

Location Trends 2019

Acknowledgements

The HERE Trend & Innovation Research team wish to thank the following people for their contribution to this project:

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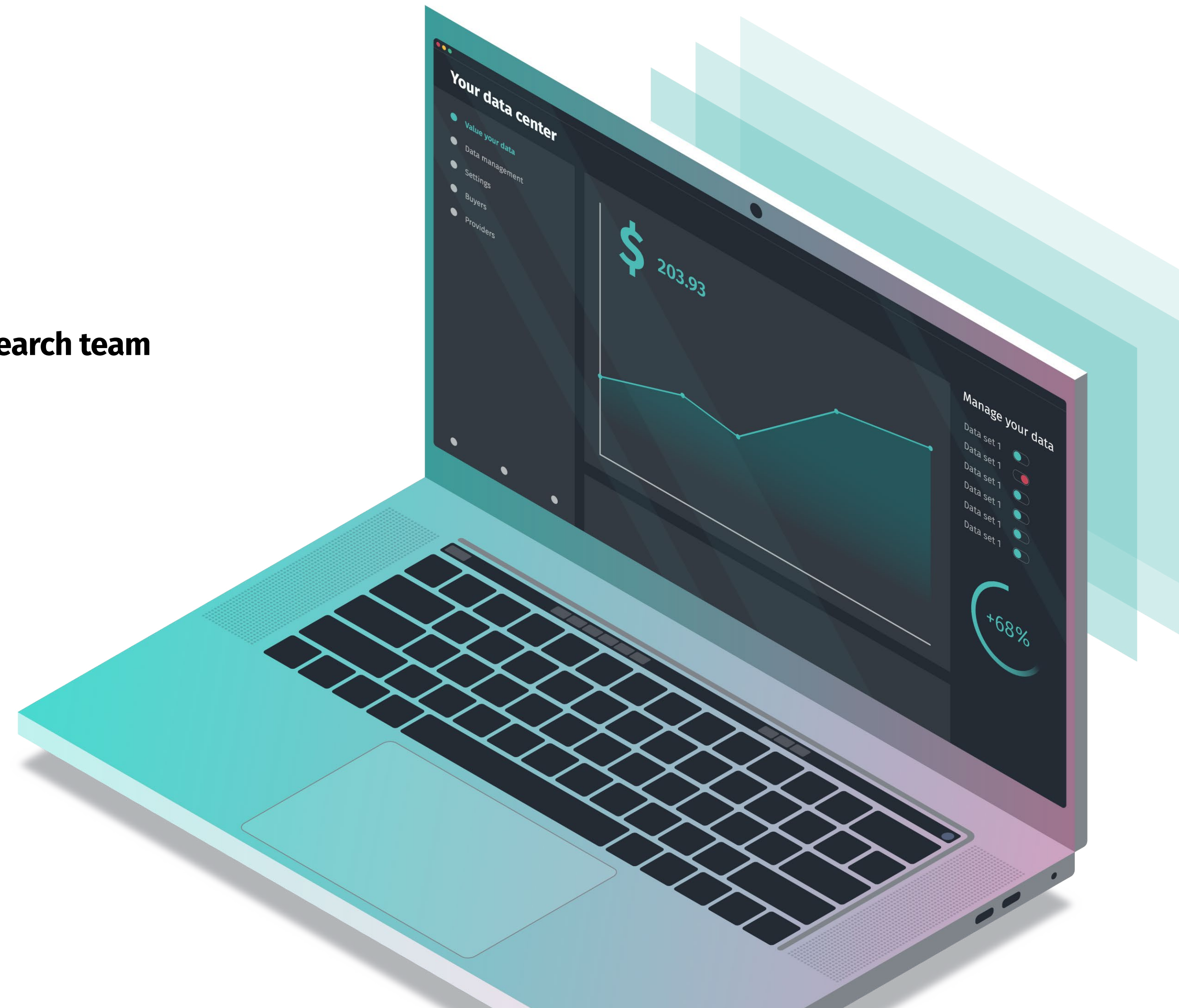
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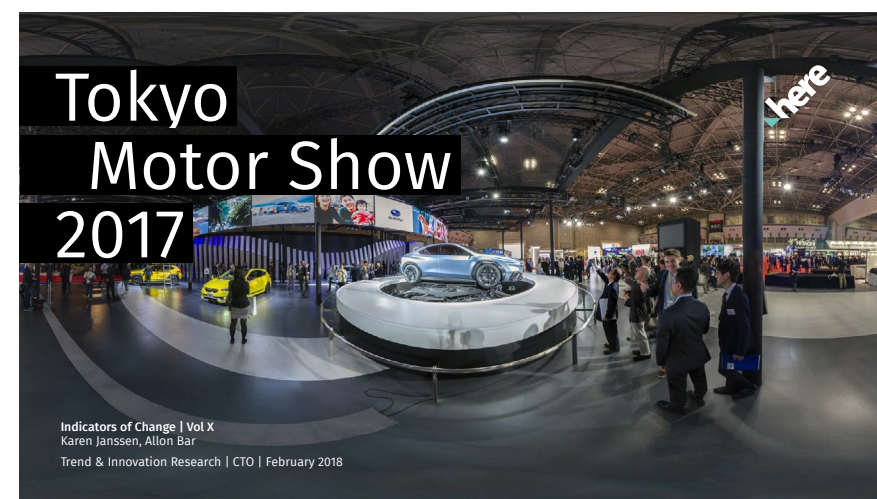
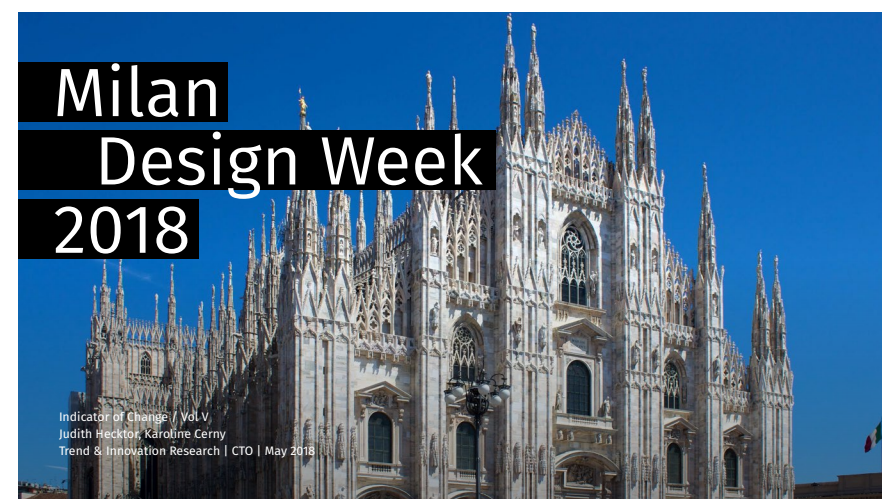


Trend research at HERE



The HERE Trend & Innovation Research team is dedicated to identifying changes and patterns in a range of industries and markets, with the goal of creating a more accurate vision of the future.

Location continues to be a driving force behind many products and services. By evaluating shifts in society, economy, geopolitics and technology, we can build innovative location-driven products and services that deliver more value to people around the world.



Our work is further enhanced by the fact that we attend global events each year, where we hear first-hand how these industries and markets are evolving.

HERE is focused on uncovering whether innovation happens as a result of technological improvements or due to customers' changing values and needs. Our aim is to inspire meaningful innovation in location technology, with an emphasis on how it affects our lives.



Innovation is a dialogue. This report will show you how our future may unfold, and hopefully inspire discussions that will shape it into something even stronger.



Methodology

We understand that innovation in one industry or market can affect another. This is why we investigate a broad range of areas – retail, work, sports and healthcare, leisure and entertainment, transportation and automotive, lifestyle, domestic appliances, logistics, education, food, financial services and fleet management.

Each year, HERE attends relevant trade shows, conferences and events to observe patterns and anomalies in society, the economy, markets, geopolitics and technology. Trends happen both in and out of view of consumers, which is why we also delve deeper into governmental projects, platforms, vehicles, data products, devices, infrastructure and services.

We combine this field research with the expertise of our team. We hold annual “What if?” interdisciplinary work sessions, where we understand and translate how our insights are relevant to HERE, its products, relationships and future. We encourage internal dialogue to inspire new ways of thinking about the future. HERE CEO Edzard Overbeek has also shared invaluable insights into this year’s location trends.

All of these efforts culminate with the annual HERE Location Trends report, which we share and communicate through workshops, reports and presentations. Creative problem solving requires an open dialogue between company, markets and society. Our trend research aims to be the catalyst that sparks this creative process.



Trends overview

1 From smart to ideal cities

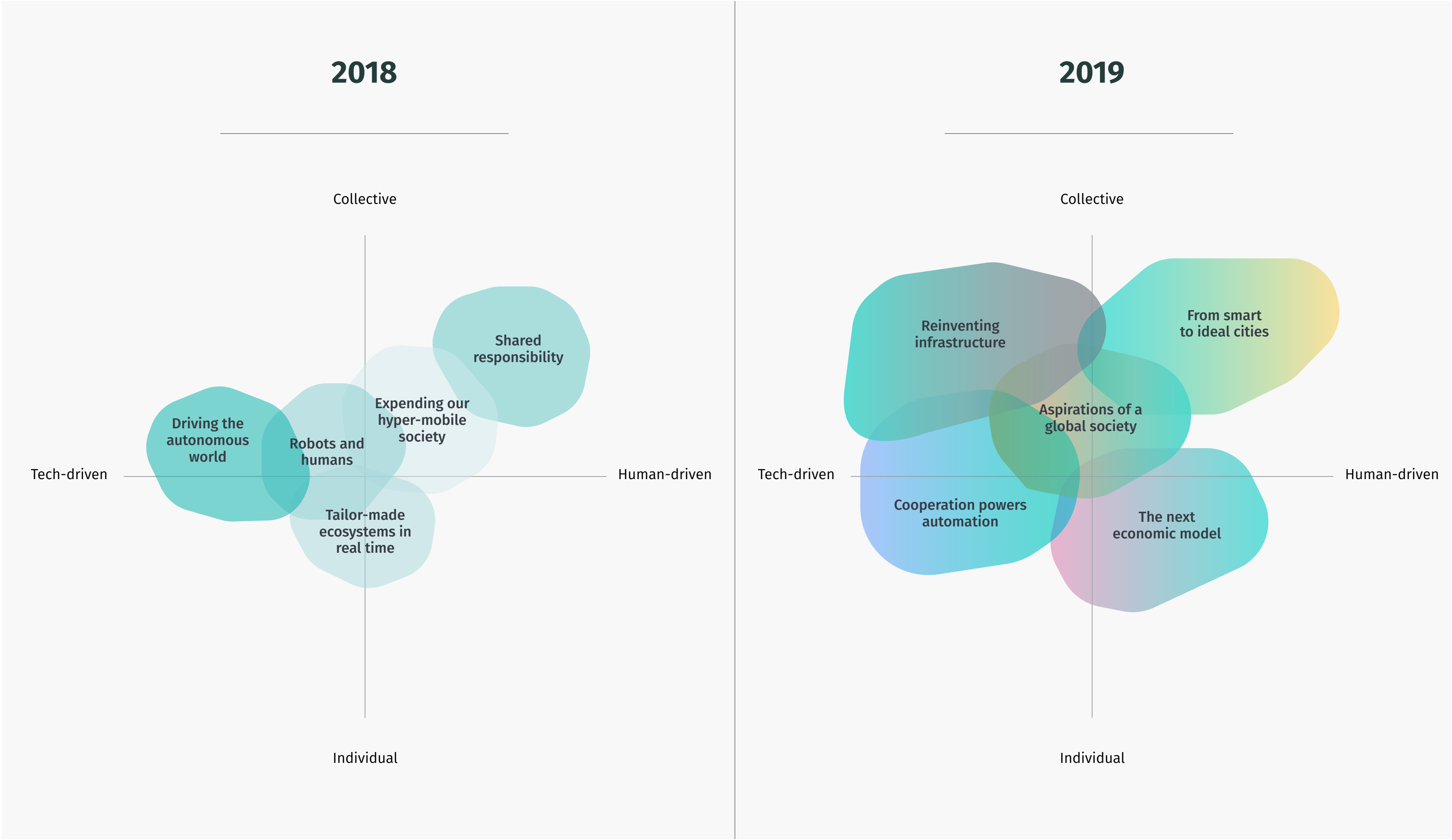
2 Reinventing infrastructure

3 Cooperation powers automation

4 The next economic model

5 Aspirations of a global society

Location Trend map



At the end of every year, we map all the material collected from different industries. Singular trends are grouped into macrotrends, which span industries. These are then mapped to a set of axes that describe the nature of the trends.

On these axes, trends move horizontally from technological evolution on the left, to changing human and lifestyle values on the right. Vertically, trends move from the individual at the bottom, to the collective society near the top.

After mapping the trends, we then perform a mix of speculative and fictional exercises to imagine what might happen in the near future across these different industries.

Finally, we introduce the aspect of location, by imagining what a company could encourage or prevent in these conceptualized futures.

The impact may be felt at different levels: from data capturing and analytics, to infrastructure solutions, new services and devices, and more. Together, this is how our Location Trends take shape.



1

From smart to ideal cities

To create the ideal city, it is essential for cities to identify and leverage their core competitive advantages and assets. They have to develop detailed long-term execution plans and strategies, carefully taking into consideration citizens, local characteristics, and specific industries.

1. From smart to ideal cities

Recent years have witnessed the birth of so-called “smart cities” where, through extensive digitalization and connection, governments and businesses collect data in a bid to make cities more efficient and optimize their services. The goal is to make urban environments cleaner, greener, safer, more mobile, and ultimately smarter and better places to live.

The wealth of city data is used to gain insight and create new intelligent transport solutions. HERE, like many others, uses rich traffic data to analyze urban mobility patterns. Marketplaces, such as OneTransport, open up siloed transport data to the private and public sector alike.

Cities are now entering the next stage of this process, which we term ideating cities. Beyond technological and efficiency capabilities, smart city technologies have the potential to greatly improve quality of life for city inhabitants. Cities are at a unique turning point in their development. Citizens can now tangibly create their future cities and interact with them easier than ever before. Smart city leaders, such as Helsinki, are already taking steps in this direction, by using co-creation techniques to develop intelligent mobility solutions that better take into consideration citizen desires.

Brands have the power to influence the values that are infused in these ideal cities. Equality in services for the rich and poor, environmental sustainability, privacy and support to municipalities may all be enhanced.

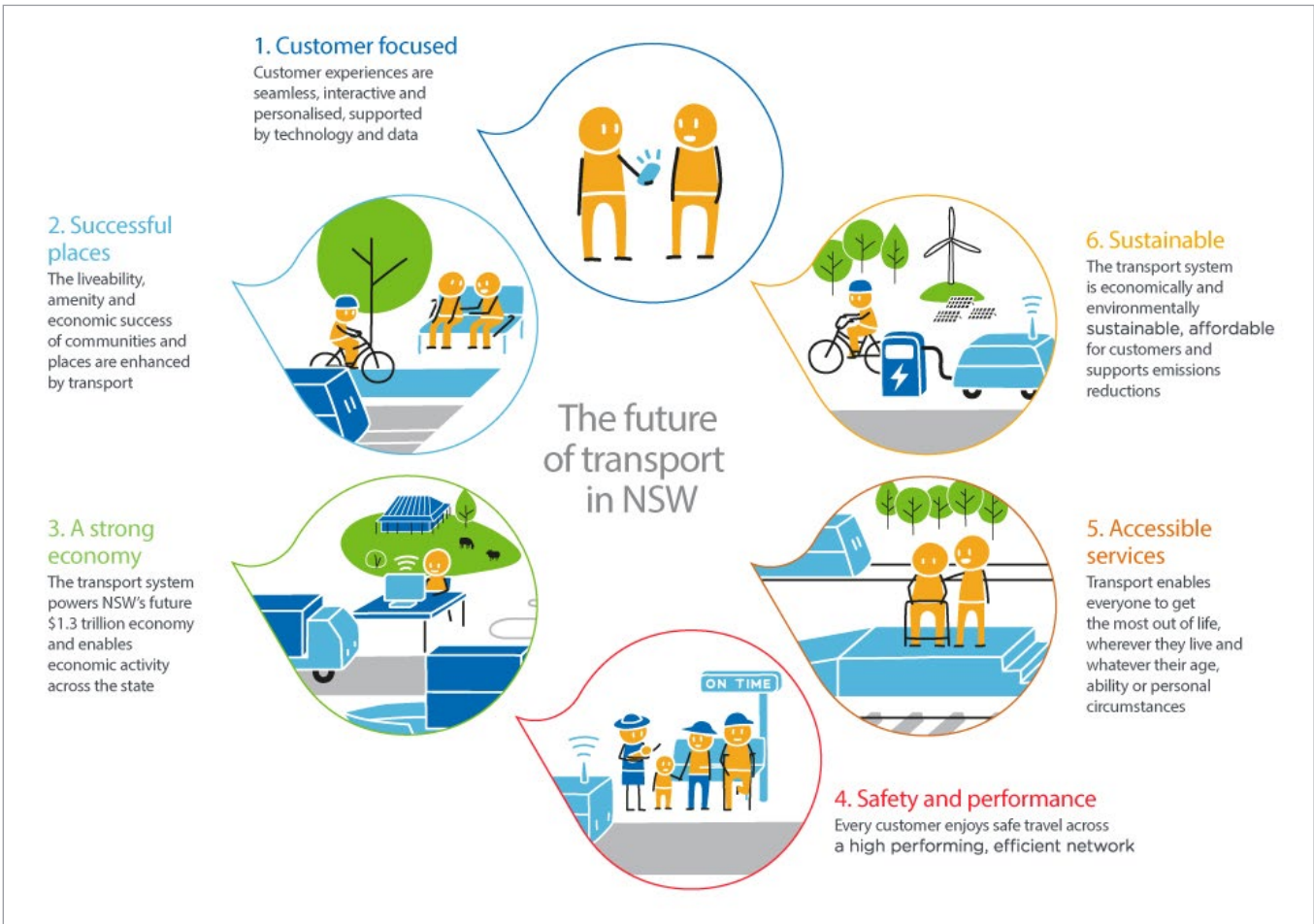
The growth of idealized smart cities will depend heavily on open collaboration between multiple stakeholders. But only constant dialogue with citizens will allow these cities to truly flourish. Visions for future cities must be translated into action today, with collective execution plans and city frameworks needed to bring such visions to life. Developing tools that help define and create those frameworks will require both openness and shared efforts between the public and private sector.



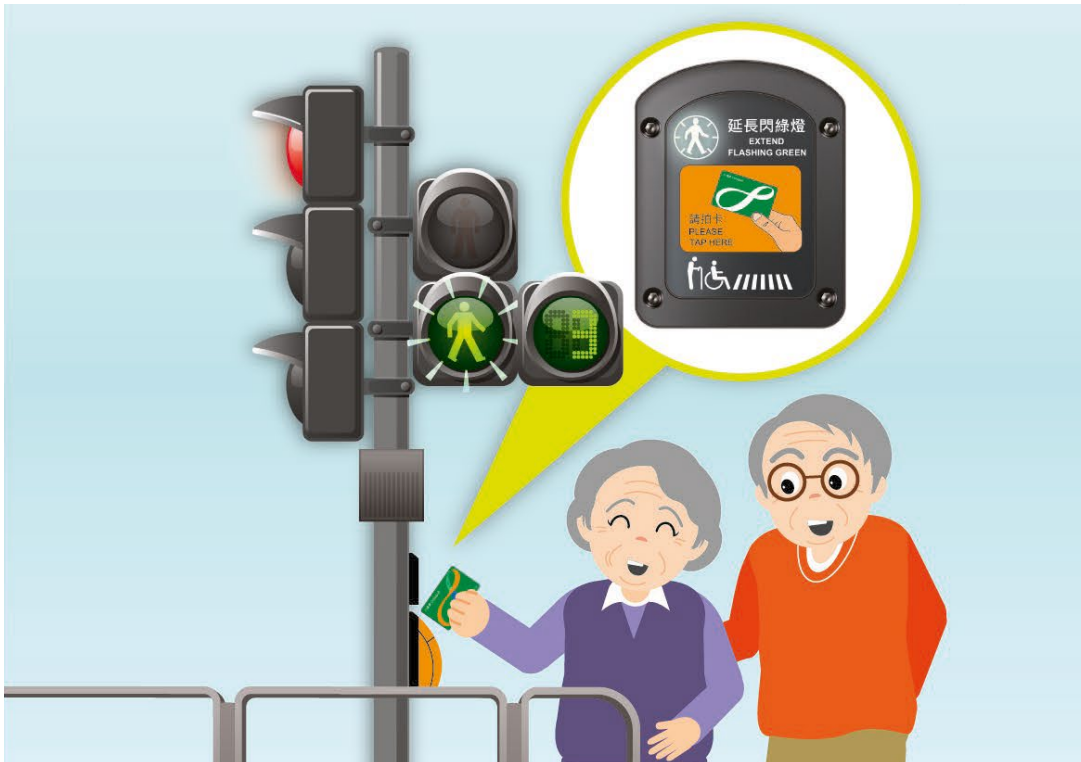
Copenhagen is a smart city committed to livability and sustainability. The biggest aim of the city's “CPH 2025 Climate Plan” is to become the world's first carbon neutral capital by 2025.



The HERE Urban Mobility Index provides a comprehensive overview of the mobility performance and smartness of major global cities, highlighting those that are ahead of the trend in meeting citizen mobility needs.
© HERE Urban Mobility Index



Transport for New South Wales used a co-design process to engage with everyone from transport staff and customers, to government agencies and industry supplies, to deliver a future transport system that meets all stakeholder needs.
© Transport for NSW



When waiting to cross the road at pedestrian crossings in Hong Kong, the elderly can lengthen the green light duration, simply by tapping the signal pole with their city transport card.
© Hong Kong Transport Department



2

Reinventing infrastructure

Following the automation of administrative processes and the consumerization of enterprises, the new “physical internet” will provide a holistic and seamless end-to-end ecosystem. In this context, it is vital for cities and governments to prepare not only technological infrastructure, but also to lay foundations within regulatory frameworks for the deployment of advanced robotic vehicles, on the road and in virtual [air]-ways.

2. Reinventing infrastructure

Throughout the 20th century, urban infrastructure has often been optimized with one primary benefactor in mind: the gas-driven car. Now, as traditional means and models of transport continue to decline, existing infrastructure has to adapt in order to serve more technologically advanced and demanding transport replacements. This will provide a holistic and connected end-to-end ecosystem, capable of renewing, rebuilding and reimagining how a city moves and functions.

Growing trends like electric, autonomous, and aerial vehicles require a fundamental overhaul of city facilities and systems. They must now cater to new forms of movement, by responding to emerging transportation paradigms such as Mobility-as-a-Service (MaaS) and on-demand mobility with multi-modal integration and interoperability. This means public and private mobility providers must collaborate closer with city authorities.

Hamburg, for example, is working together with DriveNow and Car2Go to install an EV charging network that seamlessly integrates with existing public transport.

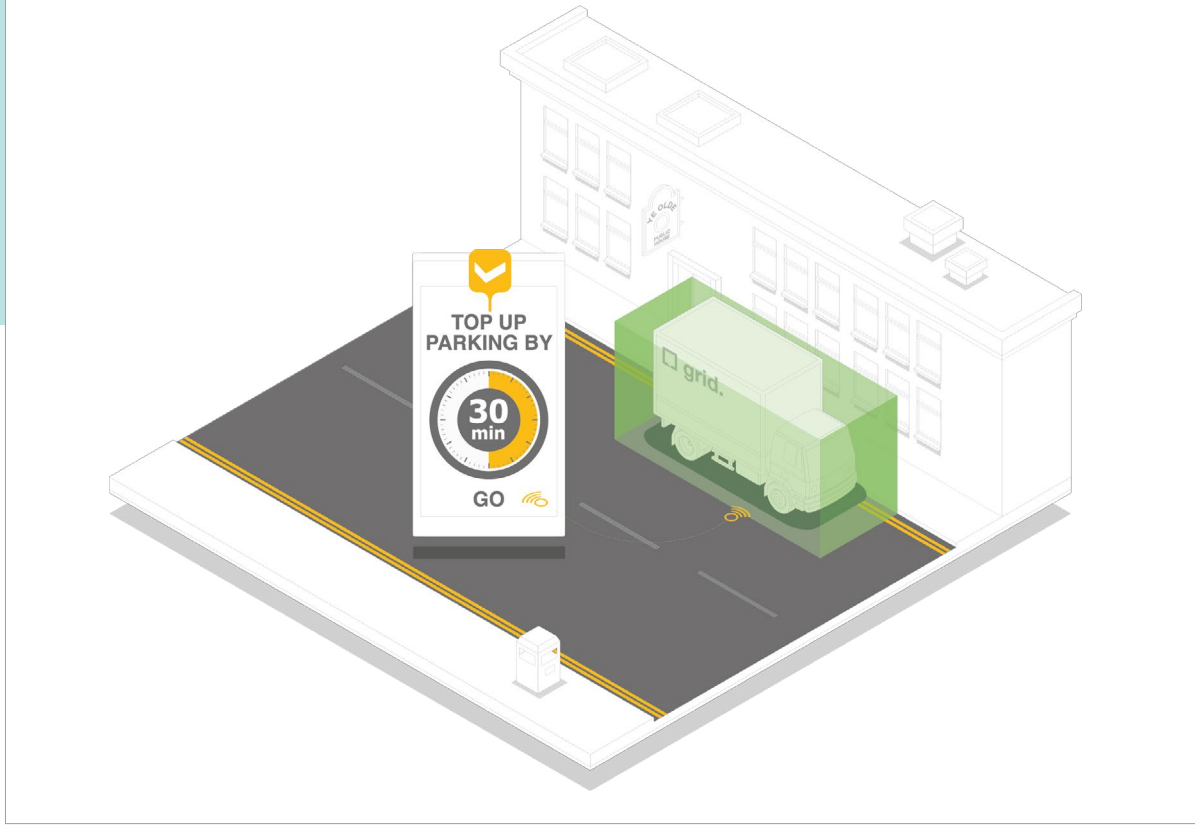
Highways are also being prepared for the next generation of mobility. Near Paris, the A1 is being reimagined as a continuous interface between the Charles de Gaulle airport and the Porte de Paris, with intermodal stations connecting the highway with dedicated metro, bus, automated vehicle and car sharing lanes.

To keep up with a growing on-demand economy and changing consumer expectations, new urban logistics models are being built upon the decentralization and redistribution of delivery patterns, using new micro delivery hubs.

The demand for enhanced connectivity and real-time data exchange pushes for new, more flexible cellular infrastructures and equipment. Throughout 2018, carriers raced to install new 5G infrastructure, with T-Mobile installing 5G networks in 30 cities. These will not only be a key enabler for future autonomous transportation, but also for a myriad of other connected services and real-time data sharing.

During this model-transition period, both old and new infrastructure must co-exist. The differing priorities of these models may temporarily lead to competing and more polluting systems.

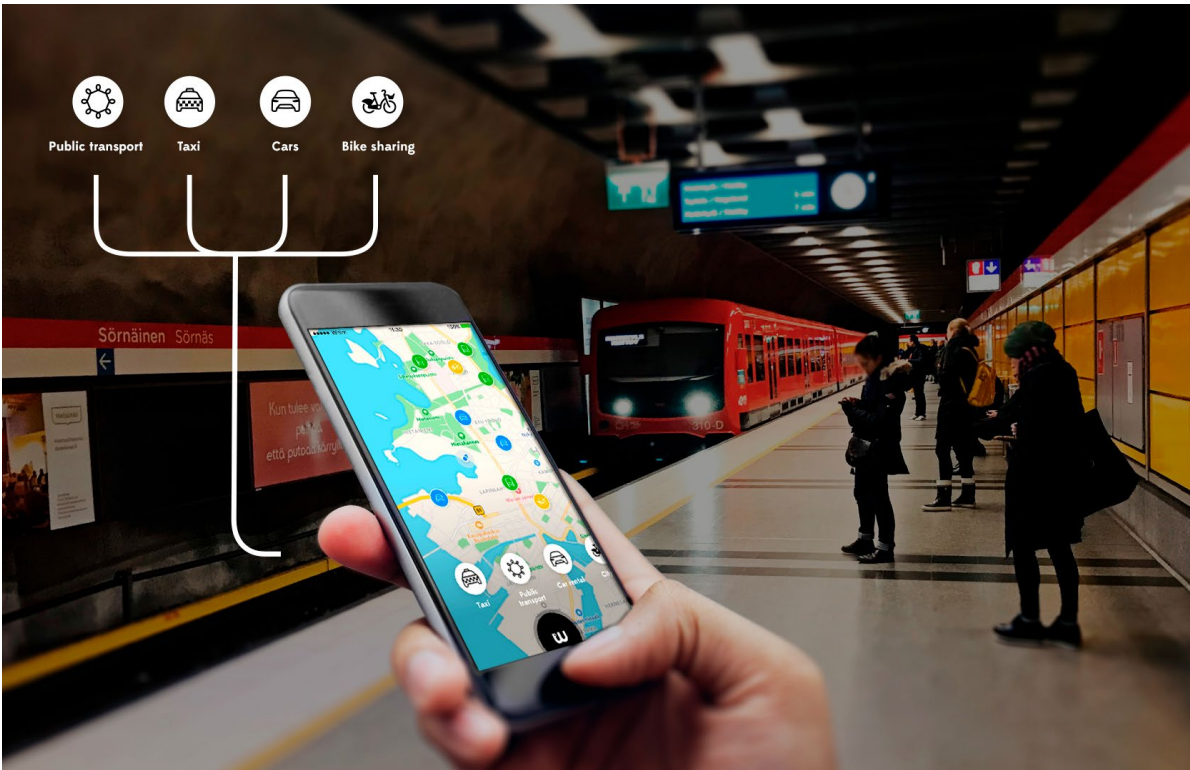
Mitigating the effects of this infrastructure redistribution will be crucial to sustain a post-fuel and autonomous society. Governments must work together with the private sector to deploy an adaptable and flexible infrastructure, which is needed to support future forms of living and moving.



Grid Smarter Cities is a smart city ecosystem built around the digitization of physical infrastructure. It allows previously restricted kerbside parking to be reserved, and makes physical streets digital to enable efficient road management with financial, social and environmental benefits.
© Grid Smarter Cities



In Saugnac-et-Muret, France, 60m² of Wattway solar panels have been built into the road surface. In ideal sunny conditions, the tiles generate sufficient energy to run the toll gate.
© COLAS



Whim is the embodiment of future MaaS. Originally developed for Helsinki, but with hopes to spread around the world, it combines all of the city's mobility options into a single app, accessible via a monthly subscription.
© MaaS Global/Whim



In France, IFSTTAR has launched the 5th Generation Road initiative, to implement innovative solutions for a connected future road network. At a larger scale, the C-Roads Platform is a joint initiative between EU Member States and road operators for testing and implementing C-ITS services to achieve cross-border harmonization and cooperation.
IFSTTAR © Jean Chapuis

3

Cooperation powers automation

The velocity of innovation and the complexities of advanced systems, alongside the economic investments they both require, have changed the way businesses compete. Today's companies are collaborative: they not only focus on their core business, but also partner for shared success by necessity. A similar cooperative process must also occur between businesses and government. This will help drive management and orchestration within future cities.

3. Cooperation powers automation

In recent years, IoT-driven automation was in the inception phase, requiring new data standards, communication frameworks and advanced network solutions. Now, automation is moving towards solving use cases through cross-industry collaboration and strategic partnerships.

The autonomous world is being built on data that is secure and trusted, yet shared and open. New data platforms and marketplaces require common data standards that must be agreed across businesses, governments and countries – all with the aim of enabling effective communication. An autonomous car driving from Vienna to Berlin must be able to communicate with one city’s infrastructure equally as well as the other. Synchronicity is a venture that aims to achieve this, by creating a common technical ground for smart city data.

The benefits of collaboration and cooperation for automation are already apparent in smart ports, such as the SmartPort of Hamburg, where multiple systems (freight management, driverless vehicles, dynamic traffic signs, real-time traffic management and navigation systems) are able to effectively communicate and cooperate with each other. At a larger scale, the EU-funded AEOLIX

platform connects logistics information systems of different characteristics across Europe, intra- and cross-company, for the real-time exchange of information in support of logistics-related decisions.

The cornerstone of automation is a network that is scalable, flexible and allows for minimal latency – something that is critical for autonomous services, from driving to emergency response. 5G promises to deliver this, and the public and private sector are already working together to build it. In Europe, a joint initiative between the European Commission and the European ICT industry, the 5G PPP, will deliver solutions, architectures, technologies and standards for Europe’s 5G network.

Future autonomy requires us to reach real globalization – neither political nor economic globalization, but data globalization through data standardization, and open yet trusted communication. Openness to collaboration, integration, interoperability and exploring opportunities across all industries and sectors are crucial prerequisites for an autonomous world. The goal is to create an open world where anything can talk to anything, across geographical and political borders.



AEOLIX is a European-funded project to develop a solution for connecting logistics information systems of different characteristics, intra- and cross-company, for real-time exchange of information in support of logistics-related decisions.
© HERE Technologies



Synchronicity is a venture with the goal of creating a common technical ground for smart city data. This convergence is vital if smart city projects are to scale.



In the port of Hamburg (a testing ground for 5G), state-of-the-art digital intelligence guarantees a smooth and efficient operation. Interaction between sensor technology and analysis, forecasting, and information systems delivers huge efficiency gains.
© HHM/Dietmar Hasenpusch



5GTNF is the world’s first open 5G testing network, centered around multiple Finnish cities. The network offers testing, trialing, and piloting services, as well as possibilities for bilateral cooperation within the ecosystem.

4

The next economic model

The GDPR is the first step in the right direction in regards to empowering consumers, but there remain ethical and moral responsibilities for the industry. Transparency is needed around the use of data and what value it brings the consumer in return. How people create and run businesses will fundamentally change in the future, especially given the rise of platforms and marketplaces.



4. The next economic model

As citizens become ever more aware of the power of their data, they will be increasingly reluctant to part with it – unless the benefits of that transaction are clear and without risk. This awareness, however, may also create personal opportunity: services such as Datawallet help consumers gain control of their data and allow them to capitalize on its value.

The growing data economy is at present dominated by B2B models. In exchange for highly personalized services, consumers are effectively treated as data providers. In spite of this, they often have little visibility or control over how their data is collected and used.

For data-driven enterprises, maximizing the value of consumer data is crucial to support innovation, reimagine services and expand into new segments. Personal data is also helping governments shape policy and deliver better public services. As an example, the Australian Treasury partnered with LinkedIn to gain better insight into future labor market developments.

Consumer awareness of data value is now being met with an appreciation of its risks. On the 25th of May 2018, the European Union’s General Data Protection Regulation (GDPR) came into force, representing an important first step of the response to increasing public concern surrounding personal data privacy and usage. Simultaneously, continued data scandals are increasingly highlighting the social, economic, political and environmental disruption that data abuse can cause. Alongside the prominence of GDPR, these events are forcing governments worldwide to consider data privacy and data protection as a basic human right, and to implement legislation to enforce it as such.

Traditional B2B and B2C models will need rethinking. Increasing awareness among consumers of the value of their data may create new business opportunities, with consumers themselves becoming business partners. Our social and business lives are becoming ever more blurred – the individual may become a product or brand, and the data they create a valuable asset.



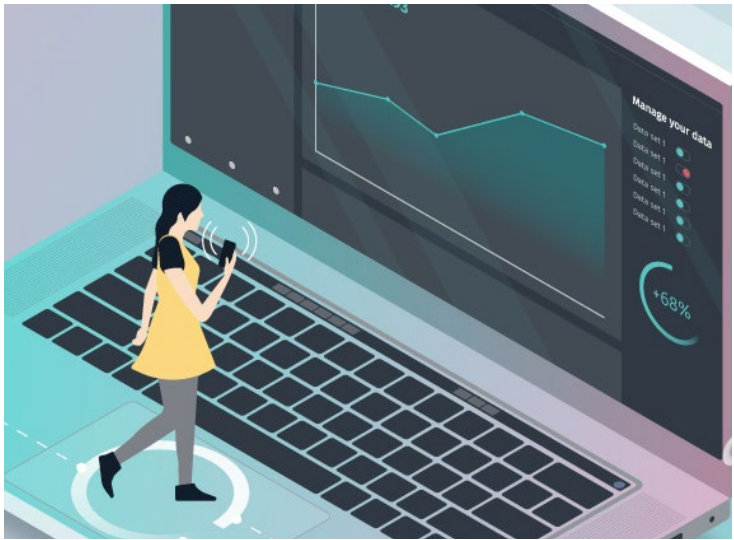
“According to the European Commission, by 2020 the value of personalized data will be 1 trillion euros, almost 8% of the EU’s GDP. As this trend grows, there will be increasingly growing conflict between the value of data and individual privacy and consent.”
© ‘The value of data’ – World Economic Forum



The Australian Treasury teamed up with LinkedIn, using data analytics to predict future labor market developments and inform economic policy.



Mozilla has committed itself to protecting the privacy of Firefox users by blocking third-party tracking cookies by default, without the need to install or activate plugins.



Services like Datawallet offer consumers a personal data management platform, which enables them to govern and even monetize their data assets. DataWallet by Pnyks, Inc.
© HERE Technologies



5

Aspirations of a global society

The race towards artificial intelligence and machine learning development has predominantly been fueled by technological achievement. Yet at the same time, how these technologies are developed must reflect our rich and diverse cultural heritage and humanistic world view. Only then will they power applications that are innovative, and social- and user-centric.

5. Aspirations of a global society

Data, connectivity and new technologies can help people gain access to education, work, health services and mobility. They also help tackle issues such as inequality, poverty and environmental threats. New technologies will transform society in a vastly positive way, but only if they are applied carefully, and with consideration of their wider impacts. Many data-driven projects maintain explicitly positive social goals, such as Flutter and Accenture’s “Million Meals” initiative.

As the possibilities of data-driven innovation expand, so too does awareness of the negative implications. Human bias present in training data can easily be amplified to create machine learning models that are inadvertently discriminatory. The implications may be especially critical in high-stake scenarios, such as immigration and law-enforcement, but also in situations such as personnel hiring and financial-liability assessments. Similar bias can also stem from homogenous training data. A lack of diversity in training data, for example, has been suggested as the cause of the Google Photo AI mislabeling black people as gorillas.

We can think of AI as a mirror – something that reflects not only the data it’s trained with, but also the typical cultural homogeneity of those who develop it. Neural networks and machine learning may be great for uncovering and amplifying

patterns, but it often does so without consideration of whether those patterns have positive or negative impacts on humankind. By mirroring our society, AI forces us to face up to our biases and flaws. We must therefore critically question, reevaluate, and redefine our values and beliefs to ensure the impacts of new products and services remain positive. A greater emphasis is already being placed on ethics and data standards, and many frameworks are being developed to address these challenges.

To help technology deliver a more positive future, we need to embrace a common and global ethics framework, applicable both for data collection (enforcing privacy regulations and anonymization) and training-data choices. Increasing awareness of potential risks should also mean that greater emphasis is placed on developing solutions that are ethically and morally sound.

Efforts to make technology fairer and more ethical must be matched with a push towards diversity and inclusivity in the real world. Debate also continues as to what exactly constitutes “ethical and responsible” AI development – there will be no simple answer to this question, which will vary significantly across different cultures and countries. The question therefore remains: is technology a unifying force for good that bridges divided societies and nationalities, and unites humanity?



Flutter is a digital hiring platform that allows companies to discover, in a faster and more efficient way, who are the candidates they should focus on, while removing bias from the hiring process. @Flutter



Accenture’s “Million Meals” project taps into a mixture of IoT, blockchain and AI to help provide millions of meals to Indian schoolchildren. Blockchain gathers feedback, IoT sensors measure food delivery and AI predicts what food is needed tomorrow.



OrCam’s MyEye is an assistive device for the blind and visually impaired. It uses AI to read text, recognize faces and even identify products, transforming the lives of the visually impaired. © OrCam



Fast.ai’s mission is to make deep learning easier, and to involve more people from all backgrounds during all stages of AI development.

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