

**Look Out 2020+**  
Industry Trends  
Transport

# Paving the way to multimodal transportation services

Thought  
Leadership

**Atos**

## Megatrends in Transport: Revolutions ahead



“Transportation is undergoing major disruption. To succeed, established players will not only need to fight their traditional competitors but also adapt to fast-changing ecosystems, repositioning themselves in customer-centric, multimodal value chains.”

**Theo Quick**  
Vice President, Transportation & Hospitality, Atos

The last 100 years have brought multiple innovations to the transport industry. Each day, a billion people take a car, bus or subway, around 11 million passengers fly and nearly 200 million parcels are delivered.

But major changes are on the way. Everywhere, new entrants are challenging existing transport practices. Online providers leverage mobile to create new relationships with travelers. Marketplaces exploit peer-to-peer to move from a world of vehicle possession to one based on usage. New players use the power of real-time data to offer personalized door-to-door travel and logistics services.

### Digital driving change

By interconnecting people, vehicles and infrastructure, digital technologies are enabling traffic to be radically optimized. They are transforming passengers' and freight owners' experiences along their journey. They are revolutionizing economic models through multimodal services and the sharing economy. And they promise to disrupt the market further with autonomous vehicles, drone-taxis, hyperloop trains and hypersonic air transport.

### Rethinking transportation

In the face of rapid change, incumbent transport providers must react if they do not want to be outpaced. This evolution can be a threat but can also offer extraordinary opportunities to thrive.

In the face of profound changes that challenge many assumptions of the past, transport companies and organizations must not only rethink the way they handle their businesses but also create new avenues for the future. Passenger relationships, operations, business models, and trust and compliance must all be reinvented.

Today's changes represent immense opportunities for organizations to place themselves at the heart of next-generation multimodal transport ecosystems.



of Transport has high levels of digitization



will be spent on intelligent transport in 2024



Global air traffic will double in the next 20 years



of worldwide energy use and 21% of CO<sub>2</sub> emissions come from Transport



Maritime traffic has grown 4-fold in the last 20 years



will be devoted each year to transport infrastructure until 2025



has been invested in smart mobility in the last 8 years

\$ = USD



Global rail will grow by 40% in the next 10 years



2bn vehicles will be circulating in 2050, 50% of them autonomous

# Four transformational challenges and opportunities for the future of Transport

1



## Rethink the 360° experience for passengers & customers

Today's **Y and Z generation travelers** have little in common with travelers of just a decade ago. Hyperconnected and mobile, they can **select from the thousands of service providers in just a few swipes**, mixing road, rail, air and sea, if needed.

During their journey, they require constant alerts on the progress of their journey, any possible incidents and suggestions on the best alternatives to sort these out; they also expect value-added services, such as free Wi-Fi and infotainment. After the journey, they expect a **broad range of complementary services**, from hotel booking to concierge services.

This makes the 360° passenger and freight owner experience a critical challenge for transport providers striving to compete in the digital era. To succeed, they need to not only take charge from start to destination; they also need to ensure the **best-personalized experience, end-to-end** from preparation, booking, ticketing, onboard support, tracking and arrival up to onward services. All that along with integrating into **multimodal ecosystems**.

> **What's at stake is not just customer satisfaction. In an era of unlimited choice, it's a matter of survival.**

2



## Boost agility & streamline costs

From infrastructure and vehicle management to logistics and route optimization, operational excellence has always been at the heart of transport expertise. But the **21<sup>st</sup> century pushes constraints to their limits**.

With four billion urbanized people, rapidly growing megacities and globalized commerce, how do you **orchestrate billions of goods, people and vehicles** to be constantly moving at the same time?

To provide service excellence while controlling costs, companies must not only optimize their own operations in real time but also **integrate within complex networks of transport providers, infrastructure operators and regulatory authorities** across and beyond multimodal borders.

> **While growing demand and harsh competition on price, speed and services constantly increase pressure, real-time and predictive operations optimization is more than a challenge: it's the prerequisite for competitiveness.**

3



## Rethink positioning in next-generation ecosystems

What's the **main role of a transport player**? An infrastructure operator, such as a railway or an airport? A carrier, such as a bus company or airline? A multimodal transportation player, such as a logistics or travel group?

Many models have always coexisted in the past, but the **digital revolution is tending to give a premium to those who master customer relations at the upper level**. Organizations will need to grow their integration into ecosystems, with multiple players fighting to become the overarching B2C or B2B multimodal platform.

To avoid being replaced or disintermediated, players need to **precisely define where they want to play in these changing ecosystems**. Do they want to fight the battle for customer dominance? Do they want to enlarge their offering with multimodal value propositions, value-added services or multi-sided marketplaces? Do they want to focus and be the best in a specific segment?

> **In tomorrow's ecosystems, the winners may well be those who choose their battle carefully.**

4



## Guarantee absolute safety & compliance

**Safety is the number one priority**. When it's your responsibility to take care of human lives or to make sure the goods you have been entrusted with arrive safe and sound, safety and security are more than an afterthought.

Digital transformation only adds to this pressure. At a time when connectivity is greater and transport is being digitized, **new vulnerabilities appear**. How do you ensure that logistics systems won't be taken over? That a plane or a train system won't be compromised? That the Artificial Intelligence software in an autonomous passenger service won't be compromised?

Beyond criminal actions from hackers, organized crime or even competitors, the risk of vital transport cyber-systems being targeted by hostile states must also be taken into account. Added to that, the **privacy of customer data is a growing concern** at a time when regulations such as GDPR create fines of up to 4% of revenue if there's a breach.

> **All this makes security and compliance not just an essential issue but a vital one. The reward: making trust a business' differentiator.**

## Building next-generation platforms to succeed in next-generation transport ecosystems



“In a fully interconnected world, the IoT and mobile, next-generation analytics, Artificial Intelligence and critical payments must be at the heart of transport technology strategies. But the key to success won't be in the technology alone: it will be in the way you leverage it for distinctive business advantage.”

**James Bain**  
Director Mobility and eTransactional Services, Worldline

To manage their complex logistics mission, transport players have a long tradition of operational excellence. For decades, they have leveraged advanced technologies for enterprise asset management, route optimization, yield management, and payments. However, new location services, analytics and real-time technologies bring new capacities to revolutionize transportation strategies.

### Bringing legacy systems into the digital era

Faced with nimble, agile competitors leveraging digital platforms to disrupt the market, incumbent transport players are finding themselves under increasing competitive pressure. To catch up, they must modernize their legacy systems and leverage innovation to meet passenger and freight owners expectations better. They must radically realign cost structures, gain agility across the whole transport value chain and, ultimately, develop new contextual services and business models.

All these challenges not only impact the organization's business, human and operating model strategies; they significantly impact their technology foundations.

### Preparing for a paradigm shift

Adapting to the new era requires a quantum leap. To fully leverage the opportunities of interconnected infrastructure, vehicles and ultimately passengers and freight, three core principles will be essential for transport players:

- Become wholly **passenger-centric and freight owner-centric**, enabling a 360° service experience along the entire customer journey from preparation and ticketing to journey arrival and onwards.
- Provide **intelligent data-driven orchestration** to not only optimize operations but also attract and federate the largest ecosystem of partners to enrich the offering and monetize data.
- Adopt **open platform foundations** and real-time process automation to provide the best transportation services at the lowest cost while being able to adapt at any time.

### The road ahead

Transport players should begin building their new architecture today. Modernizing legacy and fully embracing the latest IoT, payment, Big Data, process automation and Cloud technologies is only the start of the journey.

### Next-generation architecture for future-ready transport players

#### CUSTOMER CENTRICITY



#### MULTIMODAL EXPERIENCE

360° passenger, customer and workforce engagement, open payment and ID-based access platforms



#### COGNITIVE ANALYTICS PLATFORMS

Smart transportation orchestrator, open APIs and marketplaces



#### BUSINESS ACCELERATORS

Real-time services: ERP, EAM, open payments and predictive maintenance



#### HYBRID CLOUD

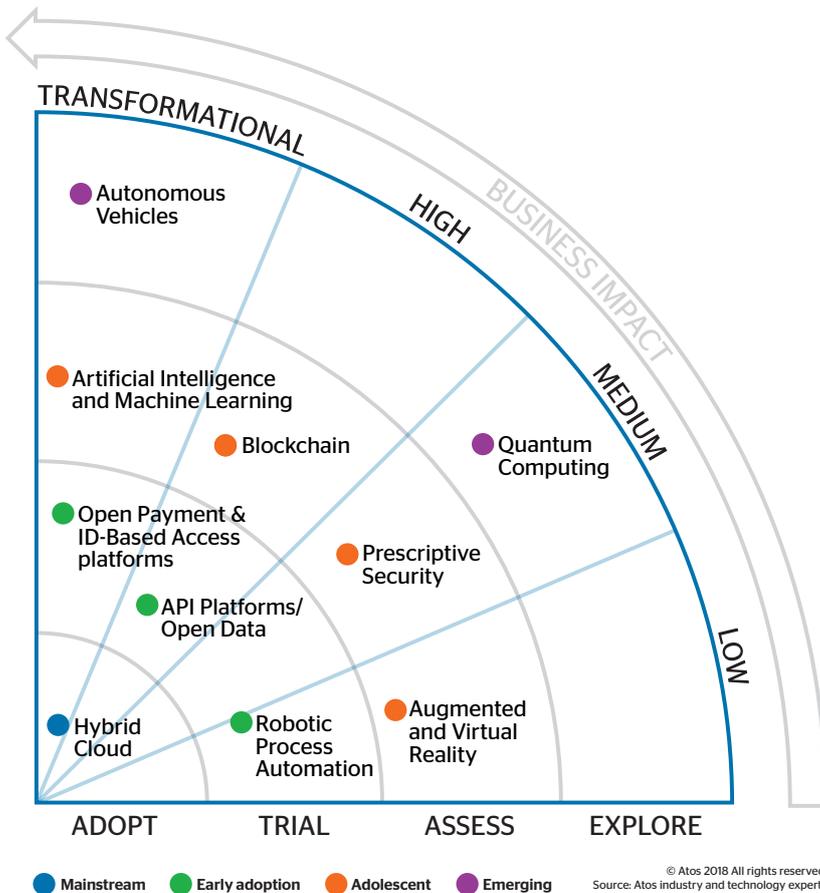
Software-defined infrastructures, microservices and DevOps

INTELLIGENT DATA-DRIVEN ORCHESTRATION

#### OPEN PLATFORM FOUNDATIONS

More disruptive technologies will emerge. While some may only appear as dots on the horizon today, they will turn out to be transformational in the years to come.

# 10 disruptive technologies that will shape the future of Transport



Transport Look Out 2020+ Radar: 10 key technologies set to impact transport over the next 5 years.



Want to know more? Examine the Look Out 2020+ Global Technology Radar to get deeper insights into these 10 strategic technologies and many more: [atos.net/lookout](https://atos.net/lookout)

**Hybrid Cloud** is reviving Cloud initiatives by enabling seamless integration of private and public Cloud platforms. With this model, organizations can exploit the benefits of public Cloud: pay-per-use, 'infinite' bursting resources, agility and innovation. Transport players must adapt their IT processes and prepare for related security implications.

**Open Payment & ID-Based Access Platforms** reduce the friction passengers experience when they use transport services, enabling these services to evolve toward trusted 'pay as you go' models. As many Generation Z people do not own cars and expect to 'just move,' legacy ticketing systems are barriers to access and therefore growth. Transport players should consider making new-generation payment and ID-based access platforms a cornerstone of their services.

**API Platforms/Open Data** allow transport offerings to be distributed and serviced across third parties. Transport organizations should put API platforms at the heart of their digital strategy to attract ecosystem partners.

**Robotic Process Automation** brings virtual workforces to manage repetitive tasks, reducing the cost of administrative and regulatory processes by at least 50% while improving quality and speed. Transport organizations should standardize processes to facilitate automation.

**AI and Machine Learning** promise to second human cognitive capabilities with virtual assistants, chatbots, knowledge engineering, smart machines and autonomous vehicles. They will impact customer experience, business models and operations along the entire value chain. Transport organizations must prepare for the

business, human and legal impacts.

**Blockchain** is a potential game-changer for conducting business with parties without prior trust relationships. In Transport, it could revolutionize supply chain management, payments, automated contracting and the microservice economy.

**Prescriptive Security** uses real-time dark web monitoring, AI and automation to detect potential threats and stop them before they strike. Applications range from cyber-protection to fraud management and compliance. Transport organizations should explore integrating it into their IT/OT Security Operation Centers.

**Augmented and Virtual Reality** are blurring real and virtual worlds, allowing customers, partners and employees to engage with digital services within the context of their current environment. Transport organizations should explore potential use cases in maintenance, sales, service gamification, virtual or physical stores and infotainment.

**Autonomous Vehicles** will disrupt the industry as we know it. Beyond driving assistance, driverless vehicles will ultimately provide completely new forms of passenger mobility or automated freight transportation and platooning. Technological, business and legal implications are huge and must be explored now.

**Quantum Computing** promises to break traditional combinatory analysis limitations, bringing advances in High-Performance Computing for vehicle design and manufacturing. It will also elevate risk by potentially breaking current cryptographic standards. Transport organizations must start preparing for both Quantum computing and Quantum-safe cryptography.

## A glimpse into the future of Transport: Expert views on best practice for digital transformation



**Theo Quick**  
Vice President, Transportation & Hospitality,  
Atos



**James Bain**  
Director Mobility and eTransactional Services,  
Worldline

### What could Transport look like in five years?

We are probably in **the most exciting time for transport innovation since the invention of the combustion engine**. We are experiencing huge technology disruptions environmental pressures, increased energy costs and new agile digital entrants to the market.

But we are also **at a turning point**. Digital communications, teleconferencing and telepresence mean tomorrow anyone will be able to connect virtually with anyone else without having to travel.

This will have massive implications for passenger transport in the years to come: **for people, transport becomes less a need but more a want!** This may completely **change the transport market by putting an increased focus on services and experience**.

To attract consumers, transportation will have to be more **personalized**. Ticketing will have to become much more transparent with technologies such as **faceID**. Services will have to become much more varied with **infotainment and hospitality**. **End-to-end multimodality** will encompass all the whole transport spectrum from active travel, such as bikes, up to **hyperloop trains and autonomous robot-taxis**. **Mobility-as-a-Service subscription models**, as trialled today in Birmingham in the UK, Helsinki in Finland and Seattle in the US, will develop further. There is a real revolution coming.

### Which driving forces will help them succeed?

In a hyperconnected world, **data is the new gold**. The data revolution will be **at the heart of the future of Transport**, which is already a very data-rich environment.

From passengers and parcels up to vehicles and infrastructure, data will help companies better analyze the best places to pick up and drop passengers, and which services they prefer. It will allow firms to manage and maintain assets predictively, and to invent new ways of leveraging them.

To succeed, working in ecosystems will be a key point for players. Digital enables easier collaboration between organizations that did not even think they could work as a team. It **breaks barriers between previously siloed value chains**: air, sea and land transporters, hospitality and infotainment providers, public authorities, etc. This also provides more space for innovation from SMEs. The large number of dockless bikes start-ups is a good example.

Existing transport players and public authorities may see these innovation trends as threats. In fact, they are major opportunities for them if they **manage to attract and leverage the inventive start-ups of tomorrow** within their own ecosystems.

“  
Succeeding in tomorrow's multimodal transport will be a collaborative game. From the start, organizations must think about ecosystems and multi-sided platforms.”

### What should transport players do today?

All the transport organizations we work with are convinced they must transform very fast if they want to survive. This is where we help them with our Digital Transformation Factory:

- **Putting a strong focus on omnichannel and multimodal customer experience**. Examples span end-to-end contactless ticketing to deploying chatbots to give customers 24x7 access to timetables or ticket purchases for the end-to-end journey through an airport or station.
- **Streamlining punctuality, serviceability and reducing costs** with predictive maintenance and prescriptive operations management. We are also pioneering research in domains such as autonomous vehicles with major vehicle manufacturers today.
- **Building platforms and marketplaces for multi-sided collaboration and data monetization**, often allying private and public authorities alike. We have strong experience in it with Worldline and our new strategic partnership with Google Cloud.
- **Enforcing trust & compliance** with prescriptive cybersecurity, payments, fraud management and also next-generation mission-critical systems, such as the digital GSM-R networks for rail signaling systems.

All our customers know that they have strategic choices to make. What is core to their organization? What should they look to give up? What must they really prepare to fight for?

To succeed, our experience is that it is essential to build data-driven, agile, open architectures and platforms; decouple back-office and front-office systems; publish APIs; **set up marketplaces to enable partners to join** and more.

**Ecosystems will be the key to the future**. This is a fast-changing time. But this is also a fascinating and very promising one for organizations who take the path to innovation.

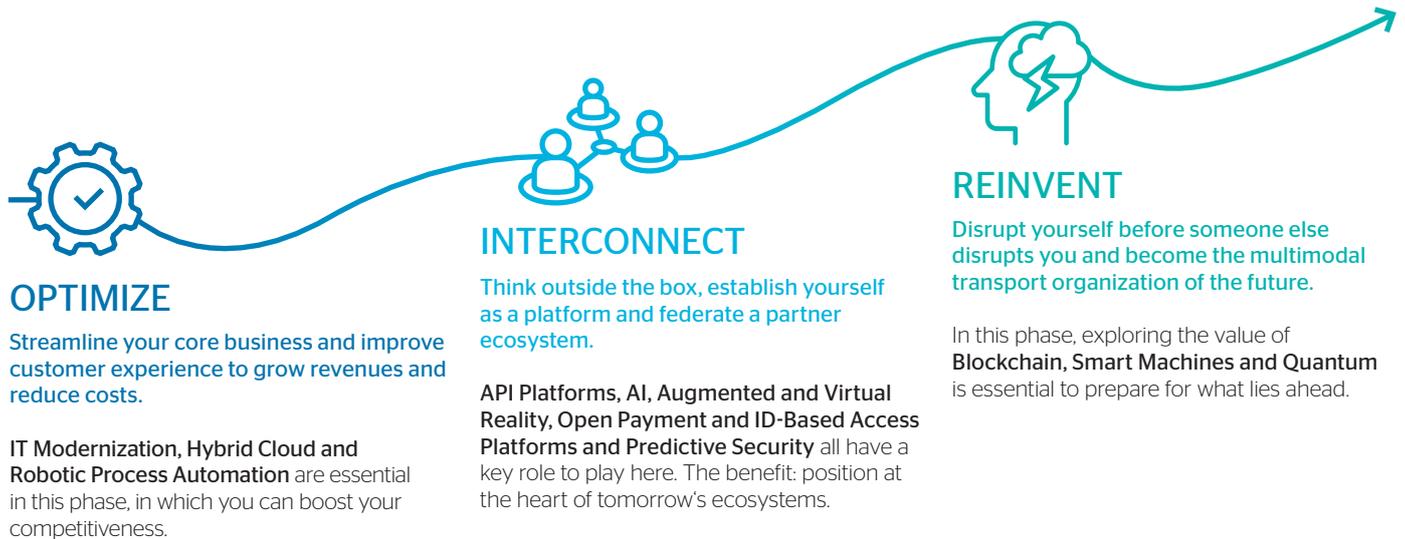
# Creating your own Transport transformation journey

With all these changes converging at once, you must steer your transport organization forward. Faced with a rapidly changing business ecosystem, the questions you will be asking is not 'Why change?' but 'Which direction?' and 'How?'.

The first step is **figuring out the role you want to play within next-generation transport ecosystems**. There are several possible positions each with its pro and cons.

Do you want to focus as a category killer? Do you want to become the multimodal services orchestrator for your customers or the overarching ecosystem platform driver?

Having made that strategic choice, you must **next embark on a journey of progressive and continuous transformation**, combining people, organizational and technology streams. Your journey requires a roadmap. We have drawn up a three-step approach, with steps that can be undertaken simultaneously.



Throughout these phases, an open approach to innovation, such as the **Digital Business Continuum** approach developed by Atos, will be paramount to success. In an ecosystem world where start-ups appear and spread at internet speed, openness is the best way to capture collective intelligence. As transport players strive to transform, **open innovation labs** such as the joint Atos and Google labs will provide an ideal environment for bringing new ideas and new concepts to life - and creating multimodal transportation services for tomorrow.

## Where should you begin?

As the Trusted Partner for your Digital Journey, Atos can help. Meet our experts and stay one step ahead by getting hands-on experience of new disruptive technologies.



**ENGAGE** in a co-innovation workshop at one of our **Business Technology & Innovation Centers**.

Get off to a quick start with a personalized workshop. Ask for a meeting:  
> [atos.net/btic](https://atos.net/btic)



**EXPLORE** how the latest technologies can boost your own practice.

Leverage our experts and labs to build POCs tailored to your own business:  
> [atos.net/transport](https://atos.net/transport)



**STAY TUNED** with the latest trends and best practices in digital transformation.

Keep yourself informed. Follow the latest insights from the field on:  
> [atos.net/blog](https://atos.net/blog)

This is an extract from the full Atos Look Out 2020+ report, which provides an in-depth analysis of the emerging megatrends, business transformation opportunities and technologies that will drive innovation in the years ahead. Explore the full report on [atos.net/lookout](https://atos.net/lookout).



---

# About Atos

Atos is a global leader in digital transformation with approximately 100,000 employees in 73 countries and annual revenue of around € 12 billion. European number one in Big Data, Cybersecurity, High Performance Computing and Digital Workplace, the Group provides Cloud services, Infrastructure & Data Management, Business & Platform solutions, as well as transactional services through Worldline, the European leader in the payment industry. With its cutting-edge technologies, digital expertise and industry knowledge, Atos supports the digital transformation of its clients across various business sectors: Defense, Financial Services, Health, Manufacturing, Media, Energy & Utilities, Public sector, Retail, Telecommunications and Transportation. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos Consulting, Atos Worldgrid, Bull, Canopy, Unify and Worldline. Atos SE (Societas Europaea) is listed on the CAC40 Paris stock index.

Find out more about us

[\*\*atos.net/lookout\*\*](https://atos.net/lookout)

[\*\*atos.net/transport\*\*](https://atos.net/transport)

Let's start a discussion together

