYSLER was #11. There were no railroad conglomerates in sight. It was very different one hundred, or even fifty years earlier.

Railroads built America and America built the railroads

The business of the first railroad operators was moving coal and iron ore from mines to coastal areas. This began in the middle of the sixteenth century, even before the First Industrial Revolution got started. There were no locomotives back then. Horses were the horsepower, and they drew wagons along rails first made of wood and then iron. It was in the early 1800s that the first steam locomotives were built. First in Britain and then in the United States, the use of railroads expanded from moving coal and iron to moving everyone and everything. When coal began to be used to make steel, heat homes, and make electricity and gas,¹² it needed to be hauled everywhere. Once the ore-haulers built the railroad beds and bridges and locomotives, they could use them



Horse-drawn coal wagon

¹¹ https://hbr.org/2006/10/what-business-are-you-in-classic-advice-from-the-odore-levitt

¹² Before natural gas pipelines started to be built in the 1950s, which carry natural gas from its principal extraction points to cities, gas was produced by burning coal.

for other purposes, like moving people, grain, livestock, and manufactured products. They linked the port cities to interior cities and in America, eventually the East Coast to the West, completing the connection in Promontory Summit, Utah on the 10th of May 1869. American railways grew from 23 miles in 1830 to 241,340 miles by 1910, more than all European countries combined.¹³ Journeys that took weeks could be completed within days, and people, goods and raw material could be moved anywhere quickly, inexpensively and throughout the year.

Building and operating railroads was a massive undertaking, particularly in the United States because of its size, varied terrain, and its sociopolitical condition at the time of expansion. Nothing like it had ever been done before. "(T)he industry helped to open the West, develop the country economically, and create a sense of national unity, while also displacing Native American peoples. Trains carried the U.S. mail and provided the same rights of way for the telegraph lines, setting the foundation for mass communication systems vital to the operations of big business. Rails also took on military significance during the Civil War, when they became strategic in transporting troops and supplies for both the Union and Confederacy."14 In 1891, the PENNSYLVANIA RAILROAD alone employed 110,000 workers. Railroad managers were responsible for supervising thousands of specialized employees within distinct units of operation. This laid the foundation of modern businesses of all kinds. During this period many of the companies that would become FORTUNE 500 companies were founded, including AT&T, EXXON (STANDARD OIL), GENERAL ELECTRIC, and U.S. STEEL.

Private enterprise could not have done this all on its own. Railroads needed local, state, and federal government support in the form of legislative authorization and financial assistance. Railroads could not zigzag around properties of owners along the straight lines of the right-of-way. The government was needed to encourage (actually force through eminent domain) landowners to sell their properties to the railroads. States and towns wanted the rails to come to and pass through their towns, but the railroad companies wanted something in return.¹⁵ During the last half of the 19th century, in what was called the Gilded Age of America,



The ceremony for the driving of the golden spike at Promontory Summit, Utah on May 10, 1869; completion of the First Transcontinental Railroad.

¹³ https://www.library.hbs.edu/hc/railroads/

¹⁴ Ibid.

¹⁵ It's no different today; companies want tax concessions, special rights-ofway, or relaxation of certain regulations in order to locate their businesses in a community.

the financial value of railroads and the wealth it generated for everyone was enormous. Until World War I, the railroads represented the highest percentage of listed stocks and bonds on the NEW YORK STOCK EXCHANGE.

The cake got bigger, and everyone wanted a bigger piece

Now is the time to ask the question: At the beginning of the 20th century, what business were the railroads in? The answer was clear to everyone, from those who used it for transportation, and the businesses that used it to haul their goods, to the government, shareholders, owners and those who operated them: <u>Railroads were in the country-building business</u>. If railroads had not been invented and people with a vision of what they could be had not stepped in to run them, there might still be only thirty stars or so on the U.S. flag. We can debate forever whether that would be a good thing or not, but there can be no debate about how it happened. Then things changed.

What happened during the first decade of the 20th century created the conditions for the railroad industry that Theodore Levitt used as his example in *Marketing Myopia*: *"Every major industry was once a growth industry. But some that are now riding a wave* of growth enthusiasm are very much in the shadow of decline. Others that are thought of as seasoned growth industries have actually stopped growing. In every case, the reason growth is threatened, slowed, or stopped is not because the market is saturated. It is because there has been a failure of management."

In Professor Levitt's attempt to create a big picture that could be generalized over the wide screen of business, he left out-or maybe he completely missed—a few important details about why the railroad business got off the rails. It may well have been a failure of management, but not the kind of failure he implies. The railroad cake had gotten very, very big, and everyone wanted to feel like they were getting a piece of it that was, in their own opinion, big enough. In the court of public opinion, the railroad barons, like Cornelius Vanderbilt, Jay Gould, J.P. Morgan and Edward Harriman, were taking pieces that were comparatively too large, and skimming off most of the icing. Passengers felt they were paying for the barons' lavish lifestyles, businesses felt that the high freight rates were eliminating their profits, workers felt they were being exploited and wanted higher pay with fewer hours, and the more powerful unions were now in a position to see to it that they got both.



Political Cartoon of a Robber Baron, Edward H. Harriman, with the railroads of America all heading toward his mouth. The caption reads 'Design for a Union Station.'.

Most importantly, and unfortunately for the railroads, governments turned against their country builder. Maybe they felt the railroads had completed their job and it was time to bring them into line. Maybe they had their eyes on the next group of country builders (e.g., car makers and oil drillers), and felt they had to devote all of their attention and money to them. It was Vice President Theodore Roosevelt, who became President in September 1901 following the assassination of President William McKinley a mere six months following his inauguration, who led the charge against the railroads. He was the first of the three so-called Progressive Presidents; Taft and Wilson followed. In 1902, he used the Sherman Antitrust Act that had been passed in 1890 but rarely used to bring a lawsuit that led to the breakup of the NORTHERN SECURITIES COMPANY, a huge railroad conglomerate. After he was reelected in 1904, he pushed for regulatory powers to be given to the INTERSTATE COMMERCE COMMISSION (ICC) to regulate interstate railroad rates.¹⁶ In 1912, when William H. Taft was President, the Supreme Court ruled that a coalition of fourteen railroads had used their joint ownership of a bridge across the Mississippi River, near the St. Louis terminal, to stifle competition. Jay Gould had organized the TERMINAL RAILROAD ASSOCIATION to control access across the river. The Supreme Court ruled their practice as "unlawful" and the bridge had to be opened to their rivals.¹⁷

The nation takes over the nation-builder

Step by painful step the government distanced itself from the railroads. The final blow came in the lead up to America's entry into World War I. Railroads found themselves caught between the rock of expanded federal oversight and the hard place of automobiles taking their passengers. Electrified interurban systems were already in a state of decline. When the War started in 1914, the U.S. began supplying the Allies even before it entered the War. This put an enormous stress on the carriers. A major strike occurred in 1916 that was not settled until 1917, and it was the Supreme Court who settled it in favor of the unions. On the 6th of April 1917, the U.S. officially entered the War. The government



A Lackawanna and Wyoming Valley Railroad electrified car running between Scranton and Wilkes-Barre, Pennsylvania. It was in operation between 1903 and 1952. Your editor remembers riding on it to visit my mother's sister and her family in Plains and being told to be careful not to step on the third rail when we got off at the similar to the one shown in the photo above.

¹⁶ The ICC had been created by the Interstate Commerce Act of 1887 with the purpose of regulating railroads to ensure fair rates, to eliminate rate discrimination, and to regulate other aspects of common carriers, which eventually included trucking, buses and telephone companies.

¹⁷ Google has been accused of similarly stifling competition by funneling most advertising traffic through its platform, and the Supreme Court will be hearing a case brought against them by the U.S. Department of Justice.

attempted to force the railroads to prioritize freight for the War effort, but this ended up creating a shortage of freight cars on the eastern side of the country.

In December, President Wilson decided the government could not risk the possibility that the railroads would fail to deliver the services needed to win the War. He effectively nationalized the railroads with the establishment of the UNITED STATES RAILROAD AD-MINISTRATION run by the Secretary of the Treasury, William G. McAdoo (who also happened to be Wilson's son-in-law). This move had been prepared by Congress which had passed the *Army Appropriations Act of 1916*, which granted the President power to take over the nation's transportation system during wartime.

The railroads' owners were compensated for their use based on the average of the net operating income for the three years between June 30, 1914 and June 10, 1917. Those had been particularly tough years for the railroads.¹⁸ *The Transportation Act of 1920* returned the railroads to their private owners, but they were not in the same shape as when they had left them due to the low priority given to maintenance by the government. Things only got worse. The railroad barons had earned all the money they needed and had begun to give it away in their new role as philanthropists. Investors shunned an industry that was out of favor with its former benefactor. The Depression didn't help.

Solve my problems and meet my needs

Levitt said that "customers attach value to a product in proportion to its perceived ability to help solve their problems or meet their needs. <u>All else is derivative</u>." Railroad owners and management could not solve their customer's problems or meet their needs around the time they were nationalized, and were in no better position to do so after they were re-privatized, because they had forgotten who their customer was. It was the government. It had always been the government. It remained in large part the government, even though the government no longer considered itself to be their customer.

A Different Kind of Nationalization

CONRAIL¹⁹ was a federally sponsored, private railroad corporation formed from six bankrupt lines in the NORTHEAST AND MIDWEST, operating between 1976 and 1999. It was acquired in 1999 by CSX AND NORFOLK



¹⁸ https://www.american-rails.com/i.html

¹⁹ Incorporated in Pennsylvania in October 25, 1974, and operations began on April 1, 1976.

SOUTHERN RAILWAY. It carried 13% of the nation's freight and 370,000 commuter passengers daily in 1976. AMTRAK is a Government-supported, quasi-public railroad corporation set up in 1971 to assume the costly burden of intercity passenger service. It is still in operation. Trains traveling its routes, encompassing 46 states, carried 32.5 million passengers in 2019. Today, there are seven Class I railroads (railroads with 2021 revenue of at least \$900 million) and approximately 615 short line railroads (Class II and III). Short lines and Class I railroads operate in 49 states and the District of Columbia, with short lines running over about 44,000 route miles and Class I railroads running over about 92,000 route miles. Class I railroads account for around 67% of freight rail mileage.

What business are you really in, Mr. Car Executive?

We want to take this discussion back to the car industry, and Levitt does that for us. In 1972, he wrote an *HBR* article that debunked the idea that there are major differences between companies that defined themselves as being in the service industries and those in the production industries: *"Purveyors of service think that they and their problems are fundamentally different from other businesses and their problems. They feel that service is people-intensive, while the rest of the economy is capital-intensive. But these distinctions are largely spurious. There are no such things as service industries. There are only industries whose service components are greater or less than those of other industries. <i>Everybody is in service."*

Imagine what kind of reaction this statement generated when it appeared in HBR in 1972. The *FORTUNE 500* list was still completely dominated by production companies. The five largest companies in 1972 were, in rank order, GENERAL MOTORS, Exxon Mobil, Ford, GENERAL ELECTRIC, and IBM. U.S. STEEL had moved down to #13. Media firm CBS was #14, transport company GREYHOUND was #33, and retailer OFFICEMAX was #61. He continued: *"Often the less there seems (of service) the more there is. The more technologically sophisticated the generic product (e.g., cars and computers), the more dependent are its sales on the quality and availability of its accompanying customer services (e.g., display rooms, delivery, repairs and maintenance, application aids, operator training, installation, advice, warranty fulfillment). In this sense, General Motors is probably more service-intensive than manufacturing-intensive. <i>Without its services its sales would shrivel."*²⁰

²⁰ Levitt, Theodore. *Production-Line Approach to Service*. *HARVARD BUSINESS Re-VIEW (SEPT.-Oct. 1972)* https://hbr.org/1972/09/production-line-approach-toservice

Again, Professor Levitt is getting the big picture correctly in focus, but he is missing a crucial detail. GM doesn't own the dealers. Dealers are the ones who deliver the service part, while the people in Detroit deliver the manufactured product. To the customer, it looks like a single package, but not to the companies nor to the governments that regulate them. Dealers and OEMs have a symbiotic relationship: one manufacturers and the other sells and services. However, multi-brand dealerships broke the oneto-one symbiosis, and now OEMs want to by-pass the dealers and become "full-service" providers of mobility, which might include selling a car, but it might also include offering rides on a pay-foruse basis. However, selling on the Internet is only a tiny part of the services side of the car business, as those who have tried it have found out.

There was no public Internet in 1972, but SEARS ROEBUCK & COM-PANY had tried to sell cars via mail order—twice.²¹ The *Sears Motor Buggy* appeared for a year in 1909, and the *Sears Allstate*, built by KAISER-FRAZER, was in the 1952 catalog. In 1972, there was very close relationship between the OEMs and the dealers who sold their cars. There was also still a very close relationship between the government and the domestic OEMs. The federal and state governments had built the Interstate Highway system. CHRYSLER delivered tanks to the U.S. military.²² GM and FORD also supplied military vehicles. In 1979, the government loaned CHRYS-LER \$1.5 billion to keep it from going bankrupt. The car companies were not in the country-building business to the same extent as the railroads up to this point, but it wasn't far from it. Then there were decades when it didn't seem like there was any single goal or direction, either by the government or the car companies.

The 70s were, in many ways, the best of times and the worst of times. It was the height of the Vietnam War, and then the end of it. A period of severe recession followed which affected America's regions unequally. This is when the East Coast lost its technology lead to the West Coast and Silicon Valley. The Arab oil embargo forced America to confront the possibility of living without oil. It was a time when the President of the United States resigned. It was when America was humiliated by Iran in the hos-



²¹ https://www.cartalk.com/blogs/jim-motavalli/remembering-when-sears-roebuck-sold-cars

²² My father worked for the Chrysler Tank Division between 1960 and 1968. He was a draftsman in their design department in Scranton, PA.

tage crisis that lasted for more than a year. It was America's bicentennial, but there were questions about what the nation was celebrating. It was the time that the Baby Boomers were released from college and began to take up their places in business. And it was the time when Japan was ready for its return to the global business stage. Ted Levitt was right there to write about it.

Globalization hit the U.S. head on

"A powerful force drives the world toward a converging commonality, and that force is technology. It has proletarianized communication, transport, and travel. It has made isolated places and impoverished peoples eager for modernity's allurements. Almost everyone everywhere wants all the things they have heard about, see, or experienced via new technologies."²³

It was Toyota that he used to exemplify how globalization worked, and would become the dominant force in the coming years. Toyota was the first company to truly globalize its product, he wrote. Toyota was in the business of delivering the best combination of price, reliability, quality and delivery of products that were globally standardized while being adaptable to the specific market conditions. GM hadn't done it. It bought OPEL, VAUXHALL and HOLDEN. FORD hadn't done it. It set up separate manufacturing operations in Europe to build cars specially designed for that market. CHRYSLER hadn't done it. It bought French SIMCA. TOYOTA did it, then came DATSUN (NISSAN), HONDA, MAZDA, and SUBARU. They delivered cars that worked and, fit budgets from the highest to the lowest, and provided all the services that a customer needed and wanted—except for the one we are still waiting for, cars that fuel themselves.

Levitt wrote that Toyota and its cohorts "cracked the code of Western markets by discovering the one great thing all markets have in common—an overwhelming desire for dependable, worldstandard modernity in all things, at aggressively low prices. In response, they deliver irresistible value everywhere."

Between the early 1970s, the time that TOYOTA entered the global automotive scene, and 2019, TOYOTA's overseas sales increased by 1,400%, starting at around 650,000 vehicles. In 2022, it was the largest producer of cars for the third year running. In 2022, TOYOTA was 9th on the *Fortune 500 Global Ranking* list, with VOLKSWAGEN in 10th place. VW, and to a large degree, BMW and MERCEDES-BENZ,

²³ Levitt, Theodore. Production-Line Approach to Service. HARVARD BUSINESS RE-VIEW (MAY-JUNE 1983).

followed the TOYOTA playbook as global automobile makers that have understood the need to deliver customer value, not just cars. Much of that value was in the services that they delivered with every car they sold.

The 80s were a decade of deregulation with Reagonomics and Thatcherism. The first mobile phone was introduced by MOTOROLA, a hole in the Ozone layer was detected, and the space shuttle Challenger went up in flames, killing all seven astronauts, the Cold War ended with the fall of the Berlin wall, and in 1989, the first Toyota rolled off the production line in its Georgetown, Kentucky plant. JAPAN, INC. took over Manhattan's Rockefeller Center as well as acquiring FIRESTONE TIRE & RUBBER and COLUMBIA PICTURES.

For the next two decades, both America and Europe embraced globalization. All the Japanese and European car companies set up shop in the U.S. to avoid heavy tariffs, but not in Detroit. FORD went on a buying spree, starting with ASTON MARTIN in 1987 and continuing with JAGUAR, LAND ROVER, and VOLVO. GM brought SAAB. Before Jacques Nasser, CEO of FORD, was fired by Bill Ford in October, 2001, he had declared that cars would be "mobile telephones on wheels". I recall how the telecoms suddenly showed up at all of the automobile events, from motor shows to ITS conferences, and threw their weight around. Some of them were big enough at the time to buy any one of the car companies, and it looked like they might, but then it all came crashing down with the end of the *dot.com* revolution and the great assault on America on September 11th 2001.

This is when the government decided that it needed to have vehicles that drove themselves, and therefore had to have companies that made driverless cars.²⁴ Not everyone had to be in the driverless car business, but it was very clear that if you wanted to hedge your bets about your future viability as a car company, you had better have a chip on a driverless square because you never knew where the ball would land on the government's regulation roulette wheel. On top of this, there have been two guiding forces for the car industry during the past twenty years, and they came as usual from government: Make your cars safer and make them cleaner, or you will pay a heavy price. Western governments decided that they were in the life-saving business, whether it had to



²⁴ The DARPA challenges began in 2004, and these were the start of the driverless car craze that continues today.

do with preventing cancer from smoking, preventing damage to our internal organs from consuming alcohol, or injuring ourselves by driving cars, it was going to protect us from ourselves. It also decided that the air we breathe had to be clean. To satisfy the safety requirement, cars were gradually transformed from mobile advertisements for chrome into loaves of bread on wheels. To satisfy the requirement for cleaner air, car manufacturers have tried every trick in the book to reduce emissions coming out of tailpipes, and sometimes the tricks resulted in a company's executives landing in jail.

Addressing the car companies' late-life existential crisis

I, for one, wish that Theodore Levitt kept his pen moving through the '90s and up until the time he turned the lights out in 2006. He had so much good advice, even though as I said, his broad brush strokes at times covered over some details. What would he have said about the *dot.com* boom and bust? What would have been his advice to companies in the decade following 911 when homeland security dominated every decision? What would he have said about opening the door to China? What would his thoughts be about companies like Google, FACEBOOK, or AMAZON? I feel strongly that he would advise us to go back to the beginning, the customer. He gave us a wonderful example in *Marketing Myopia* that could be extended to delivering an intangible product today via the Internet, like a software update, or an intangible service, like electric charging.

"Let us start at the beginning: with the customer," he wrote. "It can be shown (he doesn't say where, but since I believe what he says, I won't quibble) that motorists strongly dislike the bother, delay, and experience of buying gasoline. People actually do not buy gasoline. They cannot see it, taste it, feel it, appreciate it, or really test it. What they buy is the right to continue driving their cars. The gas station is like a tax collector to whom people are compelled to pay a periodic toll as the price of using their cars. (Is this brilliant or what?) This makes the gas station a basically unpopular institution. It can never be made popular or pleasant, only less popular, less pleasant. Reducing unpopularity completely means eliminating it. Nobody likes a tax collector, not even a pleasantly cheerful one. Nobody likes to interrupt a trip to buy a phantom product, not even from a handsome Adonis or a seductive Venus. (There were gas station attendants back in 1959, both male and female. I don't recall any Adonises or Venuses, but I was

still a kid.) Hence, companies that are working on exotic fuel substitutes that will eliminate the need for frequent refueling are heading directly into the outstretched arms of the irritated motorist."

Our arms are still outstretched, Professor Levitt, waiting for those exotic fuel substitutes. What showed up instead just after the dust settled on the Great Recession was a company that is keeping car company executives awake at night. TESLA was around earlier, but it reared its head at about the same time as the global warming story started to gain traction. Since it started delivering its first production car in 2012, the Model S, it has convinced four million customers and counting to purchase its products. It has almost single-handedly convinced the governments of most countries that electric charging stations are not the same as gas stations when in fact they are-except exceedingly less convenient—and that it is there responsibility to see to it that they are installed. Whether it is gasoline or electricity, the process of paying a periodic toll as the price of using their car is the same, but it takes longer to make that payment with an electric charger than it does with a gasoline pump. The \$0.25 per gallon Dr. Levitt was paying the gas station attendant in 1959 to fill up his 1958 Nash Rambler (I imagine this is what he drove from his home in Belmont to his office at the HARVARD BUSINESS SCHOOL across the Charles River from Cambridge in the Allston neighborhood of Boston) is worth \$2.57 today, about a buck less than what a gallon now costs at the pump. He doesn't mention price as the principal objection to fuel stops. It's time spent doing something other than using the tool to do the job you are trying to accomplish, whether it's getting to work, picking up your mother-in-law at the train station, or taking the family out for a Sunday drive.

All of the global companies in the Planet are rushing to tool up for building electric cars because they have been told that they must. It's no longer an option. Customers are being given the financial incentives to purchase electric cars, and governments are quickly closing down the option for buying anything else but electric cars. Customers will not have a choice. TOYOTA SWEDEN stopped selling ICE vehicles in 2022. I know; I tried to buy one. Car companies, therefore, must be in the electrification process business, which means redesigning everything from the materials they use and how they obtain them, to the way they put their cars together.

However, this does not in any way suggest that car companies should get out of the car making business and into the car rental



business, or the taxi business, or the skateboard business. If you watched the Tesla Investor Day presentation on the 1st of March 2023, and listened carefully to what Elon Musk and each of his staff were saying, you would have heard two messages. One from Musk and the other from his staff.

Musk's message is one that has come through in all three of his master plans. It is that he, personally and as the leader of his companies, is in the Humanity-saving Business. To be clear, he is not in the Planet-saving Business. We all know that the Planet would be better off without humans, and eventually it will get rid of us before it self-destructs in a couple of billion years. The job of humans is to survive long enough to make sure we get off Earth before it's too late. This is why Musk focuses so much on telling us that the resources that exist on Earth are sufficient for us, as long as we use them properly. The idea of building cars that have the potential to allow the Earth to let us live on it a bit longer on it as sojourners, (and to continue to enjoy the style of life we enjoy with our cars and barbecues and golf courses, rather than having to squeeze into anthills or beehives in crowded cities), and to make money that would help him build the vehicles that would eventually take us off the Planet when the time comes (with his other company, SpaceX), ignited a spark in him, and now he is doing everything to convince everyone that only by buying his cars will humanity be saved because TESLA knows how to use the resources that are needed in the most efficient ways. Governments are greasing his skids because they want to be in the Humanitysaving Business as well.

His staff's message was that the people at TESLA know how to design and build cars that are great value for money—not just good, but GREAT. They did their best to convince us that they know how to design the batteries, how to build the machines that manufacture the parts, how to assemble the parts most efficiently, how to design the software that delivers safe and comfortable rides, and how to do it all globally. Anyone who actually works in the car industry who was listening will have understood that there was nothing new or earth shattering in anything that the staff said, but this was for the ears, minds and hearts of people who are not in the car industry. It seemed like they all wanted us to believe that they were inventing the car business all over again, and that because of all the techniques and technologies they were employing they would be able to build the world's best, most dependable, most enjoyable to drive, and least expensive cars on the market. There should be no doubt that the staff were saying loud and clear: We are in the business of delivering the best car on the Planet. TESLA is in the 'Best Car on the Planet Business'.

Doing Henry Ford one better

I believe Professor Levitt would have appreciated the staff presentations because each person brought their subject back to what it would mean for the customer. He would have made the connection to someone for whom he had a great deal of admiration—as a businessman. In his '60 HBR article. He wrote: "The profit lure of mass production obviously has a place in the plans and strategy of business management, but it must always follow hard thinking about the customer. This is one of the most important lessons we can learn from the contradictory behavior of Henry Ford. In a sense, Ford was both the most brilliant and the most senseless marketer in American history. He was senseless because he refused to give the customer anything but a black car.²⁵ He was brilliant because he fashioned a production system designed to fit market needs. He invented the assembly line because he had concluded that at \$500, he could sell millions of cars. Mass production was the result, not the cause, of his (decision to set) low prices."

What no one talked about during the Tesla Investment Day presentations was what happens during and after the sale. Even diehard TESLA fans will admit that the service part of the TESLA experience is poor or non-existent. In spite of this, the company has managed to sell over 4 million of its cars, 1.3 million of them in 2022 alone. There is no reason to doubt that it will sell 20 million cars as Musk has claimed as their fully reachable goal, especially if they can build a car that is truly affordable by a large portion of prospective buyers. Those sales will be conquests, meaning they will be to customers who owned other brands and switched to TESLA. As early as 2018, it was clear that the majority of TESLA buyers were not first-time buyers but buyers who had bought their TESLA to replace a "mainstream" car.²⁶ And these buyers report that they love their cars, but they don't love the

²⁵ During the early stages of the Model T production, the car was available in almost any colour, except black, including red, green, dark blue, maroon, brown, and grey as well as black. But from 1914 to 1925, the Model T came only in black because demand for the Ford Model T was so high that it would not have been able to deliver the cars if they had to paint them different colors.

²⁶ https://www.cnbc.com/2019/03/11/teslas-biggest-problem-is-customerservice-new-bernstein-survey.html

service experience. Waiting times for service visits continues to grow as the company sells more cars, and loaner cars can be hard to come by. Customers have to travel hours to get to the company's service centers unless they live in the few places where they are located. Other companies that are trying to follow the same model as TESLA, such as RIVIAN and LUCID, will have the same problem. The Chinese brands that try to come into the European and U.S. market without having agreements with independent or brand-specific dealerships, will have the same problem.

There is nothing that TESLA has that FORD, GM, VW, TOYOTA or most of the established and global automotive OEMs do not have, except a leader who has matched the business he is in with the business that the governments of the world also want to be in, the **Humanity-saving Business**. Nothing has really changed from the time that the railroads and the U.S. government were in full agreement that they were in the **Country-building Business**. But there is quite a lot that FORD, GM, VW, TOYOTA and most of the car companies have that TESLA does not have, both on the capitalintensive side and the people-intensive side. They certainly have more to offer than what the Chinese companies have that don't have local partners, such as GEELY with VOLVO CARS.

Instead of trying to re-define their businesses to attempt to match what they believe customers want, like no ownership and pay-bythe-drive, they should focus on delivering vehicles with the best value in both product and service. Instead of chasing buyers who aren't interested in owning cars—or, because they are leveraged to the rafters because of their student loans or condo mortgages they are carrying, can't even think about owning a new car—focus on the folks who are settling in places where they will both want and need cars. Austin, Texas comes to mind. Besides the "What business are you in?" guote, one of Ted Levitt's other most oftenquoted sayings is "People don't want quarter-inch drills, they want quarter-inch holes." Car companies shouldn't interpret this to mean that they should be offering their customers the service of coming to their premises and drilling quarter-inch holes for them. Sell a good drill that doesn't wear out with lots of different sized bits that don't break, and folks will be able to drill their own holes when and where they want them. Isn't that why we buy our own tools—and, after all is said and done, cars are just tools. So were trains, and they helped to build an entire country.



About Michael L. Sena

Through my writing, speaking and client work, I have attempted to bring clarity to an often opaque world of highly automated and connected vehicles. I have not just studied the technologies and analyzed the services. I have developed and implemented them, and have worked to shape visions and followed through to delivering them. What drives me—why do what I do—is my desire to move the industry forward: to see accident statistics fall because of safety improvements related to advanced driver assistance systems; to see congestion on all roads reduced because of better traffic information and improved route selection; to see global emissions from transport eliminated because of designing the most fuel efficient vehicles.

This newsletter touches on the principal themes of the industry, highlighting what, how and why developments are occurring so that you can develop your own strategies for the future. Most importantly, I put vehicles into their context. It's not just roads; it's communities, large and small. Vehicles are tools, and people use these tools to make their lives and the lives of their family members easier, more enjoyable and safer. Businesses and services use these tools to deliver what people need. Transport is intertwined with the environment in which it operates, and the two must be developed in concert.



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