2024 European Light Rail Congress

Christophe Sanguina

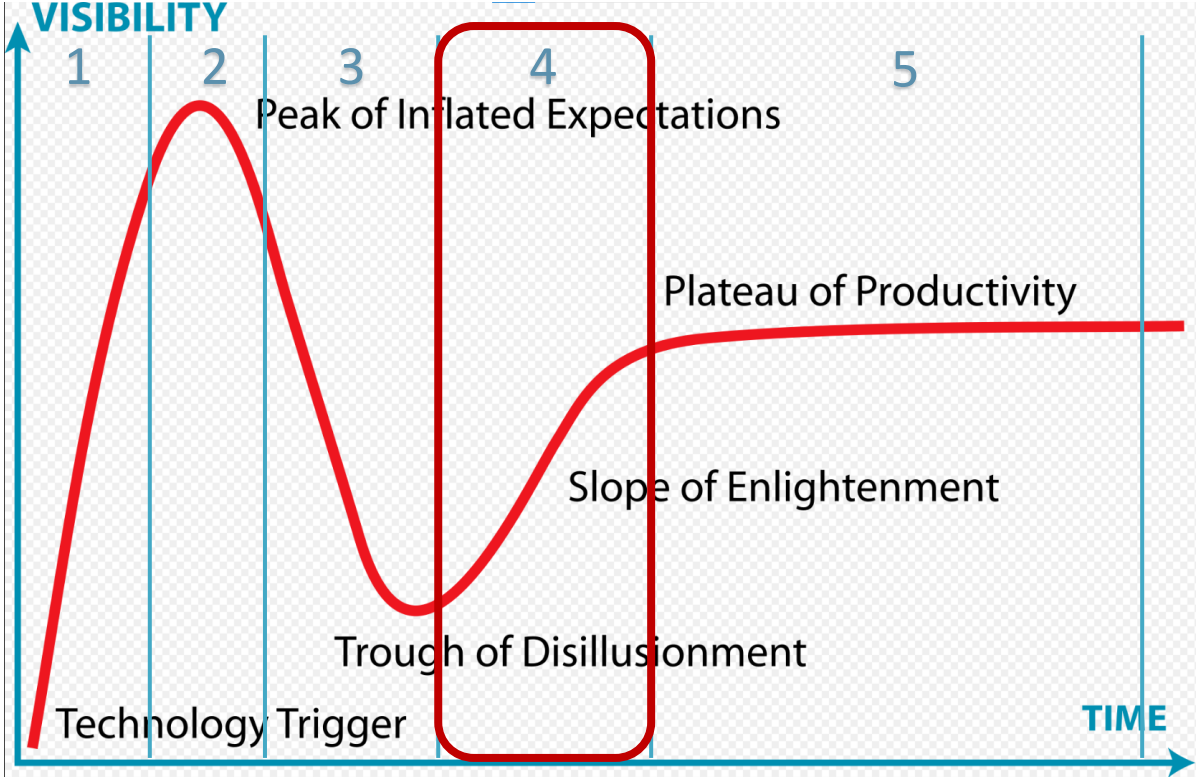
Keolis

mainspring

Asset Management Innovation next steps

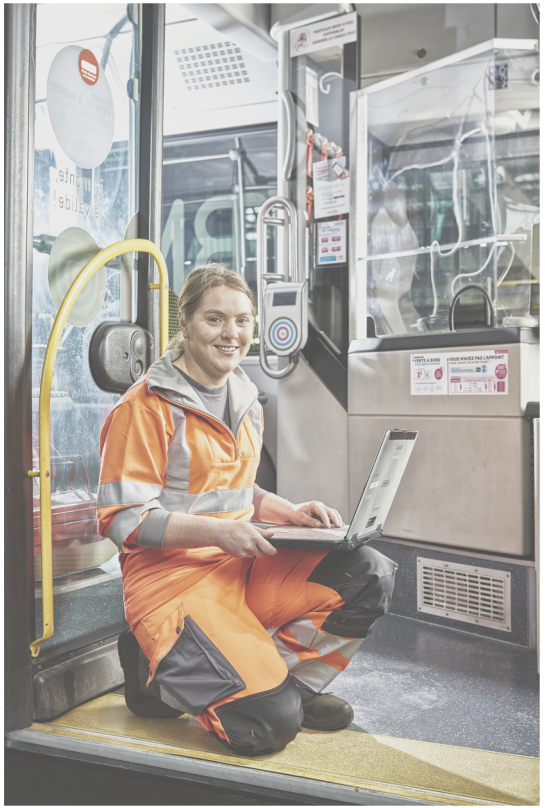
After years of Digitalisation in Light Rail, how to deliver tangible value to Passengers and PTAs?

Where do we stand on the Hype cycle?



Innovation on Asset Management, why?

- **Rapid urbanisation**, leading to growing demand for mobility
- **Increasing pressure on finances**, with up to 30% of the cities' budget dedicated to public transport
- **Constraint on resources** such as labour
- **High expectations from passengers** in terms of accessibility, reliability, safety and security



Who we are : A passenger focused company

13
countries

68,000
employees

6.7
revenues in 2022

300
Public Transport Authorities

13
transport modes operated

1st
tram operator in the world

N°1
automated metro operator in the world

7
regional train networks

+ 23,000
buses

No.1
for combined car park and on-street parking contracts

Leading
nationwilde ambulance provider in France

leader
in transport for people with reduced mobility

50
Autonomous electric shuttles services deployed since 2016

37,500
bikes in France and Netherlands

Technical diversity is in our DNA

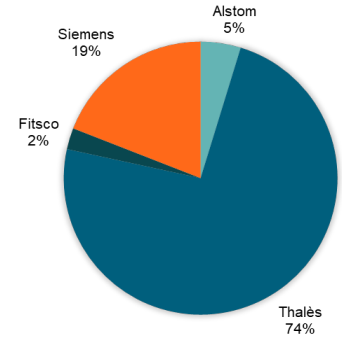
€50bn
Worth of assets

+300
PTA partners

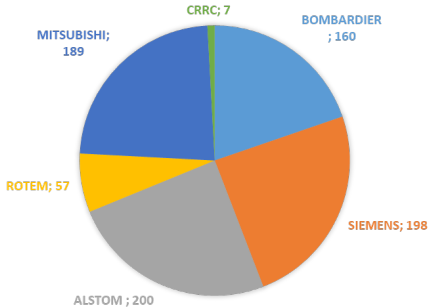
+40 years experience
In operating and maintaining shared mobility networks

10,000
Maintenance workers, technicians and engineers

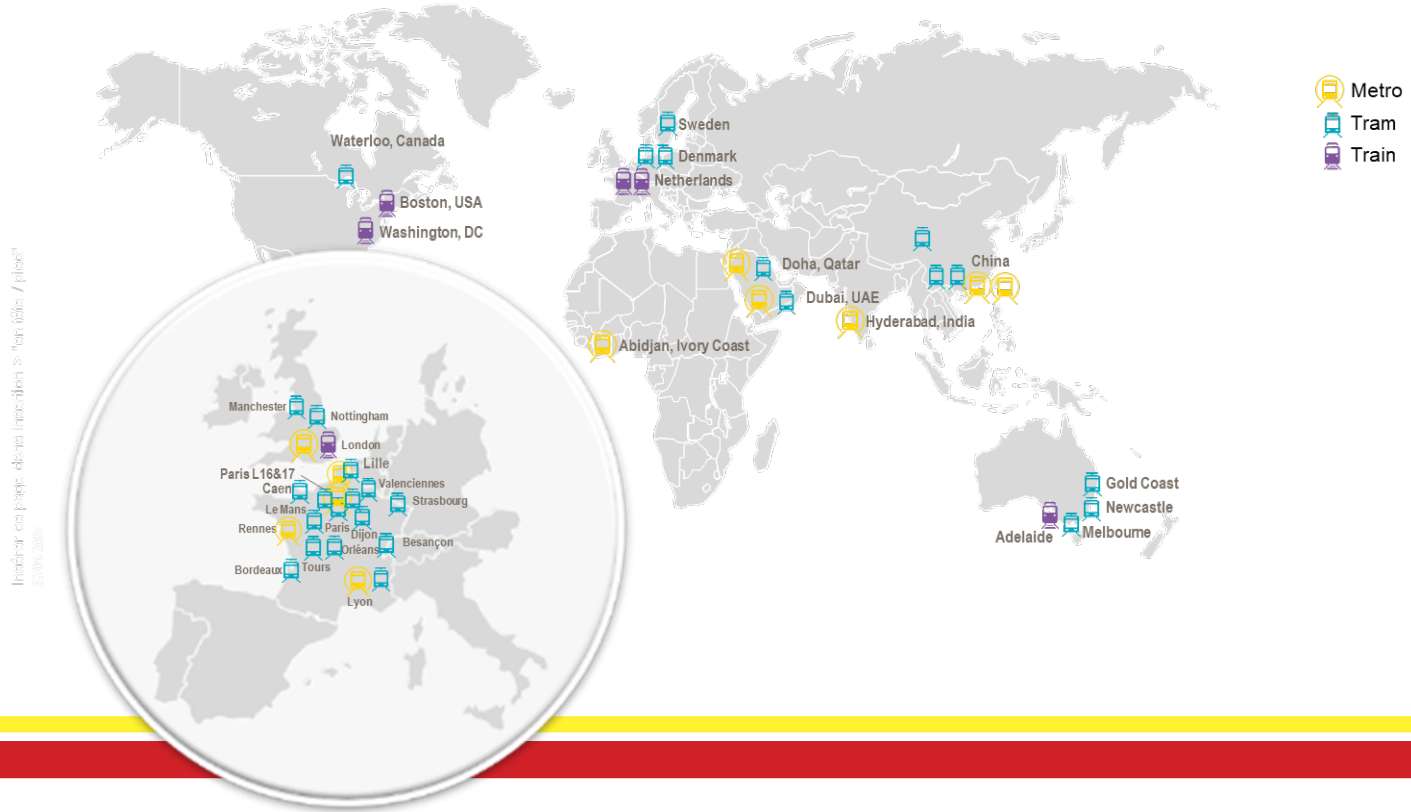
EXTENDED EXPERTISE ON SIGNALING SYSTEMS



EXTENDED EXPERTISE ON ROLLING STOCKS MANUFACTURER



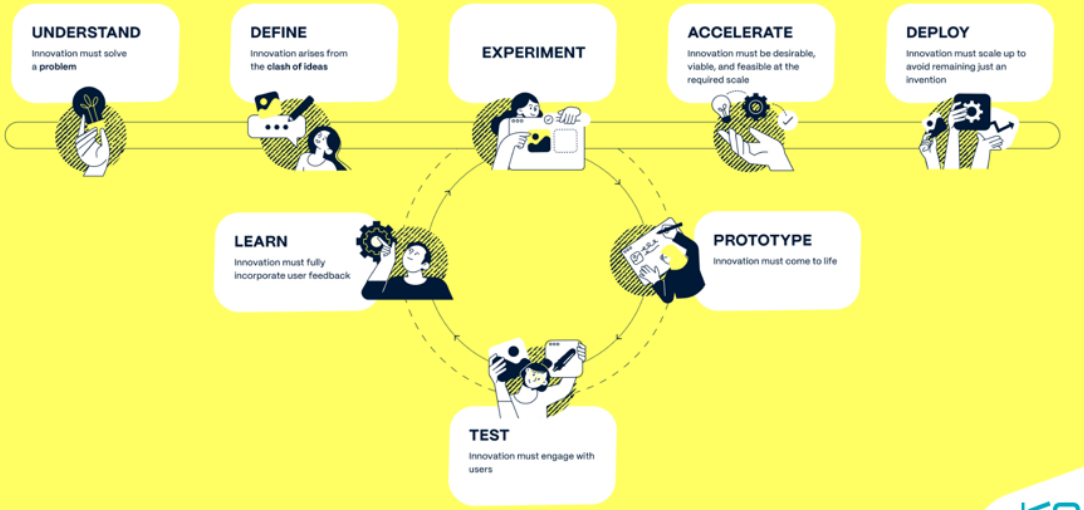
Threat and Opportunity of being a large Group



How to structure an agile Innovation Process

How to promote Innovation in most of the contexts?

OPEN LAB INNOVATION PROCESS

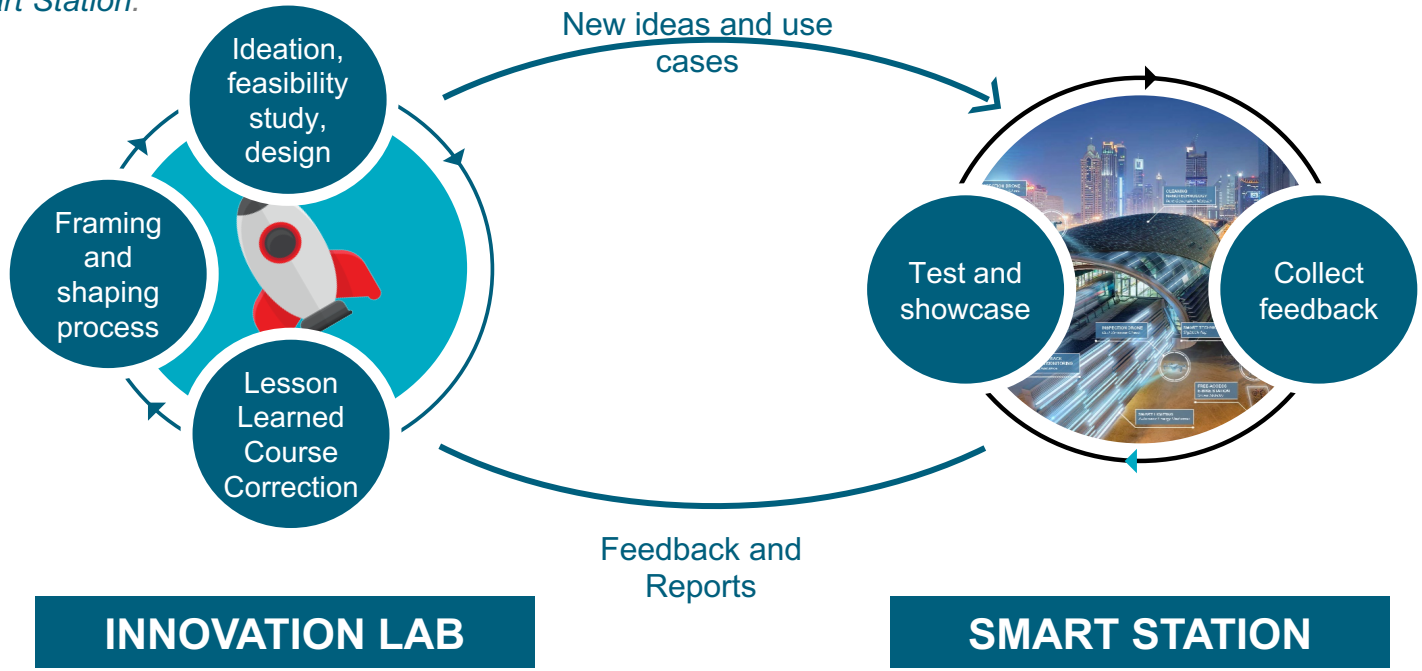


KEOLIS

Dubai Use Case developed with the RTA

The Smart Station in Dubai with the RTA

We have developed in collaboration with the RTA a strong innovation framework based on common a strategic approach and robust governance to assess existing challenges, explore opportunities, develop ideas, and build POCs that we run in the Smart Station.



PSD Remote Condition Monitoring System (POC)

Project and objectives

Technology used :

Sensors, Loggers,
Visualisation Dashboard, AI

Objectives :

Collect & analyse data for optimisation

Refine thresholds based on observations & data

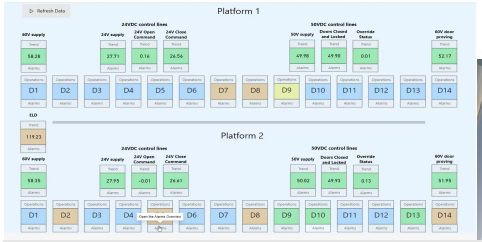
Reduction of failures
Planned maintenance to predictive

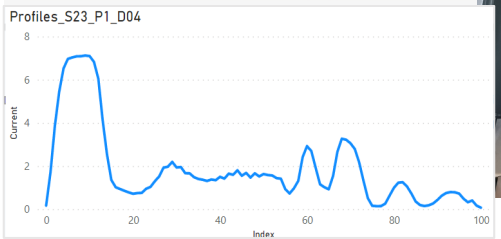
Timeline :

Solution installed and tested between May and Oct 23

Parameters to be monitored

- PSD Motor Current
- PSD Open Command (ATC signal)
- PSD Close Command (ATC signal)
- PSD Closed and Locked signal (ATC Signal)
- PSD Electrical Isolation





Train Remote Condition Monitoring System (POC)

Project and objectives

Technology used :

High imaging, optical and thermal sensors, optic fibber, AI

Objectives :

Collect & analyse data for optimisation

Refine thresholds based on observations & data

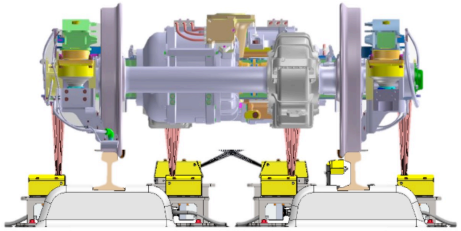
Reduction of failures
Planned maintenance to predictive

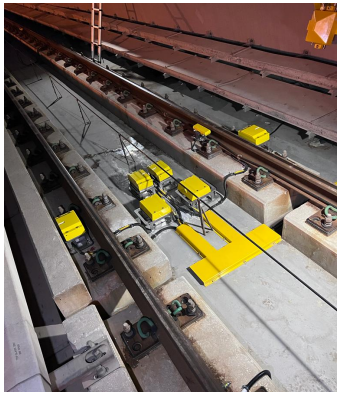
Timeline :

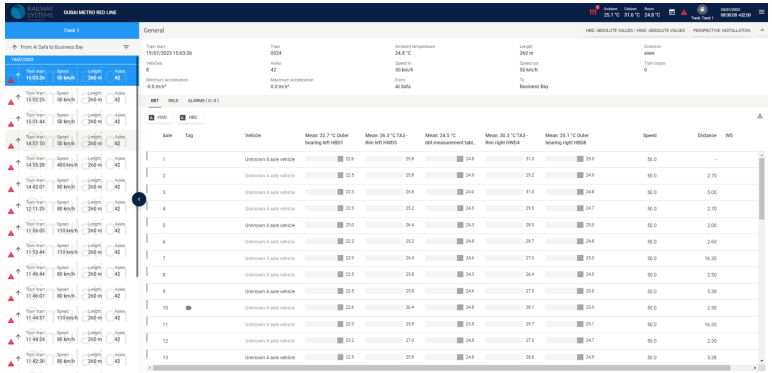
Solution installed and tested between July and Dec 23

Parameters to be monitored

- Vibration source (wheel impact detection system)
- Wheel temperature
- Bearing temperature
- Axle temperature
- Motor temperature
- Gear box temperature







Automated Rail and Infrastructure Inspection System (ARIIS)

Project and objectives

Technology used :

High imaging, LiDAR, optical sensors, acetometer, AI

Objectives :

Collect & analyse data for optimisation

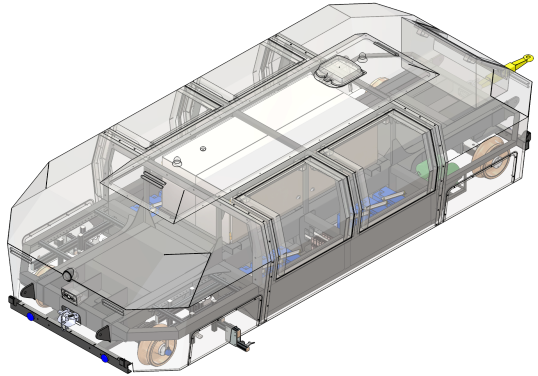
Refine thresholds based on observations & data

Reduction of failures
Planned maintenance to predictive

Timeline :

Delivered in Dubai in Dec 23
Implementation by Jan 24

- **Tracks :**
  - Gauge
  - Curvature radius
  - Flangeway
  - Free wheel clearance
  - Twist / cant
  - Rail profile
  - Cross level
  - GPS position
  - Track videos
  - Position of third rail
  - Wear of contact surface
- **Third Rail:**



Train Examination System (TRES)

Project and objectives

Technology used :

High imaging, LiDAR, optical and thermal sensors, 3D modelling, AI

Objectives :

Collect & analyse data for optimisation

Refine thresholds based on observations & data

Planned maintenance to predictive

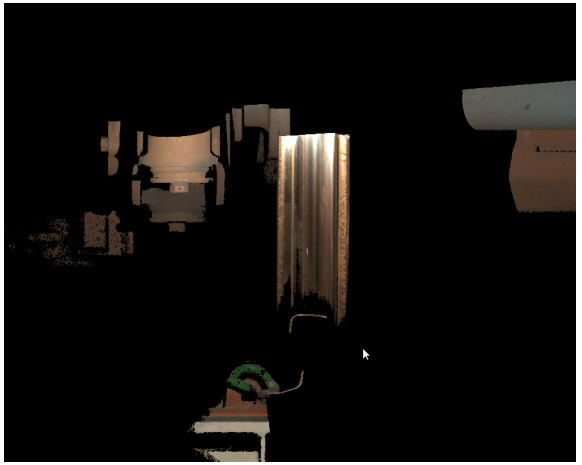
Timeline :

Solution tested in Mar 23
Implementation by Jul 24

Parameters to be monitored

- Wheel profile
- Gear box oil levels
- Collector shoe measurements
- Bolt torque marks
- Brake measurements

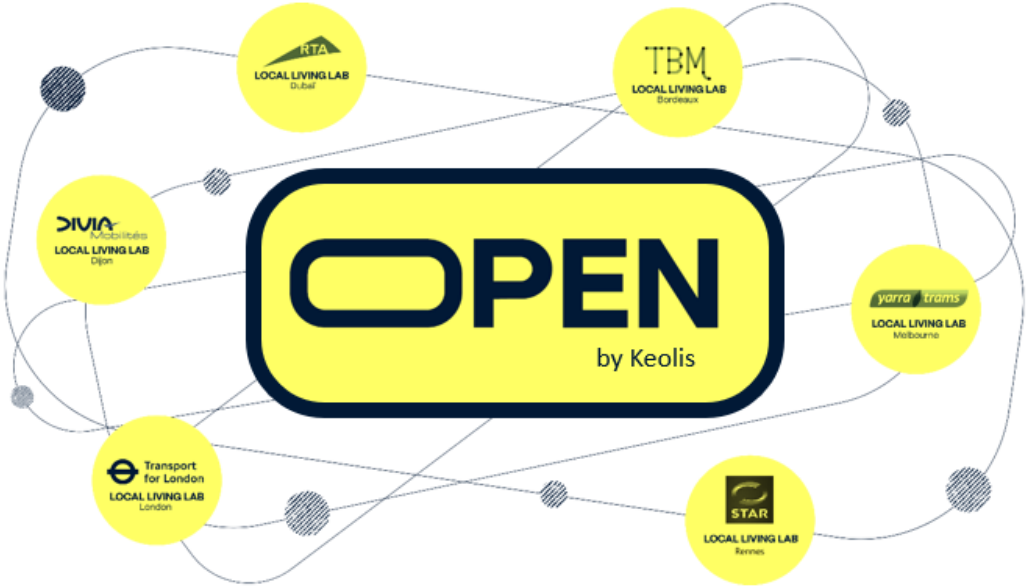
- 14 Days
- 28 Days
- 3 Months



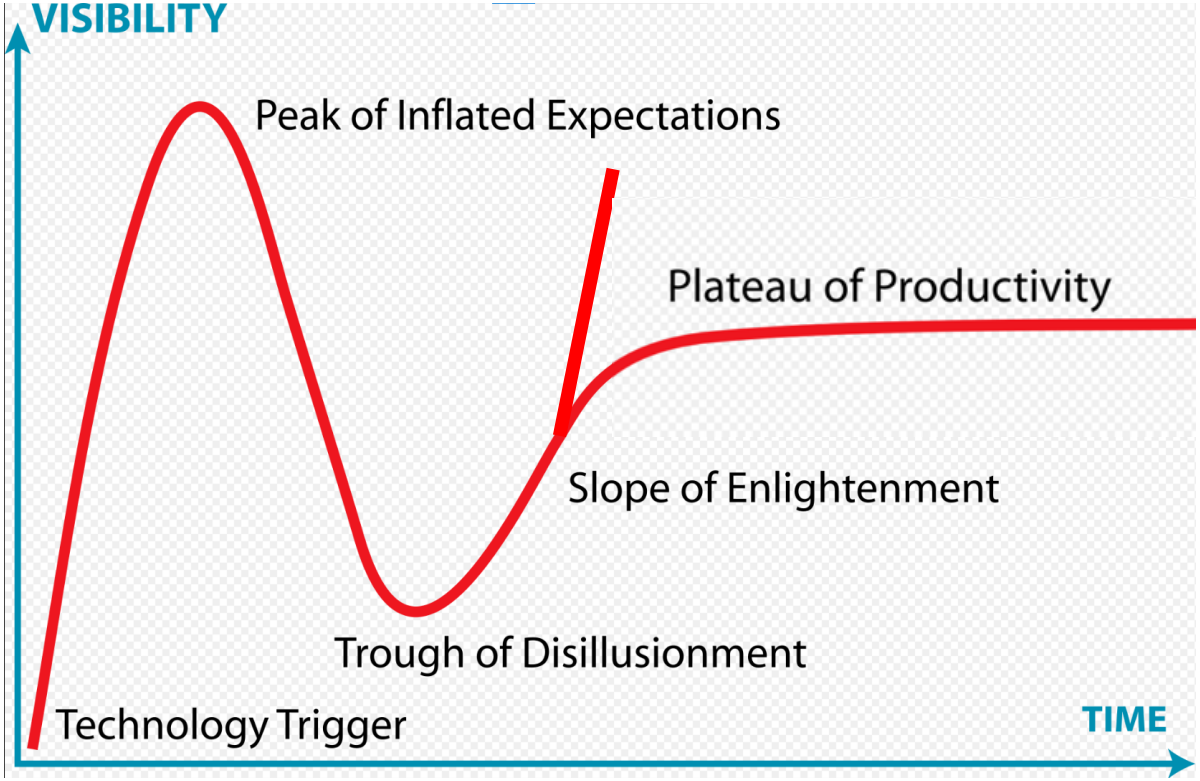
How to leverage such diverse initiatives?

How to leverage local initiatives on Innovation?

KEOLIS OPEN LABS NETWORK



We all need to enhance the Plateau of Productivity!



THANK YOU

Christophe SANGUINA