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Managing
MEGAPROJECTS
2015

Transport in the Digital Age

Smart mobility and Digital programmes

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 @whereswarwick



Rising demand for transport in UK

EUROPEANS, ON AVERAGE,
TRAVEL AROUND

35,000

PASSENGER KILOMETRES PER YEAR

EVERY YEAR THE TYPICAL
PERSON MAKES

923

TRIPS

IN 2012, THE NUMBER OF RAILWAY JOURNEYS MADE OVER
THE YEAR REACHED A RECORD

1.509 billion

SURPASSING, FOR THE FIRST TIME, THE PREVIOUS RECORD
FOR RAIL TRAVEL SET IN 1923

IN 2013

17%

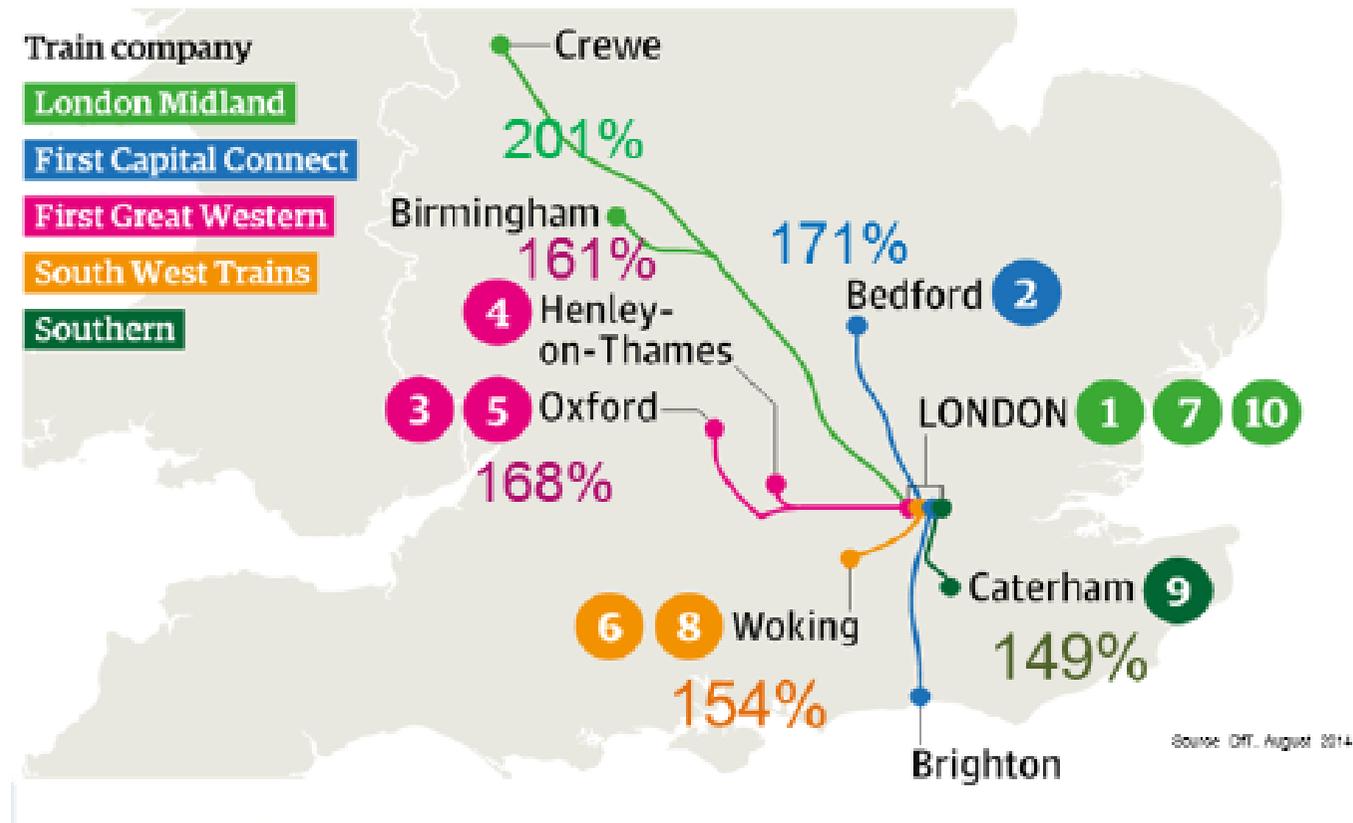
OF ALL BUS TICKETS SOLD IN THE UNITED KINGDOM,
WERE BOUGHT BY YOUNG PERSONS (PEOPLE IN THE
17-20 AGE GROUP).



#DfT
#ORR

UK rail journeys will grow from 1.6bn to 3bn by 2035

Peak capacity today on the 10 most crowded routes



#DFT

Meeting the needs of a booming megacity

London in 2031

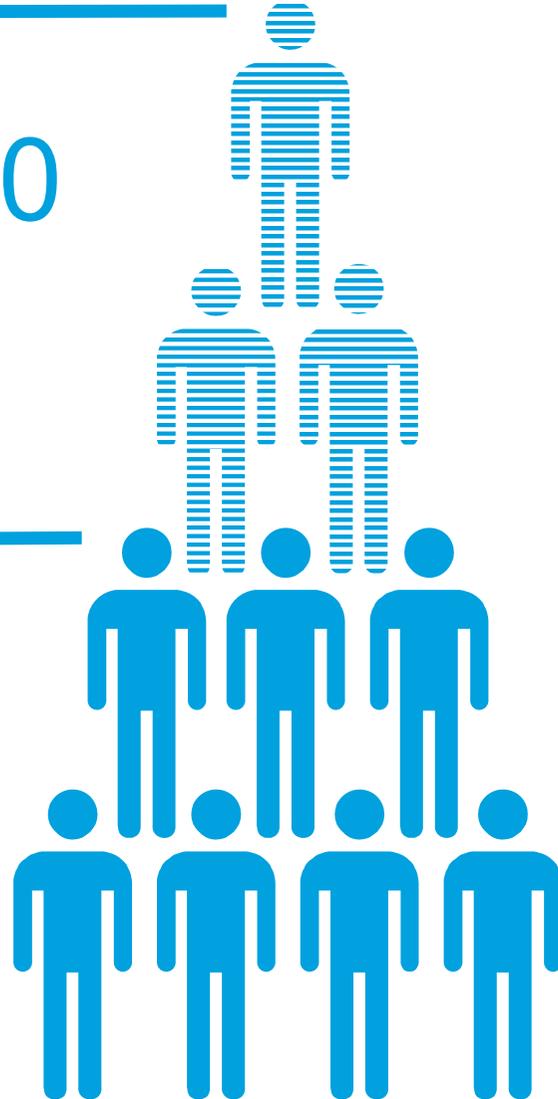
10,000,000

inhabitants

London in 2015

8,600,000

inhabitants

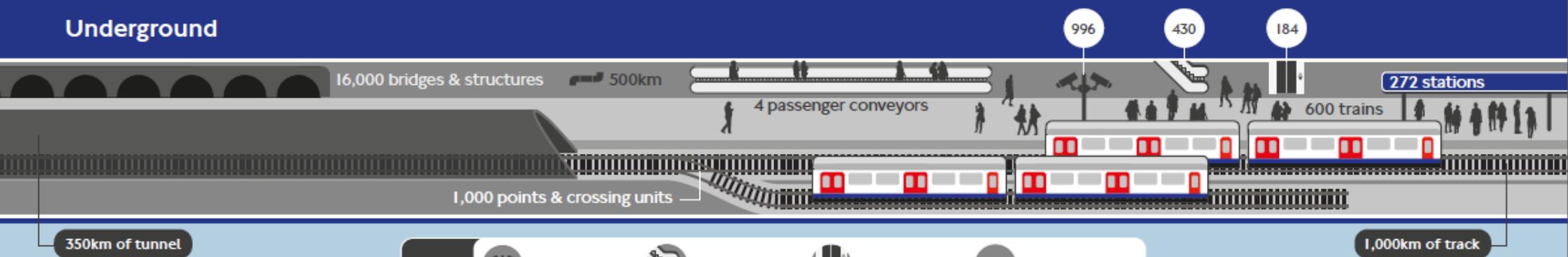
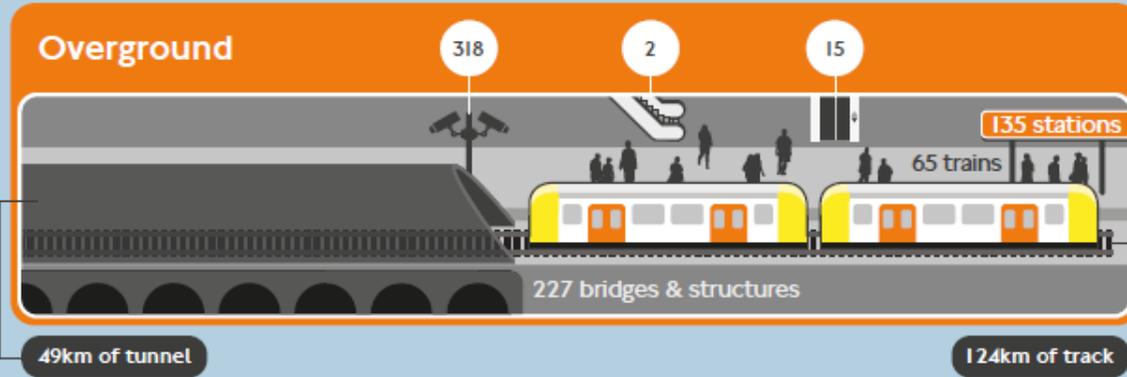
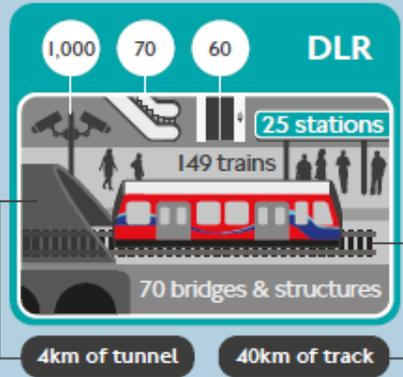
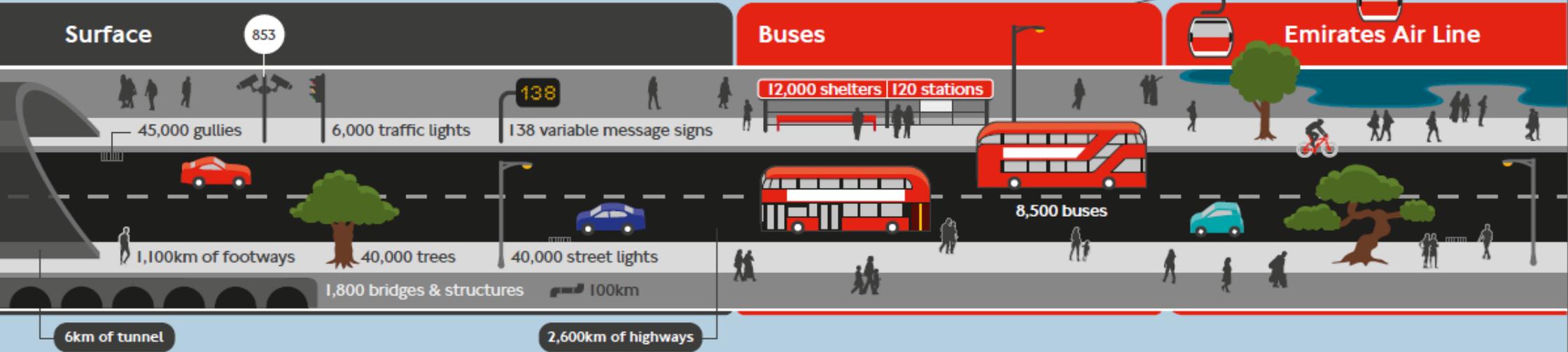


- + Political priorities
- + Socio-economic forces
- + Demographic trends
- + Global influences

A core economic driver for the “Northern Powerhouse”

Transport for London's assets

Keeping London moving

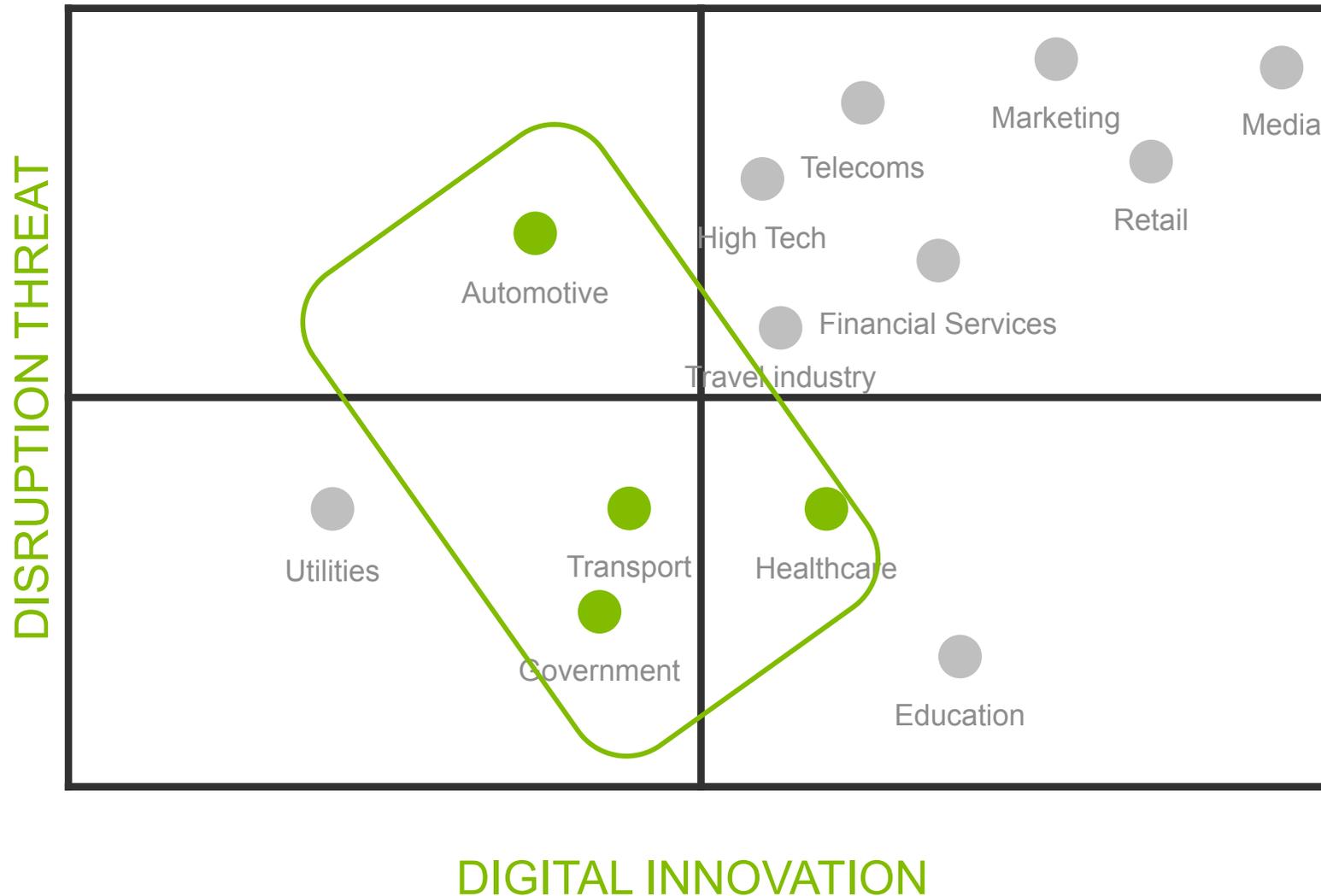


Legend

- CCTV cameras
- Escalators
- Lifts
- Drains

Digital disruption in transport and cities

Digitalisation has already made its breakthrough in many sectors. Transportation and city services sit on the axis where future digital innovation has yet to deliver key changes



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YOU CAN'T ALWAYS CREATE
CAPACITY BY POURING MORE
CONCRETE

Disruptive trends for smart transport and city services

Our study Transport in the Digital Age identified five trends that will shape the progress towards mobility services. These can also apply to a broader set of city services.



Examples of the smart trends currently in discussion

Mobility as a Service

Dynamic pricing models

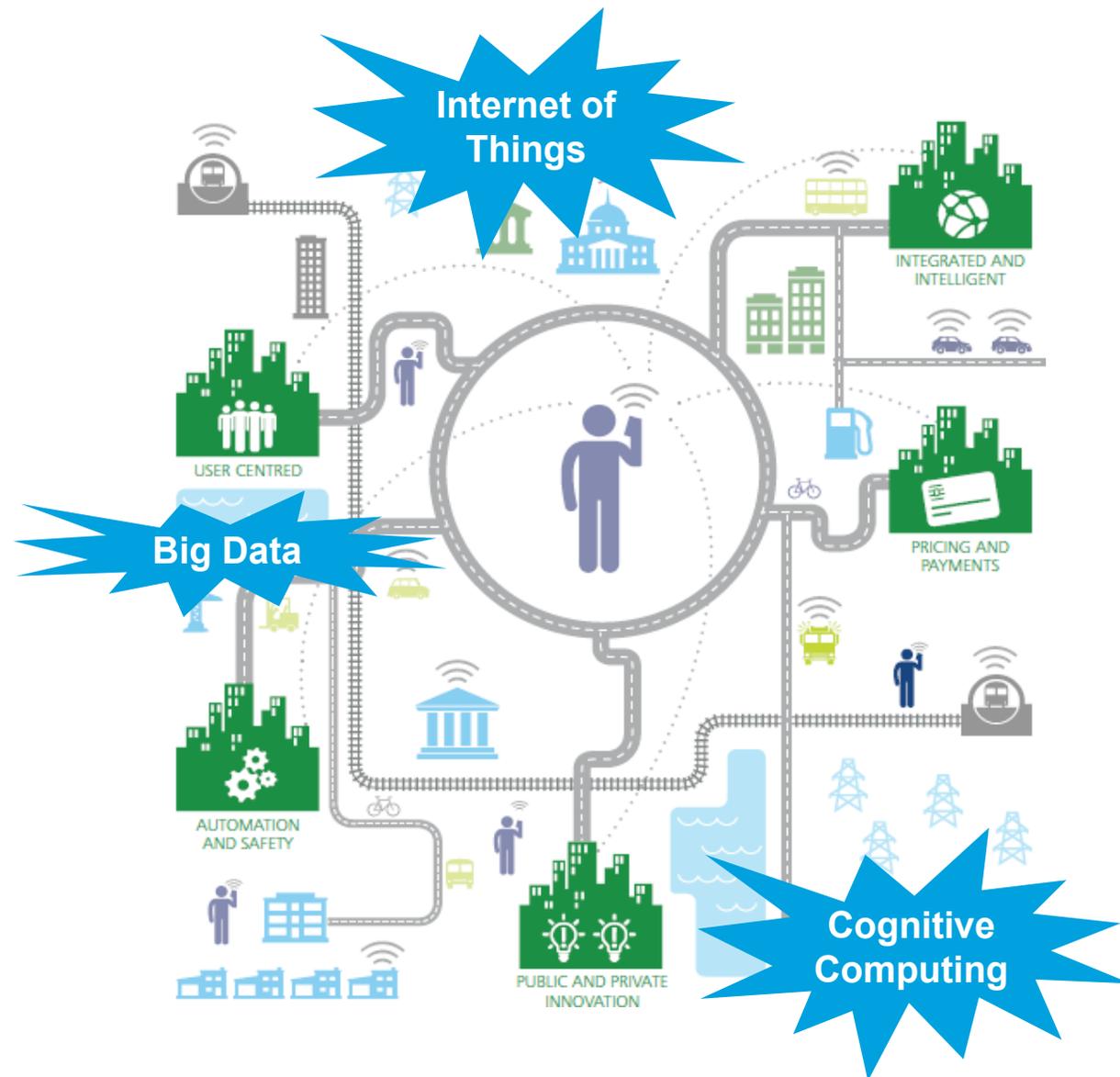
Intelligent traffic management

Power and utilities

Freight optimisation

Maturing public-private city services

Crowdsourcing and sharing economy



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40% more capacity on the
railway, delivered at
30% of the conventional cost

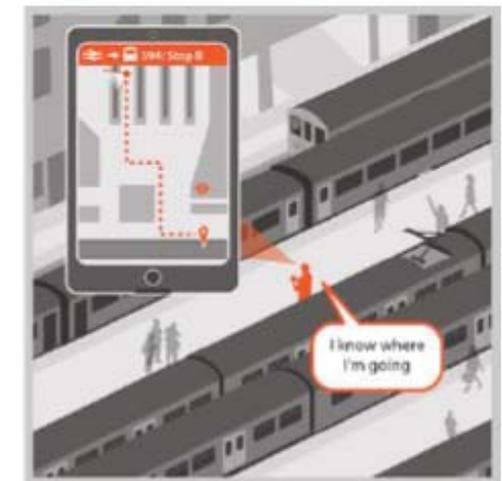
What does this look like in the rail industry?



Clear real-time journey planning information



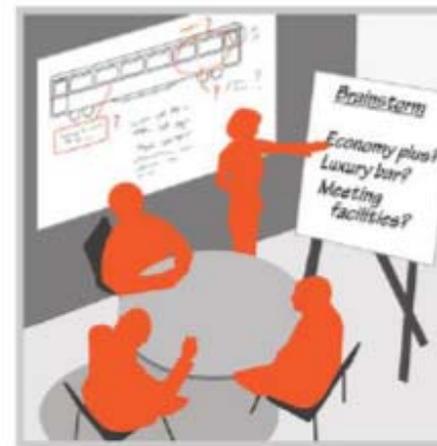
Helpful information during disruption



Intelligent guidance from one mode to another



Electronic ticketing with open interfaces for token validation



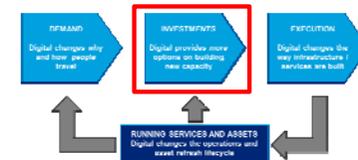
Scope for service differentiation

#DigitalRailway

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Technology is changing so fast.
How can we be sure we are
making the right long term
investments?

Understanding the new pace of change



Investment decisions today must reconcile hugely diverse investment cycles:

- There is huge difference in lifetimes between different investments
- No-one knows for sure how investments should be organised after 30 years

IIT Systems

- Lifetime 5-20 years
- Complexity and historic legacy
- Poor history of successful project delivery



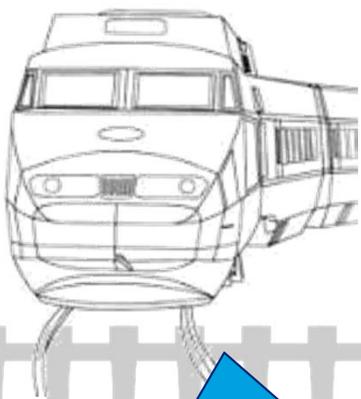
Vehicles

- Lifetime 10-15 years
- Product lifecycle 4 years, slow to gain features



Consumer Technology

- Can't predict what we will have 5 years from now
- May reshape demand more fundamentally
- Exponential speed of developments



Rolling stock

- Lifetime 20-30 years
- New fleets and refurbishment
- Private financing



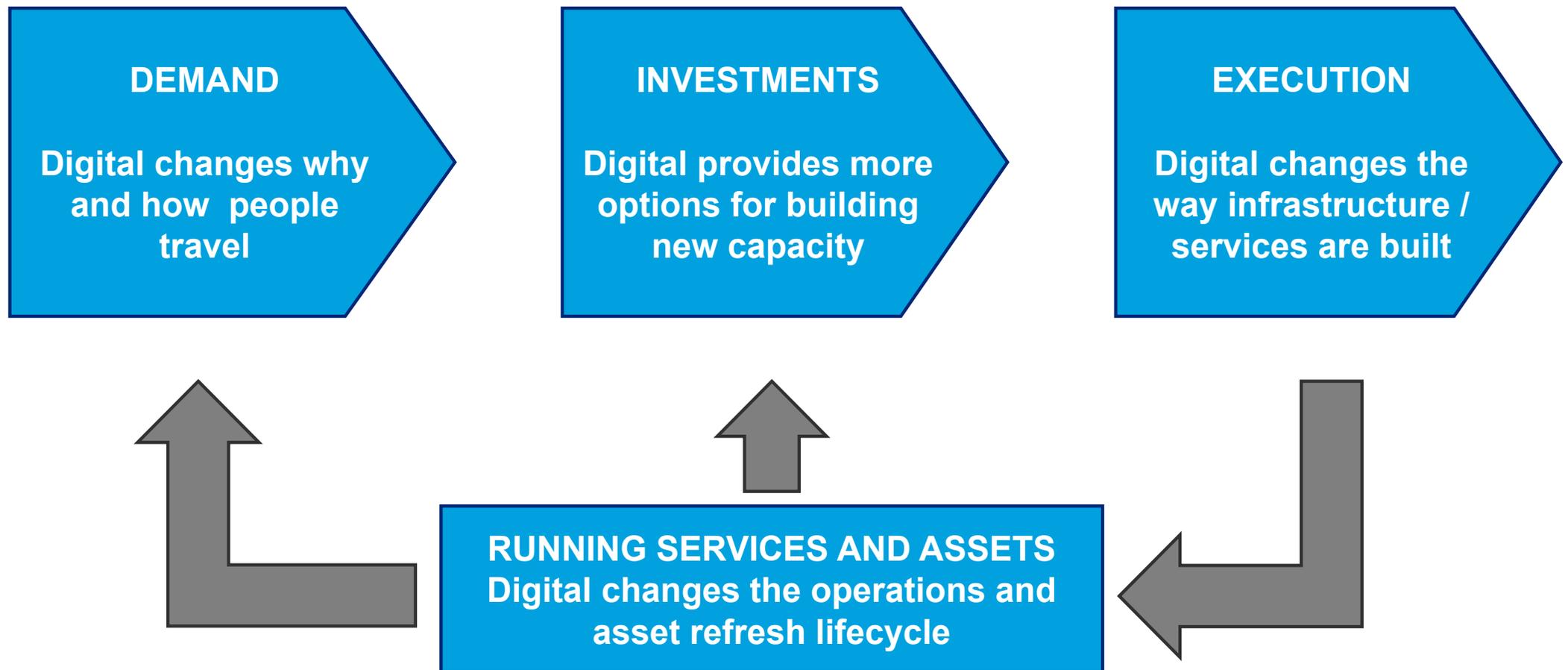
Infrastructure

- Investments for 30-50 years
- Capacity assumed steady demand growth
- Public sector investments

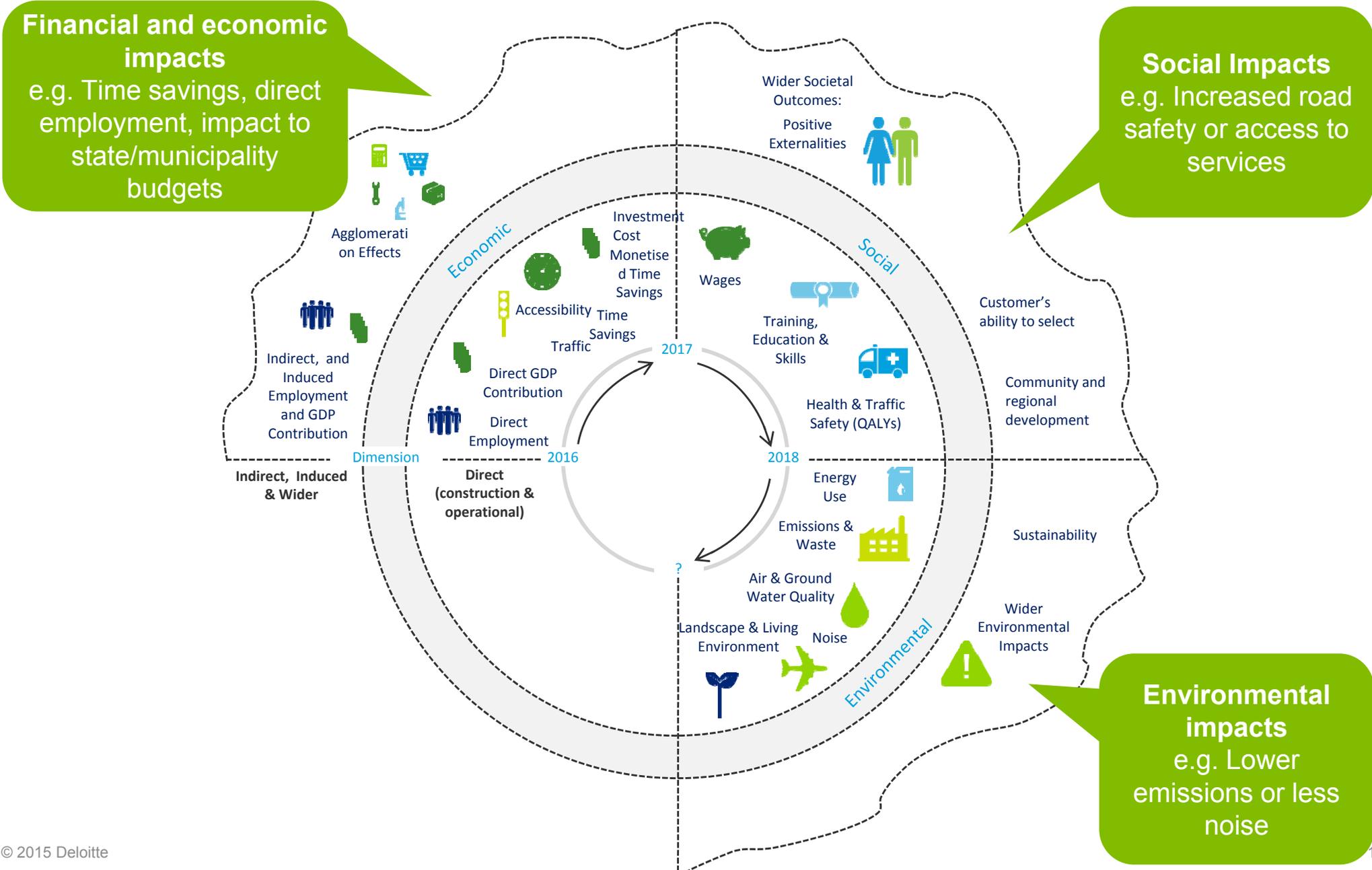


Why does digitalisation and 'smart' matter to Infrastructure investments?

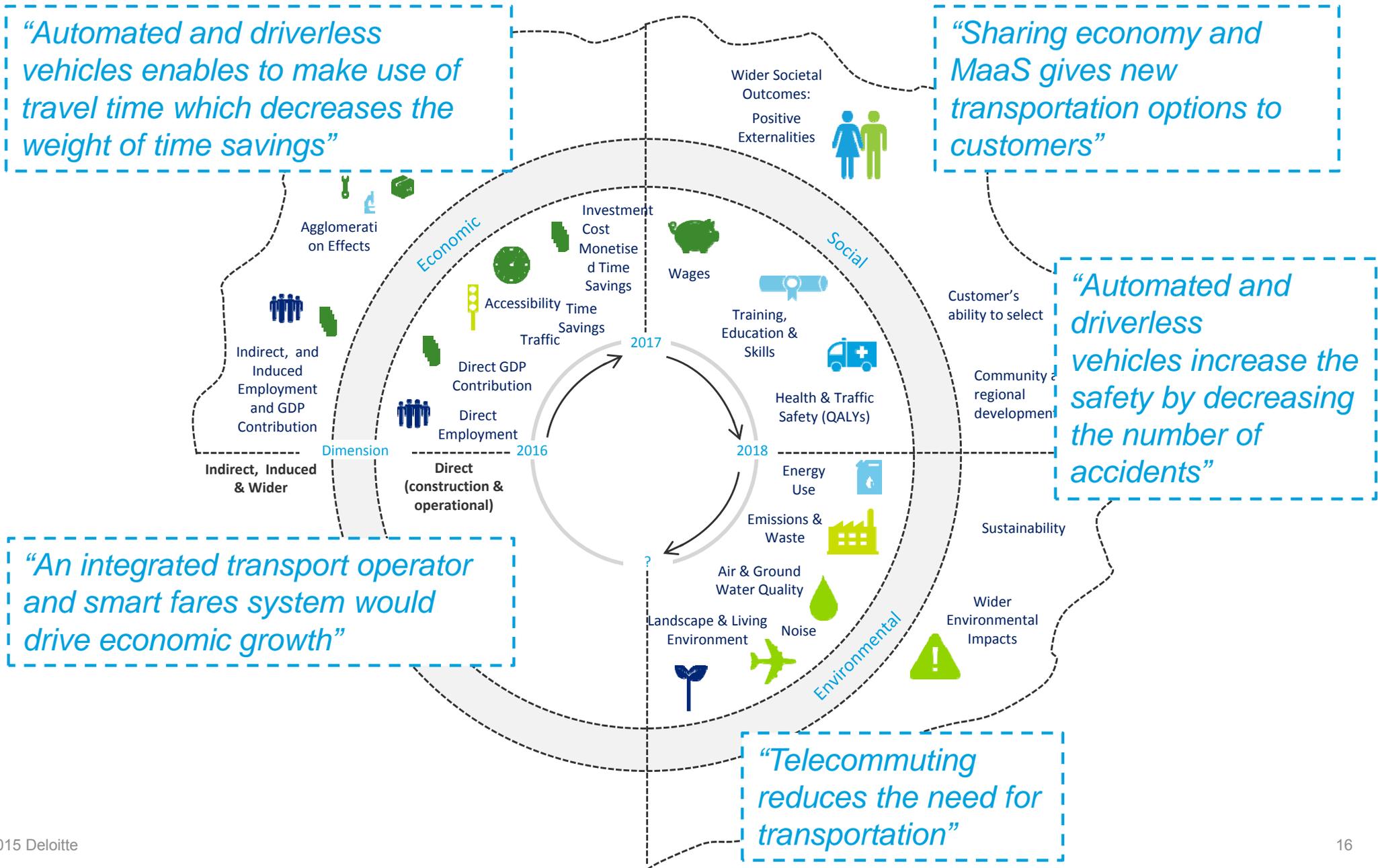
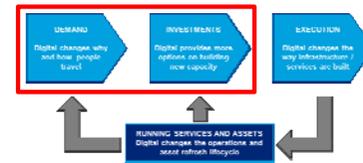
The demand for mobility and public services will change, with possibilities to create increased capacity and to steer changes in usage of existing capacity



Evaluating demand and assessing impact

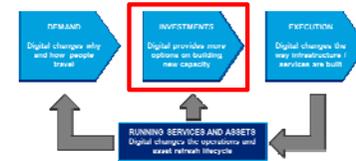


Digitalisation affects the benefit dimensions



Changing types of investment

Traditional capital programmes must be delivered alongside rapid developments in other sectors



Capital programmes

- Engineering discipline
- Infrastructure heavy
- Forecast demand
- Gateway process
- Capital funding
- Focus on the operation
- Political willpower
- Public good

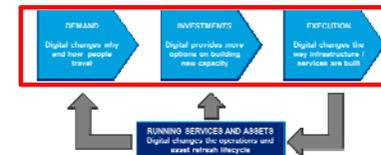
Emerging mobility services

- Creative skillsets
- Zero infrastructure
- Create new demand
- Agile process
- Service running costs
- Focus on customers
- Market forces
- Private/social good

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How does this change the way
we deliver our existing
programmes?

Service design thinking



- Service design is about building services around the needs of customers
- Start with the customer experience, not the sensors or data
- Build things that will enrich people's lives



#JRShibuya

Digital approach to executing programmes

Digital changes the way infrastructure/services are built.



- ✓ Improved data quality
- ✓ Robust controls, greater accountability
- ✓ Better insights, improved decisions
- ✓ Lower cost and timely delivery
- ✓ Faster start-up and safer operations
- ✓ Improved capital efficiency



Integrated Analytics



Data Science



Visualization



Digital Mobility



Contractor / Vendor Info



Running smart services and assets



Digital changes the way services are operated and optimised. Multi-modal transport and availability of data and automation enables a new model for Command and Control.

- Intelligent management of a multi-modal network
- Convergence of data, command and control
 - Service operations (real-time)
 - Customer information (open data)
 - Asset maintenance (Internet of things)
 - Predictive and preventative measures
 - Interface with other public sectors



1. *Digital airport towers by remote control, Sweden*
2. *City operations centre, Rio de Janeiro*
3. *Single regional traffic centre, Ontario Canada*



Running smart services and assets

Digital changes the asset refresh lifecycle. We now deliver in duplicate – a complete virtual model, linked to the real world infrastructure.



- A complete virtual record informs future upgrade and planning cycles

- Creation of a complete, hierarchical virtual model of assets



- Predictive analytics optimises maintenance cycles and prevents failure

- Physical data and real-time condition monitoring augment the virtual model

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THE ONLY CERTAIN
THING ABOUT THE
FUTURE IS CHANGE

The future role of the public sector in smart services

- Stimulate economic growth
- Defining policy to protect citizens and promote advances in smart services
- A regulator and facilitator of the open market
- Ensuring universal service provision
- Overseeing successful delivery
- Taxes and service charging revisited

- Make life easier and more enjoyable for our citizens!

What can we hope to expect?

- No paper tickets
- Pro-active travel plans
- Real-time passenger flows
- Car-to-car communication
- Digital uniforms
- Fully automated metros
- Intelligent road capacity
- No railway signals
- Real-time asset status
- Automated airports
- Automated railways
- Intelligent tarmac
- Cognitive control systems
- Autonomous cars
- No driving tests

5

YEARS

10

YEARS

20

YEARS

THANK YOU

 @whereswarwick



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