

White paper

Fujitsu Mobility: Building a trusted mobility society



Contents

Introduction	1
Digital convergence model	2
Sarah's story: A trip into town in 2030	3
Planning your transformation & The three Cs model	4
A 3-stage process	5
The S-curve of change	6
The road ahead...	7
Ride the revolution	10



Introduction:

Stake your claim in the coming mobility society

By 2030 the world will be radically transformed. People will take for granted new ways to connect, work, shop, and enjoy leisure time on the move, all of it integrated into a mobility ecosystem built around them. The key to participation is the intelligent analysis and utilization of data. Fujitsu's leadership in this arena makes us the ideal partner to accelerate your entry, future-proof your business, and stake your claim in the coming mobility society.

When we talk about mobility, we mean more than simply new driving technologies. Mobility encompasses everything our increasingly wide-region, constantly moving society does, from the patterns of flow of people and goods to the way we think about the cities we live in and the means by which we consume, interact, and enjoy life.

Though in some cases manufacturers and regulators are attempting to impose their will on the coming world, the prime impetus is our own human need for a richer and more responsive mobility ecosystem centered around ourselves. Are private cars still relevant in a post-pandemic age where teleworking has become normal for many of us? Does retail any longer revolve around the physical space? Do we expect the same levels of connectivity in private and even public vehicles as in our homes? Is personalization more than our name scrawled on the side of a coffee cup? Will we any longer put up with a fragmented, unreliable transport infrastructure?

People push change and push it decisively. We want to move more than ever before, but we want to move on our terms and in ways that uphold our values. We understand the need for freedom of travel but we hate the ways cars have taken over our cities. We see mobility not just as congested urban streets but as the heart of our life experience – from the convenience of next or same day home delivery to taxi apps that put a ride at our curb on demand. And we want all the ancillary services to adapt to these new norms.

In effect, the acceleration of society created by personal computers and smart phones, and our expectations for a seamless instant streamed world, have extended outwards to all the other parts of our lives. It needs to be perfect and it needs to be now.

Just as the movement of people and things is blurring traditional boundaries, so we're seeing a profound convergence of industries. The mobility society will replace the vertically-driven corporate model, where organizations carve out well-defined territories in specific sectors, with a horizontal model of growth that erodes the boundaries between manufacturing, retail, and service. The winners will be those who embrace this horizontal model, diversifying their offerings and linking with partners across the economic terrain to build fully-interlocking systems that stretch far beyond their core competences.

Understanding your own strengths, your near- and long-term goals, and the ways you best mesh into this integrated economy will be the blueprint for prosperity. Fujitsu categorizes the requirement as the three Cs model (see page 04) - a means to assess your role as part of a concert of industry players developing new solutions together to meet changing needs.

By itself, this is a huge challenge to every traditional industry that may be impacted by the mobility revolution. But all the changes we're about to undergo have one thing in common: they will be facilitated by data. The new mobility ecosystem is essentially an interaction of a huge number of physical real-world devices and commodities, from cars to retail goods, with a single intelligent digital services platform that must monitor and manage them in real time. Without the digital transformation no other transformation is possible.

Digital convergence model

Addressing Mobility Market Acceleration to converged markets

KEY DRIVERS:  **Consciousness**  **Convergence**  **Connectivity**

Markets

Online and offline industries are converging to form new networked value chains and ecosystems

Customer Models

Digital offers new, but competitive avenues to achieve high performing customer experience

Technology Models

Enterprise architecture and organisation will need to be reset and redesigned



Value Creation

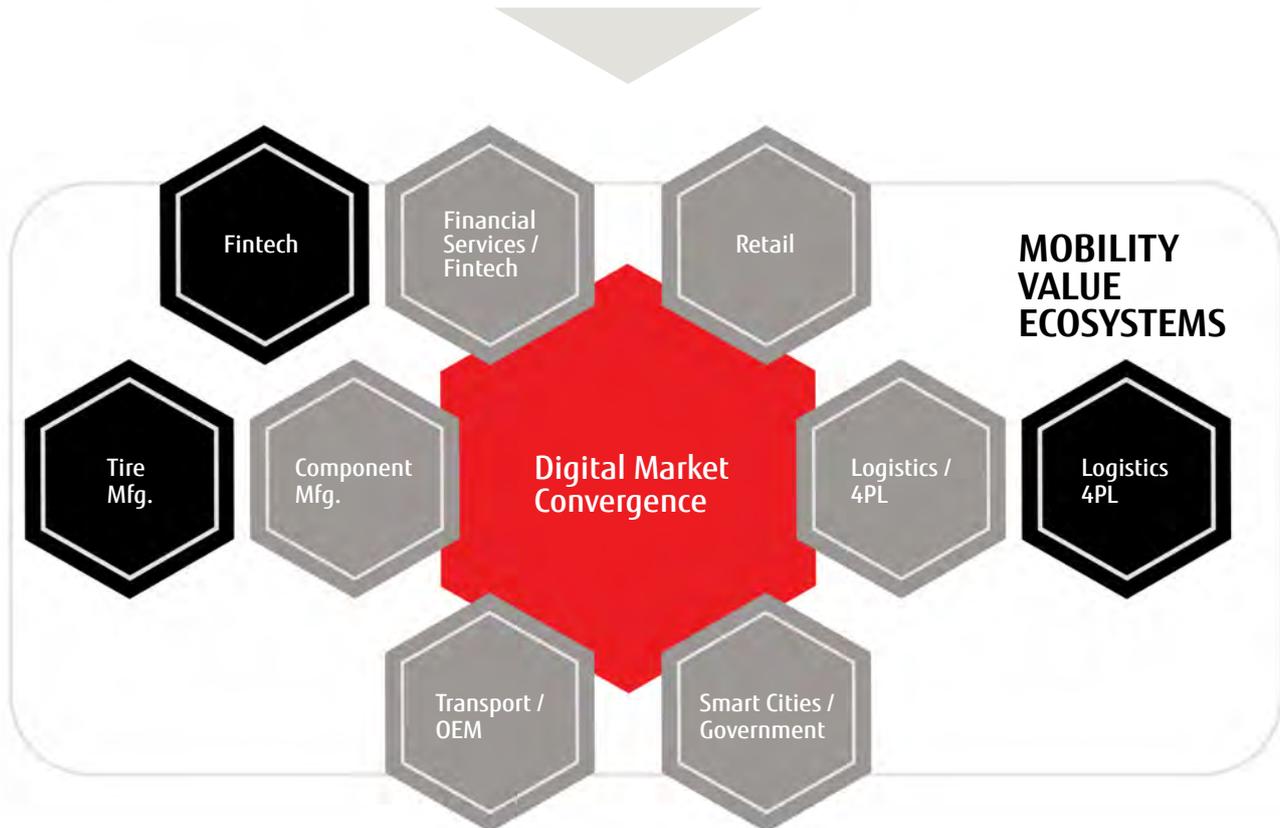
Companies will find new value from a service-led approach through monetising data

Operating Models

Operating models will need to evolve to create competitive advantage / value in new ecosystems

Demand Management

Most companies will need to enhance the flow of investment to achieve new objectives



Sarah's story:

A trip into town in 2030

Normally both my husband and I telework from home. Since we rarely travel on business, there's no need to live close to either of our offices in the city – certainly not to find a compromise location between them. Most of our daily requirements are delivered to the house, giving us all the benefits of urban living from the peace and space of the countryside. It's a better quality of life for us, for the kids, and for my mother who lives with us.

Even though we're rural, we never feel remote. Neither of us owns a car, but whenever we need one we simply book it from our phone – a semi-autonomous vehicle is on the drive at the scheduled time. If we want to take the kids exploring, we let the vehicle do most of the work. Its AI even decides on the destination based on our preferences and the trips we've taken in the past. An autonomous health service vehicle comes each week for my mother, with diagnosis and treatment right there at the house.

Today, however, I have a meeting at 9:30 in town. The moment I confirmed the appointment my digital smart assistant put together a schedule for me. It arranged the car, designated by its manufacturer as a service vehicle and managed by a provider with which my company has a mobility contract. It's waiting promptly at 8:30 with the seat and interior systems all at my preferred settings and my favorite apps up on the screens.

I climb in and settle down to prepare for my meeting while the car whisks me into the city. I'm hardly aware of the journey. I spend a productive half hour on my work, then catch up on the rest of the morning news which I'd paused when I was leaving the house. It continues smoothly from the point I left it. I even take the time to check that the kids are working in their study rooms.

The trip's easy. There's no congestion since the vehicle maps out, moment by moment in real time, the most efficient path to my office using data collected from all the other vehicles along the planned route. Twice it remaps this route, but I'm hardly aware of it: once to avoid a school crossing which is busier than usual thanks to a sports meet, and once when telemetry from other vehicles suggests strong crosswinds are causing problems on an exposed stretch of road. I'm paused for a few seconds in town when traffic lights ahead turn red to enable emergency vehicles to pass. The car's aware of this and brakes long before the lights change.

I'm in the heart of the city by 9:15. When the vehicle notes congestion on the one-way streets in town that thread around to my office, I tell it to detour to my favorite deli instead. This will mean I need to walk the rest of the way, but if I cut through the side streets I can be there in minutes, and I'll save both electricity and the time it will take for the car to head out on its next assignment.

My standard order is waiting for me at the curb the moment I pull up. I don't need to pay, even with my phone – it's all handled automatically. I climb out and watch for a moment as the door shuts and the car moves into the street. Billing for the service is handled by the company's software. For the short time that the vehicle was paused at the curb, a city charge was levied which will go toward infrastructure costs.

I'm still sipping my coffee when I arrive at my building at 9:20, refreshed and fully prepared for the day.

As I'm entering the building, I get a call from my husband at home. Since I'm in town, he has arranged a restaurant and show for this evening. Everything's organized for us, from the vehicle that will bring him to our rendezvous to the public transport we'll use to cross town – every barrier opening at our approach and indicators guiding us to our seats – and of course all the bookings and tickets.

I realize that even if my meeting runs late, I'll still have a couple hours to spare, and pick out the stores I want to visit. A new outfit for our date, maybe? By the time I'm through the gates and into the elevator that's waiting to take me to the correct floor, I've decided on my schedule and the autonomous taxis have all been scheduled for me. Traveling up, I check in on home again, and alter my plans. The app knows just the store. The kids will be delighted to find the gifts waiting for them in the hall when they come out of study tonight.

Planning your transformation

Sarah's world looks quite different to today's. In addition to the changes we can predict, there are bound to be many we can't – new sectors and services that the opportunities will open for entrepreneurs and visionaries. The important thing is to know where your business slots into the mobility ecosystem and work toward gaining that position. Have an endpoint in mind, and strive company-wide to reach it. How exactly can this be achieved?

By following the three Cs, you will understand how the disruption will affect your business, and have a means to match and exceed coming consumer demands. Fujitsu's Digital Convergence model presents a whole-page view of the mobility society, revealing how consumer expectations affect not just the immediate need but the entire span of the ecosystem.

The three Cs model

The mobility society described in this document will call upon providers to match human needs with smart solutions and services. Fujitsu believes that your response must encompass three distinct strands:

Consciousness

Who is Sarah, what does she believe, and what are her values? Providers must understand their audiences better than ever before, and tailor their offerings to each individual. Nothing succeeds without a benefit, so you must know this benefit and offer it wholeheartedly. With this intimate human knowledge to guide you, craft the user experience that makes you unbeatable.

Connectivity

How does Sarah stay in touch? How does she receive and share information? How does she curate her world? As ever-more-connected devices permeate people's lives, users will expect these services to be seamless and always on, wherever they are. Mobility is not the pause in a person's day, but may well be quality time, time for concentration on a task, or time to catch up.

Convergence

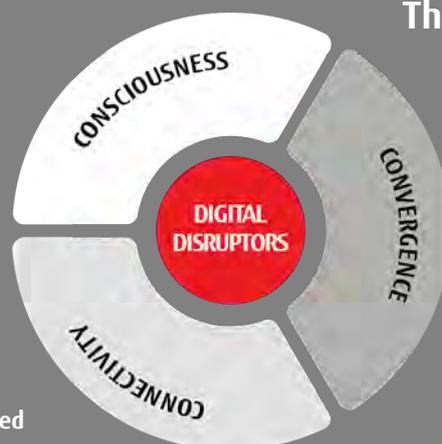
Why are there silos between the services that people use? Already industries are blurring together, such as instant pay and ticketing facilities on smart phones. As markets merge into the single mobility ecosystem, consumers like Sarah may cease to think of them as discrete parts of their lives to be managed individually, but as a single all-encompassing framework for life.

Consciousness

- Environmentally motivated
- Demand instant gratification
- Covid-19 adjusted priorities
- No longer influenced by planned obsolescence

Connectivity

- 5G
- Quantum enabled
- IOT



The 3 Cs of digital disruption

Convergence

- Digitally disrupted markets
- Seeking revenue diversification
- Reimagining the customer experience
- Reinventing corporate DNA

Over the past few decades, we've seen the eruption of digital as the facilitator for meaningful change, causing an exponential feedback loop: ever-increasing quantities of data used to build ever-more-data-reliant services. The coming mobility society will demand more data than ever before, and rely on that data more than ever before. Digital is at the heart of each of the three Cs, and therefore digital must be the focus of your transition

A 3-stage process

Guided by this model, you can plan your entry into the mobility society. Fujitsu thinks of this as a three-stage process we call "Now, Near, and Far."

Now is a clear knowledge of your business as it stands, and an understanding of how you must adapt your current processes to shift into the mobility society. What are your strengths and weaknesses regarding the world described in this document? What platforms and business models do you need? What technologies must be implemented? What obstacles and bottlenecks will stand in your way? How will it be financed? With whom should you partner?

Near is preparation for the S-curve of change. In the next four or five years, how radically must your organization transform to remain relevant? What short-term objectives must you set to build your new business upon?

Far is the place you want to reach, your standing in the customer experience of 2030. It's the point from which you work backwards to ensure the transformation cascades through your whole business quickly enough and with the authority that everyone both internally and externally will be on board.

Doing nothing is the fast-track to failure. Neither should you shackle yourself to whatever model worked in the past. "Now, Near, and Far," devised and implemented with clearheaded agility as the core of your business strategy, gives you a framework for success.

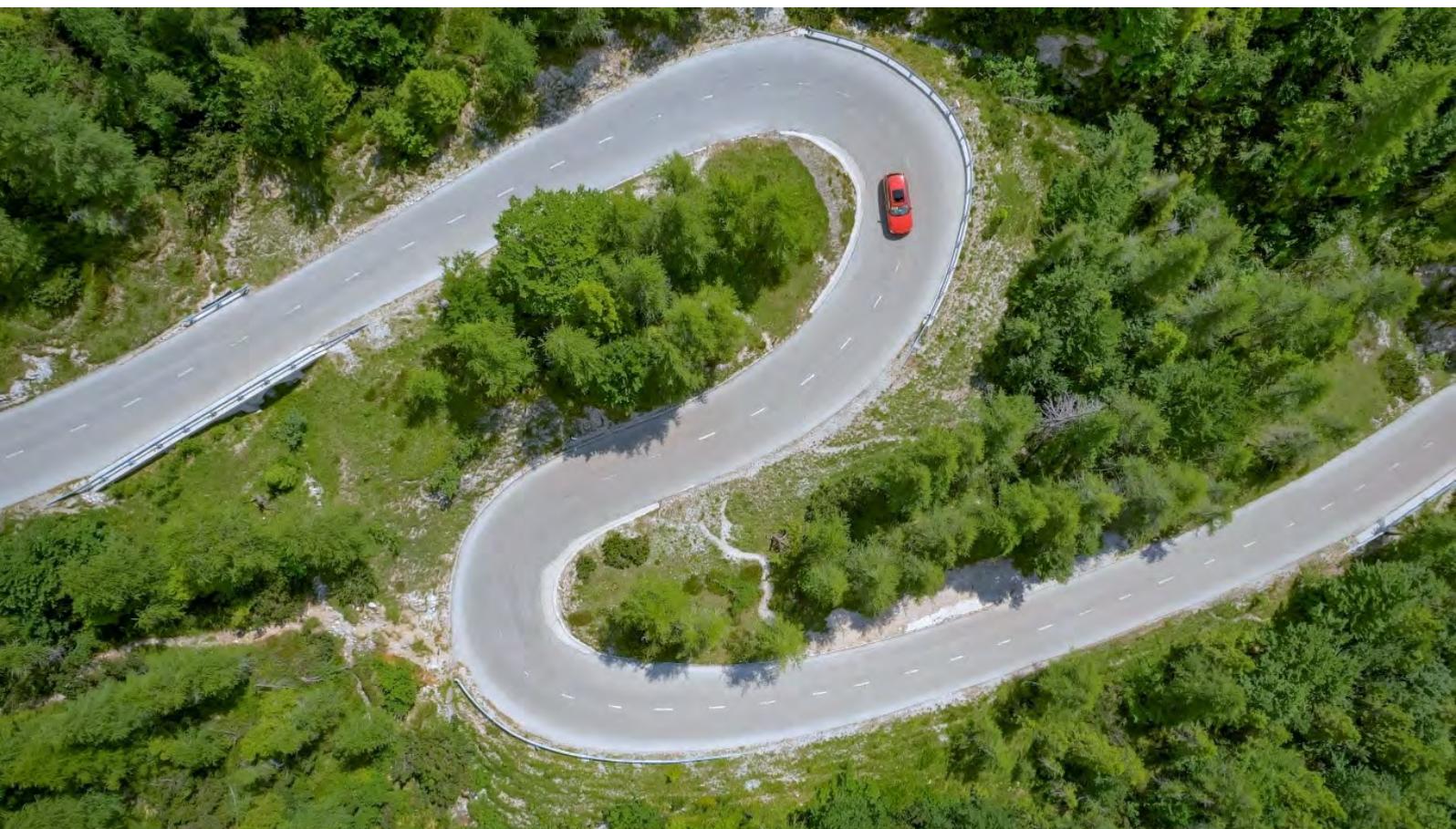
Now
Near
Far

The S-curve of change

Fujitsu's prediction is that the digitally-transformed mobility society described in this document will happen by 2030 – that's less than ten years from now. Based on research and trend analysis across the converging markets, we model a confluence of pressures and initiatives forming an integral-symbol or S-shaped curve of change with the present day at the bottom and the mobility society at the top. The point at which change becomes breakneck – the vertical part of the symbol – we estimate at 2025. By that date the facilitators of the industry will have invested more than 500 billion dollars in it. By 2030 the mobility society will be worth four times that much.

The S-curve of change is a stark warning that companies need to move fast and move intelligently if they are to stake their pitch in the mobility society. Not only will traditional industry leaders be swept away, but the market will open enormous possibilities for bright, agile startups that will shape our new world far more than the incumbents. History has taught us this lesson many times over. Those who led PC development at the beginning did not dominate it when the market matured. Those who led smart phone development at the beginning did not dominate it when that market matured.

Should you want to be relevant in 2030, you need to think specifically about your role in the new world right now, and do everything in your power to gain yourself a seat at the table.



The road ahead...

For vehicle manufacturers

Shared and on-demand services will rethink consumer needs to own, personalize, and upgrade private vehicles. Those who can telework will no longer require a car that undertakes two short journeys a day and otherwise stands idle. Rather than the existing pushers of car ownership based on aspiration, standard-and-luxury tiering, and vehicles as an external indicator of position or self-image, the industry will be driven by service needs: safe, customizable ride solutions that are always available and do not harm the environment rather than car marques and tire brands.

For other manufacturers and logistics

Sophisticated management systems, integrated into real-time analysis of road, rail, air, and maritime conditions, will perfect just-in-time transport of goods and materials, speeding delivery and obviating both waiting times and container stacks at ports and loading areas. Intelligent logistics will also minimize journeys by empty goods vehicles – indeed, much transport of goods will be by shared and autonomous trucks, including clever utilization of cool and frozen storage facilities. New shared and optimized logistics will support and accelerate last-mile services such as home delivery, while ensuring the safe and prompt transition of goods into their recipients' hands.

For fleets

Commercial fleets will be fully connected and integrated into real-time usage optimization systems. By entering into service partnerships with automotive providers, companies will be able to streamline their fleet needs for both personnel and goods.

For the public sector

Smart cities and regions, the digitally-enabled integration of public services into a single urban nexus, will be stronger economically and more resilient against crisis, downturn, demographic shifts, and unrest. For the first time, public sector providers will have a simple holistic view of the centers they manage, enabling better decision-making and more ambitious thinking across infrastructure, public utility networks, and social services. With a playbook for sustainable growth, public sector providers can concentrate on orchestrating places that are free of economic disparity and more attractive to live and work in.

For public transport

Buses and trains will be integrated into urban and rural mobility flows. Ride-sharing and autonomous taxis will be available on-demand across the urban landscape and beyond, integrated seamlessly into mass transit systems. Users will be able to map routes via a mix of transport types, optimizing their journeys with constantly-updated real-time data. Tickets will be obsolete thanks to smart phone or smart watch identification and automatic billing systems. The result is better service for travelers and much lower costs for providers.

For urban planners

An integrated transportation system, encompassing both private, public, and goods vehicles, will form more efficient, responsive, and intelligent urban mobility systems. Real-time monitoring will improve traffic flows and lane allocations, optimizing journeys. Congestion and bottlenecks will disappear. Streamlined traffic patterns will increase the scope for pedestrian zones, turning roads into parks and bicycle-dedicated pathways, and providing a richer mix of living, retail, and leisure services across the urban environment.

For road safety

Careful, autonomous prioritization of pedestrians, bicycles, and some forms of public transport will help reduce road accidents. Vehicle sensors themselves will be used to generate real-time data maps of these other kinds of road usage, building up a clear picture, for example, of each cyclist's route across town. With reliable sensors and autonomous or AI-assisted driving, pedestrians no longer need fear vehicles at crossings, and children will be safer from school to park to home. One consequence will be quieter streets, as fast-moving silent vehicles will not be a threat.

For urban revitalization

Intelligent mobility will help sustain city centers, enlarging urban dwellers' circles of transport so that they can move across town almost as easily as they walk their own neighborhood. Simultaneously, large-scale urban flow will no longer be necessary as services become available in the home or in the immediate locale. The traditional divisions between rich and poor urban areas will vanish. Better mobility will attract businesses and residents to target areas, building cities around both human and business needs. Cities themselves will compete for talent and corporate investment based on their mobility provision.

For rural revitalization

Car-sharing and other mobility systems will bring transportation options to remote and previously poorly-served areas, in turn supporting a teleworking shift from city to countryside. The new retail experience, healthcare provision, and in-home entertainment options will extend all the benefits of town life to even small, isolated communities.

For developing regions

Too long the preserve of wealthier parts of society, with provision levels that increase alongside wealth, the future will see the first true democratization of transport. Car sharing puts affordable mobility in the hands of everyone. Better managed and optimally run public transportation means it will be economical to extend it into poor and disenfranchised regions, lifting those regions in turn.

For the environment

Sophisticated car-sharing services, smoother and more efficient traffic flows, fuel-optimized autonomous driving systems, electric aircraft, and much more will minimize CO₂ emissions and vehicular pollution. Intelligent traffic monitoring systems will detect and reduce pollution hot-spots. There will be significant improvements to both the consumption of raw materials in vehicle manufacture and fuel to operate them – as well as better management of waste at the end of the vehicle's life.

For public safety

Real-time, automatic monitoring of road conditions will speed up emergency response, guiding each vehicle to its destination while controlling traffic lights along the chosen route as needed. Traffic flows can be autonomously redirected during natural disasters, when there are accidents or infrastructure failures, or to clear areas affected by terrorism, ensuring as little and as short a disruption as possible. Just as mobility spreads disease, so it can mitigate it. New mobility standards will help allay fears about crowded public transport during health crises.

For financial services

Mobile connectivity is already revolutionizing the way consumers think about their day-to-day financial interactions, replacing cash and credit with payment systems built into their phones. This will expand to cover all aspects of banking, including investment, wealth management, and currency exchange. It will extend banking services to users denied physical access to banks, such as those in remote and developing regions. The physical bank, already moving online, will be replaced by secure personal banking systems built around each user: an integrated, mobile financial center that is carried in your hand, borderless, and always open for business.

For insurance agencies

Car sensors and intelligent or autonomous driving systems, linked to real-time data monitoring and analysis, will obviate most accidents between vehicles and with pedestrians. Where accidents do occur, their causes will be better understood, feeding into an ever-improving cycle of vehicle safety and targeted insurance provision. Vehicle owners and users will enter into fundamentally different relationships with their providers, to their mutual benefit.

For executives

The moment an out-of-town meeting or conference is confirmed, intelligent mobility systems will plan every part of the journey and stay to ensure a seamless experience from pick-up to drop-off: your preferred seat on your preferred airline, the right suite in the right hotel, and all the services you'd expect along the way from meal choice to mini-bar.

For workers who cannot telework

The frustrating commute – jammed in rush-hour streets, hunting for parking places, fighting for space on trains and subways – will be over. As the benefits of smart mobility such as car sharing percolate into workers' consciousness, they will gravitate ever more readily toward these new forms of mobility. Journeys to work places will become simple, efficient, cheap, and reliable.

For an aging population

Whether in cities or rural areas, elderly people have precise mobility needs that will be addressed both by increasing human-centered services – bring the experience to the person rather than the person to the experience – and smart shared or dedicated vehicles aligned to each passenger's requirements. Old people who are no longer able to drive will not be trapped in their homes, while those who do drive into old age will be safer users of the road.

For the impaired

There will be a fundamental shift toward mobility equality for those with physical and mental impairments. The moment a disabled traveler arrives at a railway station, say, smart automatic systems will provide ramps and barrier-free access for them. Vision impediments will no longer be impediments to travel, even to drive.

For retail

The home delivery revolution we're already witnessing will accelerate, with the virtual home- or office-based experience the new standard for retail, further disrupting traditional storefronts or the need among luxury brands for retail clusters in exclusive precincts or malls. In some cases, data will flow instead of physical goods, enabling the home-printing of everything from toothbrushes to designer clothes. When customers do want to drive to a physical store, systems will automatically assign them a parking spot close to their destination.

For the food sector

The drive-by restaurant or coffee shop will integrate with the customer's movements ensuring the precise food or beverage they want – a bespoke order or their regular – is available for pick-up the moment they reach the establishment. Supermarkets will deliver orders straight to the shared car allocated for the purchaser's journey home, meaning it will arrive at the roadside with the goods right there in the cargo space.

For healthcare providers

Particularly with an aging population, medical care will increasingly shift from the doctor's office to the patient's home. When diagnosis is possible remotely, treatment will be delivered to the patient by autonomous vehicle – whether that's an insulin shot or an MRI.

For education

The long-lost paradigm of the mobile library will be reinvented in technologically-driven new forms. Teleconferencing and streaming services will replace some in-person classes, while intelligently integrated and safe child transport systems will bring students securely to their schools.

For the leisure industry

While the virtual and streamed experience is a major part of the new society, there will always be a role for travel to events, to vacation places, or just for the joy of the breeze in your hair. All these needs will be revolutionized, from automatic seat allocation in the ballpark and a parking spot outside it, to intelligent systems that make suggestions on routes and adventures the traveler might enjoy. Autonomous cars mean every member of the family can be part of the shared experience of moving together.

For streaming services

The speeds of data provision will increase rapidly with ensuing generations of mobile services. As connectivity hubs, vehicles – even shared vehicles – will become extensions of the personal smart phone, providing workplaces, entertainment, and retail on the move. In particular, we envisage a world in which travelers catch the first half of a movie or sports event in one shared vehicle, and seamlessly continue to watch that movie or sports event the moment they switch to a different transport medium.

For mobile services providers

Though the smart phone or smart watch will continue to act as an identifier, the automatic facilitator of customized services throughout its owner's journey – everything from seat and air conditioner preference to the content of the roadside billboards they pass – once in the vehicle the car itself will become the communications hub, replacing the traditional carrier network with connectivity enabled by vehicle manufacturers and their partners.

For new frontiers

The existing surface-based mobility infrastructure is not the only realm in which the revolution will change the way we think and feel, and the things it is possible for us to do. Mobility will extend to living, working, and leisure activities under the sea, or in orbit and beyond. As time passes, even these furthest reaches will be orchestrated into the single human-wide mobility ecosystem.

Ride the revolution

The road ahead is sure to be beneficial for all aspects of society, because this is true of every meaningful revolution before it. People will embrace the mobility society wholeheartedly the moment they see the advantages to themselves as people and as participants in an economic landscape. They will recognize a better, faster, safer, more enjoyable life on the move. They will witness improvements in their living and working environments, and in their day-to-day routines. They will open themselves to enormous new opportunities for leisure and entertainment. They may well feel richer. They will never look back.

It is certainly the case that the vision outlined in this document comes with significant challenges and uncertainty for the industries affected. For those with existing business models, infrastructure, and markets, the disruption will be harder than for hungry startups that can begin mapping out niche applications to ride the future.

But there are also unlimited opportunities for established companies. New revenue streams will open, and portfolios will diversify. The integration of all mobility-affected businesses into a single carefully orchestrated ecosystem will enable a vast cross-pollination of ideas and unlikely but profitable partnerships. With people's needs and aspirations as your guide, you'll be able to provide services that awaken their imaginations and inspire new thinking and new levels of loyalty – just as we saw with the PC and smart phone revolutions.

You need to be brave, focused with laser precision on the role you envisage for your company, determined without compromise to reach that goal, and aware of the platforms and partnerships that can help you.

Fujitsu's long experience and expertise in the information economy, spanning almost 80 years and global business in markets as diverse as mobile networks and finance, and our leadership in fields such as AI, quantum computing, and the cloud, makes us an ideal collaborator on your quest for the digital transformation necessary to compete in the new world. We're here to help you succeed.

You've read in this document how many of the sectors in our new mobility society will benefit from agile new forms of data gathering and analysis. Fujitsu is already working on ways that these benefits can be realized, partnering with manufacturers, government agencies, and service providers from all industries to develop smart solutions to mobility issues and requirements. This places us centrally in the evolving society as a company leading efforts to leverage digital into value that benefits people.

We're thinking big on the implications, and we're thinking big on the implementation. As a neutral consultancy and wise partner to companies in all sectors, we're bringing together key players and vital abilities, sharing visions among a huge range of stakeholders across the world.

Established companies come to us because we understand that the pain-points are the same regardless of industry or sector or consumer demographic. Disrupters come to us because we open the doors to bring their ideas to fruition. The current mobility industry relies on us to guide it to leadership in the society to come. We're dedicated to that task. We're also engaged on mobility-driven journeys with companies from finance, retail, and far beyond, and we're collaborating with educators to promote the possibilities of this new world.

We're cracking the problems of global, real-time mobility as a service: millions of vehicles and billions of people all moving and interacting. We're keeping pace with our ever-evolving and ever-smarter cities and the constantly changing needs and hopes of the people who live in or commute into them. We're using digital transformation to solve environmental issues and ensure sustainable societies. And we're pioneering open models that put the power to innovate back in the hands of businesses and residents.

That's why we think of ourselves as a Future Mobility Accelerator – a company that gets its partners up to speed and ready for the road ahead.

Business success is all about navigating around roadblocks to identify new avenues. As a wise partner, Fujitsu has proven experience leading customers in the mobility DX journey. Combined with deep expertise in the emerging technologies, we can help you navigate through complex business challenges and improve your customer's journey.

FUJITSU LIMITED

Shiodome City Center,
1-5-2 Higashi-Shimbashi
Minato-ku, Tokyo 105-7123, JAPAN
Tel. +81-3-6252-2220
<http://www.fujitsu.com/global>