1. **Do rail, aviation, and other transportation modes collaborate on solutions to provide seamless travel experience for passengers? Are the industries still operating in silos?**

   In fact, what you asked is just the current situation. And in my opinion, transportation operators, all of them realize the situation and almost all of them want to change the situation, break the different silos, and build the platforms. As you know, transportation moves passengers and freights in physical world, combining railway, subway, roadway, aviation and so on. Telecommunication moves data in digital world, through different data centers, applications and systems. Transportation digitalization will provide seamless journey for passengers.

   This year, COVID-19 has brought significant impact. For example, it made online transactions and working from home into a new normal, which means digital transformation is becoming an essential need for many industries. The main challenge of transportation remains the conflict between increasing mobility demand and poor transportation efficiency. For instance, in many airports, punctuality is only 75%. In large cities, during peak hours, vehicle speed can be less than 10KM/h.

   To improve transportation efficiency, MaaS (Mobility as a Service) for passengers and Multimodal Transport for logistics is more and more popular. It integrates passengers flow, freight flow, business flow seamlessly across multiple transportation modes.

   MaaS, or Mobility as a Service is the focus of public transportation. MaaS is combining railway, subway, roadway and aviation to meet passengers' travel needs, lowering the cost and improving efficiency. Technologies such as 5G, IoT, cloud, big data and AI will definitely play a key role in MaaS.

   Huawei offers a comprehensive transportation solution, which leverages ICT technologies to digitize all transportation elements, including passengers, freights, vehicles, and business flows. This solution consolidates multi-source data into the unified data lake, so we can develop algorithm and data model, build an indicator system for scenario-based solutions.

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2. How do you understand the airport digital transformation?

Huawei has been working in the transportation industry more than 20 years. We help customers guarantee safety, improve efficiency and optimize passengers' experience through digital transformation. All these three targets are the main vision for this industry.

Digital transformation in airports has two layers: one is digitization of infrastructures, and the other is digitalization of business flow. By converging the two layers, we can transform the physical world into a digital one. We also refer to this as 'digital twins'.

On one hand, digitization of infrastructures means all-around sensing and connection, with the help of ICT technologies like IoT, 5G, machine vision, millimeter-wave, and so on.

For example, in Shenzhen airport, passengers can quickly pass security check and get on their boarding gate using facial recognition.

We also use Wi-Fi 6 positioning technology to help airport operators predict traffic volume to increase or decrease security check lanes. It can also navigate passengers to the boarding gate quickly.

Also, we use smart Airfield Ground Light, which digitalizes the runway and taxi-way to some extent.

On the other hand, we can also deploy a digital platform including cloud, big data, and AI to optimize existing business flow.

The platform can assemble, integrate, and converge the data, then share data services to scenario-based applications. All these applications are developed in joint hands by Huawei and our ecosystem partners.

Typical examples include differentiated security check, intelligent stand allocation (airport gate scheduling), and flight support process system based on big data.

Focusing on safety, efficiency, and the passenger experience, we can use ICT to streamline flight flow, passenger flow, and cargo flow. So, we can bridge service

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broken points, remove redundant points, empower conventional industry system to help customer's digital transformation.

Rome was not built overnight, neither is a smart airport.

Digital transformation is an endless journey, with crucial milestones all along the way. Continuous evolution and sustainable iteration are essential. That is our understanding.

3. **It takes a long time to achieve digital transformation. What should we pay attention to during the process?**

I think there are 3 points need to be considered.

First of all, for digital transformation, we need to begin with the overall architecture and design from top down. We have developed an innovative solution architecture consisting of three horizontal layers and three vertical business flows.

At the first layer is the infrastructure connection layer. 5G, IoT and machine vision can fully connect all objects, such as people, vehicles, and all the things, and streamline all airport service and systems. 5G can deliver enhanced performance, including higher bandwidth, lower latency, and more dense coverage, to support passenger online services and smart inspection robots.

The second layer is the platform. It is based on cloud, providing unified storage resource, computing resource and network resource. All these 3 resources are the basic digital resources. We use this unified platform to provide big data technology to facilitate data value, to mine the data value and to share the data service.

And the third layer is the application layer. In this layer, we can gather ecosystem partners with extensive industry experience, and more AI-based applications.

For passenger flow, cargo flow and flight flow, we need to identify key scenarios along these business flows, to develop scenario-based solutions.

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Secondly, life cycle management is very important to digital transformation. It starts with consultation and planning, then proceed with system development and integration, and we need continuous operation and maintenance to help customer keep its industry position.

Last but not least, one tree doesn't make a forest. One company also cannot achieve so much alone. Vendors, partners and customers need to work hand in hand to build an open ecosystem to realize this vision.

Huawei's strength is within digital technologies, but partners and customers have the industry know-how knowledge. The combination of the two can create chemistry, and this collaboration of chemistry could potentially be the secret to success.

4. **How can we apply AI, IoT, and big data during airport digital transformation?**

The development of big data, IoT and AI will have significant impacts on the aviation digital transformation.

For example, Shenzhen Airport takes the lead in implementing intelligent stand allocation. Originally, it takes about four hours to manually allocate stands to over 1,000 flights every day and every night. The intelligent stand allocation system uses AI algorithms. We consolidate more than 60 operation rules to reduce the allocation time, and the result we can reach from 4 hours to one minute. So, we can improve bridge-to-aircraft docking rate and bridge turnover rate. After deploying this system, more than 2 million of passengers can board and disembark through contact stands instead of shuttle bus every year.

Shenzhen Airport also launched a flight support process system based on big data, which deploys IoT and machine vision to collect data on key ground support nodes, as accurate as 95 percent. This system monitors the whole flight support process, detects and handles exceptions in real time, and improves the airport's punctuality rate.

The smart airfield ground light solution is another reference. We use IoT and AI technology to control the ground lights instead of manually. We plan the taxi path and detect aircraft conflicts. So, we can reduce aircraft taxiing time, increase the

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efficiency of runways and taxiways. Normally it takes at least 20 minutes from landing to docking. If 3 minutes can be saved for each flight, the taxiing efficiency can be improved by at least 15%. Shenzhen airport handles more than 1,000 flights every day, and this solution helps to save 3,000 minutes every day.

Just now, I used 3 examples to explain how we deploy all these new technologies in airport digital transformation.

5. **Please tell us about Huawei technology and how it helped speed up the development of relevant solutions to cope with COVID-19, such as facial recognition for passengers wearing masks.**

This year the COVID-19 pandemic has spread rapidly across the globe, and the transportation industry is directly impacted. The industry has to cope with multiple challenges, such as a dramatic drop in passengers and freight traffic, delayed construction projects, and blocked industry supply chain.

IATA estimates at least US$63 billion global revenue losses for the passenger business in 2020. The demand for air travel is set to decline for the first time since 2009. According to prediction, the passenger transport market will recover gradually after the pandemic. Civil aviation will be the first to rebound as COVID-19 ends.

Meanwhile, the epidemic will accelerate the industry digital transformation, especially traditional transportation. We should also leverage technologies to prevent and control the epidemic.

During the pandemic, Huawei and its partners helped Shenzhen Airport develop an epidemic prevention and control system. We deployed an airport intelligent operation center to obtain and analyze real-time passenger and flight data. We used AI-based video analysis to inspect and control the epidemic risks. We can screen and track more than 700 passengers during the peak hour every day.

Another example is the smart flight information display system. This system can recognize faces of passengers even when wearing masks. The system automatically shows their own flight information and navigate to the boarding gate to save their boarding time. Based on a unified Digital Platform, the mask-wearing

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face-recognition feature was launched only in one week. It's a very fast system. So based on the platform, all application rollout time will be shortened.

When facing harsh challenges like COVID-19, airports and other transportation enterprises can benefit from technology to find a better way to cope.

6. **What will airports be like in the future?**

Future airports must be people-oriented, green, safe, and smart. Future airports will be backed up by extensive applications to improve travel experience. Future airports should use intelligent devices and systems to satisfy people's needs and demands. We call this 'personalized'.

In the future, airports will transform toward a comprehensive transportation hub.

And also, the airports can be a meeting place for friends, a shopping mall for lovers, and a playground for kids. So, in a word, travel will be more comfortable, and logistics can be much smoother.