



EXPERIMENTS & TRANSITION

URBANISM NEXT EUROPE  
**2021**



# Disruptive innovation framework

Disruptive new mobility innovations and fundamental human needs

Speaker: Yashar Araghi, TNO

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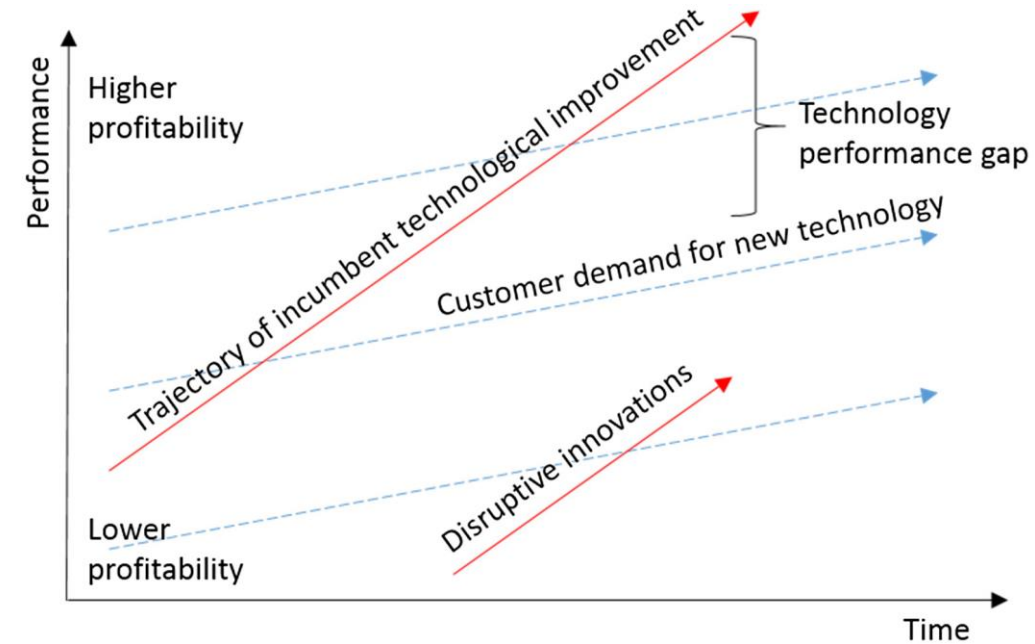
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# WHEN DISRUPTIONS HAPPEN ACCORDING TO CHRISTENSEN'S

“Disruptive Innovations are NOT breakthrough technologies that make good products better”

They transform complicated and expensive products to something more accessible so they must have the following **features**:

Christensen's features	In context of Passenger Mobility
Affordable	comparable or lower Travel Costs
Easy to use	Availability, comfort
Basic Features	Safety, comparable or lower Travel Time



Disruptive innovation can be at a variety of levels:

1. **Industry segment**, e.g. MP3 vs cassette tape and CDs
2. **Industry structure**, e.g. record companies owning musical vs distribution physical CD or digital download
3. **Social system**, e.g. artists produce and distribute own commercial recordings at lower cost vs incumbents

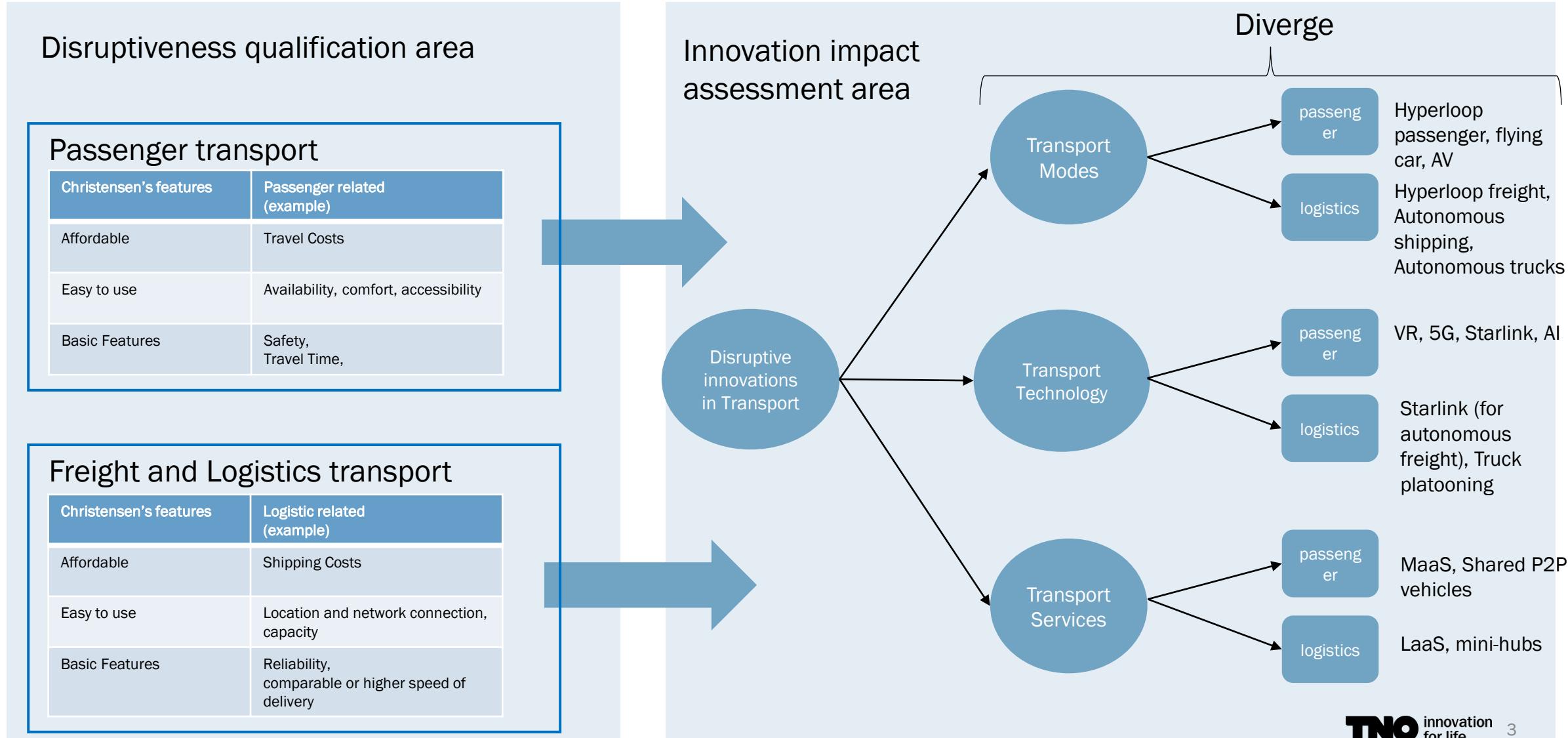
Sources:

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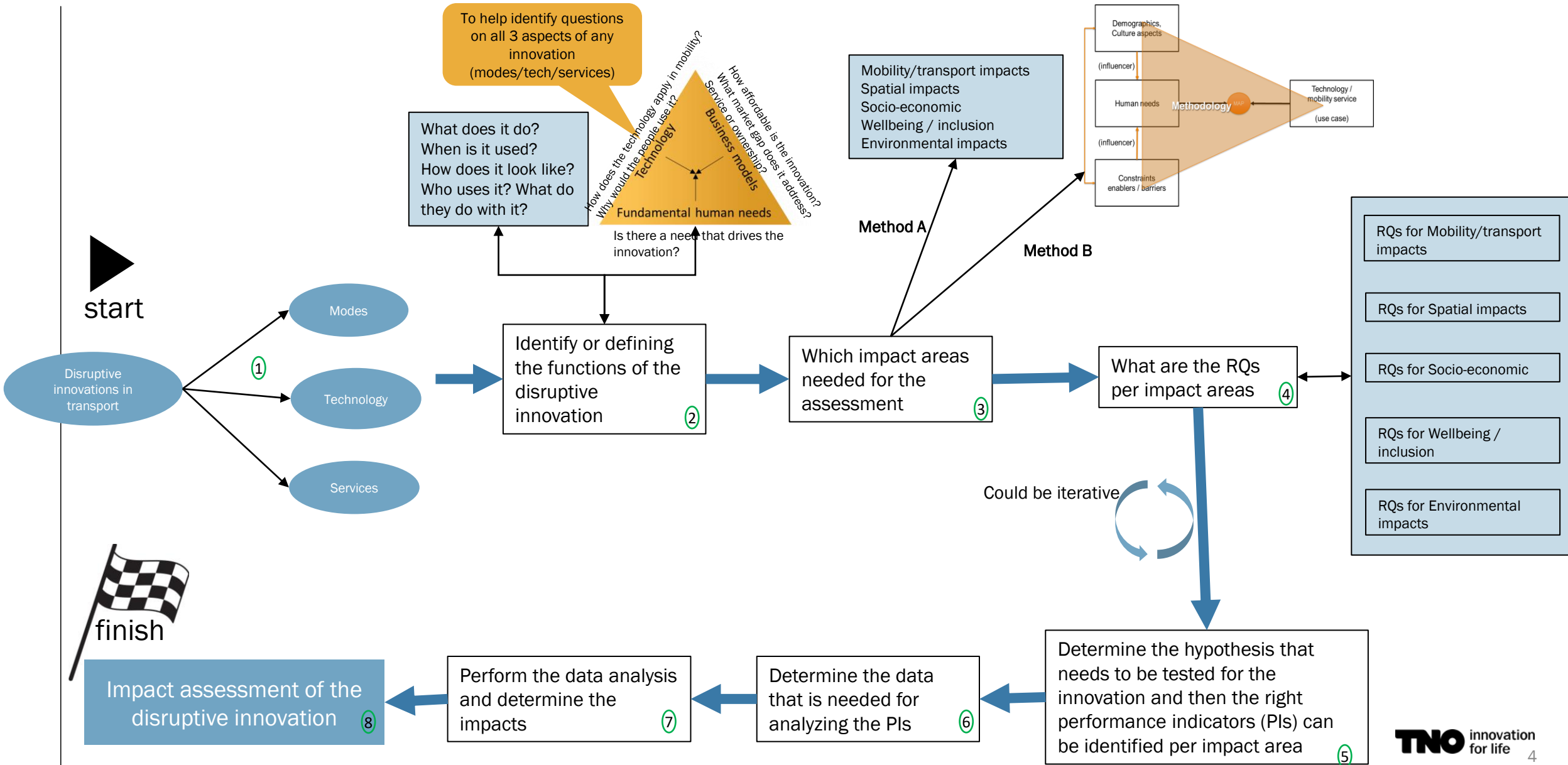
Christensen, C. M., McDonald, R., Altman, E. J., & Palmer, J. E. (2018). Disruptive innovation: An intellectual history and directions for future research. *Journal of Management Studies*, *55*(7), 1043-1078.

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# FROM DISRUPTIVE INNOVATION TO IMPACT ASSESSMENT



# THE DISRUPTIVE INNOVATION IMPACT ASSESSMENT FRAMEWORK





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# Thank you!

Do you have any question?

Ask **Yashar Araghi**, [yashar.araghi@tno.nl](mailto:yashar.araghi@tno.nl)

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Disruptive Technology	Description	ITS applications
<b>Mobile Internet</b>	Devices with some capabilities of communications and directly connect to internet	Fleet management and traveler information ...
<b>Automation for knowledge work</b>	The use of computers to perform tasks that rely on complex analyses, subtle judgments, and creative problem solving.	Advanced modelling and simulations of traffic Systems [5]
<b>Internet of Things (IoT)</b>	Networks, low cost sensors and actuators to gather data for monitoring that help to make decisions and process optimization	ITS Sensors, decentralized management systems [6]
<b>Cloud technology</b>	Use hardware and software platforms that are located in the cloud infrastructure in order to service delivery [7].	SCADA systems in the cloud for traffic centers, traffic analytics and economic geographic
<b>Advanced Robotics</b>	Robots with advanced capabilities where artificial intelligence is a key part to deploy ITS services	Robotics Parking and automation for maintenance task
<b>Energy Storage</b>	Devices that gather energy to be used in some ITS task that will be executed in a new task, this technology includes batteries	Energy backup Systems, Electric Vehicles, Solar panels
<b>Autonomous and almost autonomous Vehicles</b>	Vehicles that operates with few or without human action	Cruise Control, Advanced Driver Assistant Systems
<b>3D and 4D printing</b>	Location, needs and transport resistance are important: (a) city-level hubs are the most likely locations for 3D printers because they can coordinate material flows and gather expertise; (b) mass-individualization and personification dictates the needs for 3D printers; (c) distribution networks will be organized more efficiently, less empty vehicles, but raw materials still need shipping [8]	ITS Logistics and ITS for transport of hazardous materials
<b>Advanced materials</b>	Designer Materials for high resistance considering its weight, conductivity and functionality	CCTV (Circuit Close TV) systems y Solar Panel for ITS devices
<b>Renewable Energy</b>	Energy Generation from renewable sources to contribute to mitigate climate change.	ITS based on solar sources and wind sources
<b>Blockchain</b>	Blockchain emerged as the underlying technology of the digital cryptocurrency has recently attracted great attention from the tech giants to manufacturers [8]. Different from the centralized digital ledger approaches, blockchain uses community validation to synchronize the distributed ledgers replicated across multiple users.	Electronic Fee Collections for ITS applications (Tolls, parking, Gas station) [9]
<b>Virtual reality</b>	Creation of virtual scenarios that can help to understand the real situations	ITS simulations in general (traffic, safety, autonomous vehicles)
<b>Artificial Intelligence</b>	Specialized algorithms capable of management multiples variables to generate specific results	Video analytics in ITS, ITS sensors capable of predict accidents and more
<b>5G</b>	Mobile Networks where the bandwidth has the highest download capabilities for instance 10 Gbps (Giga bits per second)	Autonomous Driving, video Analytics in real time
<b>Autonomous Robotics</b>	Robots with abilities to accomplish with specific task	Assisted Vehicles, Smart Instrumentation in several different ITS scenarios
<b>Volumetric Displays</b>	3D screens to improve the understanding of several different phenomena	ITS simulations, autonomous driving, ITS sensors with intelligence feedback
<b>Connected Vehicles</b>	Scenarios with communications towards Vehicle to vehicle V2V, Vehicle to Infrastructure V2I, Infrastructure to Vehicle I2V, Infrastructure to Infrastructure I2I, Pedestrian to Vehicle P2V, Vehicle to Pedestrian V2P	Cooperating Systems for ITS scenarios V2V, V2I, I2V, I2I, P2V, V2P, Emergency Vehicles, police vehicles, Firetruck, Cranes vehicles etc

## Conclusions of the panel discussion regarding disruptive technologies held in the ITS LATAM 2019

- disruptive technologies of today will be everyday technologies tomorrow
- consider these technologies in the definition of new projects and services and in medium-to-long term plans
- disruptive technologies for optimizing resources and improving the quality and efficiency of the services
- local governments and companies work collaboratively to design policies that analyze and facilitate the use of both disruptive technologies available and emerging ones.

•Source: [Disruptive Technologies in Intelligent Transportation Systems | IEEE Conference Publication | IEEE Xplore](#)