Transforming Mobility:
Converging Autonomous, Connected, and Shared Transportation for Improved Fleet Management

Abstract

With evolving customer demand for holistic mobility, the convergence of four revolutionary forces - connected, autonomous, shared, and electric - are crucial in transforming how users commute from one place to another.

This has resulted in transportation services transitioning from a product-oriented mobility model to a service-oriented one, where fleet mobility services take precedence over vehicle ownership. As customer demands evolve due to COVID-19 alongside changing global dynamics, fleet mobility services offer a resilient and adaptable way to fulfil customer requirements. Fleet services offer innovative and first-hand solutions to enable the customers to make the best out of their journey. However, enabling these services will require an improved fleet management environment coupled with a strong integration in mobility services to serve the customer with utmost safety and care.

This white paper discusses how innovative business models in fleet management, backed by a connected ecosystem, can manage disruption in the transportation industry and cater to customer needs in the future in the most efficient, safe, and secure way.

Future of Transportation: Three Key Business Models

Travel in the future will be more dynamic and innovative than ever before with vehicle fleets consisting of electric, hybrid, connected, and autonomous cars[1]. However, to deliver secure, reliable, safe, and enjoyable transportation, managing the technology and communication that underlie mobility will be crucial.

This requires traditional mobility players to bridge the gap between physical and digital models. Bringing ecosystem stakeholders together, including technology enablers, platform and carrier providers, fleet owners, financial institutions, and telecom service providers, can enable mobility players to create new models[2].

Boosting Revenue with Shared Autonomous Vehicles

A fleet of shared autonomous vehicles (SAVs) can offer a low-cost, efficient, and safe mobility option to travelers. SAVs are driverless cars which combine various car-based mobility services such as car sharing, cabs, and ride sharing into a single mode of transportation, eliminating the need for a driver to move around. However, as the model grows, more vehicles are added on to the platform, making fleet management a challenge. Fleets must be carefully planned and scheduled precisely to cater to the varied demands and preferences of customers to provide complete customer satisfaction. Autonomous vehicle fleets should be maintained through continuous software updates, faster turnaround times between rides, cleanliness, and routine checks[3]. This will create demand for an additional set of service providers in the ecosystem or will require existing providers to extend their services.

In addition, the data created by SAVs based on vehicle parameters, passenger preferences, and the surrounding environment should be managed and analyzed to provide enhanced services to the customer. This can help leverage a wider connected ecosystem for additional revenue streams.

[1] Forbes; *Fireworks About ACES As Key Acronym For The Future Of Mobility And Self-Driving Cars; July 4, 2019; https://www.forbes.com/sites/lanceeliot/2019/07/04/fireworks-about-aces-as-key-acronym-for-the-future-of-mobility-and-self-driving-cars/#419f1440654e*

[2] Business Wire; *Mobility as a Service Markets, 2030 by Service, Solution, Transportation, Vehicle, Application - ResearchAndMarkets.com; August 14, 2019; https://www.businesswire.com/news/home/20190814005495/en/Mobility-Service-Markets-2030-Service-Solution-Transportation*

[3] International Journal of Sustainable Transportation; *Shared autonomous vehicles and their potential impacts on household vehicle ownership: An exploratory empirical assessment; March 15, 2018; https://www.tandfonline.com/doi/abs/10.1080/15568318.2018.1443178*
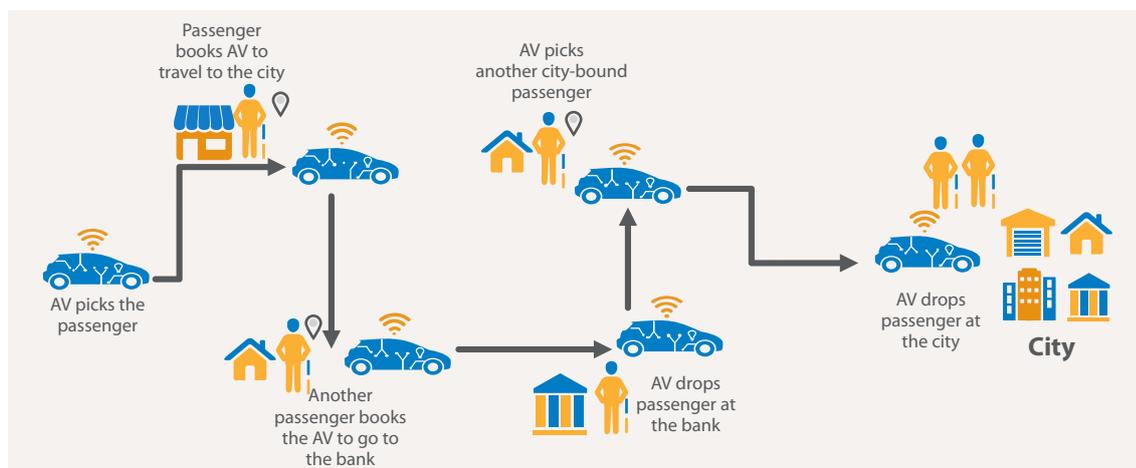
Figure 1: Shared autonomous vehicles - How pick-ups and drops take place

Customized Travel Solutions with Mobility-as-a-Service

Customer journeys these days are all about being safe while traveling. These journeys are not always simple and straightforward, as customers can consider multiple modes of transportation. However, with COVID-19, travelers now seek customized travel solutions to ensure utmost safety in such challenging times. Mobility-as-a-service (MaaS) integrates different transportation service providers such as car sharing, cabs, bike sharing, and public transport onto a single platform[4]. It covers all stages of the journey end-to-end, including planning, booking, ticketing, and payment transactions, with an eye for passenger safety, enabling companies to offer customized travel solutions.

MaaS bypasses the regular boundaries of other, different modes of transport and creates a borderless platform for transportation, all with the aim of providing the best possible service to customers.
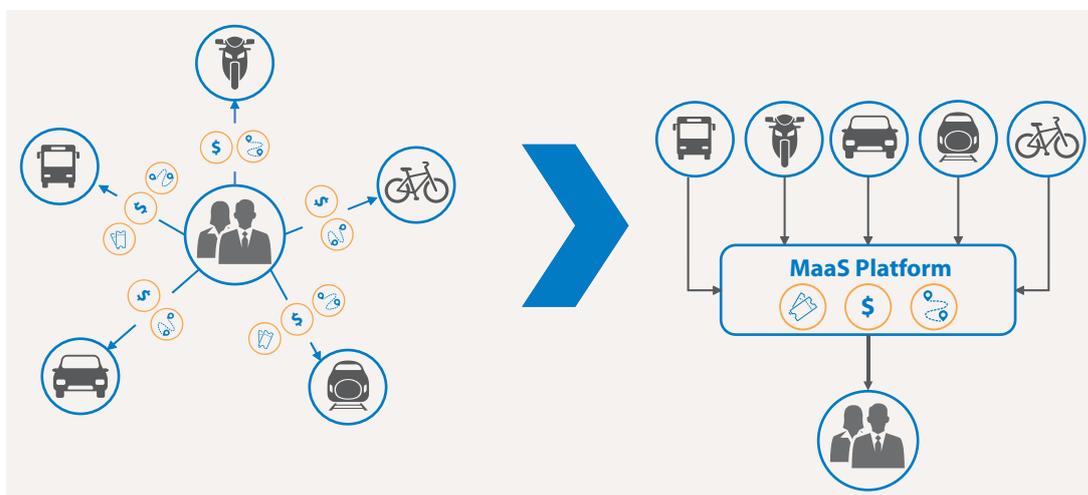

Figure 2: Transition from traditional transportation services to MaaS services

[4] IATSS Research; The shape of MaaS: The potential for MaaS Lite; December 2019;
https://www.sciencedirect.com/science/article/pii/S0386111219301797

However, as MaaS integrates multiple modes of transportation on a single platform, traditional fleet management will no longer suffice. The fleet manager will need to optimize vehicle usage, manage payments, and schedule journeys while ensuring availability and enforcing strict hygiene protocols in order to adhere to social distancing and customer safety policies[5]. Reducing the number of vehicles by either increasing the usage or reducing the idle time of vehicles will help optimize vehicle utilization. Calculating, receiving, and distributing payments through multiple modes will be integral to fleet management while ensuring availability of the fleet based on customer needs.

In conclusion, managing the customer journey end-to-end, right from selecting the mode of transport and ticket booking to parking slots, offering value-added services, and providing safe and secure modes of transportation will be crucial to creating innovative journeys.

Optimizing Fleet and Travel Costs

Traditionally, total cost of operations (TCO) has always been used to monitor the utility of a vehicle. The best use of TCO was for corporate vehicle management to derive relevant insights on corporate vehicle utility and calculate the cost associated with it. But as we step further in this fast-paced working culture, utilizing employee time has become a differentiating factor, where employees want to be driven around rather than driving themselves. This cultural change has shifted the focus of costs from TCO to total cost of mobility (TCM)[6]. This metric is calculated based on the cost per user, enabling companies to identify their total mobility costs, including peripheral costs such as driver and parking fees. However, due to COVID-19, more and more employees prefer to work from home, providing organizations an additional factor in optimizing their costs per user and in turn their mobility costs.
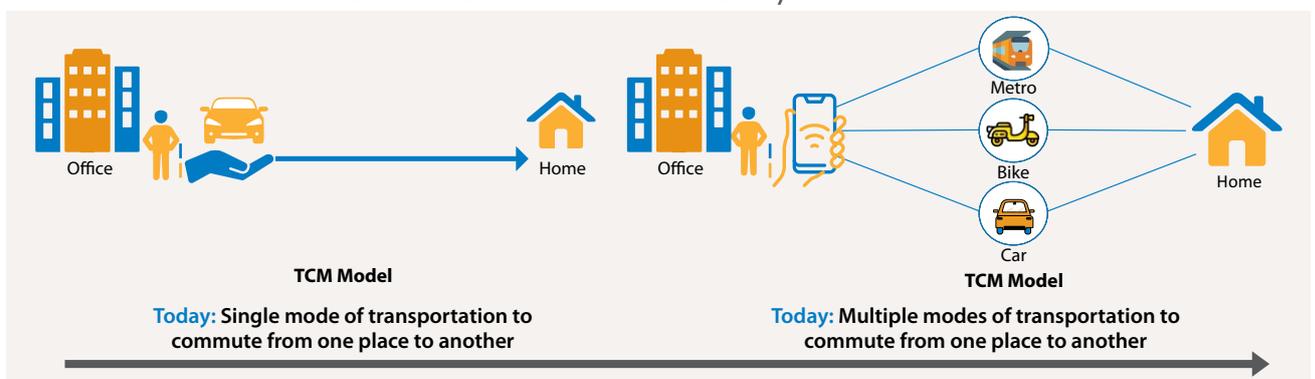

Office · Home · TCM Model · **Today:** Single mode of transportation to commute from one place to another

Office · Metro · Bike · Car · Home · TCM Model · **Today:** Multiple modes of transportation to commute from one place to another

Figure 3: Optimizing TCM

[5] McKinsey & Company; The impact of COVID-19 on future mobility solutions; May 4, 2020; https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/the-impact-of-covid-19-on-future-mobility-solutions

[6] McKinsey & Company; The trends transforming mobility's future; March 8, 2019; https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/the-trends-transforming-mobilitys-future

However, with the rise of TCM, optimizing costs means identifying the overall cost of a user as he/she completes the journey between two or more points. This requires managing the cost of vehicles, related services, and peripheral expenditures such as services used by the drivers, parking, travel management, and regular safety and sanitary measures taken for customers. In addition, TCM will help optimize the way employees travel and choose their mode of transport. For example, companies can choose from car usage in busy areas, public transport for sub-urban areas, and e-bikes for much shorter distances[7]. This will enhance fleet management and make alternative transportation attractive to employees. The end result: enhanced fleet availability through better monitoring and utilization of vehicles.

The Future of Transportation is Neural, Personalized, and Connected

The convergence of the different forms of mobility has introduced innovation in transportation services, which are driven by the demands of consumers for a more accessible, reliable, environmentally responsible, and safe form of transportation. The new transportation models of the future will help users identify the best possible way to commute from one place to another and will ensure more efficient, safer, and hygienic journeys. These intelligent models will enable a connected ecosystem driven by the personalized needs of customers. However, for the new transportation models to be successful, they need to be agile, resilient, and adaptive to the changing dynamics of customer demands. They also need to be responsive towards any unexpected hurdles, while equally ensuring the safety and security of customers. As this ecosystem grows, managing the fleet will become increasingly complex thanks to the vast amounts of data these connected and shared vehicles will generate. Drawing insights from this data using advanced technologies like artificial intelligence and machine learning will create a neural network of a connected, adaptive, and personalized transportation ecosystem. This ecosystem will help fleet managers fulfill the needs of their customers, while opening numerous opportunities in the form of direct revenue generation, cost savings, and enhanced fleet safety or security, to revolutionize the mobility industry.

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[7] *Travel Behaviour and Society; Creation of mobility packages based on the MaaS concept; June 11, 2019; https://www.sciencedirect.com/science/article/pii/S2214367X18301030*

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