Taxi Driver 2

"I live in San Francisco, and I pretty much only take driverless Ubers. The other day, I was with a human driver, and I felt uncomfortable being in a vehicle with a stranger." Carlos Diaz, businessman, Silicon Carne podcast.

Assumptions for the expansion of autonomous vehicles

Over the past ten years, the promise of autonomous vehicles left the laboratory and entered public debate as a real option for mobility. Trials are multiplying, laws are evolving, and manufacturers are diversifying. Yet the reality of the timeline remains slower, more turbulent and more socially complex than initially thought. Because it is no longer just the vehicle that is changing: an entire segment of human labour – driver, mechanic, taxi driver, delivery worker – is being undermined by a silent revolution.

Forecasts converge on a gradual deployment of autonomous vehicles which will take at least three decades. The World Economic Forum and the Boston Consulting Group set out a baseline scenario in 2025**: by 2035, fewer than 4% of private vehicles sold will be truly autonomous,** capable of operating without human supervision; most of the market will remain occupied by semi-automated level 2 or 3 models, where the human being retains legal responsibility. Only between 2040 and 2045 will robotic fleets – robotaxis, urban shuttles, long-haul trucks – become visible in their volume, present in 40 to 80 cities, mostly in China and the United States.

In Europe, the pace will be slower, with authorities prioritizing trials integrated into public networks rather than a sudden switch to driverless vehicles.

Todd Litman, from the Victoria Transport Policy Institute, goes further. According to his report *Autonomous Vehicle Implementation Predictions* (2025) : **it will be at least 2045 before half of new vehicles are autonomous, and 2060 before half of the vehicle fleet is autonomous.** Vehicle lifespans, high prices and slow fleet replacement rates make any faster acceleration unrealistic. Other scientists, in the European Transport Research Review (2024), confirm this range, while stating that the question is no longer if, but when: the uncertainty is no longer in technological feasibility, but in social acceptance and the business model that will support it.

Behind the promises of smoother traffic, greater safety and environmental benefits lies a major social transformation. In all scenarios, the first consequence of automation is the gradual disappearance of millions of driving jobs: taxi drivers, delivery drivers, bus or truck drivers, and operator staff. Litman estimates that **by 2060 between 30% and 50% of driving jobs could be replaced or transformed**, depending on the spread and the proportion of shared fleets. Road transport automation, faster than public transportation, will hit the self-employed first: taxi and ride-share drivers; then delivery drivers whose incomes are already under threat.

But the switch could be brutal. In simulations by the Boston Consulting Group and the University of St. Gallen (*Can Self- Driving Cars Stop the Urban Mobility Meltdown?* 2020), **cities that massively adopt shared autonomous vehicles would see demand for conventional taxis fall by 60% to 80% within ten years.** Such a decrease in a city like New York or Paris would lead to thousands of direct job losses not to mention the impact on garages, petrol stations and car rental companies.

The World Economic Forum concludes that: **"the transition must be anticipated by massive retraining programmes and by the creation of new jobs in mechanical, supervisory and fleet management fields.**

These new jobs will be fewer and more technical: we will shift from field work to workshops and data center work. Operators like Keolis, in forward-looking scenarios, could become the employers of "former drivers" retrained as maintenance technicians, fleet supervisors, safety managers, or travelling buddies for vulnerable passengers. In the WEF's projections, an urban robotaxi network of 50,000 vehicles would need only about 4,000 technicians to provide maintenance, compared to the previous 50,000 drivers. In other words, autonomous vehicles reduce the volume of direct jobs by a factor of ten.

These perspectives come with considerable promises. Deloitte, in its report *Enhancing Cities with Autonomous Vehicles* (2025), estimates **that a well-managed deployment of shared fleets could reduce urban emissions by 30%, cut congestion by a third, and free up 95% of parking space**, since vehicles would not need to be parked immediately near their users' homes. Road safety would improve massively: analyses of the seven million kilometres driven by Waymo show an **85% lower probability of accidents compared with a human driver**. These figures explain the interest in driverless technology: fewer deaths, less pollution, and fewer unnecessary cars.

OCDE-ITF studies (2015 and 2016) confirm the systemic potential. In their simulation for Lisbon, **replacing all cars and buses with shared self-driving taxis could meet current demand with only 10% of the fleet, while cutting congestion and emissions by two-thirds**. But these gains rely on one promise: mutualisation. If autonomous vehicles remain privately owned, the effects swing the other way: individual autonomy lengthens trips, encourages living farther away, and increases empty mileage. Karolemeas note that: "if private autonomous vehicles dominate, urban sprawl will be encouraged and the culture of 'automobility' will be maintained.

That is why most experts are in favour of a strong public framework. The experience of private hire vehicles speaks volumes: when public authorities delay regulation, the market self-regulates to the detriment of the workers. The United States today has 25 states that authorise the testing of autonomous vehicles, but only a few have integrated labour policies. The European Union, in a more prudent approach, makes autonomous circulation conditional on supervised trials, particularly in public transport – a way of pre-empting any social fallout.

This caution is reinforced by technical and economic limits. Autonomous vehicles remain expensive: their lidar sensors, on-board computing, and 5G connectivity make them at least 30% dearer. Litman recall that many motorists will be reluctant to pay thousands of extra dollars for vehicles that will sometimes be unable to reach a destination due to inclement weather or unmapped roads.

As such, the first large-scale deployments will occur where labour is most expensive: in long-haul freight, where autonomy can save two drivers per truck. **According to the WEF, autonomous heavy trucks will account for up to 30% of new sales in the United States by 2035.**

There is, however, a real risk of economic polarisation. Wealthy cities will capture the benefits – safety, efficiency, attractiveness – while peripheral regions, dependent on human-centric road transport, will see one of their few sources of employment disappear. Autonomy could reinforce the geographic divide: automated urban centres and manual suburbs. In Beyond the Wheel, McKinsey highlights that: **"autonomous vehicles will transform society more than the car"** by redefining the use of time and space, but also the place of the people who used to keep mobility running.

The speed of this switch will depend on public trust. After the incidents of 2018 and 2019, attitudes towards robotaxis remain mixed: according to Deloitte, **almost 60% of Americans still express some form of distrust**, but growing familiarity with semi-autonomous vehicles should reverse this trend by 2030. The spread will not occur through a sudden switch but through impregnation: today's driver assistance systems are training tomorrow's drivers.

Global projections sketch a classic curve for innovations: growing slowly until 2035, acceleration between 2035 and 2045, and stabilization after 2050. But the social impact is as yet a grey area. The WEF and BCG insist on the need to anticipate the "second-order effect": rising unemployment among drivers, drop in fuel tax revenues, and the need for new jobs in maintenance, algorithmic supervision, cybersecurity and charging station management. There will be massive job losses, while the few jobs created will require more skills. Authorities and companies able to train and take on these new profiles will retain a decisive advantage.

From this perspective, some established transport operators, like Keolis, appear as transitional players: they can absorb a portion of the workforce displaced by automation, offering jobs in maintenance, cleaning, logistics or passenger assistance.

KEOSCOPIE
DESIGNING TOMORROW'S MOBILITY

The story

Boston, October 2045. The rain is streaking down the windows of the Keolis maintenance depot at South Station. Travis Mankowski - everyone calls him Travis, never by his last name - looks out from his glass-walled office on the rows of Uber robotaxis lined up for a few hours. This sixty-three-year-old with greying temples still has the hands of a manual worker, despite having spent the last ten years in management.

He wears the navy blue Keolis uniform with a pride he never anticipated back when he worked as a taxi driver and boasted: "No boss, no schedule - just the one I choose."

The city has changed since his taxi driver days: the old, congested roads of the Big Dig have become fluid corridors where autonomous vehicles move in synchronised columns, communicating with one another by precise wave signals. Human driven vehicles are banned from these streets. Back Bay's skyscrapers are clad in photovoltaic facades powering an electricity grid that feeds the city fleet of 47,000 autonomous vehicles. The Common and the Public Garden have been expanded, reclaiming the space of former traffic lanes. But in neighbourhoods like Roxbury or Dorchester, where Travis oversees the night crew, changes remain progressive. Aging buildings sit alongside automatic charging stations, and homeless people still subsist and sleep under the bridges, although these structures are now equipped with sensors that alert the social services.

Travis recalls his last years driving a taxi with painful clarity. In 2028, the switch began: the first Waymo and then Uber robotaxis set up in Boston after successful deployments in San Francisco and Phoenix. At first, the general mood was sceptic: these vehicles would not survive a real New England winter. On 1 December snow did stop them in their tracks. But the algorithms learned quickly, and each storm improved their adaptive capabilities.

His revenue began declining in 2030. At first, subtly - less than 10% per month. Airport runs, his speciality, were gradually disappearing: Logan International, the airport, became the reserve for autonomous shuttles that ran nonstop and never complained about traffic in the Ted Williams Tunnel. Then, came the night rides - the night owls from Fenway and the MIT students - why call a human driver when AI takes you home 30% cheaper?

In 2033, he had only elderly customers left - those who did not trust robots - and rides requiring special assistance: accompanying an older person to the hospital, helping with luggage, listening to people's indiscretions at 3 am. $400 on a good week versus $1,500 before. His Chevrolet Malibu, the last petrol car he had managed to buy, was getting older. Spare parts accounted for a huge investment since Ford ceased

production, and he could not afford to buy a new one.

He gradually got more frustrated. He watched those silent white autonomous vehicles glide through the streets, their rotating lidars sweeping the environment, and his bitterness grew. He started visiting the forums of the “Wheel Resistance” groups – opposed to autonomous infrastructure. In 2034, on a November night, after a few drinks, and overwhelmed by resentment, he drove to the Uber sales office in Charlestown with destructive intentions.
It was his reflection in the window of an automated Dunkin’Donuts that stopped him. An ageing distraught man, on the verge of doing something stupid. The image of his father who died embittered after the closure of the Pittsburg steel mill, came back to him. Travis turned back.

The next day, in a turn of fate, he spotted an advertisement. Keolis was actively hiring to cater to the sudden rise maintenance needs. Former drivers were their priority target: they knew the city and the vehicles. The “Driver-to- Technician” program offered six months of paid training, a basic salary of $70,000 and comprehensive health insurance. For Travis, it was a second chance.

Training was demanding and many were not selected at the end. Barely one driver out of three was chosen to become a technician. They had to learn the basics of on-board computing, understand sensor cleaning protocols, and master complex safety procedures. Above all, they had to learn to supervise what was the heart of operations: cleaning. Travis, who had been self-employed for twenty years, now had to lead a team of thirty people: former drivers like himself, but also young people from back-to-work schemes, Haitian and Salvadoran immigrants who cleaned the car interiors after Saturday night misadventures.

He knows his team perfectly. José, a former MBTA bus driver, oversees the high-pressure cleaning of the sensors – a critical operation since an obstructed camera can compromise safety. Maria, from Honduras, specialises in replacing damaged seats – because despite sensors, cameras and social ratings, the cars still get vandalised. Kevin a 23-year-old South Boston native, an electronic expert who repairs circuits damaged by the summer storms.
The South Station centre processes 1,200 vehicles every night. They arrive in automated convoys, parking themselves with millimetre precision in the maintenance bays.

The atmosphere is a mix of smells: industrial disinfectant, various organic traces assorted fragrances, and cannabis residue despite the ban. Travis coordinates the operations: automatic entry diagnostics, cleaning, repair, quality control, return to operation.
By six in the morning, the fleet must be ready for the first morning fares. The vehicles sometimes hold surprises. Forgotten glasses still to be seen by their owner, packets of narcotics that nobody will come back for, personal items and once: a cat asleep on the back seat.

Travis has decent housing in Quincy, on the Red Line. He built up his own pension pot – unbelievable in his taxi days. On weekends, he goes fishing at Revere Beach, where Logan planes keep their flight paths, but where marine wildlife has reclaimed space. He is drinking less and sleeping better. Above all, he has regained his professional dignity. When a robotaxi comes back damaged, it is his team that returns it to working order. When a system failure immobilizes hundreds of vehicles on the I-93, he is responsible for coordinating the emergency response. He has become an essential cog in this new system, the guardian of the machines that once almost made him obsolete.

As day breaks, he watches from his office as the vehicles file out into the damp Boston morning, their taillights tracing geometric lines in the darkness. He thinks of his grandfather, a mechanic at General Motors in Detroit, who witnessed the automation of the assembly lines. “Back in the day, it was men who needed machines to do the job. Now it's machines that need men to do the job. But it's still work.”

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SCENARIOS

WHITE SCENARIO

An alliance between technology and society

In this scenario, autonomous cars are commonplace. Public authorities and mobility operators use them to build a system that is economical and more inclusive. Fleets belong to municipalities, cooperatives or public-private partnerships, private car ownership declines. Autonomous transport is built into an intermodal network combining trains, bikes, walking and micromobility.

The productivity gains are redistributed: they fund local employment, the retraining of former drivers, and passenger services. Citizens see their purchasing power improve by giving up their private cars, which leads to a reduction in the overall vehicle fleet. We switch from a culture of ownership to a culture of sharing.

These former drivers become mobility mediators, reception staff, neighbourhood coordinators, trainers or maintenance technicians. Their human experience becomes a form of capital rather than a remnant of the past. Technology frees up time, but that time is returned to society in the form of social connection and human presence.

The indicators show a balance of outcomes: a productivity increase of 0.8% per year, a 25% drop in emissions, and an overall stable employment rate thanks to new jobs in smart mobility. The model relies on cooperation and redistribution rather than competition. In this future, technical autonomy is facilitated by political and moral autonomy. The machine no longer replaces humans: it gives people back the ability to inhabit their world differently.

GREY SCENARIO

The regulated transition

The scenario is based on a compromise: accept autonomy but control its effects. Public authorities enforce a timetable and award operating permits to companies pledging commitments to training and retraining.

Private platforms share their data with authorities and environmental benefits are invested in training and collective infrastructure. Driving jobs do not disappear all at once: they are transformed. Half of the drivers go to work in maintenance, fleet supervision or as travelling buddies for vulnerable users. Field skills – navigation, customer relations, knowledge of local areas – are valued. There are still net job losses, but these are cushioned by an active retraining policy.

Environmental benefits are substantial: 30% less emissions and 90% fewer accidents. Robotaxis come in addition to public transport rather than replacing it, catering to the first and last mile.

BLACK SCENARIO

Efficiency working against people

In this scenario, technology moves faster than regulation. Platforms deploy their autonomous fleets without social compensation. Uber, Tesla or Waymo control the access to mobility and capture most of the value. Transport costs collapse, road safety improves and cities free themselves from parking problems and congestion. But behind this, a social divide opens: millions of jobs disappear.

In the United States, as in Europe, taxi drivers, couriers, bus or truck drivers are replaced by algorithms and self-operating vehicles. Between 2035 and 2050, it is estimated that nearly half of driving-related jobs will disappear. Former drivers survive on insecure job contracts in maintenance or fleet supervision. Autonomous technology, supposedly the key to the end of arduous work, excludes them from the productive system.

Public transport, competing with low-cost robotaxis, loses riders and sees its revenue collapse. Historical operators become technical subcontractors. The economic model wins through but is socially deserted: smooth clean and efficient mobility – and yet lacking the human touch. Structural unemployment fuels political bitterness. Cities run without drivers, but no one feels in control of their destiny anymore.

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