

Presentation by

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***What will the urban freight system look like in 2040?
Innovative and co-design solutions to shape freight transport
systems of the future: a participatory process.***

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Outline

- Introduction
- Background: transport system of the future
- Stakeholder Engagement
- Methodology: co-design with participatory process
- Results
- Comparison: Bristol vs Smartfusion
- Conclusion

Transport system of the future

Introduction

EXPECTATIONS...



To what extent is this true?

Last Mile Deliveries: the most expensive, least efficient and most polluting leg of the whole supply chain (Gevaers et al., 2014).

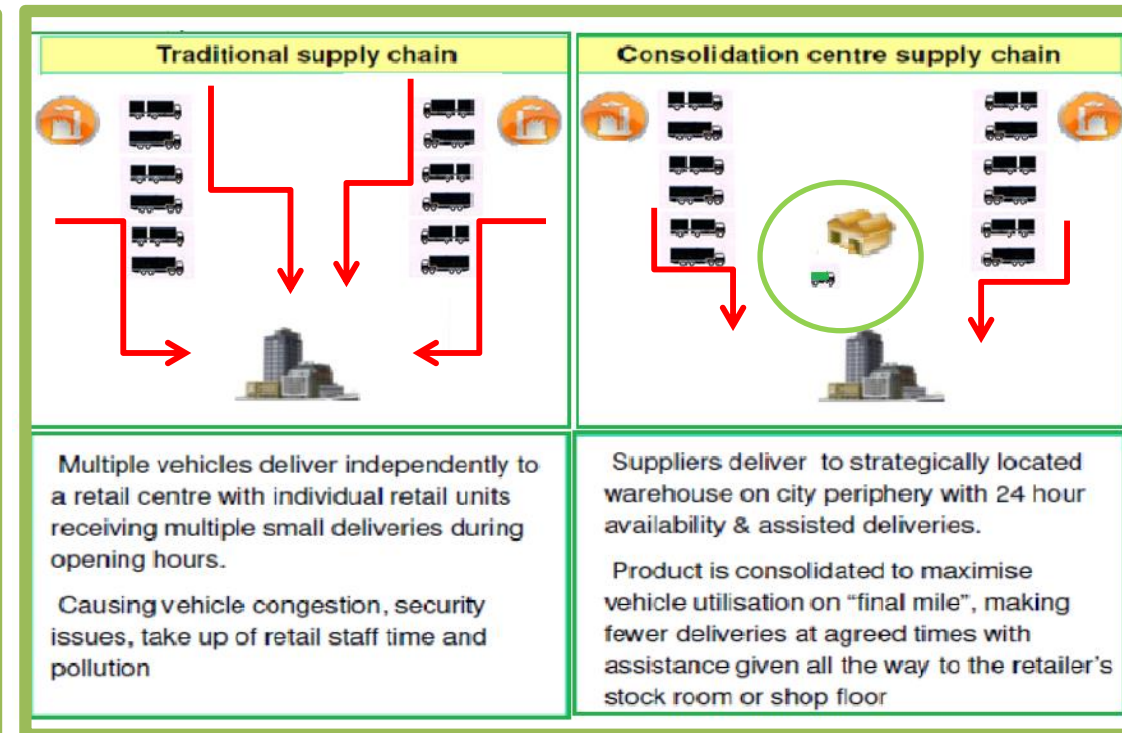
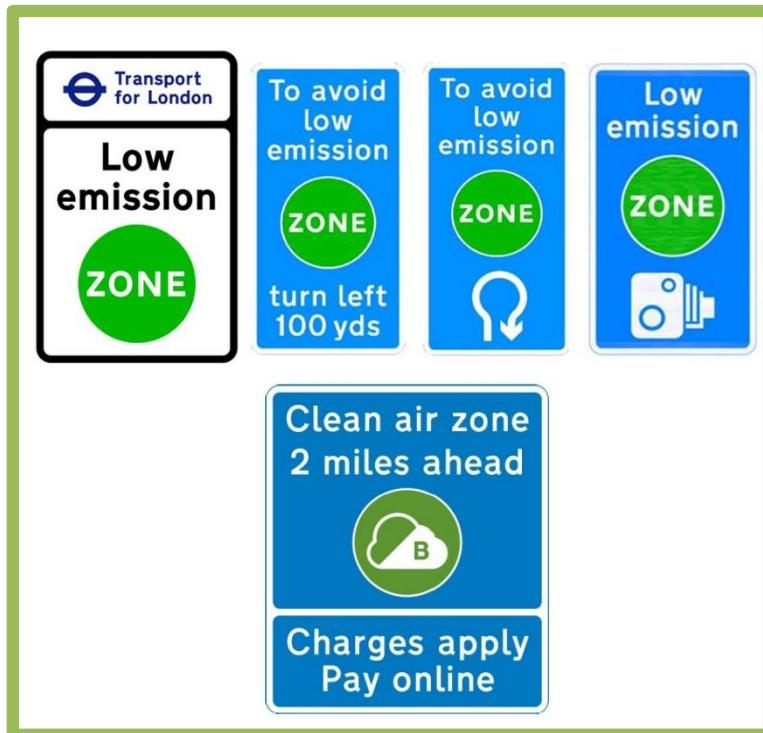
Autonomous vehicles, drones and 3D printing: potential future solutions to reduce urban congestion and air pollution, whilst at the same time improving safety (Paddeu et al. 2019).

But...

Technology development & testing?

Policy Implications?

1. Reducing n. delivery vehicles - Low Emission Zone/ Clear Air Zone, UCC, pack-station

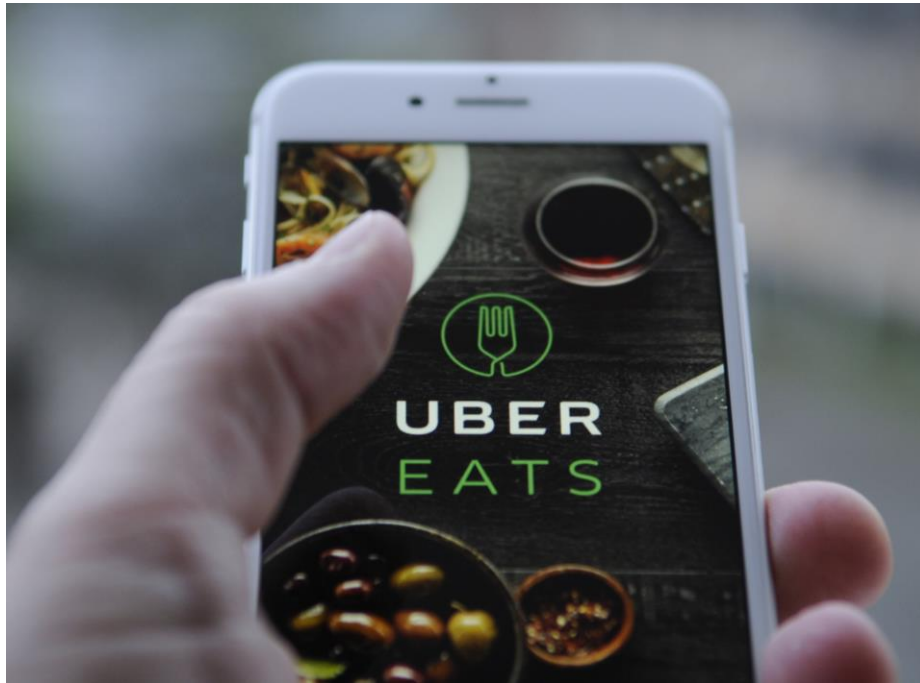


2. Reducing (impact of) Polluting Emissions - Electric Vehicles, bike cargo, tricycle, night deliveries

Introduction
Solutions



3. Sharing - Crowd Shipping, Uber for goods (e.g. Uber eats), virtual/on-demand delivery platform



In the future?

4. Autonomous Vehicles – Driverless

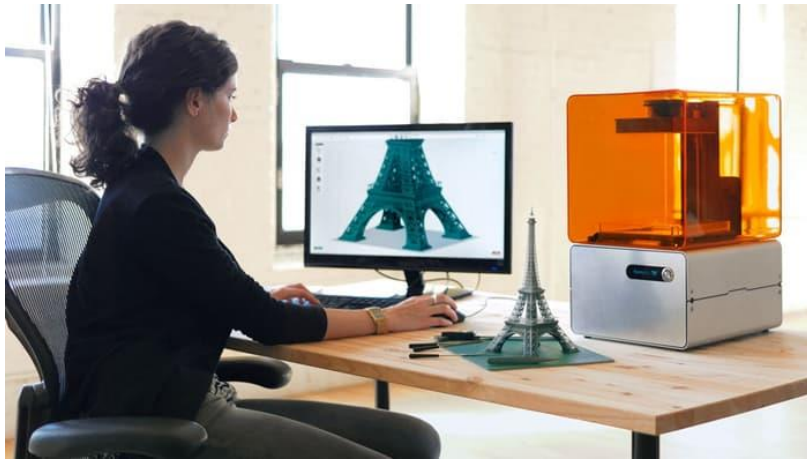
Pods, robots

Introduction
Solutions

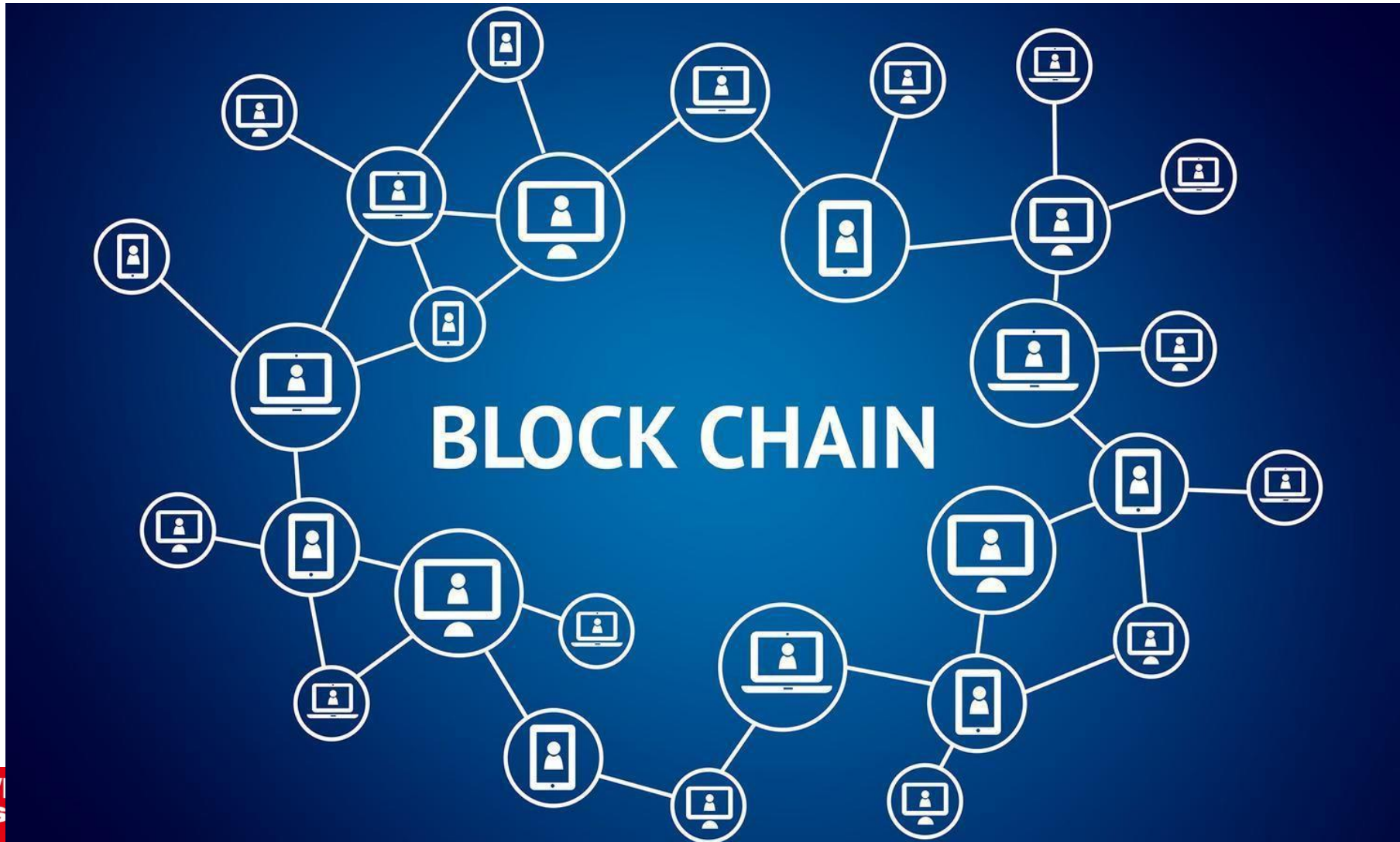


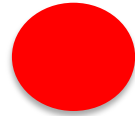
5. Reducing n. road vehicles – Drones, 3D printing

Introduction
Solutions



6. Network optimisation – routing, “now-casting”, IT, Block-chain





Main barriers:

- Resistance from stakeholders
 - Users' acceptance



Key factors to support LA:

- Stakeholders' collaboration
- Behaviour change

[Holguin-Veras et al, 2017; Sanchez-Diaz & Browne, 2018]

How to design workable city logistics schemes?

How to make them acceptable and viable?

Stakeholder Engagement



Urban freight transport policies – workable approaches

LA:

- **Refers** to National and European goals - reduction of polluting emissions, congestion, and increased road safety (Fossheim and Andersen, 2017).
- **Design** a range of targeted policy measures, which might be opposed by citizens and/or businesses.

Most common measures applied in Europe:

- Traffic restrictions (Quak, 2008).
- Time windows (Dablanc, 2008).
- Low emission zones (Ellison et al. 2013).
- Consolidation & coordination of city logistics measures, e.g. best practices (Zunder et al. 2016).

Urban freight transport policies – workable approaches



When and why do they **fail**?

- **Lack of communication** with stakeholders (Zunder et al, 2014; Akgün et al., 2019)
- Inability to **identify** and **select** the most effective policy measures
- **No integration** with the overall transport system.



What does their **successful** implementation depend on?

- **Stakeholder engagement**
- **User's acceptance**

[Lebau et al., 2018]

Stakeholder Engagement

- **Online Forums** [OECD, 2003; Quak et al., 2015].
- In the UK: **Freight Partnership** [Browne et al., 2005].
- **Design and Monitoring Framework** (DMF) [Zunder et al., 2014].
- **MAMCA** [Macharis, 2007], bottom-up approach.

However, the set of alternatives is not designed by the stakeholders, who are rather asked to evaluate a set of scenarios designed and proposed by the research group.

'CO-PRODUCTION'

i.e. a deep and broad participatory process to identifying, scoping, and undertaking an initial assessment of future collaborative sustainable and innovative urban freight solutions, including new technologies, automation and driverless delivery vehicles.



Research Question

“What are the needs and expectations of stakeholders in respect of future, more sustainable, urban freight transport”?

- Stakeholder Engagement Workshops (SEWs), Bristol (UK) in January 2019.

Future innovative services.

- Workshops, Newcastle (UK) in 2012-2013 + extra interview with key stakeholders who were involved with the process then in January 2019.

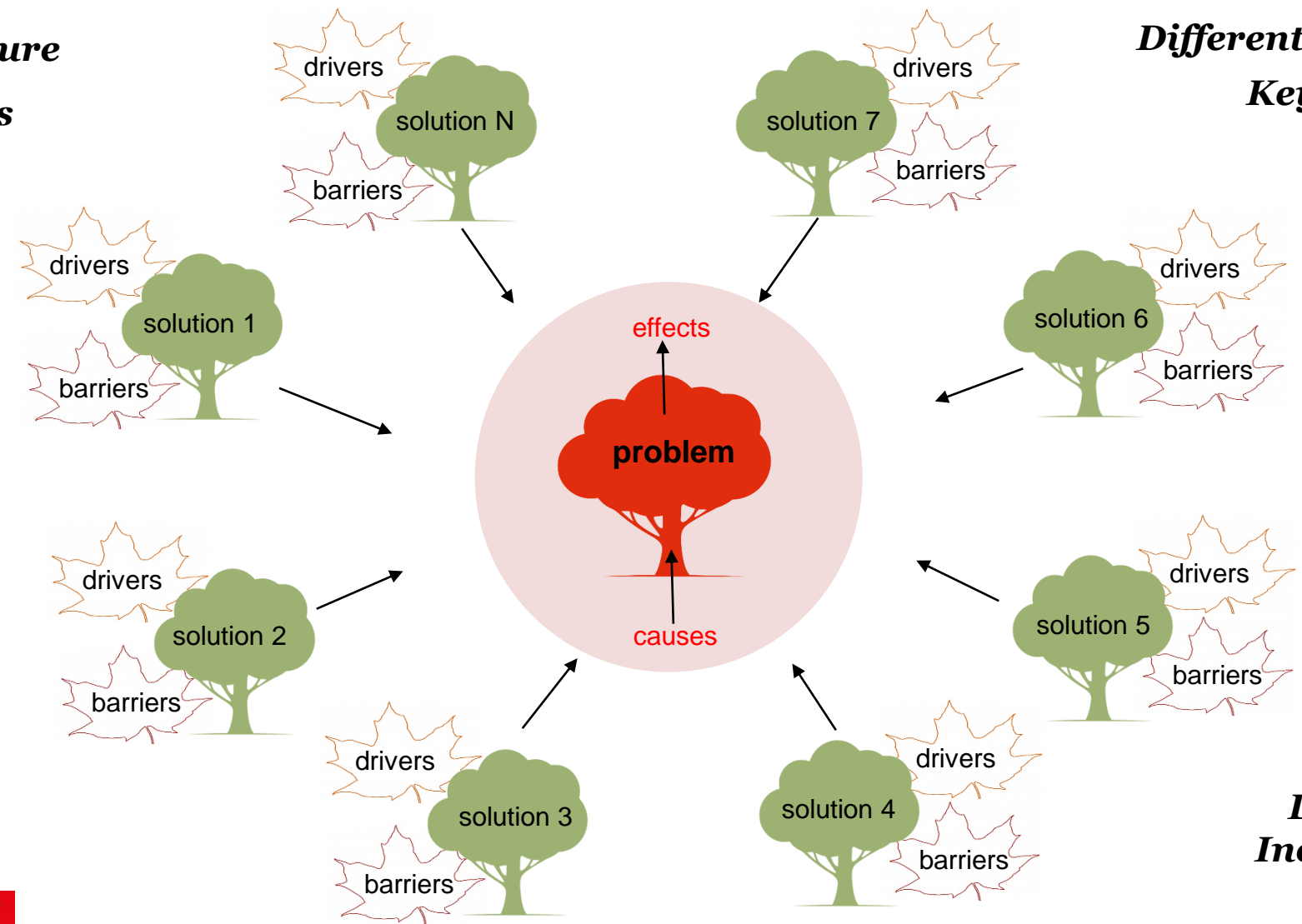
Business models.



Participatory Approach

Current & Future alternatives

*Different perspectives
Key-stakeholders*

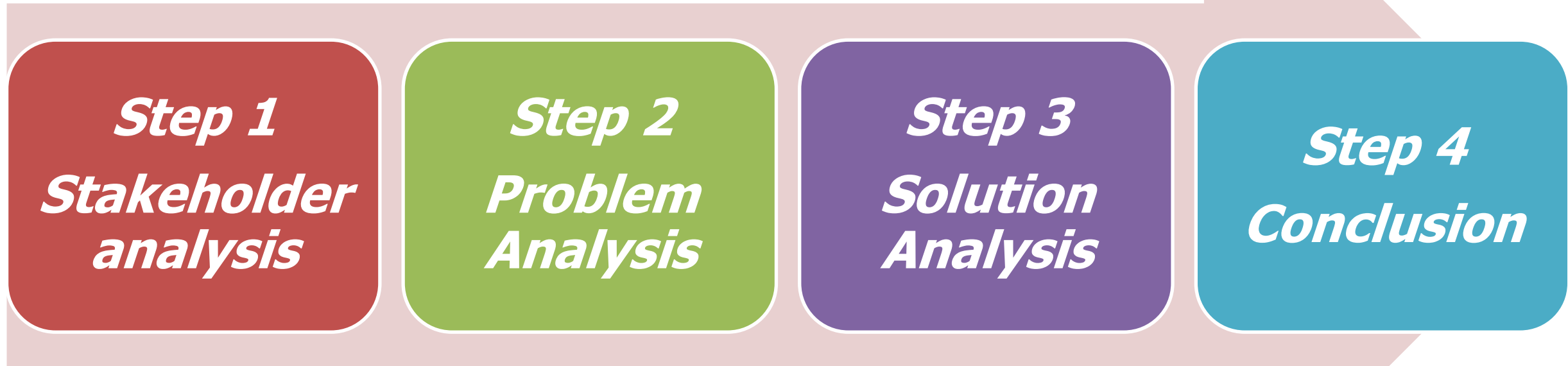


Holistic

*Democratic &
Inclusive process*

SEW

Methodology



Adaptation to the Design and Monitoring Framework Approach (ADB, 2007)

effects

Air Pollution

Public Health (i.e. due to air pollution, and mental health - stress)

Slow journey time

Road safety

Delay on transport network



CAUSES

Low occupation of vehicles - not sharing

Increased e-commerce

Demanding retailers (e.g. set delivery time)

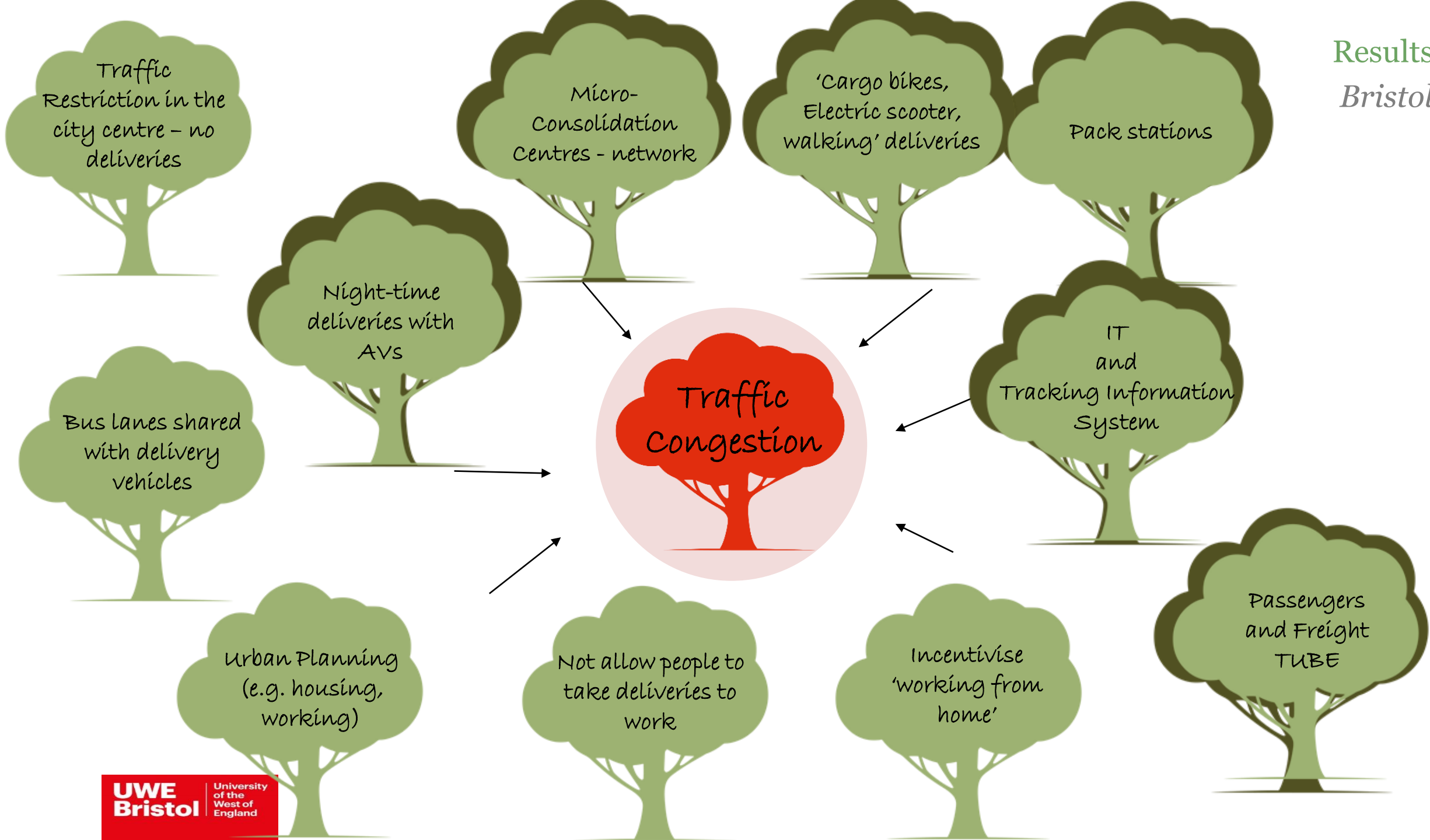
Segmentation of demand (e.g. frequent and small size deliveries)

Increased volume of traffic

Convenient stores (e.g. parking, click and collect)

Independent 'food' retailers (e.g. restaurants, bars)

Population growth



Measure	Description
1 Traffic regulation and planning	Clear Air Zone (i.e. traffic restrictions to polluting vehicles in the city centre), congestion charging, workplace parking levy, pedestrianisation of the central shopping area, Park&Ride, bus lanes shared with delivery vehicles, and in the future night-time deliveries with AVs.
2 Shared schemes	Virtual platforms/apps with uber/cabs for freight and passengers, collaborative schemes for carriers (e.g. sharing vehicles and customers to increase vehicle's load factor), passengers & freight tube, with specific wagons for freight.
3 Behaviour change	Not allow people to take deliveries to work, incentivise 'working from home', communication campaigns to sensitise people to more sustainable choices.
4 Urban Planning and Land Use	Re-design the city (e.g. housing, work places) to reduce the number of flows in the city centre.
5 Freight measures	A network of micro-consolidation centres, Cargo bikes, Electric scooters, and 'walking' deliveries, Pack-stations, virtual loading bays, IT and efficient tracking information systems to allow flexible and sustainable on-demand services.

Drivers

- Communication.
- Strong awareness campaign (e.g. education to sustainability).
- ‘Stick’ measures (e.g. traffic restrictions, congestion charging, pedestrian areas).

Barriers

- Public Acceptance.
- Behaviour Change.

Summary of results – Bristol vs SMARTFUSION

	Bristol	Newcastle	Berlin	Como
Collaborators	Policy makers, logistics professionals, experts, retailers, and citizens	City authority, logistics service providers, FTA, city retailers, warehousing company, consultant, technology providers (Smith Electric Car, VOLVO), experts, and many business sub-functions (university purchasing director, estate service director, student union manager)	City senators, city port warehousing company, consultant, technology providers (PTV, VOLVO), experts, Other city functions with interest in environmental issue	Local authority (policy makers), Urban consolidation centre management, carriers/logistics operators (such as 3PLs), receivers (city retailers with majority are small shops), Technology provider (FIAT), consultant, experts
Problems	Traffic congestion	Unsustainable freight transport in the centre of Newcastle that causes increased traffic volumes ; high transportation cost; and high use of conventional fuels	Barrier for market uptake of alternative vehicles and electric vehicles in specific urban area that causes low air quality	Inefficient freight transport system leads to congestion and air pollution that causes congestion and air pollution

Summary of results – Bristol vs SMARTFUSION

	Bristol	Newcastle	Berlin	Como
Objectives	Addressing traffic congestion and the related negative effects (e.g. air pollution)	Addressing traffic safety issue and low air quality	Addressing barriers for market uptake of alternative vehicles	Addressing congestion and air pollution
Alternatives	Integration of a range of urban freight solutions, e.g. micro-UCC, passengers' & freight tube, electric AVs and cargo bikes, night-time deliveries, when delivering to retailers; and pack-stations, traffic restriction, when delivering to privates (e.g. e-commerce). Both are supported by new policies on urban and transport planning, and awareness/educational campaigns driving behaviour change.	Adoption of electric vehicle to serve freight transport in Newcastle; and consolidation and coordination of high unconsolidated freight flows	Addressing imperfect market condition with alternative propulsion systems ; coordinating overpoweringly strong supply of cheap and flexible proven diesel technology	Adoption of environmentally friendly vehicle fleet; providing conditions for loading and unloading within the limited traffic zone; increasing load factor in vehicles; and to provide transport services to meet customers' expectation

- Stakeholders' **perception** & **WTU** new tech: Key factors for a successful implementation of future sustainable urban freight systems.
- Newcastle freight SE forum: much longer experience. **Consultation process** remains a key strategy to engage with key stakeholders.
- The visions of sustainable urban freight system from the case studies are concentrated on addressing general urban transport problems namely: **traffic congestion & environmental pollution.**

“engaging”

“easy-to-use”

Co-design with Participatory Approach

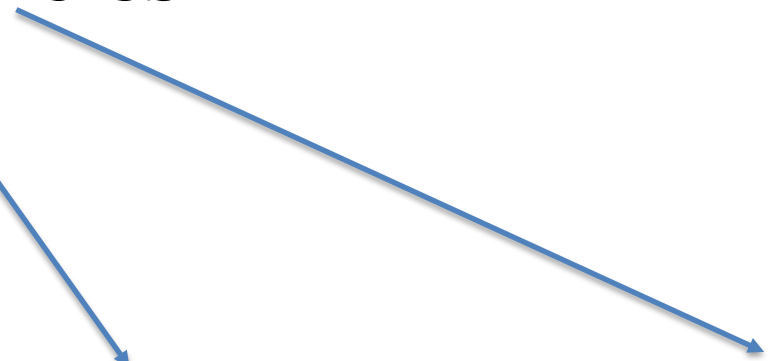
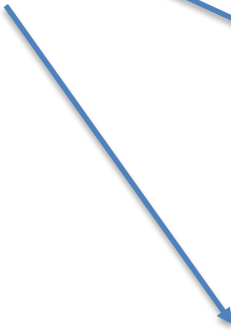
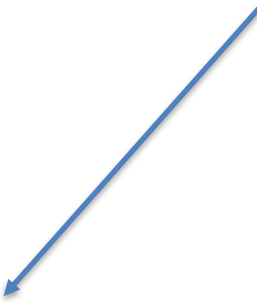
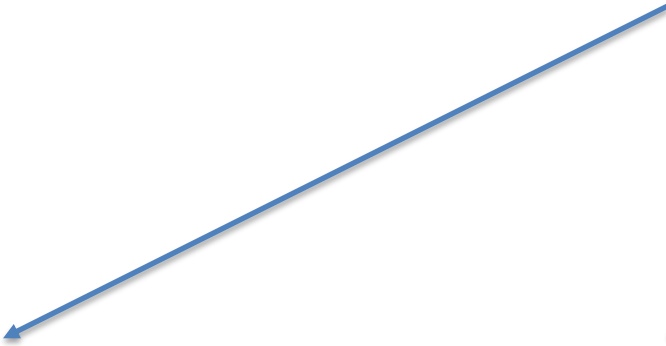
“quicker”

“very positive”

Conclusion



New Tech & UFT Policies



Industry

Economy

Environment

Society



1. Reducing n. delivery vehicles

Bristol: CAZs; Network of micro-consolidation centres; and Pack-stations/collection points for e-commerce.

SMARTFUSION: Using Consolidation Centre (Newcastle, Como, Berlin); Delivery Servicing Plan (Newcastle); and Receiver led city logistics (Newcastle).



2. Reducing (impact of) Polluting Emissions

Bristol: Electric vehicles; cargo-bikes or tricycles.

SMARTFUSION: Electric Vehicles (Newcastle, Como, Berlin), Smart routing (Berlin).



3. Sharing

Bristol: positive with crowd-shipping, even though a bit 'suspicious'.

SMARTFUSION: not known in Smartfusion.



4. Autonomous Vehicles – Driverless Pods, robots

Bristol: Avs by night; not WTS the space with AVs or robots.

SMARTFUSION: not known in Smartfusion.



5. Reducing n. road vehicles – Drones, 3D printing

Bristol: not confident with drones; 3D printing: not good quality and still need for supply materials.

SMARTFUSION: not known in Smartfusion.



6. Network optimisation – routing, “now-casting”, IT, Block-chain

Bristol: not confident with block-chain; positive attitude with routing optimisation and IT to support tracking & optimise info flows.

SMARTFUSION: not known in Smartfusion.

3Ds

‘3Ds: Density, Diversity, Design’

Urban planning - by Robert Cervero (1997) in addressing travel demand

3Cs

‘3Cs: Consolidation, Coordination, Collaboration’

City logistics solutions in addressing UFT demand

Thank you! 😊

Any questions?

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If you want to know more about new technology and automation in freight transport and handling systems:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/781295/automation_in_freight.pdf