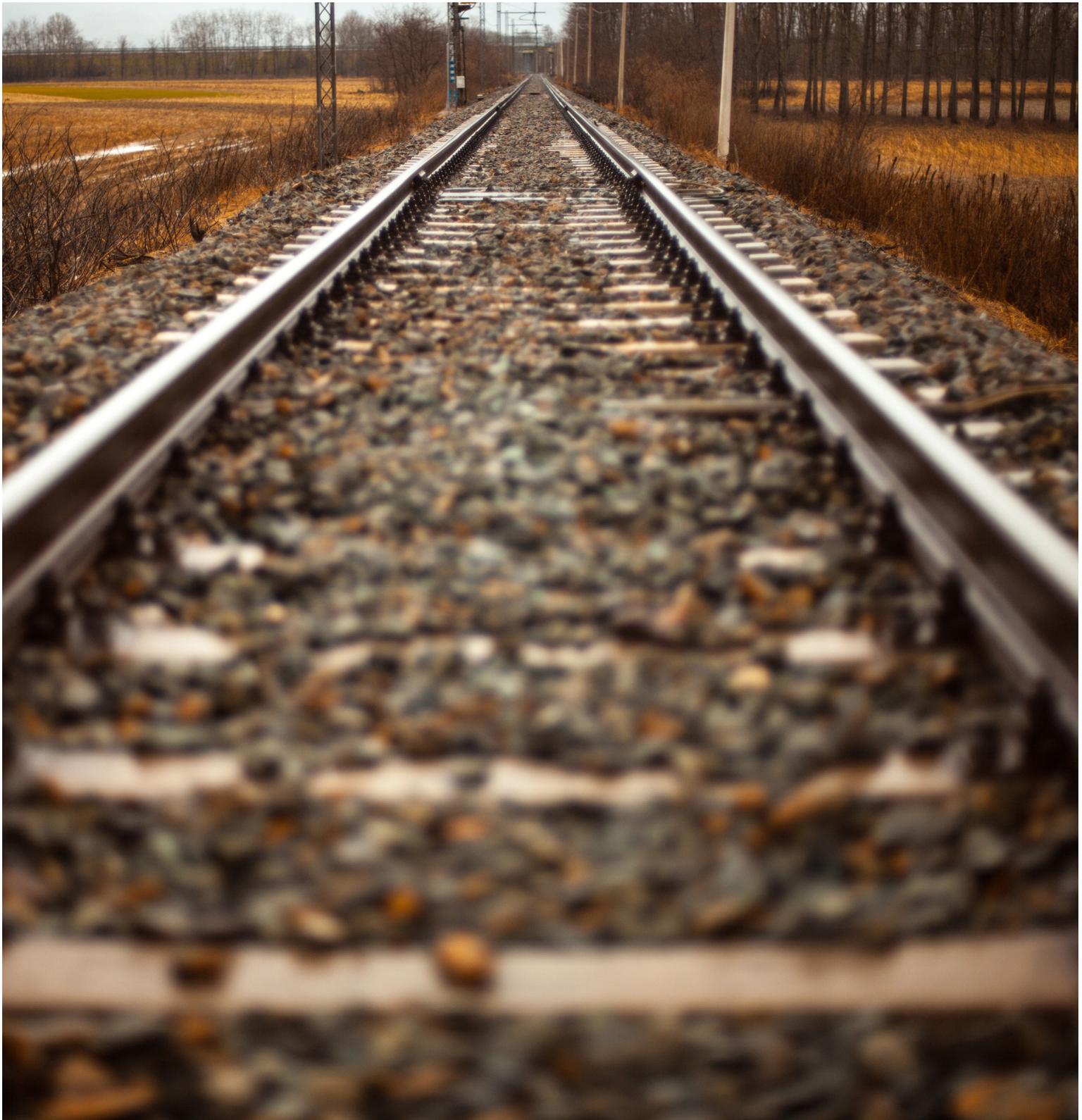


# guide.

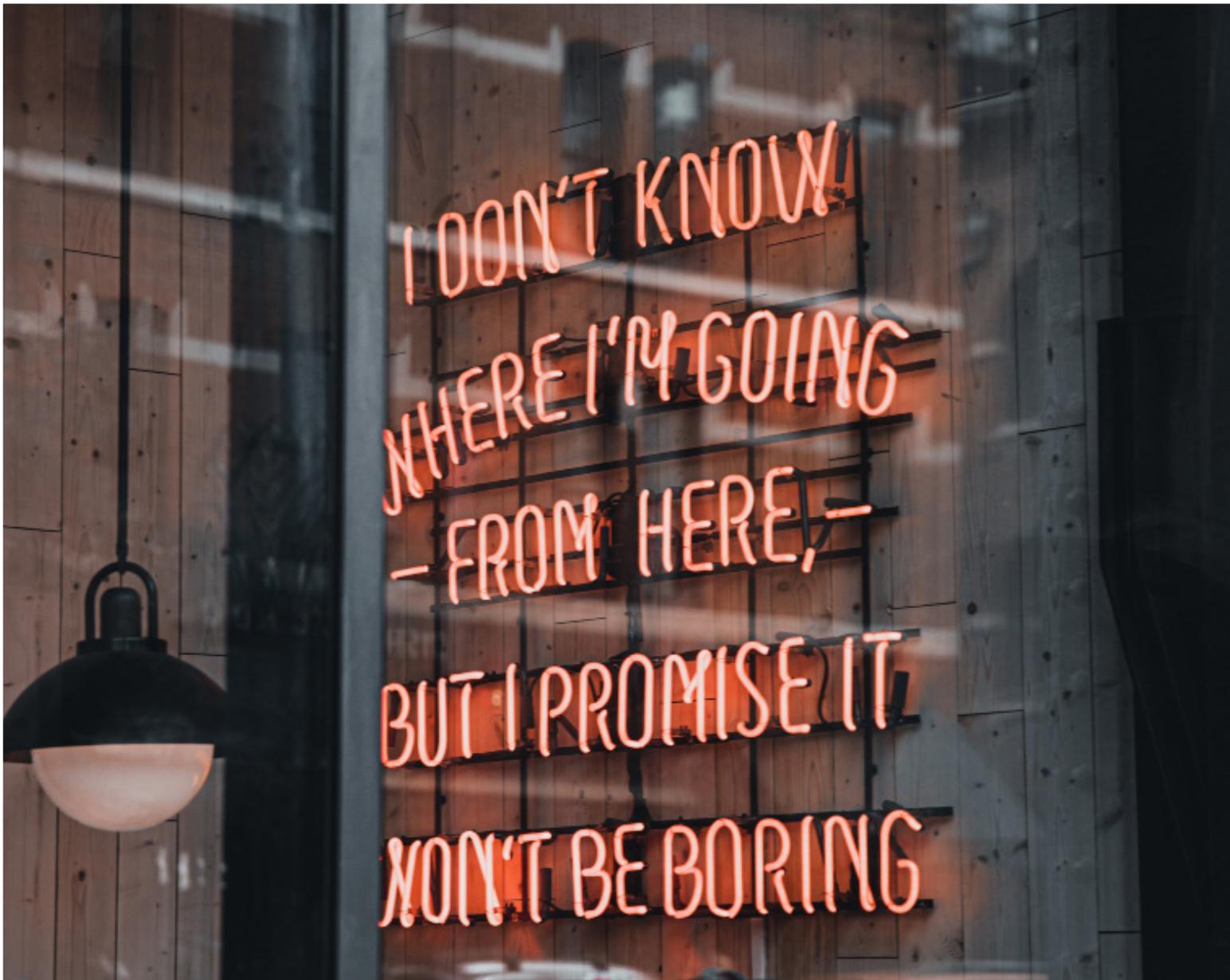
Data-Driven Public Transport.



World events during 2020 have changed how millions of people work and use digital services. This has led to an acceleration in digital transformation, where meetings are now held online, and many businesses have added e-commerce solutions as an additional channel when the physical options were closed. Others have even changed what they produce to meet the needs of the society, as well as securing the workforce when demand of their normal products temporarily decreased due to lock-downs around the world.

Each step on the digital journey offers new capabilities and creates vast amounts of data. We use data to improve customers' experiences with new services, to be relevant in conversations and to increase sales conversion. Lately it has also become possible to apply AI capabilities to process large amounts of data and provide us with insights to support smarter decisions.

**We have both the technology and the data, and it is time to understand and fully harvest the business value of this data.**





*An industry which has been highly affected by Covid-19 is the public transport sector. Public transport authorities and operators serve the society and are responsible to secure that citizens and visitors can travel to work, school and to places of interest in a secure, sustainable matter. Not seldom combining more than one mode of transportation. However, in 2020, the authority was both requiring the operators to keep up the service levels, while at the same time imposing restrictions on the number of passengers allowed on board, or even discouraging the public to use public transport at all. The definition of fully occupied buses or trains changed overnight and most public transport authorities and operators have lost well above 60% of their passengers, and hence a large part of their revenues, while at the same time being required to keep the same level of services.*

## Predictive occupancy supporting a return to safe travels.

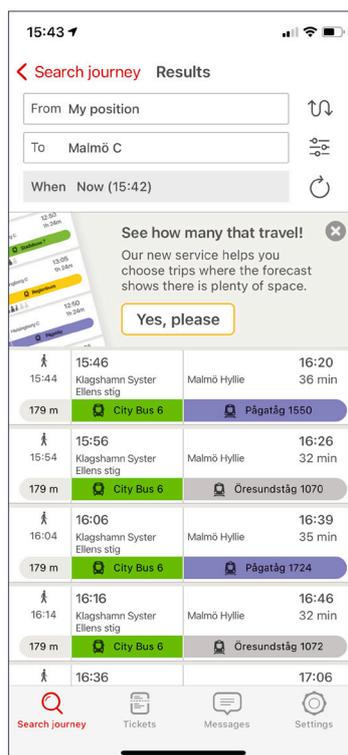
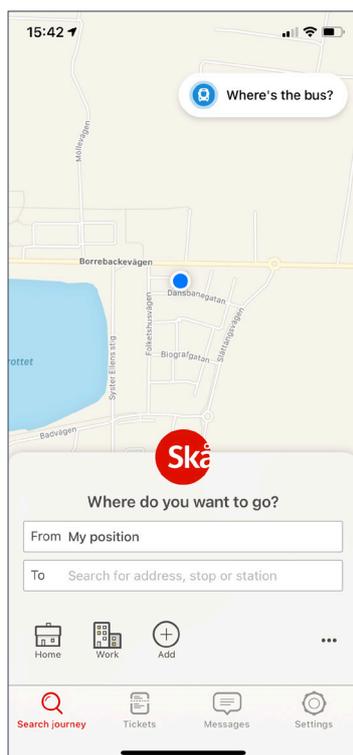
As society struggles to return to a new normal, research indicates that some of our changed behaviours are likely to remain over quite some time. We will for instance be encouraged to keeping a social distance in order to enable society to return more quickly to a new normal. New behaviours like these will need to be addressed within public transport.

As many other industries, public transport has undergone a massive digital transformation during the last 10-15 years. This has resulted in new digital services, not least mobile apps used to search and purchase tickets, but also to collect and store sensor data. This data can be used to improve customer experiences but also to improve operations and efficiency.

An area which might not have been foreseen, but which due to the pandemic is of high importance, is the ability to predict occupancy to be able to offer secure travelling. By using journey search data, ticket purchases and ticket validations from boarding, we can determine how many people are boarding at each stop but also predict where they will disembark. Hence, we can calculate how many people are onboard, compare that figure with the actual vehicle capacity and calculate occupancy levels. This is without any passenger counting solutions. If we add additional datasets, e.g., Wi-fi information, smartphone telemetry, video cameras, weight sensors and other data sources, we can increase the granularity in the predictions and predict, for instance, which car is more occupied than another in a train set.

# Skånetrafiken case.

Stratiteq's client Skånetrafiken, which operates the public transport in the southern part of Sweden, recently launched the possibility for a traveller to get information of the predicted occupancy levels for the possible journeys to choose from. In the mobile app, the passenger can search for the journey they wish to make and based on historic data get a prediction of how busy the different departures will be, which empowers them to adjust and choose the ride that they will feel the most comfortable with from an occupancy perspective.



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*“We are always looking to improve the experience for our travelers and are continuously in a process to find innovative ideas, supported by new technologies. Stratiteq is a long-term partner to us and with their deep knowledge within our industry and how to use data in new, pioneering ways, we have created several sustainable and future-proof solutions for our travelers. Not the least our latest project of predictive occupancy, which based on Stratiteq's ideas help our commuters travel safer in times of a pandemic.”*

Johan Frithiof Karlberg, CIO Skånetrafiken

Not only does this create a valuable service to their travelers, but it also helps traffic planners to understand when additional buses or more train cars need to be deployed. Being able to analyse data and plan traffic, accordingly, offers a possibility to be more cost efficient yet keeping a high degree of service.

# Designing the capability to create data-driven public transport.

The ability to become data-driven is not created overnight but is the result of both having the right architecture and technical solution and understanding where the data can be used to provide the most business value – for example increasing revenue, customer satisfaction but also improving operations.

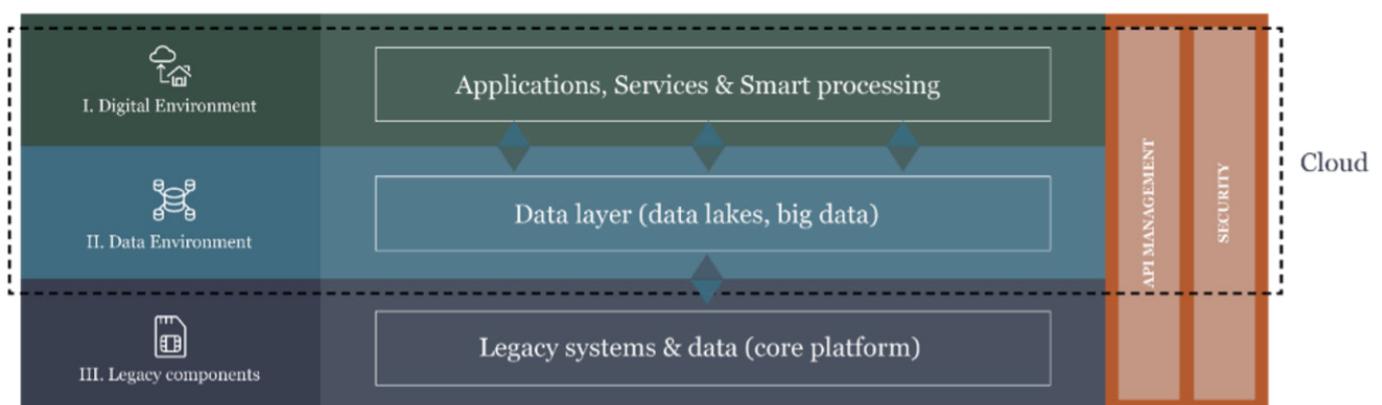
We believe there are three major areas to consider when becoming data-driven:

- 1. Technology** – creating a data-driven architecture
- 2. Business** – using data to create business impact
- 3. People** – ensure processes are adapted, people are empowered and trained, and create a data-driven culture

## *Step 1: Technology.*

### **A data-driven architecture.**

To be able to make data work for you, data must be made available and reliable. Identifying which data to collect and structuring the data for accessibility are critical activities. Common data sources within public transport are for example fare collection and ticket systems (purchases, validations etc), real time vehicle information (sensors, GPS etc) but could also be data from mobile apps and other systems. Data sources can be internal but could also be external, for example weather data and traffic data. The data that should be collected must be carefully selected, considering both legal restrictions as well as ethical values.



Creating a data-centric architecture will provide the capabilities to both collect, store, analyse and build applications and services. It decouples the data-layer from old legacy systems, as seen in the image above as the light blue section in the middle. It is favourable to build the data-layer in the cloud to be able to draw on all the advantages like security, new technology, services like AI and real-time analysis and not least the capability to scale the solution as needed.

## *Step 2: Business.*

### **Data-driven business applications.**

Data is purely nice to have if not used to bring business value. Within public transport there are several areas which we suggest can become more data-driven:

#### **Process automation and optimization.**

Many processes are by tradition manual, the outcomes are based on experience and history and might not use all data available, hence decisions might not be fact-based. Typical examples are timetables which could be optimized, using data to adjust for time for embarking/disembarking, traffic congestion, time of day, giving a more accurate timetable than when using more general rules for adjustments.

It is also possible to adjust timetables and inform passengers in real-time based on weather data, traffic data or other events that might be affecting the operations.

#### **Customer segmentation and tickets.**

By analysing customers' travel patterns and comparing them with the type of tickets purchased, new segmentations could arise and reveal the need for new types of tickets. During the pandemic, many commuters stopped commuting to work every day but chose to only be at the office a couple of days per week. The number of periodical tickets purchased were reduced and by analysing the data, a new, more flexible ticket was offered, keeping commuters from considering stopping commuting by public transport in favour for by car. Continuing to mix working remotely with working at the office is a behaviour that is expected to stay and will most likely be something that public transport operators will have to adjust to.



### **Traffic planning.**

By using occupancy data, it is possible to plan the operations more accurately – number of buses, size of buses and trains, driver schedules etc which will increase efficiency and reduce cost. By adding weather data and traffic data it's also possible to make quick adjustments and improve customer satisfaction as both availability and accuracy will improve.

### *Step 3: People.*

#### **Creating a data-driven culture.**

It would be ignorant to suggest that creating and implementing the architecture is easy and that identifying the relevant business cases is obvious. Neither is true. But even if these steps have their challenges, getting people on board, ensuring the right skills, adapting processes, and creating a data-driven culture is a challenge of a different kind. It requires time, change management skills and a dedication from management to become data-driven to make it happen. There are several areas to consider but among the most important are:

#### ***Data literacy.***

Being able to translate data into business value which requires both experience from handling and understanding data as well as having sufficient business and domain knowledge to understand where data can be applied to create business impact.

#### ***Legal and ethics.***

Understanding the regulations in different areas, both national and international, not the least in terms of which data can be stored and how. A common discussion within the public sector in general is the storage of personal data in the cloud. There are major benefits that the cloud offers and that are essential to offer the services discussed above, however this is an area that can affect the possible architecture and might call for hybrid solutions, combining both cloud and on-premises solutions. From an ethical perspective, it is important to consider how the data collected will be used. Many consumers and individuals fear a greater ability for companies to monitor movements and surveillance. It is therefore important to define the customer benefit with releasing data, of course to follow regulations and have clear communication with your customer on how the data will be used.





### ***Agility.***

Identifying use cases and application areas where data can be applied and create business value might require data discovery activities. Ideation sessions can create hypotheses and assumptions which need to be validated by data before continuing to, for example, a proof of concept. Working in an agile way by researching, validating, and pivoting is the normal approach which can differ from how organizations are used to working traditionally. This also requires understanding and acceptance from management that some assumptions and ideas will fail and rather be a source of learning than success.

### ***Trust in data and adapt processes.***

Finally, a data-driven culture is an organization which trusts its data. Processes are adapted, manual steps removed or automated and the organization is empowered to trust and act on insights. As AI and Machine Learning are applied to a greater extent, the smart decision might no longer fully be taken by humans but by machines or served as suggested actions for a human to decide on. This requires trust in the core values of your company, knowing that ethical aspects and regulations are considered and followed, an understanding of how data is applied and how different actions impact the business.

# Getting started.

Stratiteq helps clients become data-driven sustainable businesses. We have deep knowledge within the Public Transport domain, having developed a leading edge, modern, cloud-based ticketing system as well as an analytics platform with advanced analytics capabilities for public transport operators and other clients within the industry.

We help you all the way from strategy to technical implementation, supporting you with data-driven architecture as well as change management to build a data-driven culture.

Contact us to start your journey within data-driven public transport.

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Stratiteq is a premier consultant company for forward thinking clients who aim to become sustainable data-driven businesses. We empower clients to take control of their digital future through optimizing their data, shaping technical solutions, innovation and by driving organizational change.

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