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The future of mobility is autonomous, connected, electric and shared. But to really understand that vision of the future of mobility we need to look beyond vehicles, to individuals and society. Most importantly, what do people want? And how do they want to move – and live.

In this hoganlovells.com interview, Hogan Lovells partner Patrick Ayad, Global Leader of the firm's Mobility and Transportation sector group, and Lance Bultena, Director of Thought Leadership for Mobility and Transportation, discuss the future of mobility and how ACES relates to the concept of Living Mobility.

### What's next for ACES? And what is Living Mobility?

**Ayad:** The acronym ACES or CASE, which stands for Autonomous, Connected, Electric and Shared, is a business concept that was developed a few years ago. If we think about the future of mobility, particularly in the last couple of years, ACES is still the general direction where the industry is heading.

There are discussions about reframing the “S” in ACES. Rather than “Shared” some are starting to call it “Smart Mobility” or “System Integration.” In part, that is because there are struggles with shared mobility in light of the COVID-19 global pandemic. But reframing from shared reflects a vision beyond automobiles.

In terms of innovation, we are seeing an emphasis on AI, sensors and connectivity. There is a clear trend in thinking about convergence of all transport modalities – planes, drones, trains, micro-mobility and vehicles– and how it all comes together into mobility or, more broadly, an ecosystem. That system is also about moving people and goods.

So, again, we think ACES is still the general direction for the future of the global automotive industry and more generally the future of mobility. But we thought about how we could approach this somewhat differently and adjust the perspective to see it from a customer's point of view.

The customer perspective is what we are calling Living Mobility. Living Mobility is a shift of our mindset in how we look at the future of mobility. And Living Mobility for us comes down to four descriptive elements: Objective, Inclusive, Unifying and Sustainable.

## How did you develop the Living Mobility concept and the elements within it?

**Bultena:** In taking the perspective of an individual consumer or customer we realized that ACES focused on the car or vehicle but customers have many more transportation options – there is the traditional public transportation system, new micro-mobility options, even a vision of drones flying people in the future. We noticed that mapping programs no longer provide merely navigational options, they provide different transportation options as well. When the way we move is changed this does not only change the car or vehicle, it changes us by shifting what we do and how we think and that in turn changes society.

We saw this shift on display when we attended CES in 2020. It was pretty fascinating how the traditional automotive players presented themselves. Many OEMs didn't have a traditional car at their booth and this at what has essentially become the dominant auto show in North America. They showed a vision not merely a product.

The breadth of that vision was maybe easiest to see in a display Toyota had about a “woven city” it was planning to build near Mount Fuji. The vision of that model city explored not mere traditional cars or vehicles but several modes of transportation. And it involved how people would live in this new “smart” or connected city and what technology they would have in their homes, including robots. Other displays throughout the show also explored this “smart” interconnected vision for how individuals would soon live with technology. We realized this vision was not just about transporting people it was about services that meant new ways of shopping and delivering goods and new ways of moving and tracking freight.

We were fascinated by the fact that automotive companies were not showing what we'd drive but how we'd live. And we strongly believe that the way we move is closely connected with how we live. “This is Living Mobility” was our conclusion. We loved the phrase but we had to define what it meant. We mapped the concepts behind the ACES acronym to more holistic terms that we felt defined the collective vision we saw. Through conversation “Autonomous” became “Objective”, “Connected” became “Inclusive”, “Electric” became “Sustainable” and “Shared” became “Unifying”.

## Autonomous and Objective. How does autonomous technology relate to Objective Living Mobility?

**Ayad:** In autonomous driving a machine using sensors and computational capacity drives rather than an individual. This process is an objective one. The machine does not drive with its emotions based on how it feels – like we do as humans. It is not distracted. Ideally, it does what it is designed to do without error. It is objective.

As sensors are increasingly embedded in almost everything and that data is analysed and utilized by artificial intelligence so many of the questions found with autonomous driving apply more

generally. The most fundamental is: does it work? In other words, does the vehicle or the system reliably do what it is supposed to do in a broad range of real world conditions. This requires an objective view. Other important questions are about the appropriateness of the objective decisions made.

There are lively discussions about ethical rules for autonomous vehicles. Frankly, there are arguably more pressing questions from an engineering perspective. But from a customer perspective, this seems to be an important point. So we need to form an objective view on how we solve these potentially ethical issues that arise so people are able to trust in this technology. That will require a whole range of new government policies.

But it will also require transparency. This is an important point. We need to make the technology transparent to customers. Suppose a customer prefers dogs over cats. You may want to tell that person the car would make a decision favouring the cat and not the dog and this person would not purchase the vehicle. This may be a silly example but it shows that customer transparency is key. It's also key if you think about the data that we are collecting in these vehicles. Transparency is very important for customers to accept the technology.

## **Connected and Inclusive. What does Inclusive mean in terms of connectivity in the transportation and mobility world?**

**Bultena:** A connected vehicle is no longer “an island”, it is included in the broader world through the Internet. It communicates with surrounding vehicles and infrastructure for operational purposes, but it also enables robust interaction for passengers to meet their entertainment desires or their functional needs.

The mobility systems of the future will be inclusive in a more vivid fashion than mere connectivity to the Internet. If transportation systems are cheaper and denser this will help those with fewer financial resources. It may provide greater options for those who live in rural or more challenging environments. Drone delivery could provide not merely faster access to materials at a lower cost but bring some products and services to places not previously reachable.

This new mobility system will allow new vehicle designs and the driver assistance capacity, and ultimately the fully autonomous capacity, should provide individual transportation options to those who are aged, too young, or who have a visual impairment.

Accessibility is key to inclusiveness both in terms of physical access to the new modes of transport but also in terms of the costs. And it goes back to the point of customer acceptance. As new technologies and business models evolve they almost certainly will tie us together in new ways and create new opportunities and challenges.

## **Shared and Unifying. How do shared services relate to Unifying Living Mobility?**

**Ayad:** The launching point for our thoughts were shared vehicle services and traditional modes of public transportation. But a mobility system is really much more than not owning a vehicle or riding a train with someone else. The focus of Living Mobility is on the system and not just discrete modes of transportation.

Unifying goes hand-in-hand with Inclusive. But it also encompasses all the other categories as well. The most important thing about Unifying is that this is where all stakeholders come together. We need a holistic approach when we think about the future of mobility.

One of the interim CEOs of a car manufacturer once said “Silos are our death.” If that is true for a complex design and manufacturing operation it is absolutely true for a mobility revolution taking place on a global scale. We need to break through these silos. And it’s already happening. We see a lot of collaboration going on between public and private sectors – and that is hugely important for the introduction of new mobility solutions.

Where many stakeholders are involved and cooperation is needed between the public and the private sectors it is an exciting time for lawyers that explore the changes in laws and regulations rather than just assist with compliance on existing static rules for current business models.

Micro-mobility is a good example. I was totally fascinated when companies started introducing micro-mobility with e-scooters in various cities. But even in Europe there are no harmonized rules or standards for this technology. Do you need to wear a helmet? Do you drive the e-scooter on the road or on the sidewalk? It’s totally confusing. For example, I was traveling to Paris, London and Berlin in the same week and used e-scooters in each city. It was really not clear to me what the rules were. And this is totally confusing for the customer. Again, customer acceptance is key.

While there is lots of discussion about standards at the local, national, regional or even global level it is clear we cannot make progress on any of those levels without clear and accurate analysis. SAE is an organization that tries to standardize rules and came up with the levels of autonomy for autonomous vehicles. Last year, SAE came up with standards for micro-mobility, too. At this stage, it’s just a categorization of these different types of micro-mobility. It is an important and good start but we need to do more in this area.

The mobility revolution is really just beginning. As the technology and the business models evolve the governmental rules will have to evolve. There is a lot of work to do.

## **Electric and Sustainable. Is Sustainable Living Mobility all about electrification?**

**Bultena:** Electrification is certainly a focus for the automotive industry. Governments all over the world have been pulling the industry toward electrification for the last few years. The industry is moving quickly in that direction. There are significant hurdles ahead. For example, electrification is one important aspect of sustainability but battery technology itself will also need to be

sustainable. This process will require the cooperation of industry and policymakers and ultimately the acceptance of consumers.

The vision of sustainability in Living Mobility goes well beyond electrification of a vehicle's drive-train and even beyond how that electricity is produced or whether fuel cell vehicles are an option. The idea is holistic and includes evaluating the environmental sustainability of the manufacturing process, the supply chains, the materials used, and the recycling of them once their mobility use ends.

And it's not just environmental protection. Sustainability is also about protecting economic and social development. We see more "upstream" questions about the supply chain and not just in terms of its cost or reliability. How are suppliers in other parts of the world treated? How and where are raw materials and resources obtained? Sometimes the questions look "downstream" and explore how the product might impact consumers or their community. Governments are looking into these issues and there are initiatives on these topics in supranational organizations like the United Nations and the EU. All these questions address how we behave as humans in a social context. Once again we are brought back to looking at mobility from a customer and a societal perspective rather than just looking at a set of engineering questions and regulatory standards for a specific product.

For more insights into the Living Mobility elements, read our [Living Mobility Spotlight Q&A series](#).

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