

# FUTURE CITIES CATAPULT

## INNOVATION INSIGHTS & METHODOLOGIES



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SME Programme Lead  
JULY 2017



WE ARE  
FUTURE CITIES  
CATAPULT

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# Multidisciplinary Team

SERVICE DESIGNER

CULTURAL ANTHROPOLOGIST

CREATIVE TECHNOLOGIST

DATA SCIENTIST

DIGITAL ECONOMIST

DIGITAL DESIGNER

PLANNER

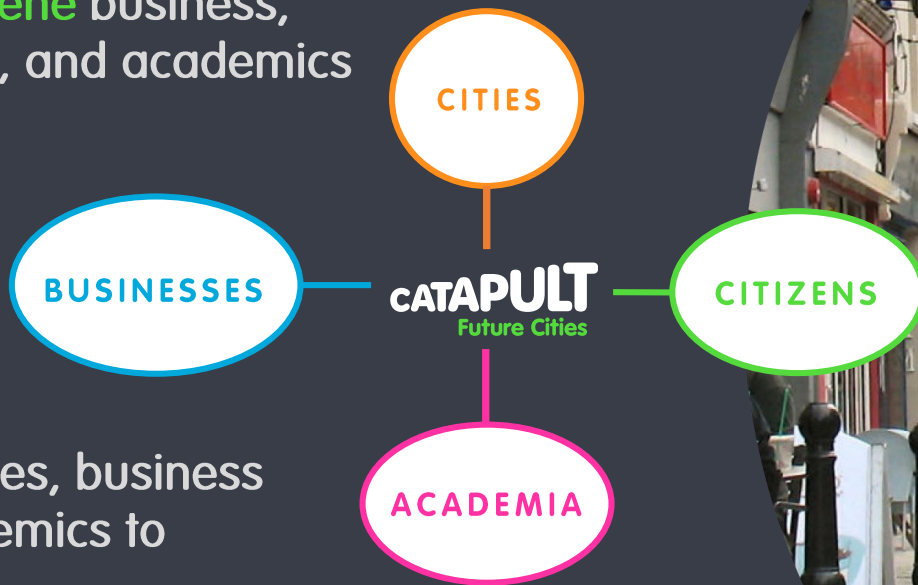
PROTOTYPER

FRONT END DEVELOPER

BACK END DEVELOPER

# HOW WE WORK

**Convene** business, cities, and academics



**Enable** cities, business and academics to innovate

**Accelerate** the development of innovative solutions



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# How are we structured to deliver Innovation?

## **BUSINESS DEVELOPEMENT**

Understanding the city  
market and bringing in  
new opportunities

## **OPERATIONS**

Ensuring delivery of  
projects by establishing  
the right mechanisms

## **THE LAB**

Developing and testing  
new ideas and  
delivering projects

## **SME PROGRAMME**

Supporting HGP SMEs in their journey for growth

# THE LAB – THREE CORE CAPABILITIES

## CITY STRATEGIES

Implementing plans and **Standards** built on market analysis and technology scanning

## CONNECTED CITIES

Co-creation and user-centric design  
+  
technology deployment, testing and experimentation

## URBAN DATA

Urban modelling, data visualisation and advanced analysis  
+  
economic, financial, social and environmental impact measurement



City Standards

*Standardisation supports the market by **creating consistency** in the reference points used by all city stakeholders, thereby instilling the **confidence** required to de-risk investment in advanced urban services that ultimately enables solutions to be **deployed in multiple cities***



# Standards of many flavours

## Strategic level

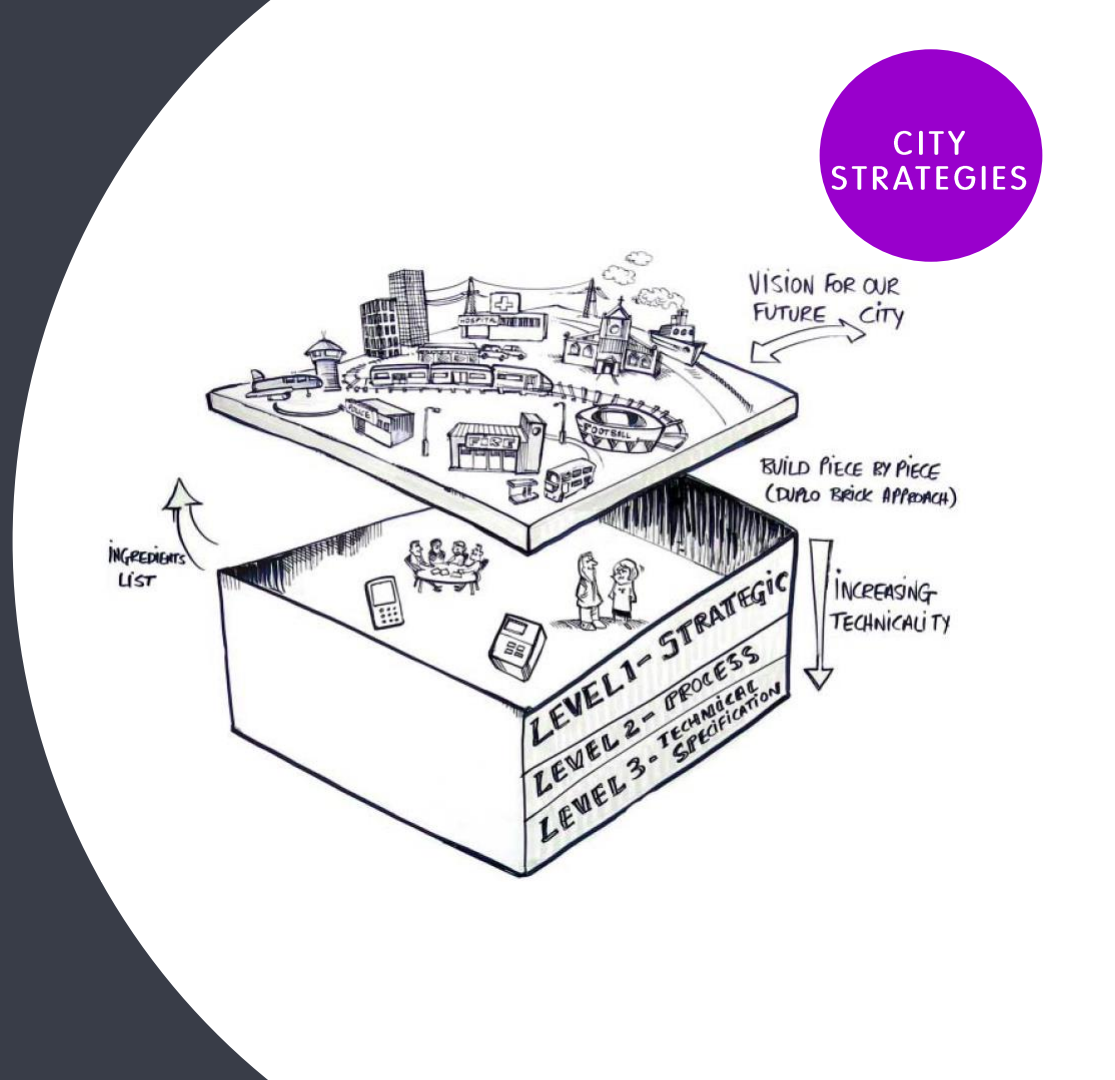
Decision-making frameworks for city strategies

## Process level

Guidance for data sharing process and project planning processes

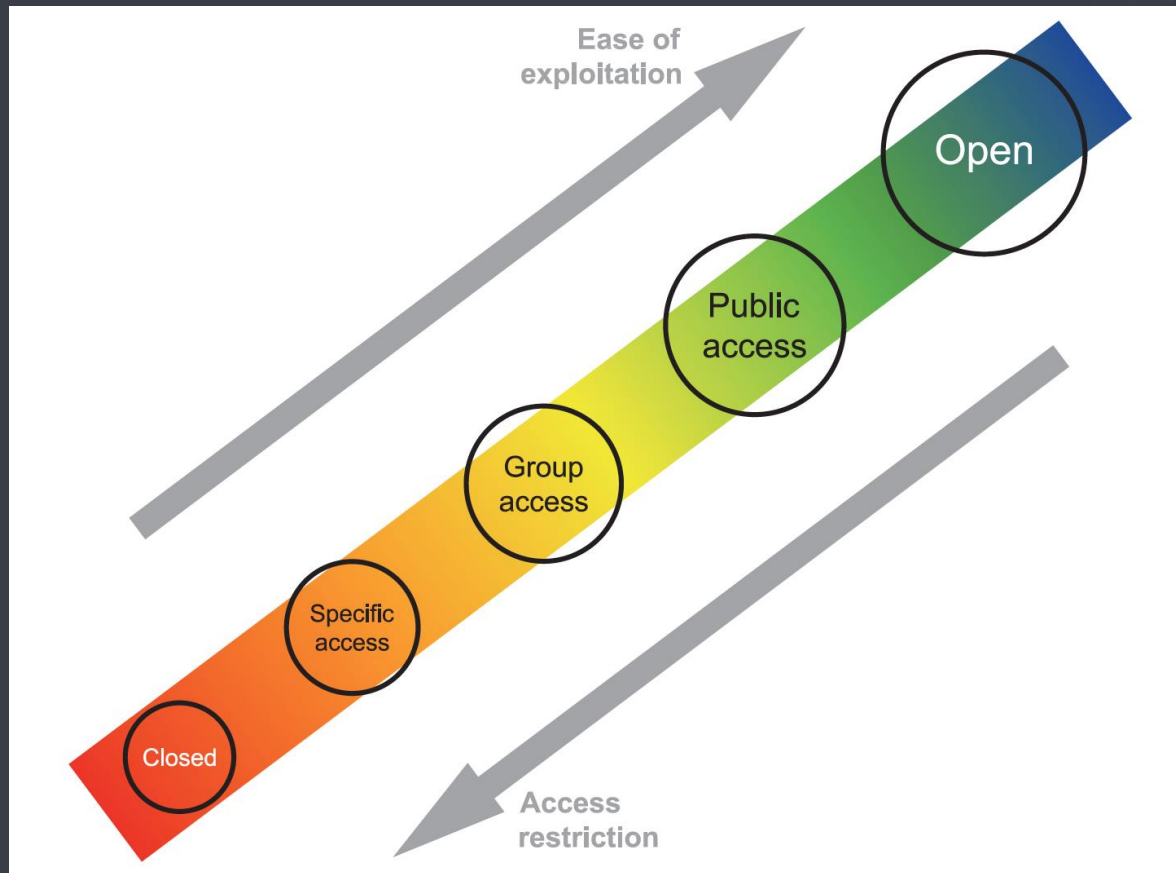
## Technical level

Data standards for interoperability between system and services



# BSI PAS 183:

Guide to establishing a decision making framework for sharing data and information services



# SYNCHRONICITY

## A Global Digital Single Market for IoT-enabled Urban Services

20 m€ (3 m€ Open Call); 34 partners; 11 countries; 33 months

**Core cities:** Antwerp (BE), Eindhoven (NL), Helsinki (FI), Manchester (UK), Milan (IT), Porto (PT), Santander (ES), Carouge (CH)

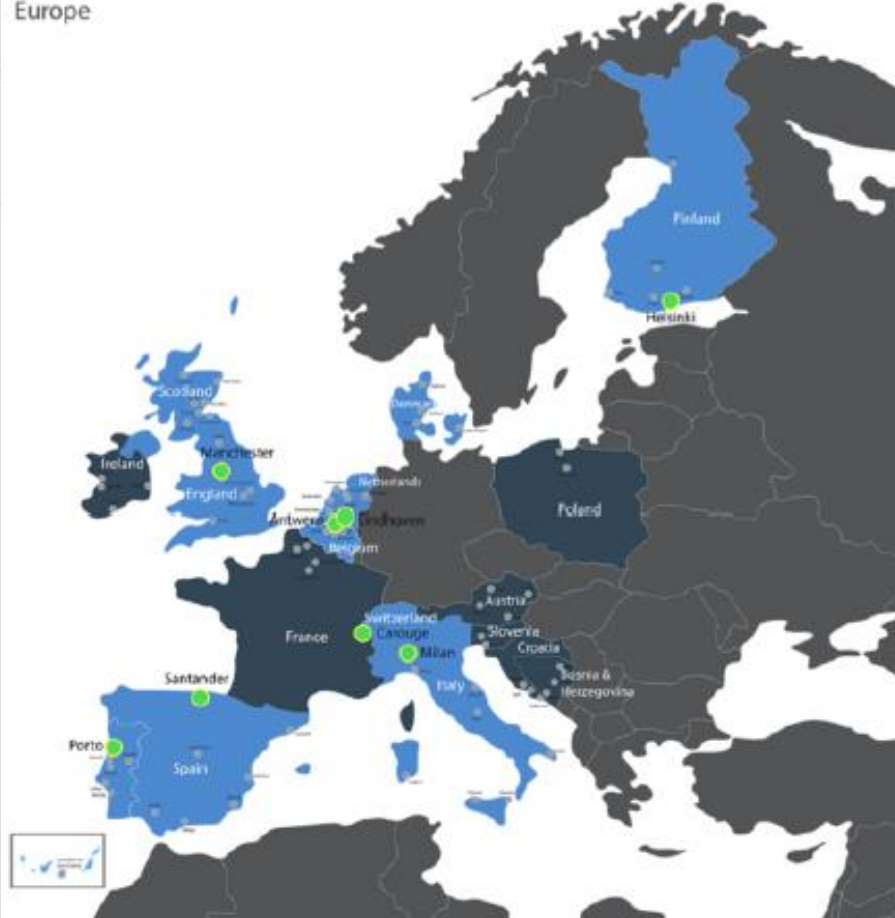
**Linked cities:** León (Mexico), Seongnam (Korea), Portland (USA)

**Leveraging:** Open & Agile Smart Cities (OASC)

## Americas



## Europe



## South Korea



## Oceania



-  Directly involved regions
-  Other OASC regions (potential replicants)
-  Directly involved cities
-  Other OASC Cities (potential replicants)

# SERVICE DESIGN AND USER RESEARCH

Putting yourself in other's people shoes



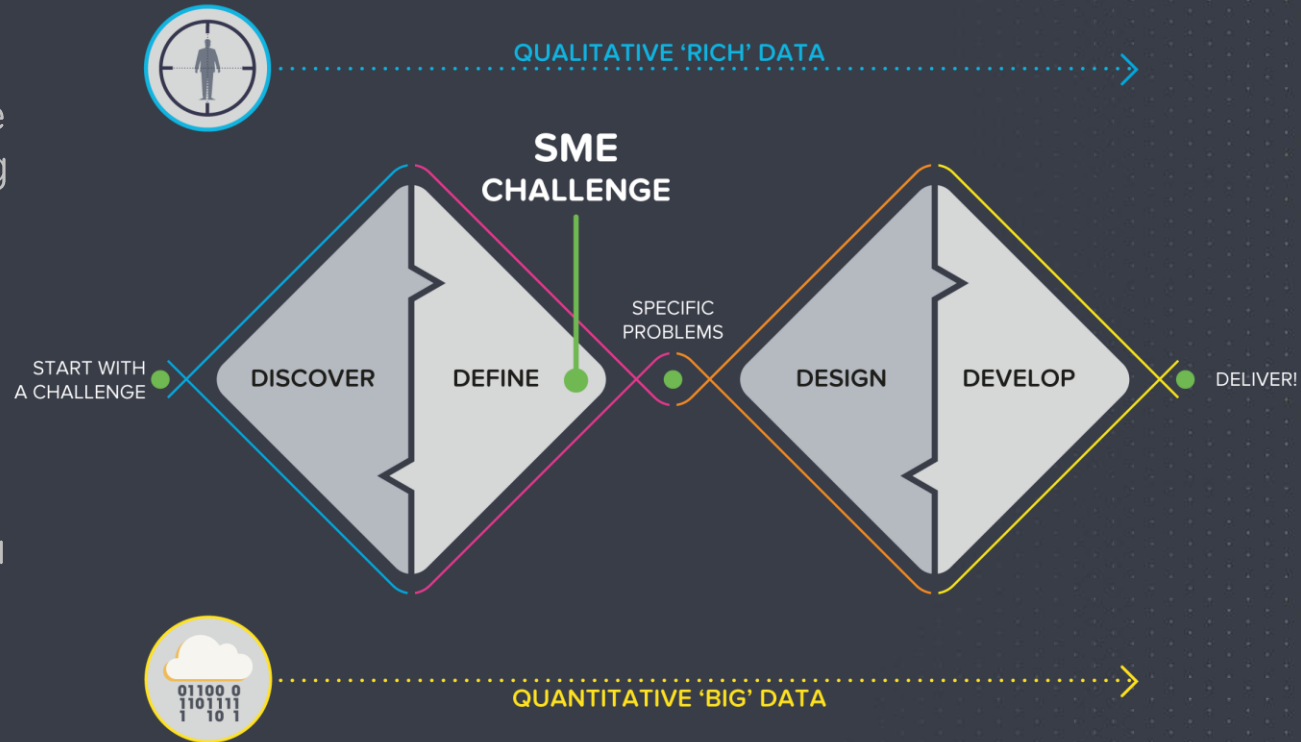
A photograph of a group of people seated at desks in a classroom or meeting room. The room has a dark red wall with a pattern of small green dots. A large, dark blue circular overlay is centered in the image, containing the text "Now it's your turn!". The text is in a white, sans-serif font. Two thin blue horizontal lines are positioned above and below the text within the circle. The people in the background are looking in various directions, some towards the camera and others away. The desks have papers and other items on them. The overall atmosphere is that of a professional or educational gathering.

Now it's your turn!

# The **double-diamond** design process

The double diamond maps the divergent and convergent stages of the design process, showing the different modes of thinking that designers use.

We will include quantitative 'big' data and qualitative 'rich' data throughout the process.

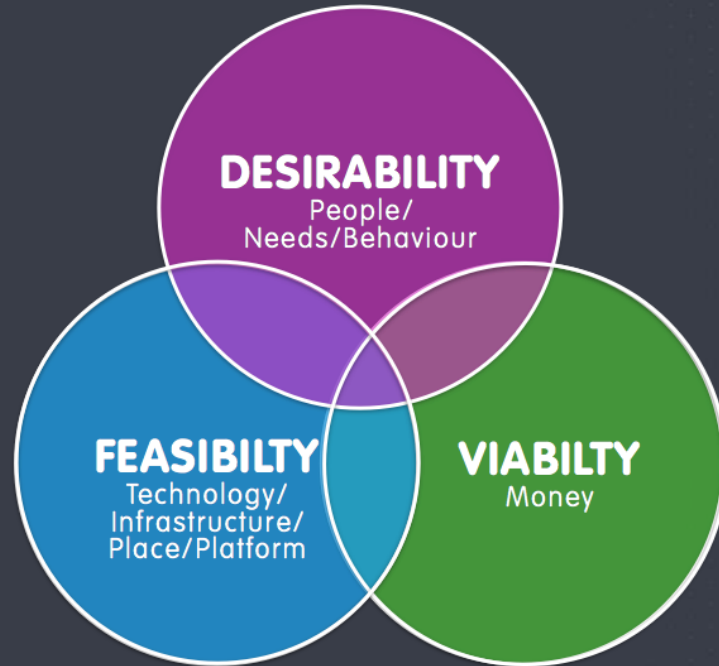


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# Why should we always do **user research?**

Innovating new services and designing for behaviour change requires a balanced approach.


If people don't want / embrace / use your idea, it won't be successful.





An aerial, high-angle view of a modern, planned city in a desert environment. The city features a grid-like layout of buildings, roads, and green spaces. Several large, white, cylindrical water towers are scattered throughout the urban landscape. In the foreground and middle ground, there are extensive solar panel arrays. The city is surrounded by arid, brownish terrain. A large, dark blue circular graphic is overlaid in the center of the image, containing white text. Two thin blue horizontal lines are positioned above and below the text within the circle. The overall scene is brightly lit, suggesting a sunny day.

**BUILD IT AND  
THEY WILL USE IT  
DOESN'T ALWAYS  
WORK**

A photograph of a park with a paved path, green grass, and trees. A dark blue circle is overlaid in the center, containing white text. The circle is decorated with a grid of small green dots and has two horizontal blue lines above and below the text.

**BUILD IT AND  
THEY WILL USE IT  
DOESN'T ALWAYS  
WORK**

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Discovery is **NOT**  
about asking users  
what they want

Do you want  
this <thing  
that we want  
to make>?

What do  
you want?

?



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**People** don't  
always do  
what they say,  
say what they  
think or act  
how they feel.



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# It **IS** about finding out...



WHO ARE YOUR USERS?  
WHAT ARE THEY LIKE? WHERE  
ARE THEY LOCATED?



HOW WELL IS THE  
CURRENT SITUATION  
WORKING FOR THEM?



WHAT ARE THEIR NEEDS? WHAT  
ARE YOUR USERS CURRENTLY  
DOING TO MEET THOSE NEEDS?

# Advantages of user research



Starting with  
People has  
many advantages



Projects can be  
**better tailored** to  
what citizens and  
stakeholders  
**really want**



Citizens and  
stakeholders will have  
**better buy-in and  
acceptance** of the  
service/offer/product



It will **save the city  
time and money**,  
increasing return on  
investment



People running and  
enabling a smart  
city will have  
**achieved greater  
impact**



# CASE STUDY

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# LIFE

The Life First Emergency Traffic Control (LIFE) project aims to reduce the time taken by ambulances to reach critically ill patients

The project is funded by Innovate UK, and delivered by FCC in partnership with Red Ninja, the Transport Systems Catapult and DINNIQ

Our role is to identify the main issues around delays, so we can accurately define the challenge and shape a suitable response.





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# Using different research methods



SURVEYS



DIARY  
STUDIES



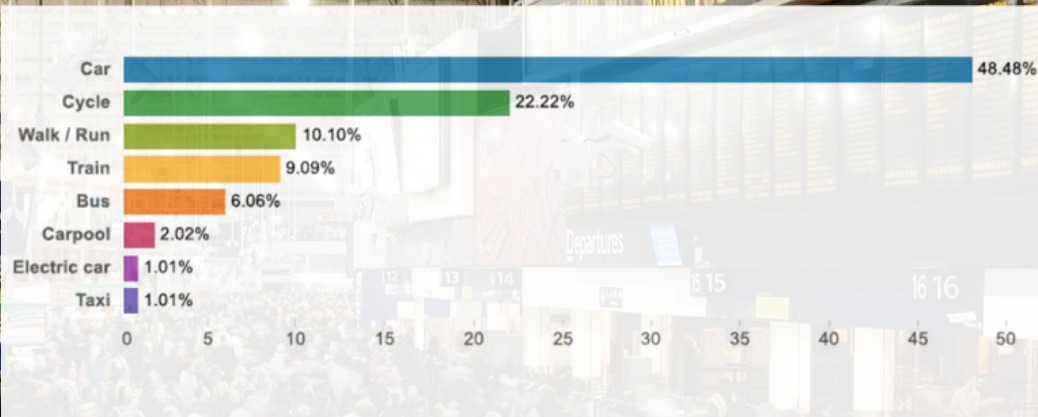
INTERVIEWS



WORKSHOPS



OBSERVATION



Types of research:  
**Surveys**



The baby slept through the night! I feel like I'm reborn from the ashes. Sleep is so fundamental for health and wellbeing. Then my husband took her in the morning and I slept till 10. Both were so tired from all the playing they fell

asleep. physical and more Olympic Only last was fun latter ma Funnily, remainir the pros good ph I'm attac

# Types of research: Diary study



Photos: chillout in a cafe, healthy way (green tea) and naughty way (coffee and brownie)



Photos from today:  
The lovely calming Waterglades  
The part of East village filled with cafes  
My Greek lunch (vegan babaganoush) and my pink shoes - they are all funky and looking at them motivates me to exercise too





Types of  
research:  
**One-on-one  
interviews**

Types of research:  
**Workshop engagement**





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Types of  
research:  
**Participant  
observation**

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# Collaborative analysis

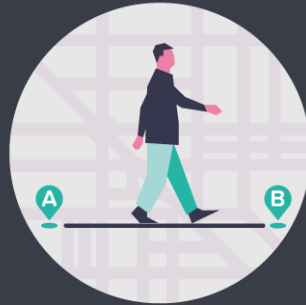


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# Creating deliverables that fit the purpose of the research



PERSONAS



USER  
SCENARIO



PAINPOINTS &  
OPPORTUNITIES



FILMS





# CASE STUDY

# Enabling Smart Cities in Brazil

Belo Horizonte



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# Belo Horizonte

Belo Horizonte is one of the largest cities in Brazil, with one of the most populous metropolitan areas of the country.



# Problems (user's perspective)

Main issues:

- Overcrowding
- Long waiting times at the bus stops
- Inaccurate schedules
- Safety





**ALINE (35)**

Secretary

Most used transport type:

85%



15%



**EMERSON (32)**

Teacher

Most used transport type:

50%



50%



**IRENE (66)**

Retired/Accessibility needs

Most used transport type:

60%



40%



**MAGDALENA (61)**

Psychologist/Professor

Most used transport type:

100%



**ALISON (30)**

Analyst / Uber driver

Most used transport type:

25%



75%



**GERALDO (55)**

Insurance broker

Most used transport type:

100%



**CELINA (44)**

Private nurse / caretaker

Most used transport type:

57%



43%



**HELAINÉ (36)**

Retired/Accessibility needs

Most used transport type:

80%



20%



**LAILA (23)**

Student

Most used transport type:

46%



23%



31%



**MELCHIADES (53)**

Municipal employee

Most used transport type:

45%



45%



10%



**PAULO (48)**

Municipal employee

Most used transport type:

79%



16%



5%



**RAFAEL (22)**

Hotel receptionist/Student

Most used transport type:

50%



50%



**RICARDO (50)**

Retired/Community leader

Most used transport type:

100%



**VANESSA (29)**

House keeper

Most used transport type:

88%

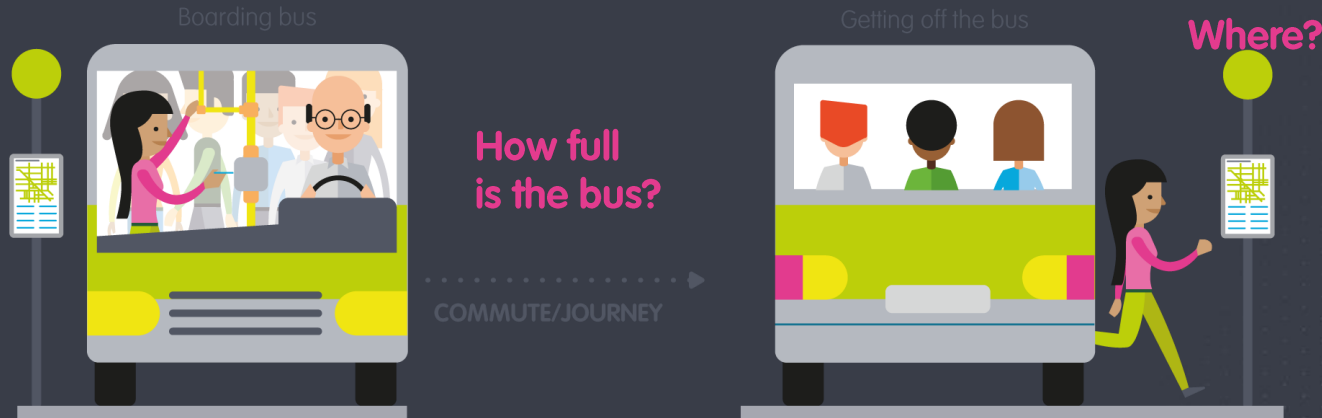


11%



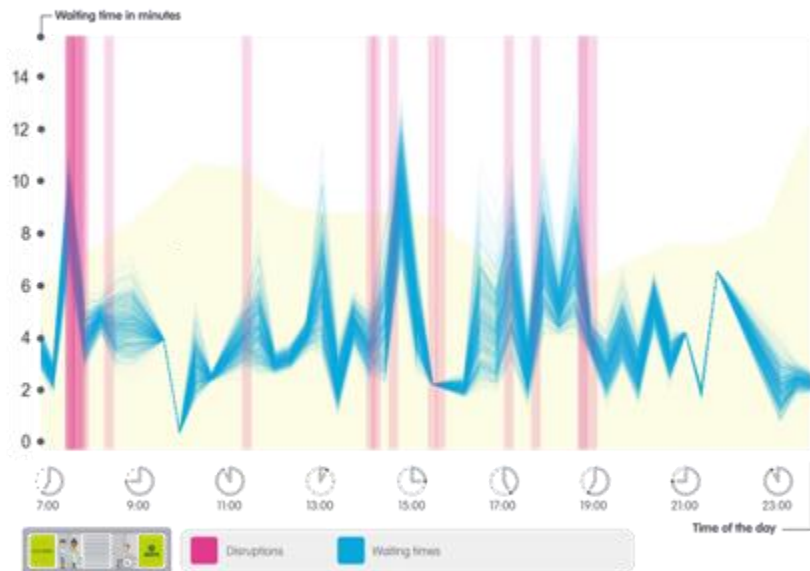
# Problems (BHTrans perspective)

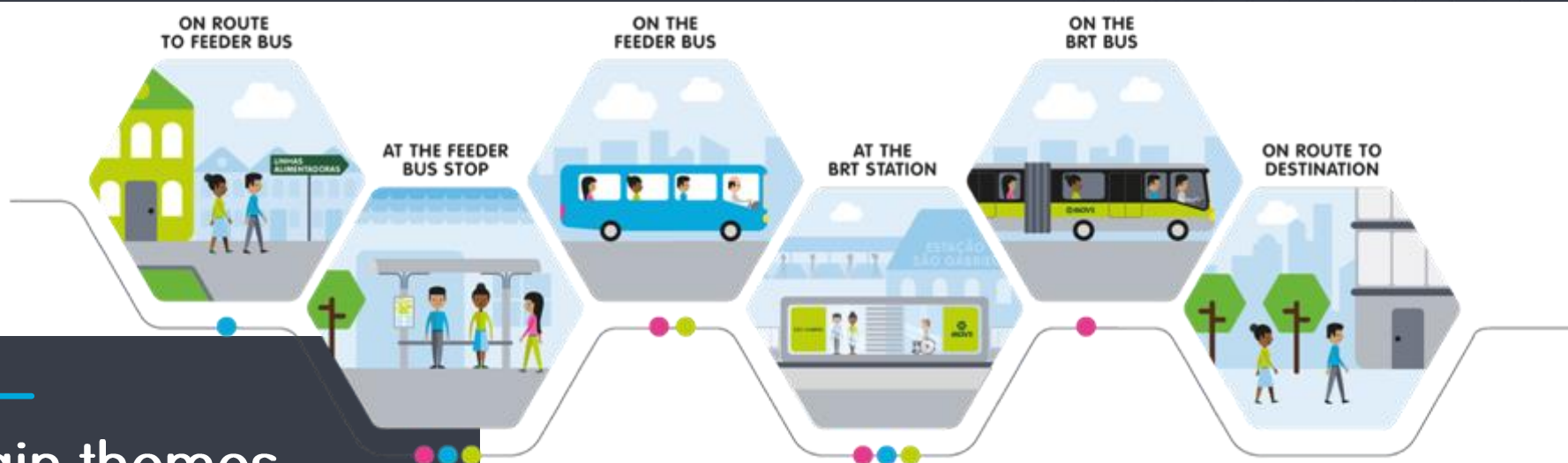
- The SITBUS system is an entry only system – we don't know where people gets off the bus, how far they travel, and how full the buses are, etc.
- The SITBUS (data) is locked-in to a 3<sup>rd</sup> party organisation - difficult to improve t bus service or respond to overcrowding



# INTERACTING WITH THE BUS

Waiting at the bus stop





## Main themes discovered

Most popular purpose of travel is commuting to work

- 1) Interchanging transportation means
- 2) Exchange of information
- 3) Experiences while waiting at the bus stop or transferring



**INFORMATION INSIGHTS**



**REACHING FOR THE BUS INSIGHTS**



**INTERACTING WITH THE BUS INSIGHTS**



In our report “Enabling Smart Cities in Brazil – Belo Horizonte BRT Service Journey”, we offered six recommendations. Four of those recommendations can potentially be addressed by innovative services offered by two SMEs. Their solutions specifically target the two major customer concerns: **overcrowding buses** and **excessive wait time at bus stops**.

## Recommended solutions based on challenges

1. **Improve the punctuality and regularity of bus service in real time, particularly during disruptions**
2. Enabling more direct access to MOVE BRT network
3. **Monitoring or estimating bus occupancy**
4. **Communicating information to the users related to the operational status of bus network through the right channels**
5. Improving and analysing customer feedback
6. **Enabling seamless navigation inside Sao Gabriel station as well as enhancing the user experience inside the station**

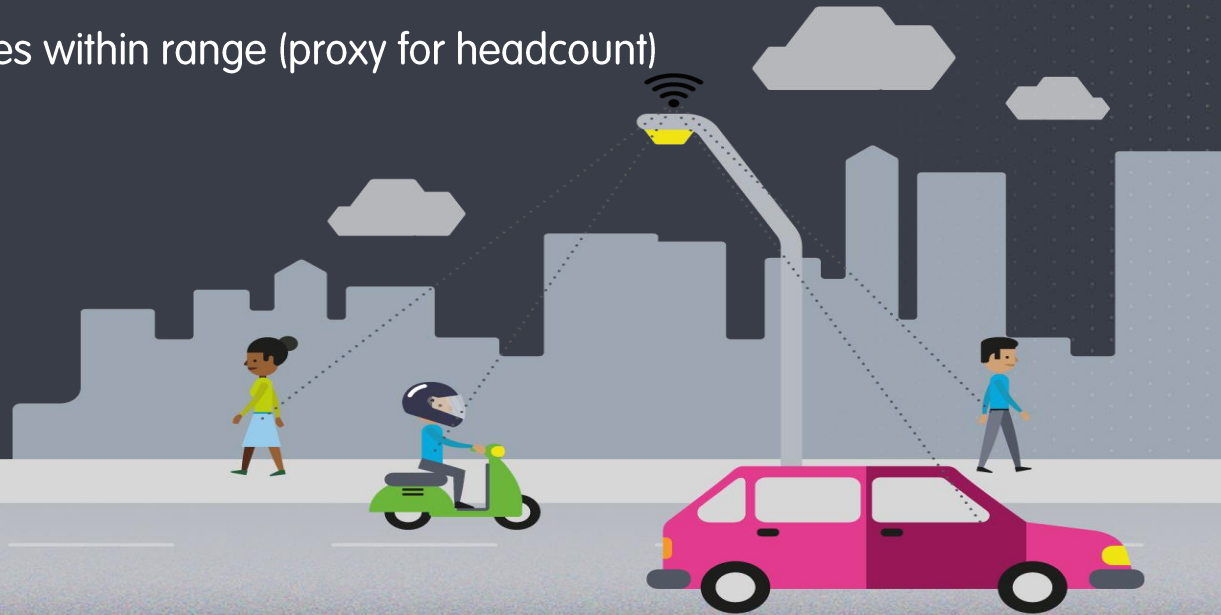


# SME 1 : Red Ninja

Red Ninja offers to use sensors to detect the movement of people within an area (e.g. Sao Gabriel station). The sensors detect wifi-signals from mobile devices and can register their MAC addresses. It provides a cost effective way to count the number of mobile devices in areas within 150 m of the sensors.

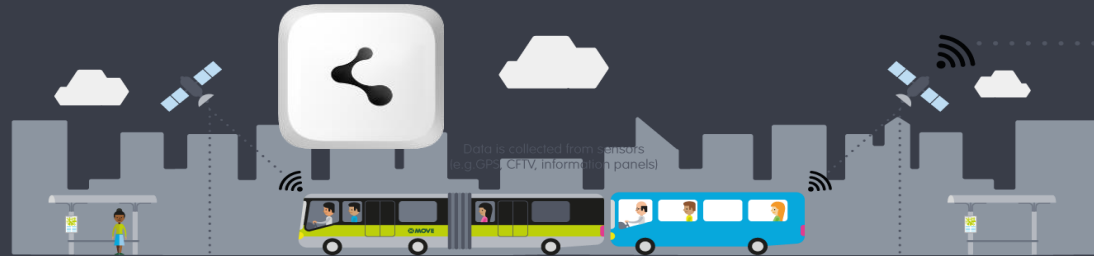
## Data collected:

- Number of wifi-enabled devices within range (proxy for headcount)
- People movement
- Dwell time
- Air quality (optional)
- Noise level (optional)



## SME 2 : Corethree

CoreThree proposes to install bluetooth beacons on buses to monitor occupancy levels. The beacons will pick up mobile devices that have bluetooth turned on. The occupancy data will then be transmitted to the cloud, and shared on mobile apps for passengers to better plan their journeys.

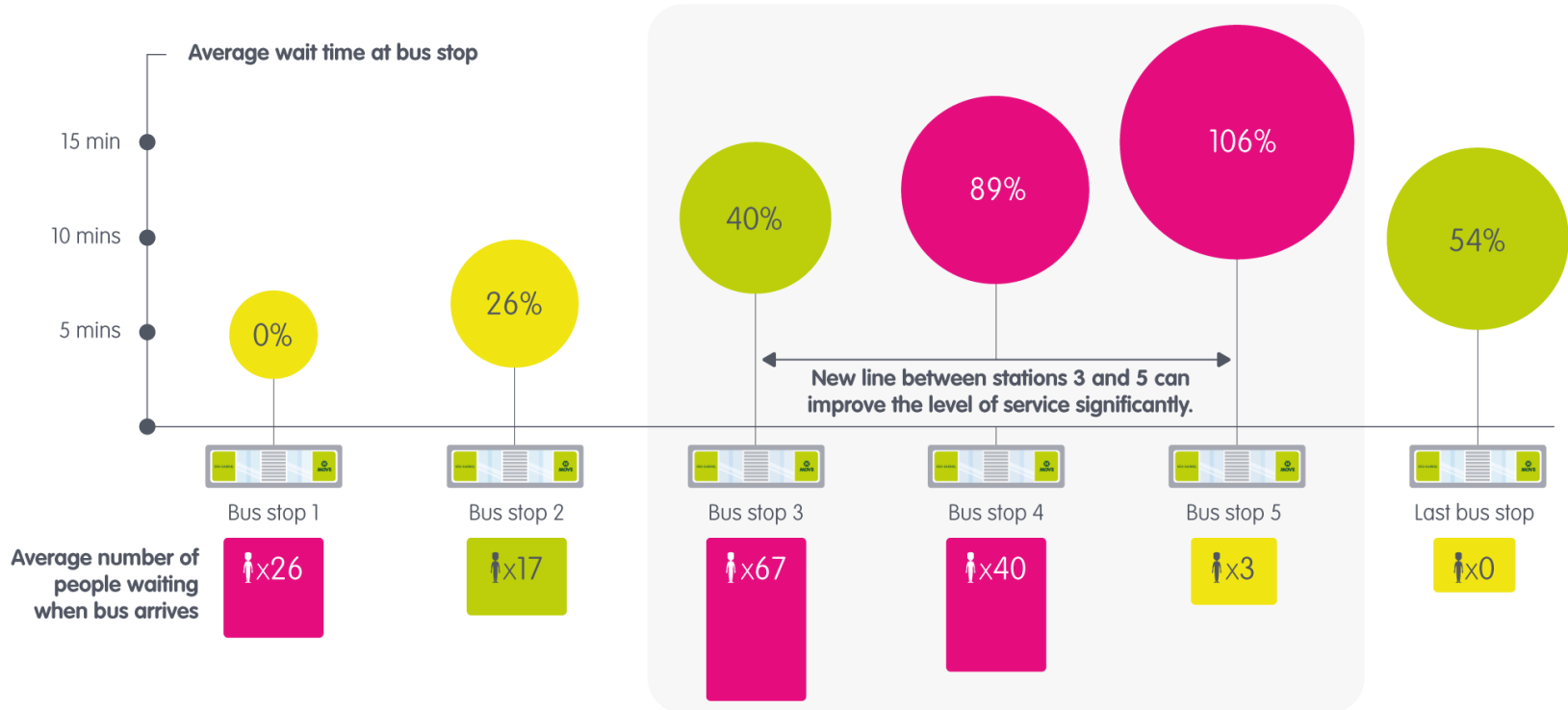


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1011001100011010010110101001110101011  
11010001000001010101000101010100010100  
00101101101010110101011110100010000010  
10101001010101000101000010110110101010  
100000101010100101010101011101001110
```

Data collected:  
Number of bluetooth-enabled device within range (proxy for headcount) on buses.

# Hypothetical Scenario: Potential BHTrans Interventions

Percentage and circle size denote actual occupancy level



# Estimating Benefits from Shorter Wait Time

Value of Time in Belo Horizonte

R\$ 3/hr

R\$ 4.5/hr

R\$ 10/hr



**COMMUTING**



**WAITING/WALKING**



**WORKING**

FCC estimates based on Belo Horizonte avg. monthly disposable income of R\$1590 and World Bank guidelines.

# Quantifying benefits

Estimated benefit due to reduced wait time at MOVE BRT stops

Parameter	Conservative	Medium	Optimistic
% of passengers benefiting from the pilot programme	5%	10%	15%
% of wait time saved	20%	30%	50%
% of saved wait time occurs while at work.	5%	10%	15%
% of saved wait time occurs while commuting to/from work (non-work hours).	95%	90%	85%
Total annual benefits (R\$)	428,000	1,336,000	3,470,000

# TIPS AND RECOMMENDATIONS

- **SMART** should stop talking to SMART and start talking with **PEOPLE and CITY**
- **Multi-disciplinary** and **multi-cultural** environments pays-off
- Use **Service Design** approach from the very beginning
- Use a **user-centric** approach – empathy
- Involve people who are relevant to your product/service into the development of the solution – **Co-create**

END