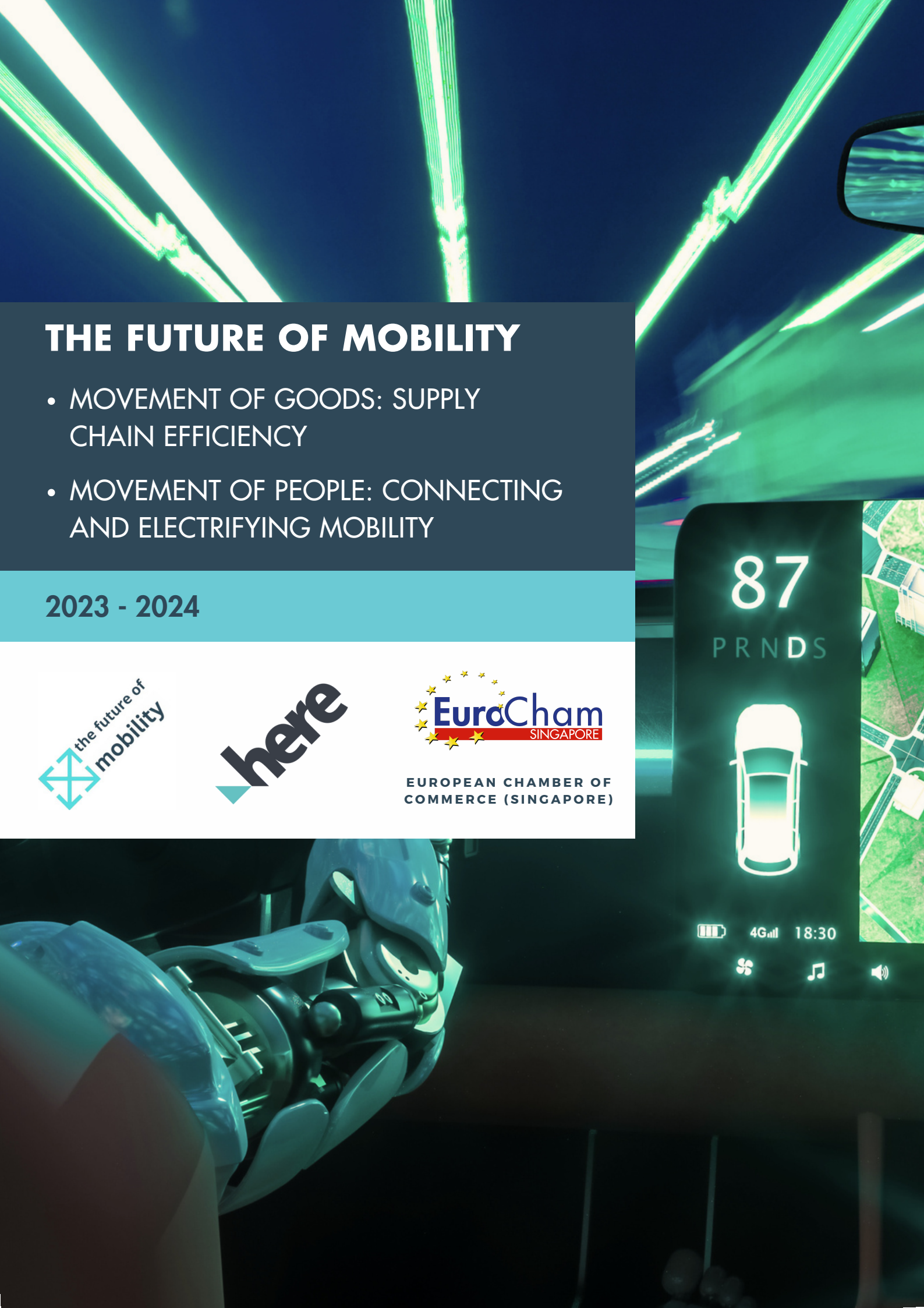

THE FUTURE OF MOBILITY

- MOVEMENT OF GOODS: SUPPLY CHAIN EFFICIENCY
- MOVEMENT OF PEOPLE: CONNECTING AND ELECTRIFYING MOBILITY

2023 - 2024

the future of mobility

here

EuroCham SINGAPORE

EUROPEAN CHAMBER OF COMMERCE (SINGAPORE)

CONTENTS

INTRODUCTION

The passenger and commercial vehicle industries are undergoing major transformation as new technologies are innovating and disrupting the movement of people and goods globally.

Cities have to combine multiple modes of transport for passengers and goods - such as private cars, public transport, delivery fleets - into integrated transport systems while ensuring safety, speed and reliability.

At the European Chamber of Commerce Singapore, the Smarty Mobility Committee leads the discussion on two key topics –

- Rethinking how we can move goods efficiently to adapt to shifting supply chain demands and disruptions both globally and in Asia.
- Connecting and electrifying mobility.
    - Connected mobility is all about creating a digital cockpit for vehicles that are more connected, automated, electrified and software-defined. It offers a unique and personalised experience that enhances road safety and navigation, while offering comfort and convenience.
    - Electrification of vehicles supports the shift towards sustainable mobility for cleaner, greener cities.

INTRODUCTION

The Future of Mobility programme, now being run for the second time, covers broad topics such as:

- Movement of people
- Connecting and electrifying mobility and movement of goods

Through breakfast talks, luncheons, member exclusive closed-door discussions, and written reports, EuroCham creates ample opportunities for European companies to step forward, connect with their peers and drive discussions forward with relevant stakeholders.

This year's Future of Mobility programme builds on recommendations from previous iterations and explores newer topics including:

- Electric vehicles and the role of infrastructure
- Challenges of EV adoption
- Digitalisation of fleet management
- Internet of Things and supply chain visibility
- Sustainability in the movement of goods and people

We unite participants from European automotive fleet management, transport, and logistics sectors with their counterparts from Singapore, along with governmental bodies, fostering substantial conversations. During these discussions, participants share insights on their companies' goals, advancements, and strategies in the realm of mobility. Through this exchange, our aim is to bring clarity to sustainable solutions, address challenges, and capitalise on emerging opportunities.

EuroCham is grateful to HERE Technologies as our knowledge partner for The Future of Mobility programme 2023.

DEFINITION

THE FUTURE OF MOBILITY

The Future of Mobility refers to the dynamic and multifaceted concept that involves a holistic approach to transportation, integrating technology, sustainability, and societal needs to create more efficient, safe, and environmentally friendly mobility solutions.

KEY ELEMENTS

- Autonomous Vehicles: The development and integration of self-driving or autonomous vehicles are a significant aspect of the future of mobility. These vehicles have the potential to reduce accidents, increase efficiency, and provide new mobility options.
- Electric and Alternative Fuels: The shift toward electric vehicles (EVs) and alternative fuels is a crucial component of future mobility. This transition aims to reduce dependence on traditional fossil fuels, decrease greenhouse gas emissions, and promote sustainability.
- Connected Infrastructure: The future of mobility involves creating smart, interconnected transportation systems. This includes communication between vehicles, traffic lights, and other infrastructure elements to improve traffic flow, enhance safety, and optimise transportation networks.
- Shared Mobility Services: The rise of ride-sharing platforms, car-sharing services, and other shared mobility solutions is transforming the way people access transportation. Shared mobility promotes efficiency, reduces the number of vehicles on the road, and addresses urban congestion.
- Urban Planning and Design: Rethinking urban planning and design to accommodate new transportation trends. This includes developing pedestrian-friendly spaces, integrating public transportation with emerging technologies, and creating sustainable and livable urban environments.
- Data Analytics and Artificial Intelligence: Essential for optimising transportation systems. These technologies can be applied to traffic management, route planning, predictive maintenance, and other aspects to enhance efficiency and reduce congestion.
- Regulatory and Policy Frameworks: Governments and regulatory bodies play a crucial role in shaping the future of mobility through the implementation of policies that encourage innovation, ensure safety, and address societal concerns related to transportation.

PANEL DISCUSSIONS

MOVEMENT OF GOODS - SUPPLY CHAIN EFFICIENCY

May 25, 2023

INTRODUCTION

The last few years have affected our understanding of the future of mobility in several crucial ways. Both the COVID-19 pandemic and geopolitical conflicts had significant impacts on supply chains, and challenged several theories of supply chain management. For instance, multiple companies were running just-in-time inventory models that proved infeasible. There was also an overall lack of information on supply chain disruptions, which inhibited companies' abilities to make the right decisions even when they wanted to scale their operations. Lastly, both on the supply and demand side, people's welfare was impacted.

These challenges, though prevalent in 2023, are likely to persist in some way, shape or form, into the future. As a result, the sector is seeing a lot of dialogue about how to prepare for the future and take care of the macro-environment.

On May 25, 2023, a panel discussion held at the Singapore office of HERE Technologies on the subject of supply chain efficiency revealed key insights about the supply chain ecosystem.

The panel discussed the impacts of the last few years on the supply chain ecosystem, including the movement of production closer to the target market, the diversification of sources, B2C last-mile delivery operations, as well as the growing investment in technological platforms and technological solutions. Moving forward, real-time visibility, increasing productivity, and the optimisation of transport and network capacity will be crucial. Here, there is the need for horizontal information sharing across various functions, as well as targeting blind spots in efficiency, like the high cost of storage during the operational process. Additionally, sustainability goals will remain of paramount importance to any discussion of optimisation. Digital transformation is a pivotal functionality to driving all these goals.

Panel members:

Abhijit Sengupta
Senior Director and Head of Business, Southeast Asia & India
HERE Technologies

Kushal Rajveer
Head of Supply Chain, Asia Pacific, Oceania & Japan
HERE Technologies

PANEL DISCUSSIONS

LEVERAGING DIGITAL TECHNOLOGIES TO OPTIMISE FLEET MANAGEMENT

Matthew Gallagher
Sales & Marketing Director
Kuehne+Nagel Singapore
& Malaysia

Innovative digital technologies can assist with optimising fleet management, spearheading the goals to reduce costs, save time, and improve sustainability. Technology and automation will be a crucial driver of optimisation in the future. With technology and automation, businesses are able to handle an immense amount of scale and complexity, while improving efficiency and minimising errors, benefitting both cost benefits and safety. While there are concerns about technology and automation replacing employees, it is likely that job scopes will shift in conjunction with the needs required by automation, rather than disappearing altogether.

New technologies can also optimise fleet management with respect to last-mile deliveries. In ecosystems like the Philippines, Malaysia, and Indonesia, drone deliveries could be increasingly valuable. Electric vehicles can also be critical to the last-mile delivery space. In the future, the relevant question will likely be how to go about linking these technologies with various ecosystems, given that they might completely upheave operations planning for that ecosystem.

Efficiency and sustainability often go hand-in-hand, as such, new digital technologies can also advance sustainability goals. Automation and technology create swaths of data which can be used to minimise waste and achieve peak efficiency. For instance, shipping companies can make use of programmes to relay information to vessels in advance to precisely calibrate arrival speeds to terminals, making turnovers more sustainable and efficient. Generally, automation and technology directly promote the smart use of energy and sustainability efforts. One example is how companies can lower carbon emissions when their fleet operations are optimised and when trucks have routes planned out for them to avoid traffic congestions.

PARTNERSHIPS AND COLLABORATIONS TO ACHIEVE END-TO-END AND REAL-TIME VISIBILITY

While most companies are still lagging when it comes to visibility, exacerbated by COVID-19, the industry is seeing an acceleration in the adoption of technology specifically tailored to drive greater supply chain visibility. More and more supply chain leaders are being given a seat at the table – enabling conversations and partnerships that promote transparency. From HERE Technologies' perspective, location intelligence is a key component of the future of end-to-end supply chain visibility.

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These data points will allow progression towards the creation of a digital reality index, which can enhance the supply chain at the pre-planning, execution, and post stages. Furthermore, location intelligence can help create a baseline where further data can be used to measure how different variables affect sustainability – in effect, helping various companies synthesise maturity graphs which will inform an understanding of supply chain health.

Shahjar Jogi
Head – Customer Success, APAC & ANZ
FarEye

The supply chain ecosystem can be greatly enhanced through a common marketplace or data highway problem. In Singapore, the promulgation of SGTradeX, a public-private partnership, has allowed for greater visibility of the holistic realities of the supply chain. These sorts of partnerships do require a significant consortium of players to be at the table and participate, which is somewhat challenged by the sheer diversity and number of players in the logistics industry. In the future, with the rapid increase in various mergers and acquisitions, we might expect the playing field to consolidate further to allow for more collaboration. While some initiatives do exist, governments often do not have concrete solutions that facilitate the adoption of supply chain visibility solutions.

Tay Huay Ling
Associate Professor
School of Business/ Logistics and Supply Chain Management
Singapore University of Social Sciences

However, even with the addition of data, interpretation is important. Supply chain planning is contingent on having the correct information, but also the correct interpretation of this data – for this reason there is a need for more people, offices, and expertise to help companies interpret the relevant data. This will also drive visibility and the connection between the realities of warehouses and stocks of products and the ability to effectively manage the supply of these products.

Lastly, visibility is also key to last-mile deliveries which is still the most expensive part of the supply chain. Here, visibility becomes important to both internal and external stakeholders. For internal stakeholders, predictive analytics drive business decisions. Meanwhile, externally, consumer experience of visibility matters – customers must be able to access the data consistently with every delivery. Another important factor to consider for last-mile players is cash management linked to proof-of-delivery. Here, visibility is critical for the parcel journey to be completed and for the order to be considered "completed."

PANEL DISCUSSIONS

CONCLUSION

Location technology will continue to transform supply chain management at every level affecting the flow of goods and information available. It can and should be leveraged to optimise fleet management and advance the twin pillars of efficiency and sustainability.

Furthermore, location technology can be used to enhance end-to-end, real-time, visibility, which is critical for internal stakeholder planning, last-mile deliveries and the overall consumer experience.

PANEL DISCUSSIONS

CONNECTING AND ELECTRIFYING MOBILITY

August 3, 2023

INTRODUCTION

As the world's leading location data and technology platform, HERE Technologies has a unique stake in the electrification of mobility and proliferation of electric vehicles (EVs).

Electric vehicles are becoming increasingly indispensable to discussions about sustainability, especially in ASEAN, where the development of a regional EV ecosystem is a key priority for the region. However, facilitating this ecosystem requires a number of considerations. Despite the growing demand for EVs in Southeast Asia, countries are progressing at uneven paces when it comes to EV adoption.

Original Equipment Manufacturers (OEMs) face challenges with the shift towards EV production and manufacturing. Energy providers face issues with charging structures and scalability, as do governing bodies. Furthermore, drivers of EVs face unique challenges with the knowledge gap in the consumer experience. There is a need for updated knowledge on charging stations, the availability of charging points, the compatibility with different EVs, and the cost of charging. For its part, HERE Technologies is working on providing connected EV solutions that aim to help OEMs and partners create robust, scalable solutions for their consumers.

In a panel discussion held on August 3, 2023 at the HERE Technologies office in Singapore, panel members representing OEMs, energy providers, and maps and location solutions had a rousing discussion about the pivotal role of technology in creating a seamless and personalised driving experience. The panel explored the challenges and opportunities associated with EV adoption from a variety of perspectives

CHARGING STATIONS – CHALLENGES AND OPPORTUNITIES

There are a variety of issues around charging points – for one, there is the challenge of sharing charge points, which encompasses how fast the charging stations can power a vehicle, and whether these stations will misuse power that is meant for the general building. Additionally, the scalability of the power grid is a concern. In Singapore, 80% of the current EV customers have landed properties. However, as more and more consumers adopt EV, charging stations will need to be implemented in more shared spaces, which will require cooperation with governmental bodies.

Panel members:

Stephen Lee
Head of Partnerships, Singapore
HERE Technologies

Abhijit Sengupta
Senior Director and Head of Business, Southeast Asia & India
HERE Technologies

PANEL DISCUSSIONS

OEMs also face challenges in this field. When they cooperate with power suppliers, as Audi has in the past, OEMs can set up destination charging networks, but operations like this are typically costly and will also increase the costs of the car. One of the main challenges for OEMs is to determine whether they should invest in charging networks, or relinquish these issues to energy providers.

Companies specialising in location services can help with disseminating knowledge regarding the whereabouts of charging stations. However, the availability of charging stations (i.e. whether they are occupied) will also be relevant to the consumer experience in the future. The consumerfirst perspective will entail a consideration of various intelligence points.

Markus Schuster
Managing Director
Audi Singapore

THE COST OF EVS, A SHARED RESPONSIBILITY

Southeast Asia presents a diverse landscape in EV adoption, with Singapore at the forefront. This progress is largely attributed to the upfront investments made by the Singapore government through dedicated programs, budgets, carbon tax and initiatives. Funding allocated towards electrification and smart city initiatives lays the foundation and incentivises consumers and operators to switch to EVs through lowered upfront costs.

Ultimately, the public and private sectors share a responsibility in Singapore's sustainability and electrification journey. As the EV market matures, new business models have emerged from the earlier catalytic investments, potentially shifting how users pay for and utilise EVs.

Beyond of cost reduction, change management strategies tackling, for example, range anxiety or charging infrastructure concerns, could become crucial to alleviate initial uneasiness and enable the EV ecosystem to flourish.

Yvonne Zhang
Sustainability & Climate Director
Deloitte South East Asia

EVS AND SUSTAINABILITY

The primary reason for transitioning to EVs is to reduce carbon emissions and curb the impacts of climate change. There are also health benefits to not having carbon and exhaust from transportation systems directly pumped into the air. Electric vevhicles are one piece of the larger journey towards net zero, and while they are still powered by electricity from natural gas points, EVs are far more efficient per unit of carbon yielded as compared to traditional vehicles. Given the 90% energy efficiency rate, compared to a traditional car's 15%, EVs are also far more efficient.

PANEL DISCUSSIONS

From the OEM perspective, beyond putting EVs on the road, there must also be a consideration of the entire value chain. Public transport is also a key player in the transition to EVs. Similarly, considering the growing importance of transport logistics, the game must extend beyond passenger vehicles, to include trucks and logistics vehicles. The conception of EVs, in and of itself, must extend beyond passenger vehicles to consider the entire set of players and stakeholders who could benefit from the interconnectedness of the technology.

Franck Vitté
Managing Director
Bluecharge

INNOVATION AND THE FUTURE OF THE EV ECOSYSTEM

Looking ahead, mobility services in general are likely to evolve. Massive urbanisation might push people away from buying their own cars. Car-sharing or ride-sharing applications are likely to become more popular in heavily urbanised areas – and these sectors will also interact with the proliferation of EVs in unique ways. The transition to smart houses and smart cities will also affect the EV infrastructure.

Another major disruptor is autonomous vehicle technology. A vehicle spends a majority of the time parked – with autonomous vehicles, there is a possibility to reduce vehicles on the road by 50%. Autonomous vehicles will also require the development of new technology, such as charging infrastructure that allows for cars to plug themselves into, and communication services between charging structures and cars.

Paul Welsford
Head of Business
Development (E-Mobility)
ENGIE South East Asia

CONCLUSION

The adoption of EVs will necessitate a variety of considerations from numerous stakeholders. Strides are being made in industry collaboration to match the leaps in technological advancement. Communication will remain key to coordinating the varied interests of energy providers, OEMs, location services providers, and consumers.

As far as EVs are concerned, the destination is highly important, but the journey is even more significant.

PANEL DISCUSSIONS

AI IN SMART MOBILITY, SHAPING URBAN MOBILITY IN SINGAPORE

November 21, 2023

INTRODUCTION

In a panel discussion held on November 21, 2023 at the HERE technologies Singapore office, panel members representing HERE Technologies, Continental Automotive, Audi Singapore and Energy research institute at NTU discussed the role of 'ArtificialIntelligence in Smart Mobility, Shaping Urban Mobility in Singapore'.

The session delved into the Singapore urban mobility challenge. With a 66% increase in domestic travel, there is not enough space to increase the number of vehicles at the same rate as the population growth. Car-lite precinct testing has been done in the One-North area. The results have shown that in the short term there is an increased use of ride sharing services (such as Gojek). There is also an increased proliferation of car-sharing services (BlueSG, GetGo, TribeCar, Drive Lah) and some transition to using public transport. In the longer term, there will be use of autonomous vehicles (AVs) services with the use of electromobility and Software Defined Vehicles (SDVs).

CHALLENGES OF AV

The challenges of Autonomous Vehicles are centered around the quality of training database, information defined in the software, and its adaptation to diverse cultural, population, and industry contexts. Despite achieving 100% detection accuracy, the prediction aspect, powered by AI and machine learning, still encounters numerous errors.

Regarding the time frame, AVs will become a norm gradually over time.

FUTURE OF AV

Autonomous vehicles do not revolutionise overnight. Its integration will occur gradually, emphasising safety. Predicting human behaviour remains a challenge, making AV zones more likely for public transportation than private use. Due to privacy concerns and other factors, the seamless integration of Unmanned Aerial Vehicles (UAVs) flying next to residential areas is not anticipated in the near future as well.

Panel members:

Niels de Boer
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University

Bart Sweerman
Senior Vice President,
Global Services & Support
HERE Technologies

PANEL DISCUSSIONS

SDV'S

Software Defined Vehicles (SDVs) represent a transformative shift in the automotive sector, moving away from conventional steel-built vehicles. Unlike traditional vehicles, where most of the vehicle's functionality is hardware dependent and static after manufacturing. In software-defined vehicle (SDV), functions are powered by software. By separating software from hardware, it allows for rapid and ongoing development, as well as the seamless integration of new features and software updates throughout the vehicle's lifespan.

Yap Kok Hoong
Project Manager of the CTO Office
Continental Automotive

SHIFT IN OEMS AND INNOVATION

This shift has posed challenges within OEM companies, necessitating a re-evaluation of the business itself and the integration of new capabilities. In Singapore, the Land Transport Authority (LTA) is limited by current operational challenges in taking a strategic perspective for the future, hence exhibiting less risk appetite compared to China. Consequently, innovation capacity is affected. China, with a forward-thinking approach, has OEMs taking liability on insurance issues, while Singapore's legislator prioritises caution to ensure safety.

Markus Schuster
Managing Director
Audi Singapore

USE OF AI IN SMART MOBILITY

Artificial Intelligence is already used in applications today in the form of advanced analytics by private hire vehicles to optimise trip pricing. EzLink analytics are used by LTA to optimise public transport requirements and deployment to meet those requirements. For vehicle safety, Automatic Emergency Braking (AEB) and Automated Lane Keeping Assist (ALK) are in use. Moving ahead, Smart Fleet Analytics and Optimisation, Predictive Maintenance and AV applications will require access to a larger pool of data. Data quality is needed, not data quantity. In the beginning you need more data but there is a point of diminishing return once it is trained properly, but it is very much application-dependent. If you pump more training data into a model, but data quality is poor, then the AI gets worse, not better.

AI is a technology domain, not a specific product. For every high profile chatbot which people are concerned about there is also a machine learning application to optimise an engineering process to reduce cost and improve reliability which is completely invisible to anyone except the engineers who implemented it. You can regulate certain aspects of certain applications but there will not be something like "AI regulation".

CONTRIBUTORS

EuroCham is grateful for the contributions which made this report possible. A special thanks is to be extended to HERE Technologies for being the knowledge partner for this report and the following people and entities who joined our panel discussions as speakers, panel members and moderators:

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AI IN SMART MOBILITY, SHAPING URBAN MOBILITY IN SINGAPORE

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