

ACCELERATING THE IMPACT OF TRANSPORT RESEARCH AND INNOVATION INITIATIVES

TRANSPORT SYSTEMS CATAPULT



United Nations Workshop
Transport Research and Innovations
5th September 2016

CATAPULT
Transport Systems

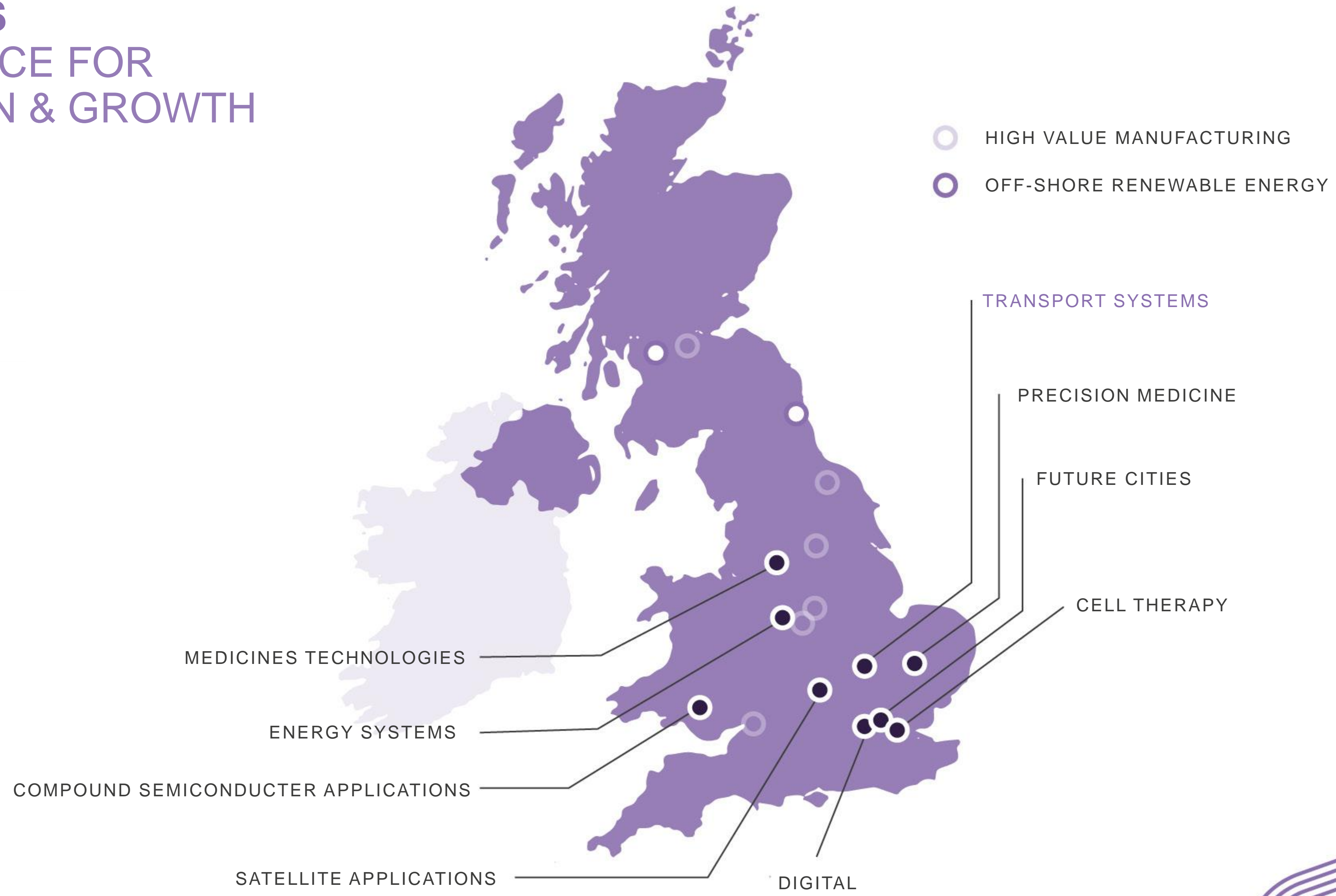
CATAPULTS

A NEW FORCE FOR INNOVATION & GROWTH

11 Catapults

£1.4BN

Private and Public
Sector Investment



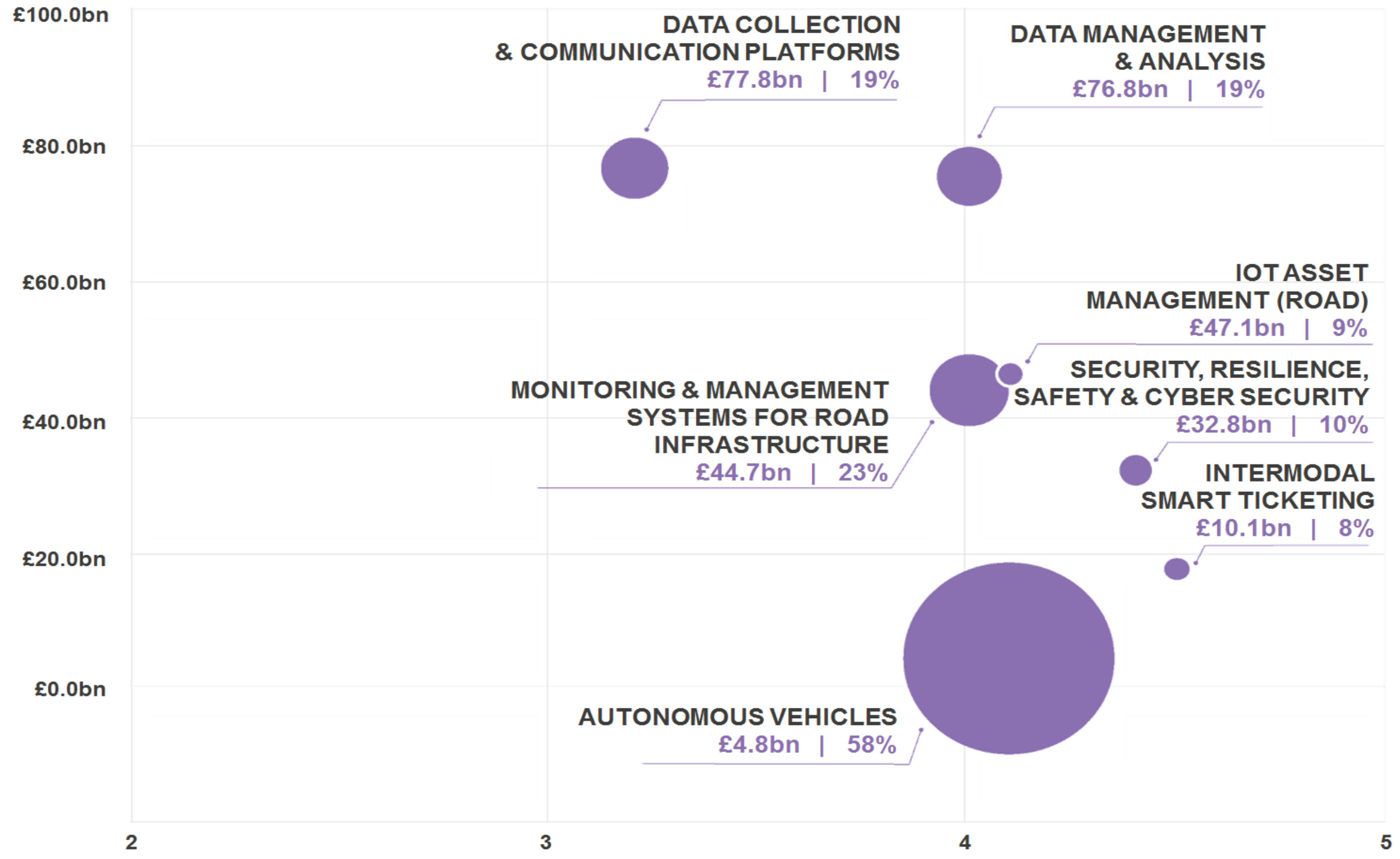
TRANSPORT SYSTEMS CATAPULT

“ Drive UK global leadership in Intelligent mobility, promoting sustained economic growth and wellbeing, through integrated, efficient and sustainable transport systems.

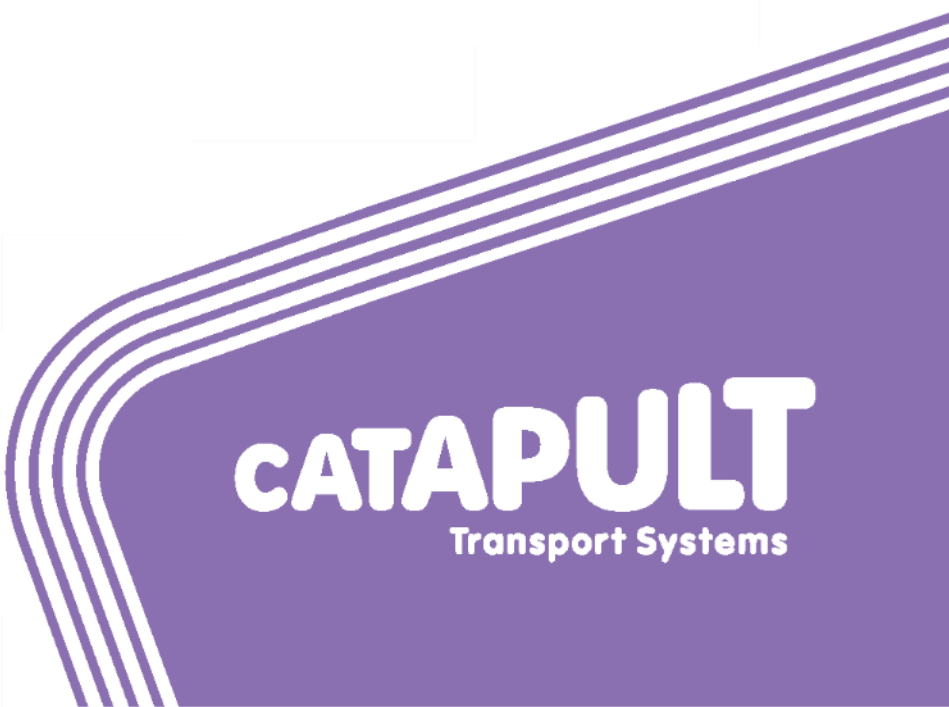
“ Create an environment that will make the UK a World leader in Transport Innovation.

TAKING A TARGETED APPROACH TO EXPLOITING IM OPPORTUNITIES

GLOBAL INTELLIGENT MOBILITY MARKET BY SEGMENT IN 2025

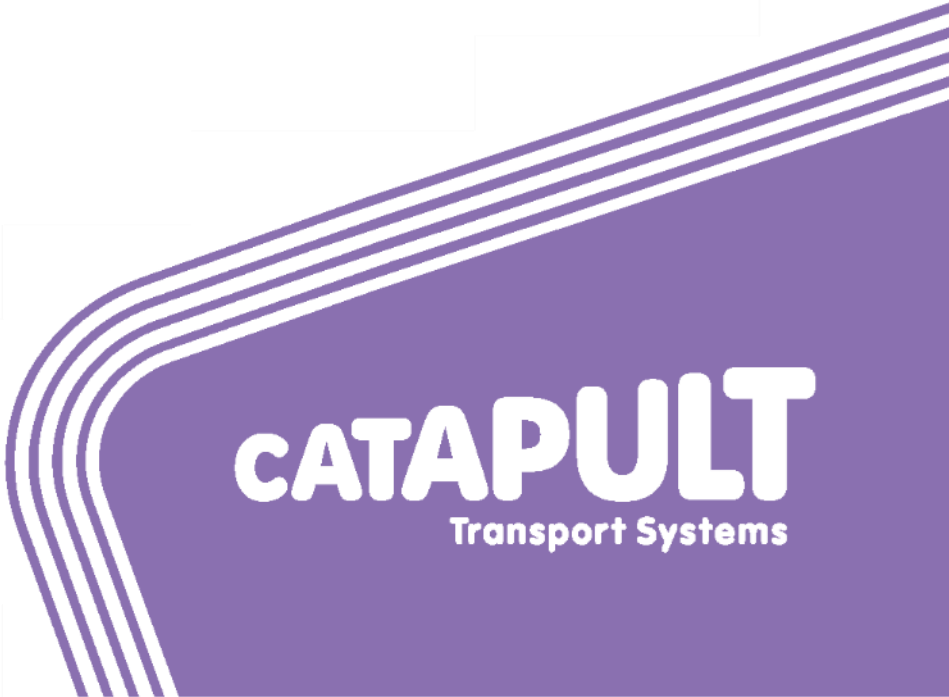
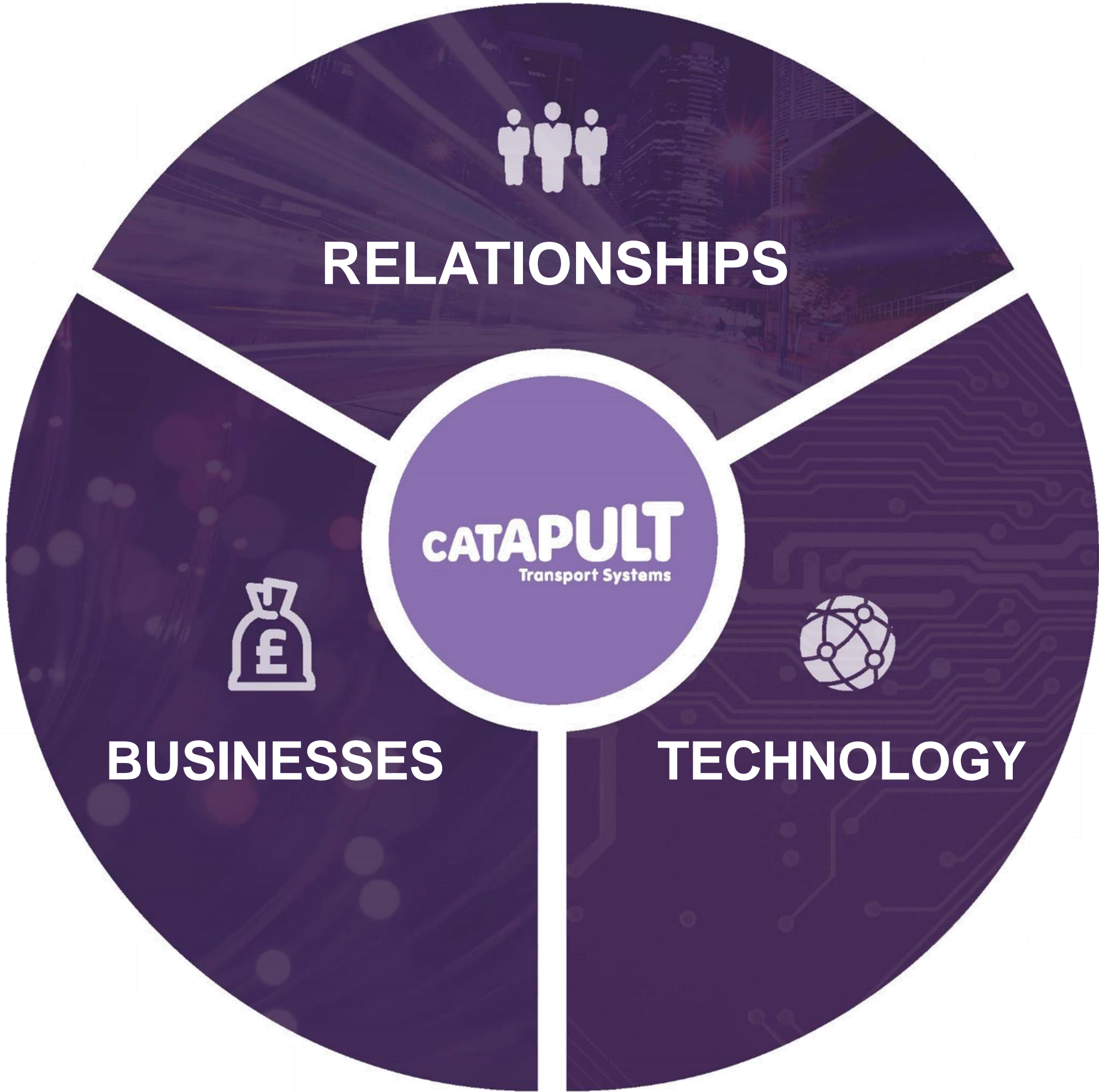


THE DIAMETER OF THE BUBBLES REPRESENTS CAGR

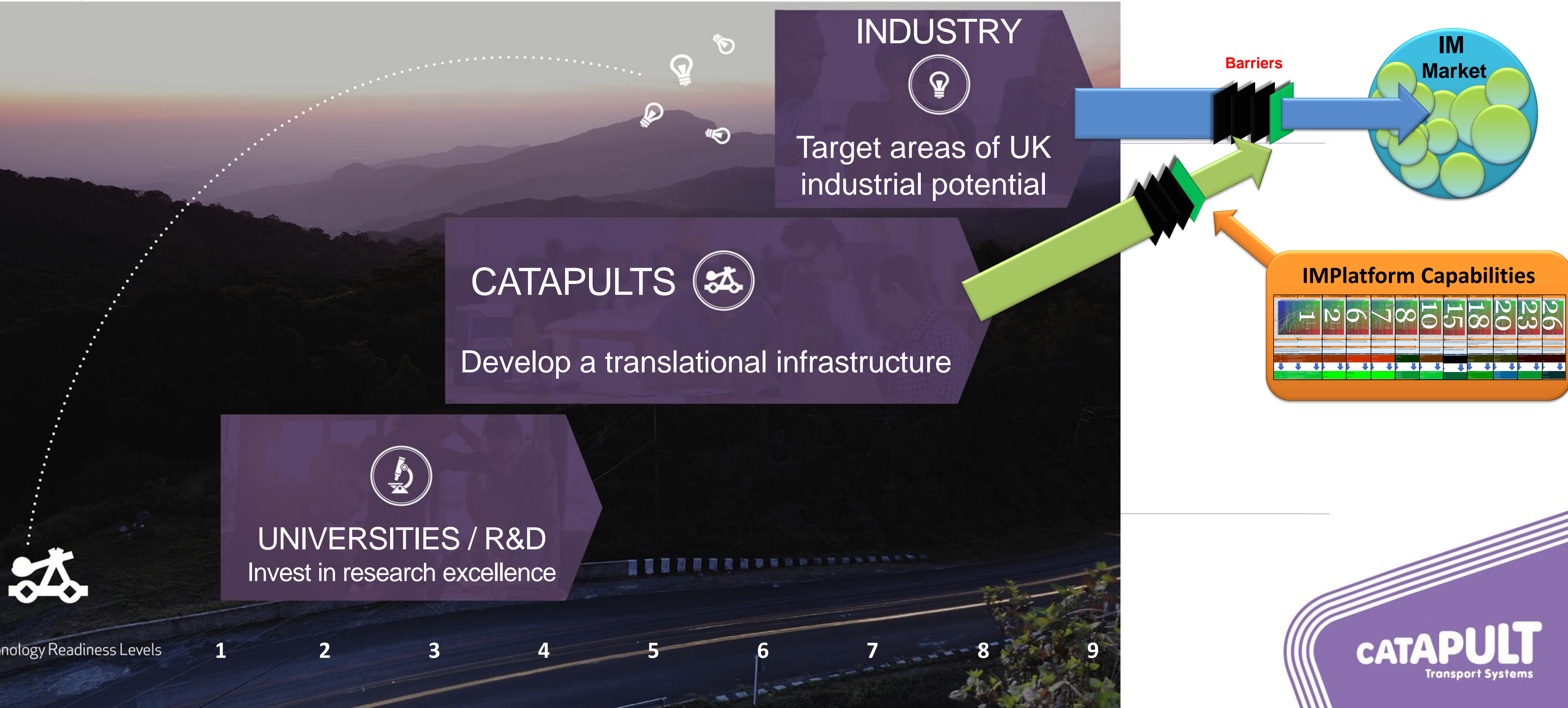


UK CAPABILITY STRENGTH RELATIVE TO THE REST OF THE WORLD (FROM LOW TO HIGH)

A CATALYST FOR ACCELERATING INTELLIGENT MOBILITY GROWTH



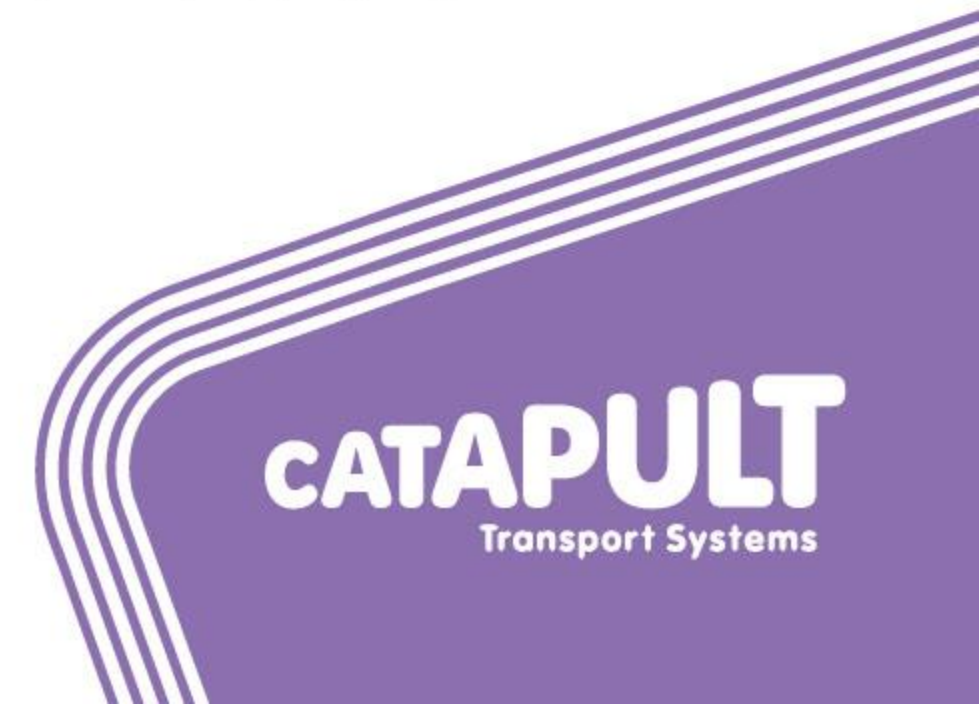
A TRANSLATIONAL INFRASTRUCTURE



Technology Readiness Levels

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

ACADEMIC ENGAGEMENT PROGRAMME



OUR CAPABILITIES



AUTOMATED
TRANSPORT
SYSTEMS

MODELLING
&
VISUALISATION

CUSTOMER
EXPERIENCE



INFORMATION
EXPLOITATION

SMART ASSET
MANAGEMENT



OUR NEXT DESTINATION INTEGRATED TEST ENVIRONMENT

SENTIMENT MAPPING

Re-defining the use of social media data for transport

IM
CENTRE FOR
HUMAN-CENTRIC
DESIGN

MODELLING FOR AUTONOMOUS VEHICLES
Unifying pedestrian, vehicle and pod modelling

IM
MODELLING &
VISUALISATION
PLATFORM

CATCH!
PASSENGER JOURNEY DATA
Crowdsourced data on
passenger journeys

IM
INFORMATION
PLATFORM

IM
INTEGRATED
TEST
ENVIRONMENT

INNOVATION IN RAIL FRANCHISING
Tools and processes to enable
innovation in rail.

IM
ACCELERATOR

INTRODUCING AUTONOMOUS CARS
AUTODRIVE
Driverless pods and cars
in the real world

IM
CENTRE FOR
OPERATIONAL
TRIALS AND
EVALUATION

IM
CENTRE FOR
CRITICAL
SOFTWARE
SYSTEMS
DEVELOPMENT

AUTONOMOUS ROAD VEHICLE SAFETY EVENTS DATABASE
Informing the need for a safety events database.

CASE STUDIES

- 1 TECHNOLOGY STRATEGY 2016 – Sharing the vision for intelligent mobility**
- 2 SENTIMENT MAPPING – Re-defining the use of social media data for transport**
- 3 TRAVELLER NEEDS SURVEY – Identify key IM areas and recommend investment priorities and policy interventions**
- 4 STATION INNOVATION – Innovative technology and operational solutions in stations**
- 5 INNOVATION GRANTS – T-TRIG and ALSTOM challenge**



MAKE TRAVELLING AN
END-TO-END **USER-
CENTRIC** EXPERIENCE



MAKE OUR TRANSPORT
SYSTEMS MORE
SUSTAINABLE AND REDUCE
ITS ENVIRONMENTAL
IMPACT



**SAVE MANY
LIVES**



GENERATE **BILLIONS**
WHEN MOVING PEOPLE
AND GOODS



MAKE OUR TRANSPORT
SYSTEMS MORE
RESILIENT



MAKE OUR
TRANSPORT **ASSETS**
MORE PRODUCTIVE



IMPROVE **ACCESSIBILITY**
FOR ALL SEGMENTS OF
SOCIETY



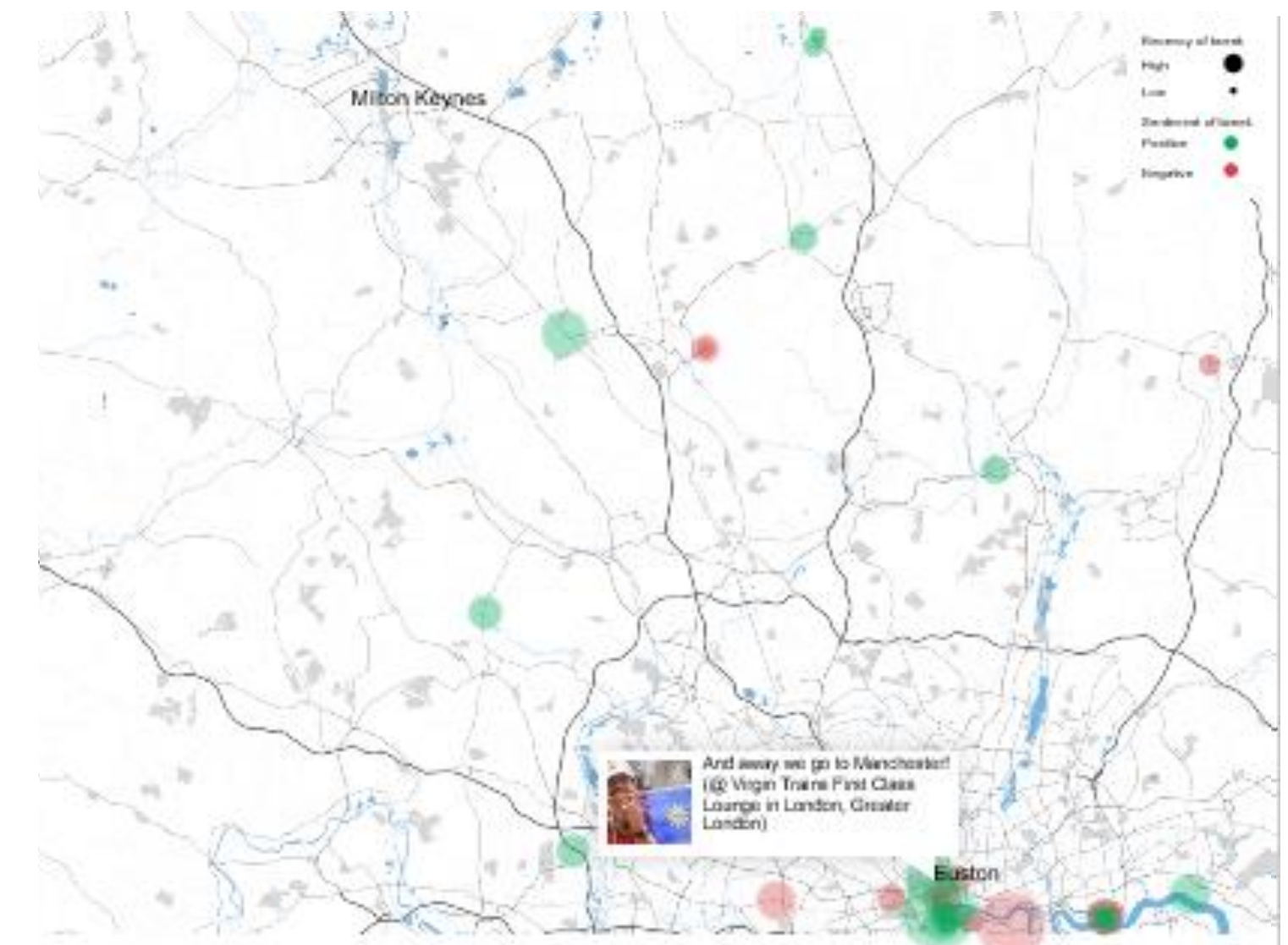
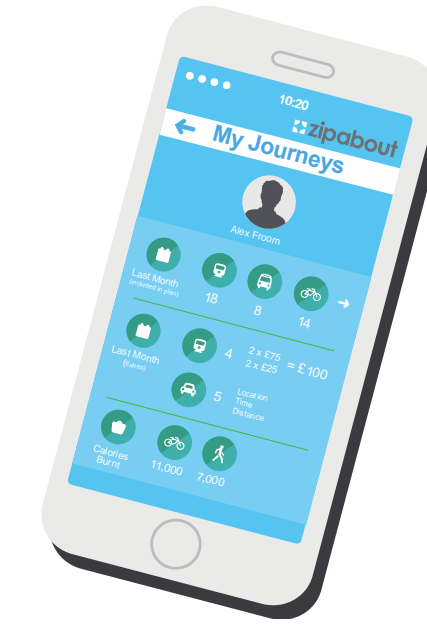
MAKE TRANSPORT OF
PEOPLE AND GOODS
QUICKER

SENTIMENT MAPPING

PHASE 1 – Proof of concept

Aiming to give travellers:

- Door to door journey 'health check'
- Live map of services overlaid with conditions and sentiment
- Informed choice prior to departure



How are people feeling about...



 **Commonplace**

How is sentiment data used?

- Uses **Twitter** Firehose - Approx 3m Tweets processed per month, available for retrospective analysis
- **Sentiment score** is based on natural language processing
- **Mapped** to an individual running service or station - **Normalised** against live operational and environmental data
- **No # tags or keywords** – all data is processed, mapped and categorised in real time

SENTIMENT MAPPING

PHASE 2 – Demonstrator

Aiming to give rail travellers:

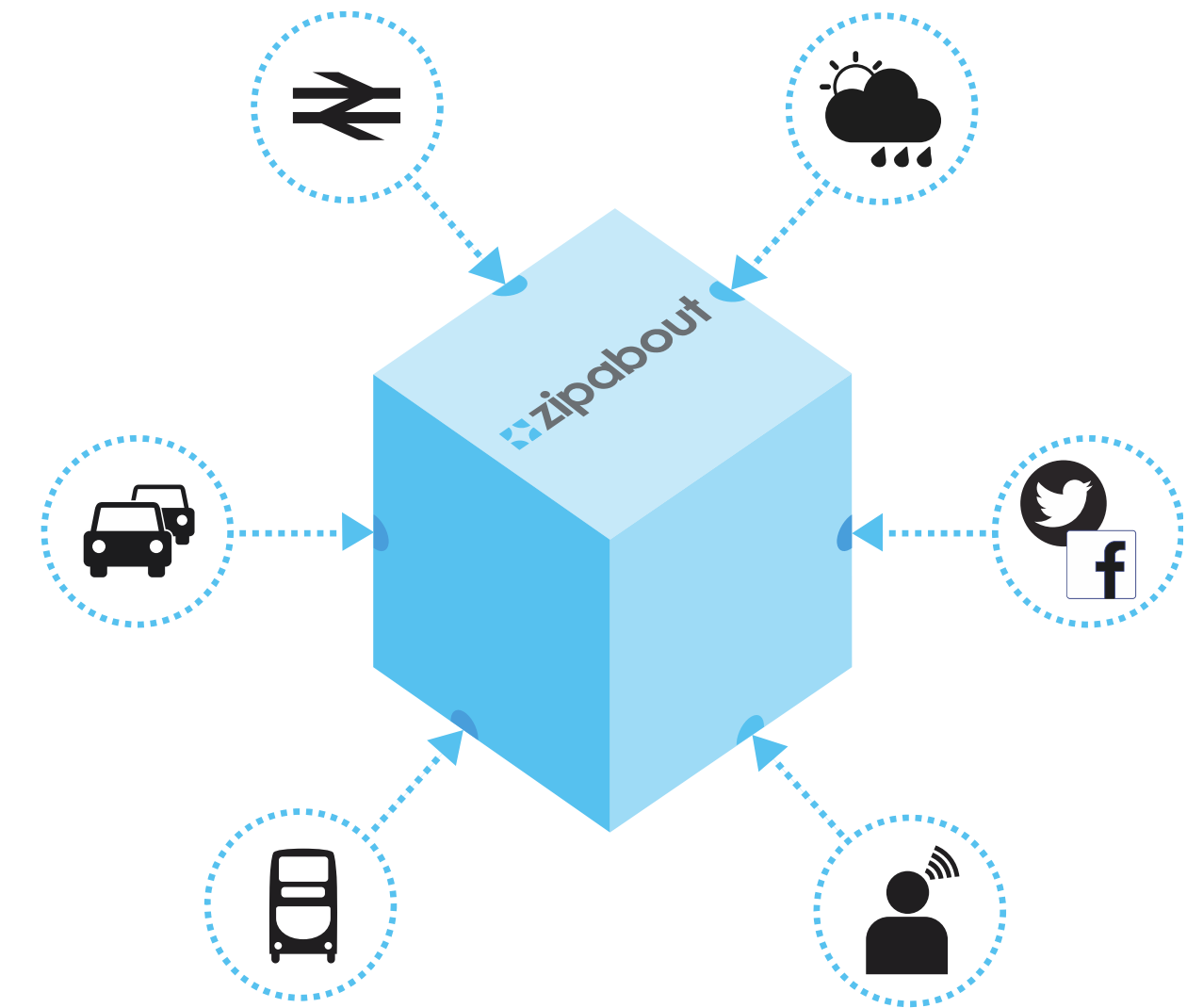
- Enhanced map of phase 1, plus
- Predictive and live push alerts

Zipabout take billions of pieces of data...

...and use machine learning to:

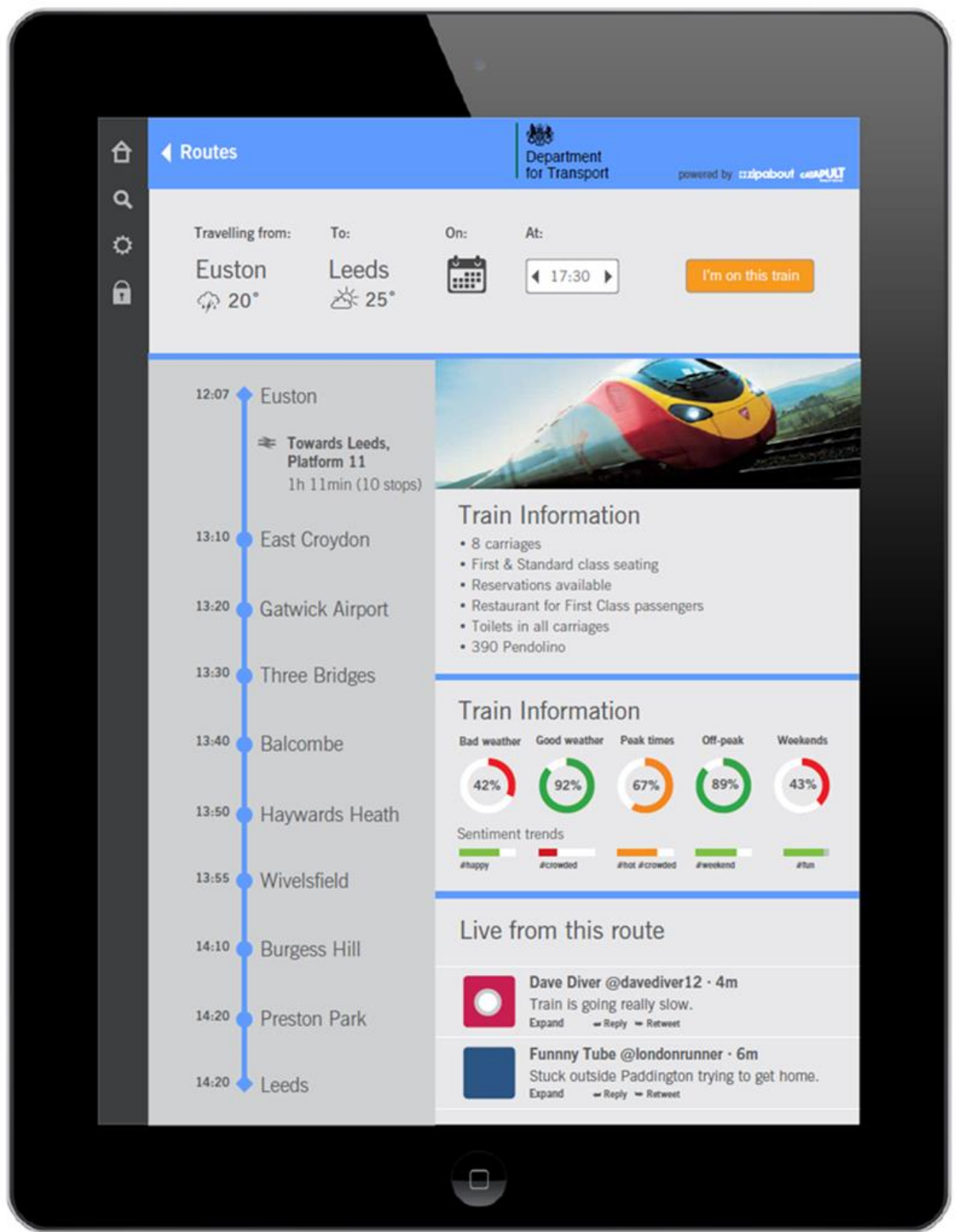
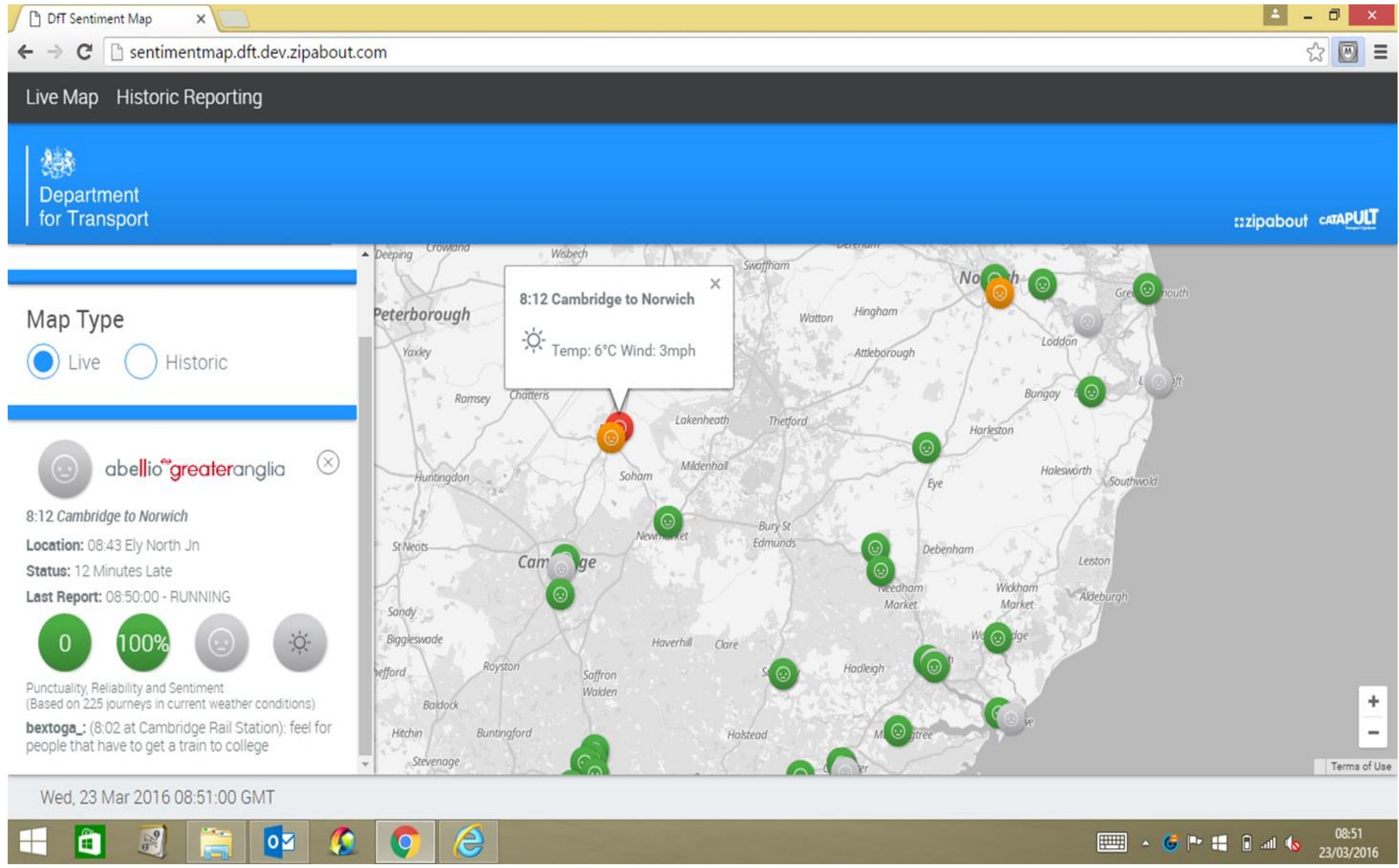
- Analyse the past
- Identify patterns in real time
- Predict behaviour / disruption in the future

TSC in collaboration with Zipabout, Transport Focus, Nottingham University and Keolis, funded by DfT



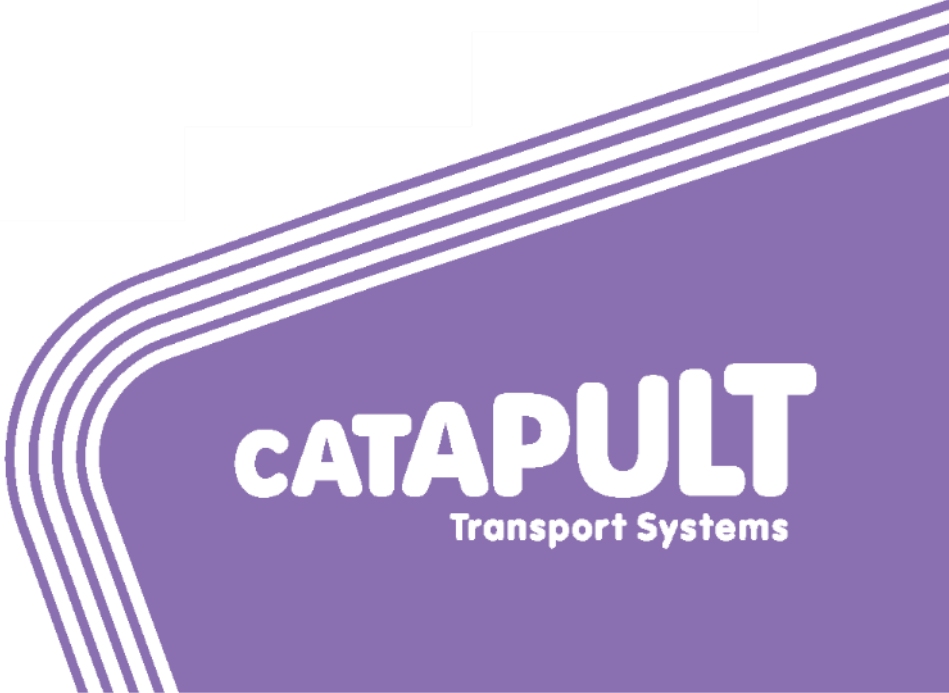
SENTIMENT MAPPING – DEMONSTRATOR

Map of live running services and sentiment analysis



web based door to door Traveller Journey Health Check

Tool based on 2 years of historic operational data and sentiment analysis. The tool allows for multi-modal expansion.



SENTIMENT MAPPING

PHASE 3 – Extend scope of demonstrator

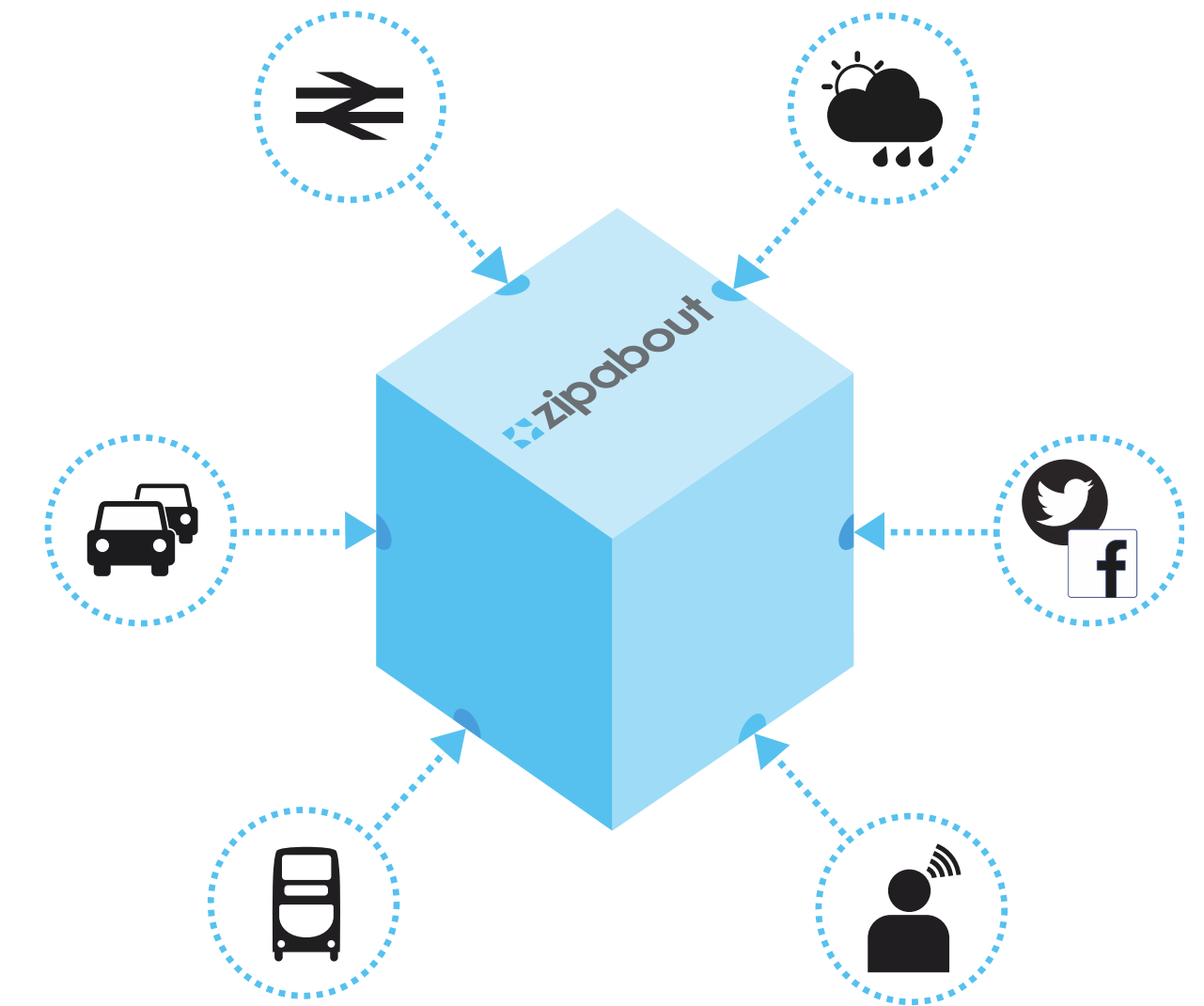
1) Enhancing travelers demonstrator

2) Aiming to give train operators:

- Enhanced business intelligence and customer experience tools for staff, train crews and control
- Ability for targeted, service-level communication

3) Visual Business Intelligence tool

- Provide a visual representation of customer sentiments for different train operators
- To provide senior managers with an overview of train service performance overlaid with real-time customer sentiment



The Traveller Needs UK Capability Study

funding from



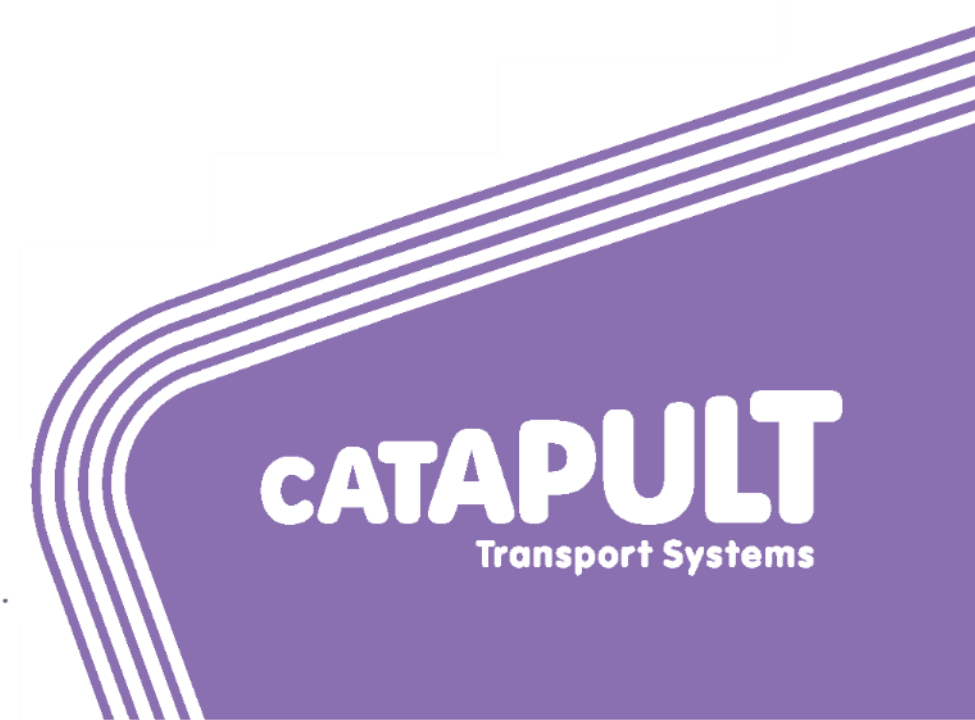
We work with **Innovate UK**

active involvement of over 70 industry partners

Main aim:

To identify IM areas of value, recommend investment priorities and policy interventions to deliver value to the UK (by 2030)

- Extensive multi-modal Intelligent Mobility study
- 10,000 on line respondents
- 100 detailed interviews with industry experts



Why traveller needs?

Many studies have analysed user travel sentiments

- Most are specific to a transport mode or geography
- Short-term incremental improvements of current transport systems

Other studies have explored future mobility technologies

- Tendency to focus on technical innovations in a specific sector

This study takes a holistic view of Intelligent Mobility

- Transport modes
- Sectors
- UK geographies
- All aspects of Intelligent Mobility



3

Traveller types

Flexibility of door to door solutions.
Dynamic, seamlessly integrated.



Default Motorists

26%

Frequent Traveller



Progressive Metropolitans

14%



Ideal lead users for new Intelligent Mobility solutions



Rural

Urban

Local Drivers

24%



21%

Dependent Passengers

Require mobility services that provide independence are affordable and cost-effective.

Infrequent Traveller

15%

Urban Riders

Opportunities for sharing and affordable 'non-local' travel.

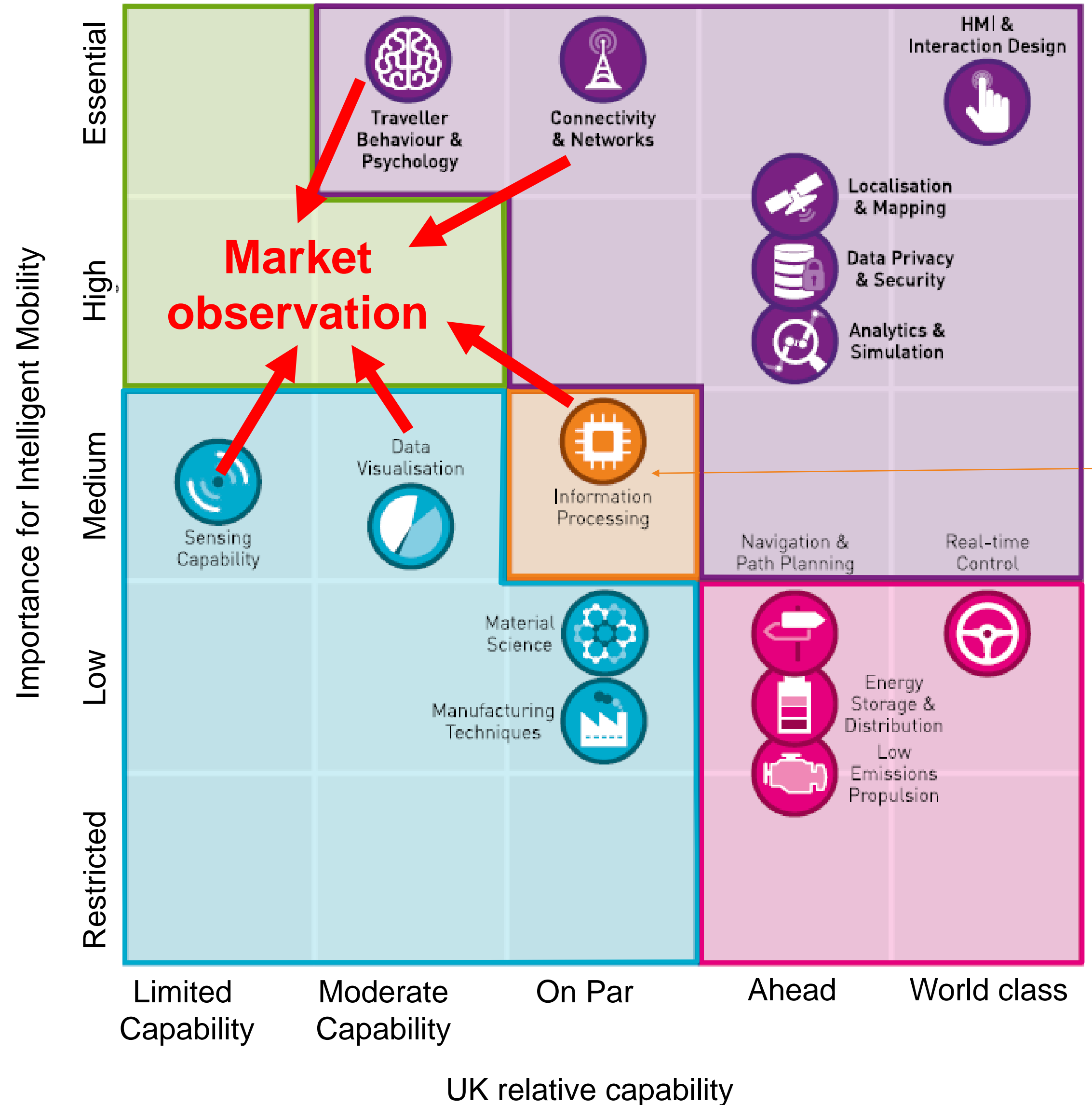


Driving experience and Context aware information services would benefit these users



Capability priorities

Collaborate with other countries

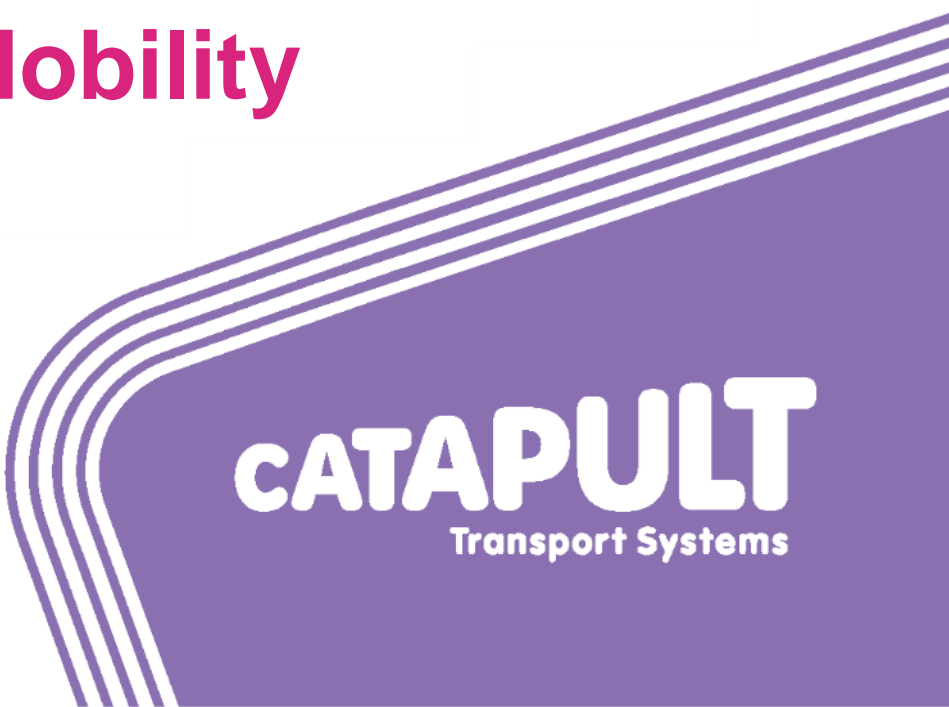


Priority developments

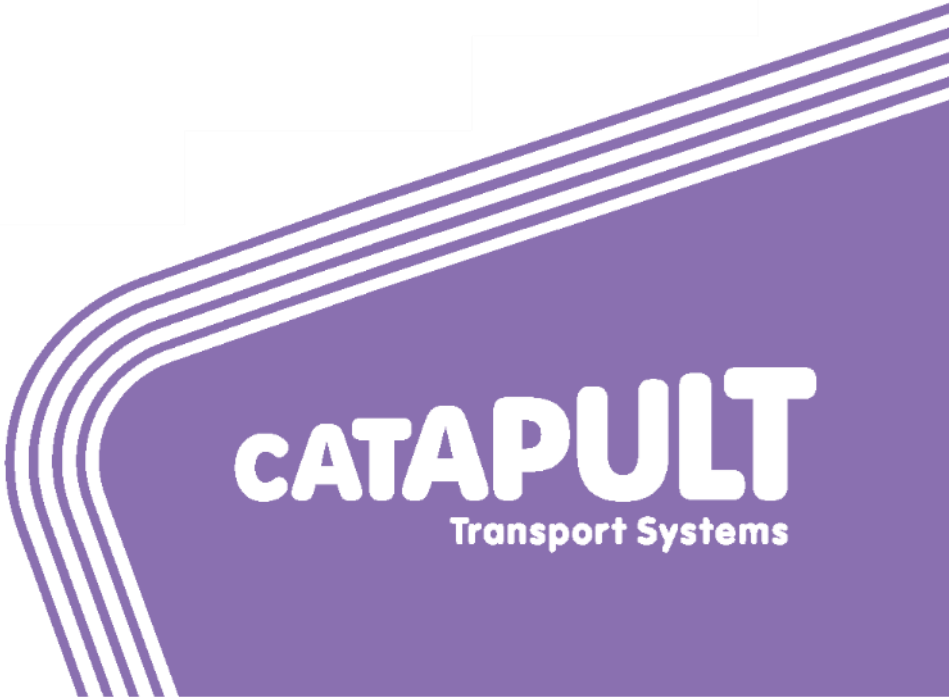
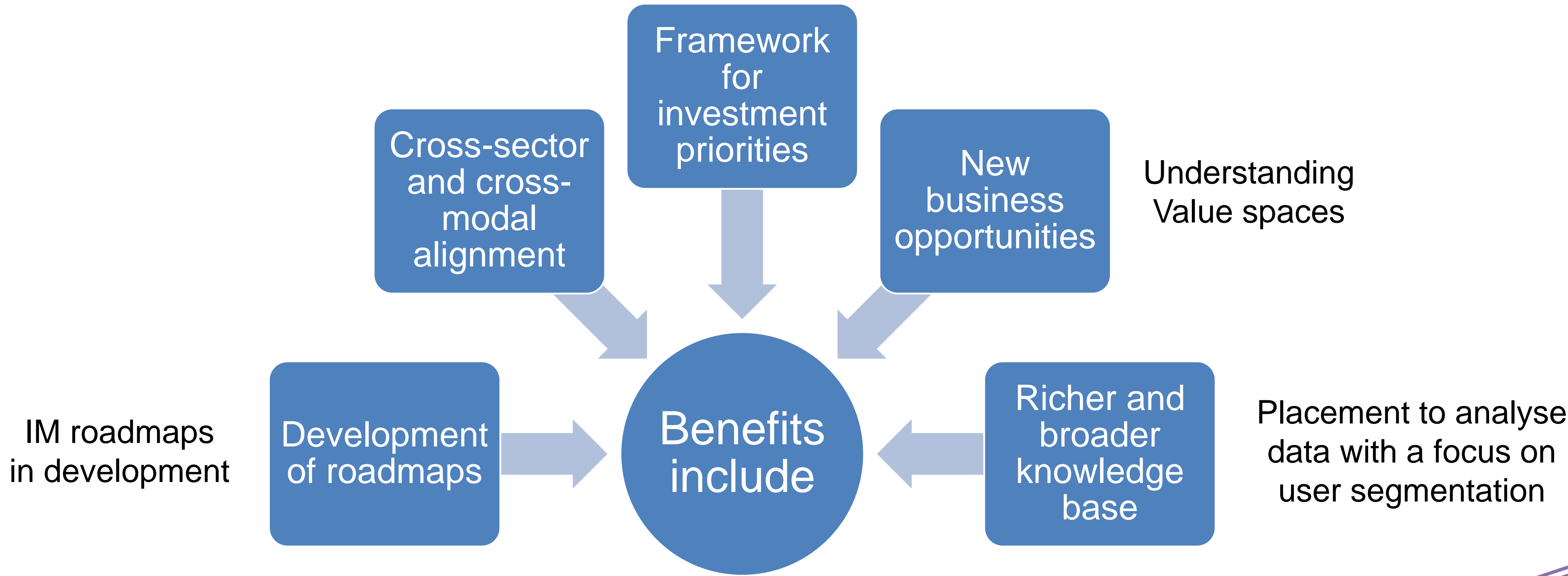
Potential developments

Not focussed on Intelligent Mobility

Lower priority developments



Next steps for the study...



Station Innovation

PHASE 1 – Preliminary investigation

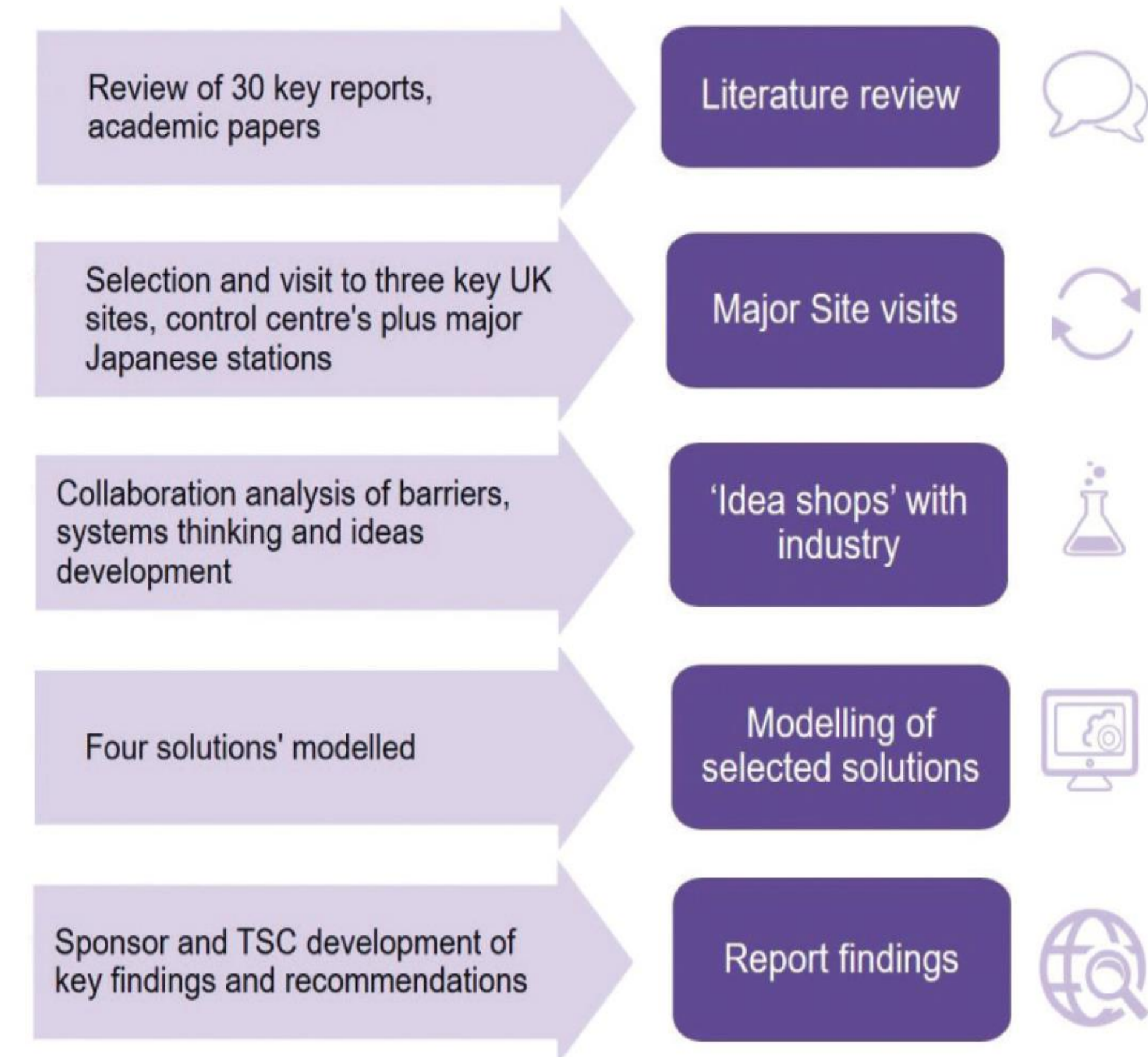
Main Objectives:

- Audit of access, movements and station-train interfaces
- Generate a set of options through ideas shops
- Identify barriers to innovation for further capacity improvement
- Low fidelity pedestrian modelling of potential options
- Create an on-line portfolio of high impact SMEs;
- Recommend actions from short- to long-term.

Challenges identified

- *Reducing constraints from congestion and lack of speed*
- *Reducing conflicting flows to increase capacity and movement*
- *Minimising obstacles which block movement*
- *Is industry innovation rapid enough compared to passenger needs?*

Overall approach



Station Innovation

PHASE 2 – Pilot and trials of solutions from Phase 1

Main Objectives:

- Establishment of Pilot Station **Milton Keynes Central**
 - Pedestrian Tracking and Carriage Occupancy Technology Pilots **Sensors technology commissioned**
- Passenger flow optimised rail time table and platform allocation
 - Operational Trials and Customer Experience Innovation
 - Connected and Autonomous Vehicles Impact on future station design



**Prototype
VR station**

INNOVATION GRANTS

- **Transport Technology Innovation Grants (T-TRIG)**

Competition run in collaboration with the DfT to fund (via the means of a grant worth up to £25,000) innovative transport research ideas that will help progress the industry within the UK and beyond. TSC had a coordination and evaluation role.

<https://www.dft.gov.uk/innovation-grants/>

- **ALSTOM Challenge**

The Rail Grand Challenge competition will have a prize of up to £50,000 to help an SME develop their idea or product.

The winner will also have the opportunity to work with Alstom to see their concept realised and in use on the railway network.

<https://ts.catapult.org.uk/news-events-gallery/news/the-tsc-and-alstom-launch-the-rail-grand-challenge-for-uk-smes/>

<https://ts.catapult.org.uk/you-us/open-calls-space/>

Conclusions

TSC has been designed to accelerating the impact of transport research and innovation initiatives by embracing challenges and turn into bigger opportunities

Develop shared knowledge building on travellers value, experience and needs

After 2 years TSC has demonstrated, through several case studies, that can make a big impact to transport innovation

TSC is open to provide support and share the experience gathered so far to develop new national and international initiatives

**Other excellence exist within the United Nations community,
..... **Transport Research and Innovation HUB!****



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