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The changing use of e-scooters in London: Stakeholder perspectives and future scenario pathways

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Being a dissertation submitted to the faculty of The Built Environment as part of the requirements for the award of the MSc Transport and City Planning at University College London: I declare that this dissertation is entirely my own work and that ideas, data and images, as well as direct quotations, drawn from elsewhere are identified and referenced.

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Abstract

COVID-19 has somewhat altered the field of transport planning. Business-as-usual trends have been uprooted and society continues with lower predictability and higher uncertainty. Forecasting futures now proves to be difficult.

The pandemic has forced us to ask how ‘safe’, socially-distanced travel can be facilitated in dense cities such as London. E-scooters could provide the answer. The UK Government has brought forward e-scooter trials though it is clear that the original intended use of e-scooters to complement public transport is no longer appropriate.

This study aims to fill a research gap by providing an insight into the views of stakeholders in order to establish conversations that may contribute to the future e-scooter landscape in London. A participatory, yet socially-distanced methodology has been constructed. Firstly, a stakeholder survey is undertaken to understand the alignments and misalignments of stakeholder opinions surrounding the use of e-scooters in London, both in the short-term and long-term. Secondly, an online workshop allows stakeholders to vision future scenarios and backcast policy pathways. Results aim to establish if there is a consensus amongst stakeholders and what the championed futures are through policy package choices.

The study finds stakeholders are largely in favour of e-scooters with alignment found on the use of e-scooters for commuting. Stakeholders agreed that hard infrastructure is the most important policy package for the future of e-scooters though divergent views on the likelihood of modal shift are found. Four future scenarios are built against two key uncertainties: technology and behaviour. Championed policy pathways suggest the future of e-scooters extends to a scenario of ‘Self-care’, though contrary to others, decision-making stakeholders rank regulation as having low importance.

Whilst this research has been conducted during a pandemic and the methodology has limitations, results provide a sound conversation starter to aid policy-building and suggests pathways to further research.

1. INTRODUCTION

1.1. Sustainability and uncertainty

Sustainability and uncertainty are two prominent topics within 21st century transport discussions. The impacts of unsustainable travel behaviour are becoming increasingly understood and the realisation that change is required at an individual level is becoming more evident. Changes to technologies, infrastructure, organisations, market regulations, user practices and niche innovations are required to facilitate the change needed to move society away from the dominant automotive system (Geels, et al., 2017). Innovation, however, is often met with resistance and its implementation requires careful planning because it upsets existing power structures (Gössling and Cohen, 2014). Indeed, in the case of convenient and personal mobility, the battle sits between the car versus micromobility devices including e-scooters, e-bikes and bikes.

1.2. COVID-19

At the time of writing, much of the global population are in lockdown following the outbreak of COVID-19. The pandemic has generated a drastic change in travel behaviours during this unprecedented time – a great social experiment which we are undertaking through no will of our own. The need to reduce public transport use to slow the spread of the virus has challenged key workers to make use of personal mobility modes. However, the choice of modes in the UK remains somewhat restricted.

Politically, the debate sits between sustainability and safety. It is widely understood that steps need to be taken to drastically lower transport-related carbon emissions, particularly in a large city such as London, UK. The Mayor's Transport Strategy (2018) sets out the aim to have 80% of trips in London made by sustainable transport by 2041. By the same year, the 'Vision Zero' policy aims to eliminate all deaths and serious injuries from road collisions on London's streets. This raises the question: how do we radically change how we move around cities whilst ensuring it is both sustainable and safe?

1.3. E-scooters

In the UK, e-scooters are defined as a motor vehicle with two wheels – front and back, designed to carry one person and powered by an electric motor (Department for Transport, 2020). E-scooter advocates have been keen to underline the role these micro-modes could play in the development of sustainable cities, though early studies contest whether benefits will materialise. COVID-19 has somewhat altered the field of transport planning: we now ask how can 'safe', socially-distanced travel be facilitated in dense cities.

The Government's 'Future of Mobility: urban strategy' (Government Office for Science, 2019) calls for people to have the chance to make the most of opportunities from micromobility. As the UK emerges out of lockdown, e-scooter trials originally planned for 2021 have been brought forward and expanded to all areas that want them. The original intended use of e-scooters to complement public transport is no longer appropriate, yet, in a world of the 'new-normal', might e-scooters regain their original intended purpose, as a sustainable, complementary mode to public transport? It is unclear as to how stakeholders, in particular policy-makers, urban designers,

regulators and local authorities, might be impacted or plan for this potential modal shift. Will e-scooters play a part in their envisaged future? Uncertainty prevails.

1.4. Scope of study

Given the permittance of e-scooter trials in the UK, it is hypothesised that in general there is consensus across stakeholder groups regarding the use of e-scooters, though a greater understanding is required. Therefore, this research has two aims: firstly, to understand the alignments and misalignments of stakeholder opinions surrounding the use of e-scooters in London, both in the short-term and the long-term. Secondly, it aims to determine if there is a consensus amongst stakeholders regarding policy pathways to bridge the gap between the short-term and the long-term.

It is emphasised that this study has been undertaken during a time of uncertainty – the UK is easing itself out of lockdown and life is beginning to return to normal albeit travel habits remain severely impacted by the pandemic. Change is taking place daily but research that aims to piece together clear policy pathways should not be delayed.

In contrast to existing literature, this research does not delve into the detail of specific aspects of e-scooters, i.e. their life cycle, safety, potential for modal shift etc. Focus remains high level and looks broadly across all e-scooter research given that stakeholders take a comprehensive, balanced view when discussing e-scooter use as a whole. The subsequent sections will include the following:

- Chapter 2: Context and Literature Review - sets out current e-scooter research and touches upon futures studies;
- Chapter 3: Method - describes the methodology, exploring survey design and application;
- Chapter 4: Analysis and Discussion - highlights and discusses the main research findings, presents recommendations and summarises limitations; and
- Chapter 5: Conclusion - summarises the study and provides some reflection. .

2. CONTEXT AND LITERATURE REVIEW

2.1. London's mobility landscape

Carbon emissions

Cities account for 70% of global carbon emissions (Gärling, 2005). Whilst London is estimated to have lower carbon emissions per capita than any other UK region (Department for B.E.I.S, 2017), population is high and the proliferation of transport activities including congestion and pollution have highlighted severe problems that need to be solved (Lakshmanan and Anderson, 2009). Whilst some studies suggest the UK has moved past the 'peak car' phase (Focas and Christidis, 2017), the inefficient automobile remained the mode for 36% of London trips in 2016, 0.5% higher than the previous year (TfL, 2017) This was the first increase in private car trips since the 1990s.

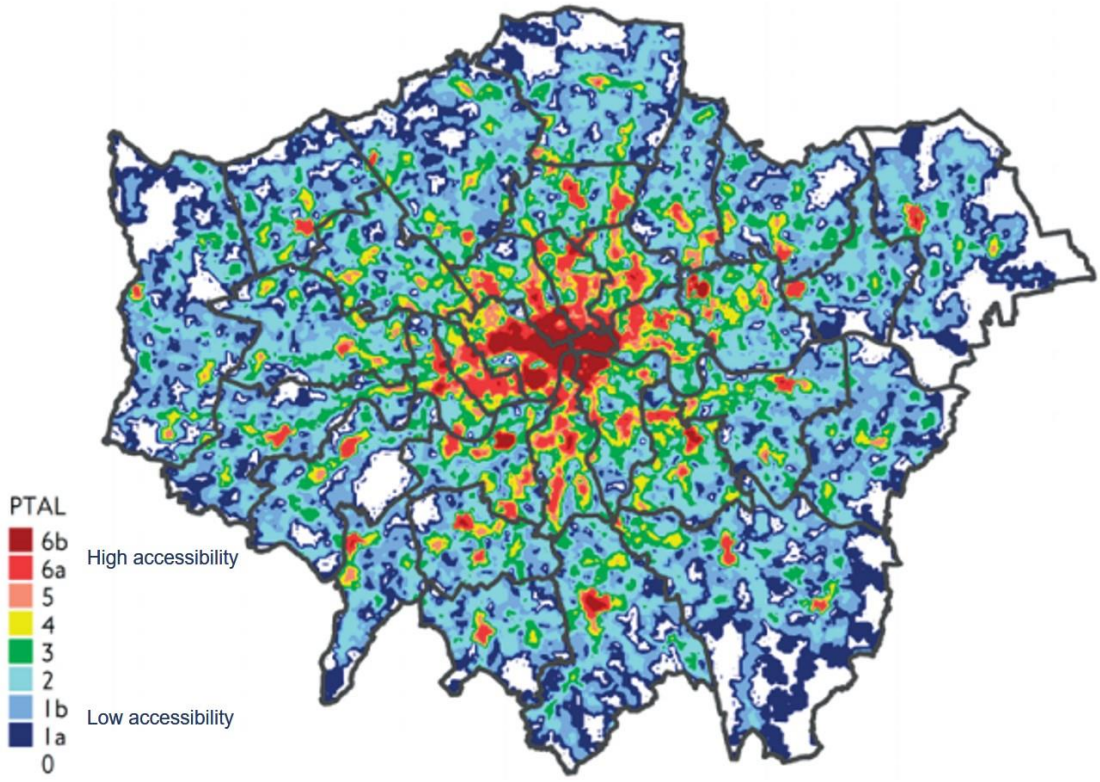
Travel mode choice and accessibility

The potential for denser, urban environments to reduce car ownership is clear given that higher population densities translate to shorter trips and lower driving speeds (Hass-Klau, 2003). In London, population density and the inversely related car ownership levels vary significantly across central, inner and outer London, as demonstrated in Table 1. Existing reasons for this include a vast public transport system, congestion charging and other difficulties with owning a car. Even still, a study by Chng et al (2019) found that cars in London (though notably a specific area was not referenced) were viewed as a necessity due to the perceived lack of accessible, alternative transport in areas not served by public transport. A vast city, public transport accessibility varies spatially, as indicated by the Public Transport Accessibility Level (Figure 1). Clearly, there is a need to enhance the accessibility to existing public transport systems. Smaller, personal vehicles therefore provide a potential solution in urban environments such as London.

Table 1: Ward characteristics

	Density (persons per sqkm) (Census, 2015)	**Car Ownership (vehicles per household)** (Census, 2015)	**PTAL** (TfL, 2015)
Church Street Ward, Westminster (Inner London)	29,750	0.3	6b (highest possible)
Darwin Ward, Bromley (Outer London)	181	1.7	1b (poor)

Figure 1: London PTAL (TfL, 2015)



2.2. E-scooters

No longer confined to a child's birthday wish list, the e-scooter and other forms of micromobility stand alongside recent transport innovations such as autonomous vehicles, drones, Mobility as a Service applications and data capture systems. A seemingly novel solution to a serious problem, e-scooter manufacturers flout their potential to aid the decarbonisation of cities through modal shift from car to e-scooter (Carbone 4, 2019), thereby also allowing cities to reclaim space previously used by vehicles, increasing inclusivity and affordability of personal transport (Tillemann and Feasley, 2018). However, challenges are presented. Some studies emphasise safety concerns, poor kerb space management, modal shift from sustainable modes and poor life cycles. DuPuis, Griess and Klein (2019) summarise the key challenges and opportunities for e-scooters in cities:

- Safety
    - E-scooter operation on footways
    - Lack of regulatory mechanisms to improve pedestrian safety
    - Rider is required to educate themselves on the different rules in different cities
    - Lack of infrastructure
    - Helmet usage
- Kerb Space Management
    - E-scooters discarded carelessly

    - Difficulties to enforce appropriate parking, albeit designated parking zones provide a low cost solution

- First and last mile
    - E-scooters improve accessibility of areas with low public transport provision
    - Increase the distance someone is willing to travel to access public transport
    - Promotes equity by improving services to low-income and underserved communities
    - Quickly deployed in cities
- Data
    - The collation of sharing system data provides insights into when and where users travel
- Environmental
    - Studies indicate e-scooter trips are replacing car trips
    - Lifespan of sharing e-scooters is poor
    - Environmental cost associated with maintaining and charging dockless e-scooters

Further literature has been reviewed to provide relevant detail surrounding the opportunities and challenges for e-scooters. It is emphasised that much of the existing research reflects shared e-scooter systems, rather than private e-scooter use which is particularly under-represented in literature. Moreover, research is largely international given that e-scooters, aside from the trials, are not legal in the UK - the 1988 Road Traffic Act restricts their road use and the 1835 Highways Act bans use on pavements.

Public perception

Studies show that in cities with legalised e-scooter use, the public has met their arrival with both enthusiasm and scepticism as authorities struggle to cope with unforeseen outcomes. Gössling (2020) undertook media analysis in 10 cities to assess public concerns prior to and after the implementation of e-scooter schemes. Results suggest that cities largely adopted a trial and error approach to seeking appropriate legislation with policies introduced including maximum speeds, mandatory use of bicycle infrastructure, dedicated parking and limiting the number of operators. Concluding that where negative public opinion can be averted, e-scooters stand a chance to become a disruptive niche innovation.

Little research has been undertaken in the UK, though a leading bike retailer surveyed 2,000 adults on their views surrounding e-scooters. Half of respondents thought scooters would be good for the environment whilst 37% believed they should be made legal (Halfords, 2019).

Sustainability

Beneath supplier and retailer claims that the e-scooter offers a sustainable travel solution, studies have started to emerge which dispute these conclusions. Following past life cycle assessment studies on other micromobility modes such as e-bikes (Weiss *et al.*, 2015; Zhang *et al.*, 2018), emerging e-scooter research focuses on dockless e-scooters. US studies such as Hollingsworth, Copeland and Johnson (2019) conclude that sustainability claims should be met with scepticism. Utilising scenario analysis coupled with Life Cycle Assessment, the study determines that the materials and manufacturing burdens of dockless e-scooters are

greater than the activities associated with charging the vehicles, a conclusion also echoed by Chester (2019). Importantly, both studies concur with the conclusions of e-bike studies regarding the impact on other modes and the related environmental impact. In both US-based e-scooter studies, 34-36% of e-scooter trips would have been a car trip, however 45-49% would have been by either walking or cycling and 6-7% of trips wouldn't have occurred at all.

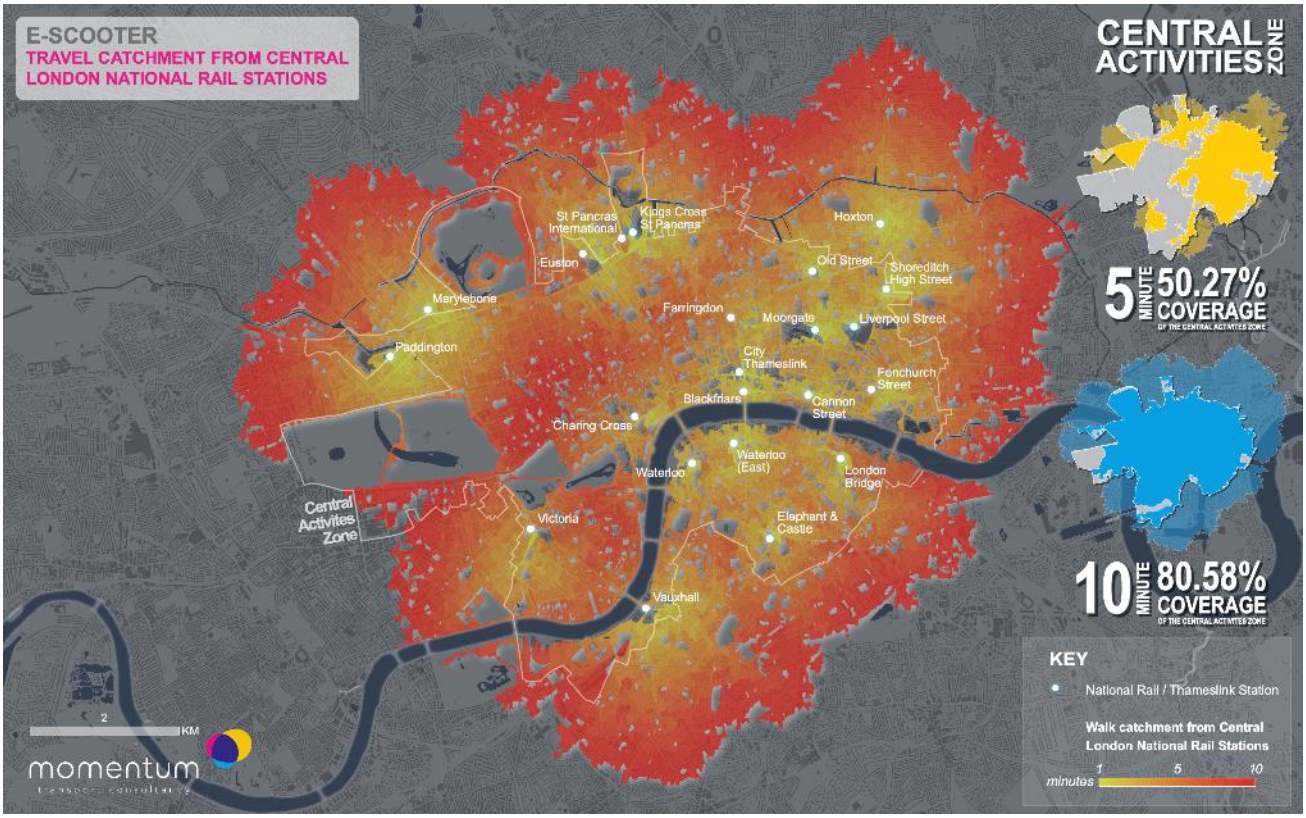
Notably, a large number of studies originate in US cities which in some cases have characteristics (less-dense urban form, lower public transport provision etc.) that are drastically different to London and indeed many European cities. A study in Paris, a city with a good public transport provision and perhaps reflective of London, suggested only 3% of scooter journeys would have otherwise been by private car (6t-bureau de recherche, 2020). It concludes that e-scooters have become an additional option, facilitating multi-modal trips with public transport and walking. The London Cycling Campaign (LCC) collated a total of 21 e-scooter mode shift studies from around the world. The average mode shift suggests that 36% of e-scooter trips replace private vehicle trips albeit the study fails to account for varying base mode share across different cities. Further mode shift results are shown at Table 2.

Table 2: Average modal shift to e-scooters taken from 21 global e-scooter surveys as presented by (LCC, 2020)

Mode shift from	% e-scooter riders
Private vehicle	36%
Walking	37%
Cycling	9%
Public transport	13%
Unknown modes	5%

It is difficult to determine the modal shift to e-scooters in London but spatial analysis has been used to infer an educated guess. Packard and Draper (2020) use GIS to understand the potential for e-scooters to complement train use in central London (Figure 2). They suggest that 81% of central London is accessible by e-scooter in under 10 minutes from Zone 1 train stations concluding that there is great potential for them to replace London Underground journeys.

Figure 2: E-scooter travel catchment from Central London train stations (Packard & Draper, 2020)



A recent research piece in Brussels, not included within the LCC research, questions the 'green' attributes of e-scooters. It concludes that the use of shared e-scooters shows a higher environmental impact than the transportation modes they replace due to their short lifespan (Moreau *et al.*, 2020). Secondly, it states that privately-owned e-scooters have a significantly lower 'global warming potential' given the longer lifespan of a personal e-scooter due to less mis-use and vandalism. Thirdly, no vehicle is needed to collect and charge the e-scooter. The importance of lifespan is highlighted once more, though it is assumed that with technological advances, the lifespan of vehicles will increase and the global impact per km travelled could decrease. Perhaps the environmental benefits claimed by e-scooter manufacturers will only come to fruition in the long-term.

Much of the current research is conducted, or at least funded, by shared e-scooter operators such as Lime and Bird, with only single, short-term surveys undertaken. As such, these studies are expected to contain an element of bias and results are geographically dependent.

Equity, Access and Health

Whilst it is broadly accepted that increased mobility has a positive effect on equity, health and wellbeing (Ewens *et al.*, 2016), few studies with a focus on e-scooters have been undertaken. In a broad sense, e-scooters provide greater access to public transport for lower-income, urban fringe residents albeit a Chicago study found e-scooter users were predominantly young males with a salary twice the median income (City of Chicago, 2020). These results were echoed in Paris, Lyon and Marseille (6t-bureau de recherche, 2019). In terms of physical accessibility, findings from Wellington, New Zealand suggested 13% of e-scooter users with accessibility needs said they wouldn't have made their recent trip without e-scooters whilst 91% with accessibility needs strongly supported the use of e-scooters (Condie, 2020).

It is debated as to whether e-scooters sit under the umbrella of ‘active travel’. Irrespective of this, the LCC (2020) conclude that being outdoors can be beneficial for health whilst the slower speeds of e-scooters, in comparison to vehicles allows more social interaction and an increased ability to stop at places of interest. The report continues to state that any form of micromobility has more in common with cycling than public transport, increasing footfall on high streets with the user experiencing a greater feeling of control.

Safety

E-scooter safety has generated several studies. The International Transport Forum (ITF) examined micromobility safety, concluding that a trip by car or motorcycle in dense urban areas is more likely to result in a fatality than by an e-scooter. Though the risk of hospital admissions may be higher on e-scooters, the lack of studies on this topic is noted (ITF, 2020). Understanding the risk to pedestrians is difficult given the likelihood of unreported incidents. Bekhit, le Fevre and Bergin (2020) note that data captured in Auckland, New Zealand shows that the introduction of e-scooters to the city has had a large impact (increase) on regional healthcare costs.

James et al (2019) identified through a survey in Virginia, US, that non-riders and riders have divergent perceptions about safety with non-riders feeling unsafe around dockless e-scooters. The same study found that 22% of e-scooters were not parked properly or were blocking the pedestrian right-of-way, a potential hazard highlighted by the Royal National Institute of Blind People within evidence submitted to the Transport Committee (RNIB, 2020).

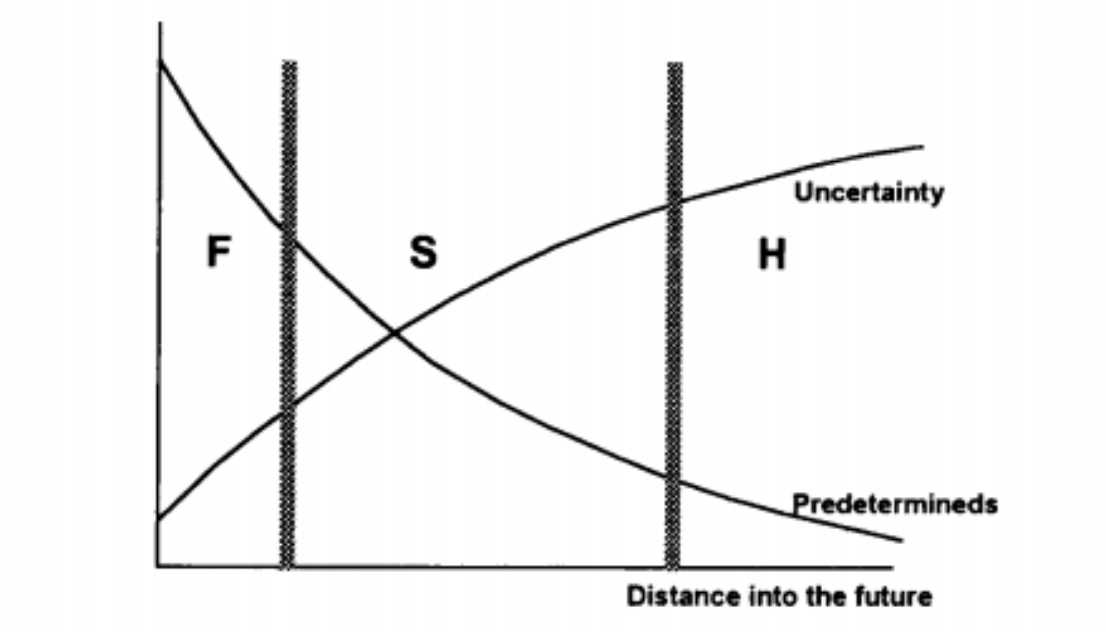
2.3. Futures Studies

Forecasting disruption

The COVID-19 outbreak has highlighted the difficulty when using the past to predict the future. Indeed, forecasting remains necessary in all elements of life, not just planning though the problem is we get complacent with our forecasting skills, reducing the ability to adapt. This causes problems when uncertainty strikes and trends are broken. Kuhn's (1970) paradigm shift, which denotes that scientific theories are constant before a phenomenon can’t be explained and the theory adjusted to suit, is a philosophical explanation for adjusting to ‘new-normals’. It summarises how societies adapt to unexpected shifts developed through changing societal perspectives, spatially and temporally.

In Figure 3, van der Heijden (1996) summarises our view of the future. As predictability decreases and uncertainty rises, we move from forecasting, through to hope as our attempts to plan demonstrate diminishing returns.

Figure 3: The balance of predictability and uncertainty in the future (van der Heijden, 1996)



The premise behind historical studies is to try to understand change and how society has reacted to uncertainties previously so we can apply this knowledge to determine future trends. Historians echo "*The past causes the present, and so the future*" (Stearns, 1998). The decisions we make and the strategies we apply may be better informed if we understand the existing data and the circumstances that might impact them, so, data is continually collected and extrapolated. Wack (1985, pg 73) highlights "*Forecasts are not always wrong, more often than not they can be reasonably accurate"*. With this complacency, problems are caused when uncertainty strikes. Following a past of forecasting, the UK has had a destructive past of 'predict and provide' policies (Goodwin, 2012), notably leading to excessive car use. Indeed, vehicle numbers have grown though not at the rate predicted by original forecasts, yet, forecasters have stubbornly revised forecasts to 'growth later', not 'less growth'. New knowledge might tip the balance towards an alternative future and so there is hesitance, but a requirement to understand and apply it.

Planning for the future

Futures study stems from our desire to understand uncertainty so that we can make it part of our reasoning (Banister and Hickman, 2013). Pioneered by Herman Kahn of RAND Corporation in the 1950s, variations of his 'future-now' thinking technique has been used most widely in business planning, most notably at Shell Global in the 1980s. Simply stating '*The most likely future isn't.'*, Kahn's view of business-as-usual was that it was unlikely to happen, so he developed a method to draw up future scenarios using multiple images of potential futures (Bishop, Hines and Collins, 2007). The resultant scenario planning technique has been developed resulting in 23 variations used to suit each research topic. van Notten et al (2003) summarises the scenario planning techniques into 3 categories:

- Predictive - what could happen? (Forecasting)
- Exploratory – what is likely to happen? (Scenario Planning)
- Aspirational – what do we want to happen? (Backcasting)

Forecasting has traditionally been reliant on quantitative indicators including pollutant emissions, density, vehicle trends etc. which establish clear paths that the future should follow (Nogués, González-González and Cordera, 2020). Scenario planning allows trend-breaks, such as the current pandemic, to be analysed and solutions created. Indeed, few studies set out a desirable future or action plan (Banister and Hickman, 2013) but, they allow wider-thinking and movement away from short-term focus. Ultimately, scenarios encourage strategic conversations.

The nature of predictive and exploratory scenario planning is that current trends tend to be extended to the future, though creativity is limited and baggage is carried forward. The backcasting technique utilises a normative view of desirable end-points. It allows a future state to be imagined first, then the analysis works backwards to discover the pathways which allow us to enable a plausible, catastrophic, fantastical or preferred future (Bishop, Hines and Collins, 2007). The approach facilitates discovery and steps away from the bound aspects of forecasting. It is considered particularly useful when the business-as-usual case is no longer appropriate (Åkerman and Höjer, 2006; Vergragt and Quist, 2011) and significant changes are required in order to reach certain goals.

A range of studies have utilised the backcasting approach to firstly, vision a future state, secondly, develop policy package pathways and thirdly, assess the wider impacts of the chosen pathways on environmental, social and economic issues. In the UK, the VIBAT study (Hickman and Banister, 2006) developed future transport scenarios with a technological and behavioural focus. More recently, the UK Government Office for Science (2019) Future Mobility programme set out to use a scenario approach to explore different futures, identify opportunities and help mitigate the unintended consequences of new transport modes, technologies or trends. Four qualitative scenarios were developed following a workshop: Trends Unmodified, Individual Freedoms, Greener Communities and Technology Unleashed. The explored scenarios are utilised to understand how to deal with uncertainty and mitigate consequences of new modes allowing policies and decisions to be more considered, enhancing resilience and flexibility.

3. METHOD

3.1. Research Aim and Questions

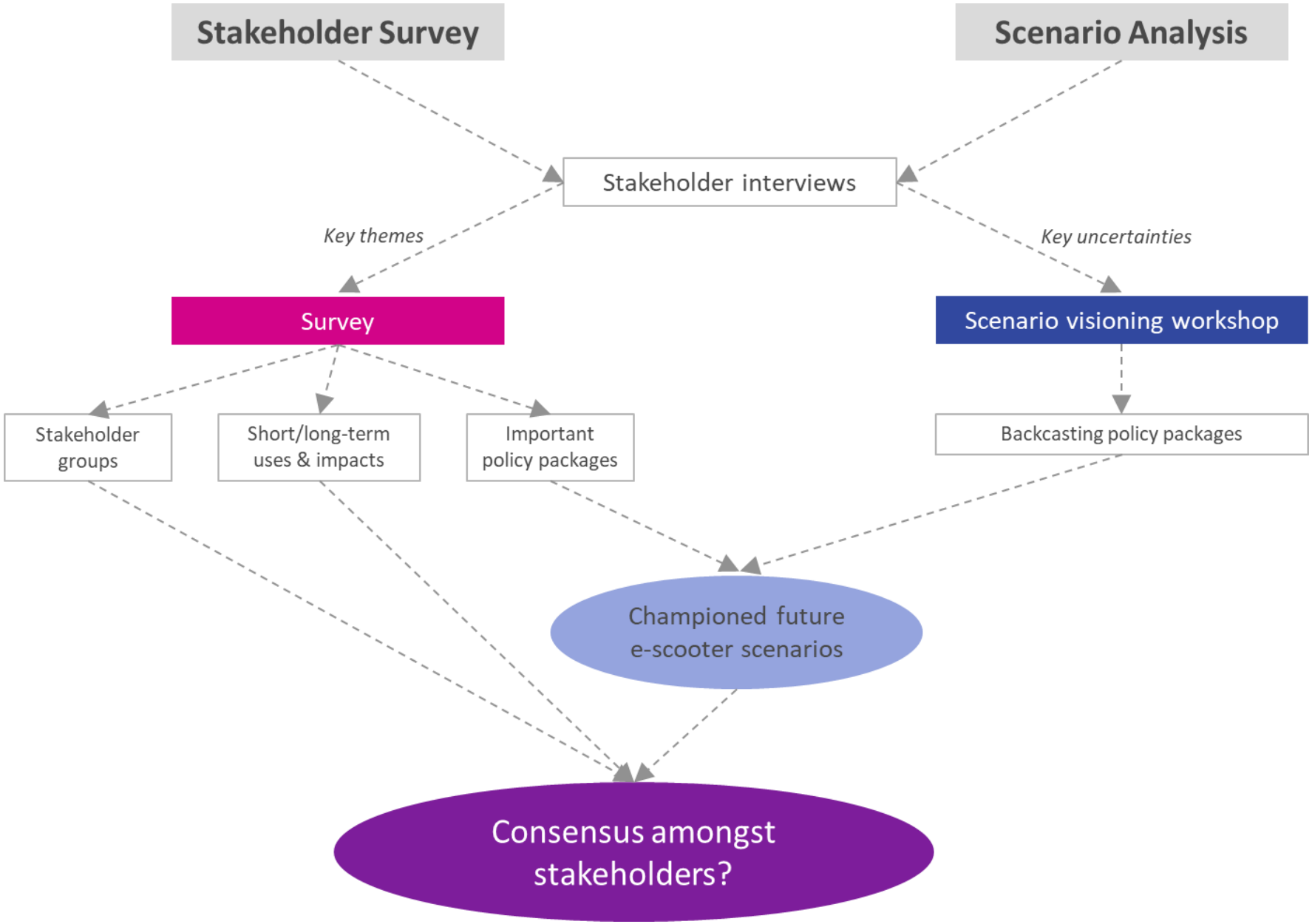
This research aims to gather an understanding of e-scooter futures in London by combining two research pathways. Firstly, through a stakeholder survey it aims to understand the alignments and misalignments in stakeholder opinions on the use of e-scooters in London, both in the short-term and long-term. Secondly, it aims to use participatory scenario planning to develop four future scenarios. Using a backcasting approach, the most appropriate policy pathways to facilitate these futures can be determined. Stakeholder survey results establish if there is a consensus regarding these policy pathways.

The research aims can be divided into the below questions:

1. What are the alignments and misalignments in stakeholder opinion surrounding the use of e-scooters in London, both in the short-term and long-term?
2. Is there a consensus amongst stakeholders regarding the use of e-scooters in London?
3. What are the key uncertainties concerning e-scooters in London and what might future scenarios driven by these look like?
4. Do stakeholders agree on the policy pathways that may be implemented to facilitate their desired future for e-scooters?

In order to collate information to answer research questions 1 and 2, a survey was distributed to stakeholders. Question 3 was investigated using a stakeholder interviews and a scenario planning workshop. Question 4 combines information gathered from both the survey and workshop. A diagram indicating each methodology step is shown in Figure 4.

Figure 4: Method



3.2. Ethical considerations

Given the level of interaction and number of participants within the methodology as well as the relevant and controversial nature of the research topic, the author felt it important that where possible, participants remained anonymous. As per the findings of Hickman and Banister (2014), this also aims to ensure that the influence of social pressure and level of bias remained low.

3.3. Stakeholder survey

Stakeholder interviews

Stakeholder interviews were undertaken to confirm the main themes and variables to be included in the survey. A total of 3 interviews were undertaken, with conversations structured around the use of e-scooters, key uncertainties and the impact of COVID-19 (Appendix A). One stakeholder identified themselves as working at Department for Transport (DfT), another at Transport for London (TfL) and the third indicated they were a keen potential e-scooter user. As per the literature findings, the interviews confirmed that e-scooter uses, trip purposes and impacts were important points of discussion.

Selection of participants

Those belonging to organisations/groups such as the following were considered important stakeholders of e-scooters:

- Local authority
- Greater London Authority and relevant organisations (TfL)
- Central Government department
- Shared e-scooter system operator
- E-scooter retailer
- Think tank
- Transport Consultant (private company)
- Investor
- Campaigning organisation
- Prospective e-scooter user
- Academic researcher

Stakeholders within the authors professional network who matched one of the above categories were invited to complete the survey. Furthermore, the survey was shared on a professional networking website in order to extend the surveys reach.

The first part of the survey aimed to classify and separate respondents into stakeholder groups. It also asked the respondent to indicate their level of support for e-scooter use in London and if their personal opinion matches that of their organisation/group. The respondent was able to answer using the Likert Scale (strongly oppose – strongly favour and extremely unlikely – extremely likely) allowing for a degree of opinion to be indicated.

Investigating the short-term and long-term

The second part of the survey asked a number of questions to understand how stakeholders viewed the use of e-scooters in the short-term and long-term. Given the uncertainty and few scientific studies surrounding how quickly the country will recover from COVID-19, specific timescales (i.e. 2 years, 10 years) have not been determined. Instead, two future phases have been defined – short-term (semi-social phase) and long-term ('new-normal' phase). For each phase, respondents were asked a number of questions surrounding the main uses of e-scooters, the main trip purposes and their views on travel mode shifts, demographics of e-scooter users and conflicts.

Stakeholder policy pathways

The final part of the survey aimed to gain an understanding as to how stakeholders would facilitate their desired long-term future of e-scooters. Following a literature review, the author designed a total of ten policy packages (Figure 5) which respondents were asked to rank in order of importance.

A copy of the survey is included at Appendix B.

Figure 5: Policy packages

PP1 – Strong Regulation • Legislative policies control competition, innovation and geographical freedom. • Strict safety and operational • Geofencing • Regular reviews by operators and authorities • Data sharing	**PP2 – Transport tech innovation** • Authorities encourage technology advancement (vehicle specs and alternative uses) • Research and development funds • Trials for new vehicle trials • E-scooters used in Mobility-as-a-Service offerings	**PP3 – Active transport** • Campaigns encourage active transport • Forefront of local transport investment • Ambitious mode share targets for all areas and members of society • Trips subsidised for financially vulnerable	**PP4 – Urban planning** • Improving accessibility of areas with poor public transport links • New developments in these areas are encouraged • Transport 'hubs' provided at train and tube stations • Parking and charging stations are included in developments	**PP5 – Infrastructure investment** • Active travel corridors with consideration given to e-scooters • Urban design focuses on reallocating car space • Wayfinding • Dockless scooter parking areas and other parking infrastructure
PP6 – Public transport • Ongoing investment • Multi-mode hubs facilitates wider MaaS app use • Bus priority measures • High quality public-transport vehicles with additional loading space so e-scooters can be transport on buses, tubes and trains	**PP7 – Behavioural measures** • Campaigns encourage sustainable journeys reducing car trips • E-scooters encouraged as first/last mile solution • Cycle to work schemes include e-scooters • E-scooter safety and etiquette training courses at schools	**PP8 – ICT** • Shared e-scooter applications are free and easy to use • Flexible working arrangements • MaaS app use is promoted • Gamification of e-scooter apps promote responsible use and encourage further modal shift away from cars	**PP9 – Logistics solutions** • E-scooters used to replace inner-city logistical trips including deliveries • E-scooter innovation in logistics is promoted	**PP10 – Clean, alternative fuels** • Battery powered vehicles encouraged • Increase in electric charging points for cars and other modes • Investment in extending battery ranges

3.4. Scenario Planning

Stakeholder interviews

The primary aim of the stakeholder interviews was to gather high level views surrounding uncertainties which might affect the future use of e-scooters. Three key uncertainties were highlighted by the stakeholders: technology, regulation and user behaviour. Each stakeholder confirmed they were in favour of e-scooters, albeit they anticipated a level of disruption once schemes began.

Regulation, whilst a key uncertainty in the future of e-scooters, is suggested to be the most 'controllable' of all uncertainties given that it is at the hands of the government and local authorities. Therefore, technology and user behaviour were chosen as the key drivers of uncertainty to develop e-scooter future scenarios.

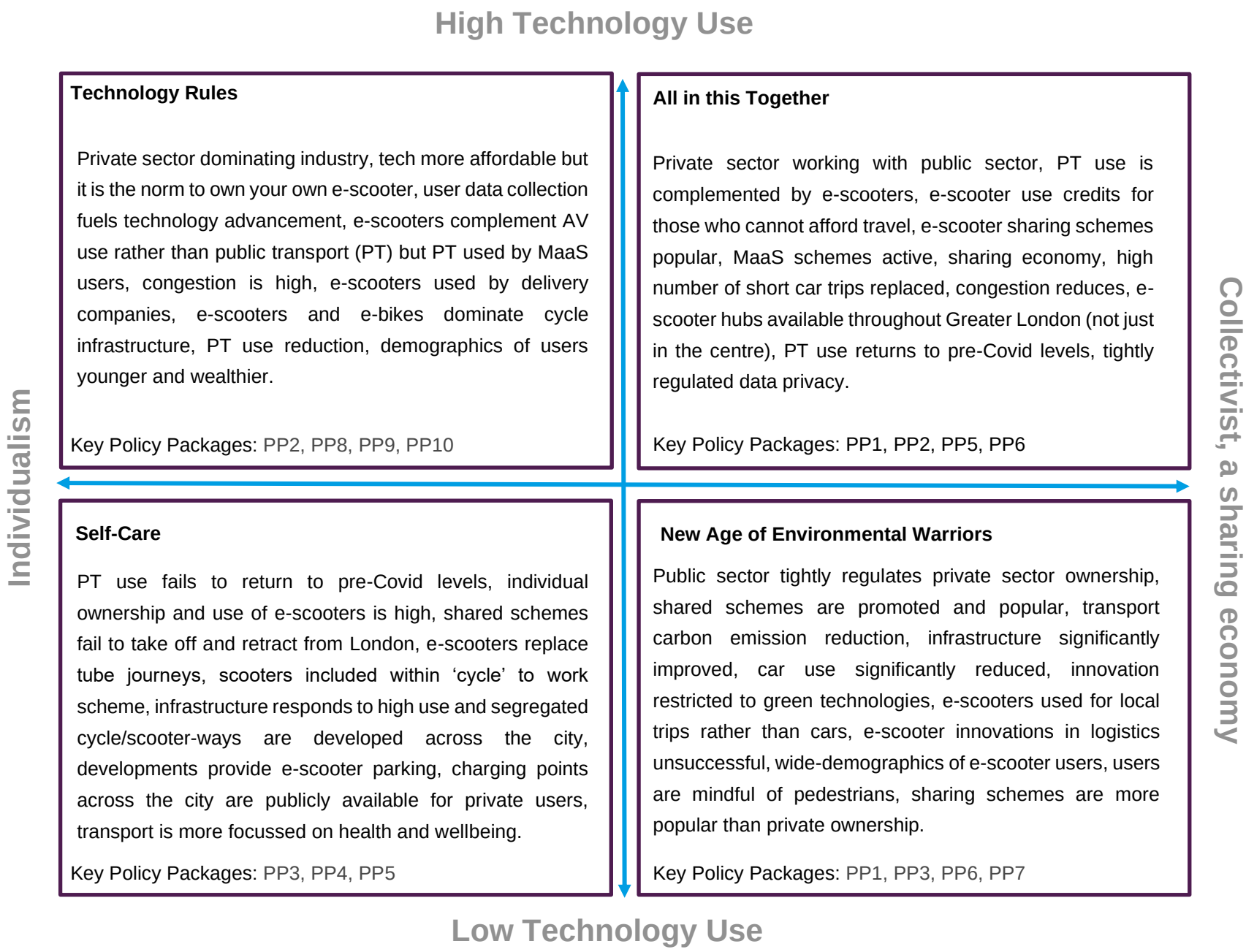
Future e-scooter scenarios

Specifically, the scenario matrix method as set out by Hickman and Banister (2014), has been used to determine the future transport scenarios using technology (high use / low use) and user behaviour (collectivist society / individualistic society) as the key drivers of uncertainty. Against these two drivers, four scenarios have been devised highlighting different futures for e-scooters in London; Technology Rules, All in this Together, Self-Care and New Age of Environmental Warriors. Contrary to typical scenario planning methods, scenarios were not developed for a specific future year. It was determined that the temporal uncertainty relating to COVID-19 meant that a focus year could not be specified. Instead, the long-term 'new-normal' phase definition was relayed to the workshop participants. It is emphasised that these scenarios are not predictions but assume that in the future, though not reflective of the present situation, both privately owned and shared system e-scooters will be legal for use.

The visioning of future scenarios is a collaborative method that greatly benefits from participation and interaction from multiple stakeholders. At the time of research, COVID-19 restricted any in-person workshops from taking place, therefore an online workshop was undertaken on the 10th July 2020 with 30 transport consultants from a private consultancy contributing to the development of scenarios. The attendees were split into groups and asked to develop the scenario narratives. Participants were then asked to 'backcast' by choosing the policy packages best suited to facilitate the future scenarios. The 10 policy packages presented matched those used within the stakeholder survey.

The four resulting scenarios and their policy packages are shown at Figure 6.

Figure 6: Future e-scooter scenarios



4. FINDINGS AND DISCUSSION

4.1. Stakeholder alignments and misalignments

Over time, a wealth of perspectives have arisen through changing societies, professions, cultures and technologies, yet we continue to question if the future is still a continuation of the past or something new. A deeper understanding of these changes is required (Marsden and Lyons, 2019). But, without a thorough understanding of the present, how might we use scenario planning to look to the future? The aim, through survey analysis, is to understand if this starting point and indeed then future is the same amongst all industry stakeholders.

Stakeholder groups

Whilst the range of e-scooter research at present remains slim, some research offers analysis surrounding user perspectives in areas with operating shared e-scooter systems (Carbone 4, 2019; City of Chicago, 2020; Gössling, 2020). Whilst user perspectives can be useful, in the early stages of adoption decision-makers in London need to prioritise policy-making to ensure successful implementation. Importantly, stakeholders need to be involved in the implementation of policies in order to gain support and prevent failure (Macharis and Milan, 2015).

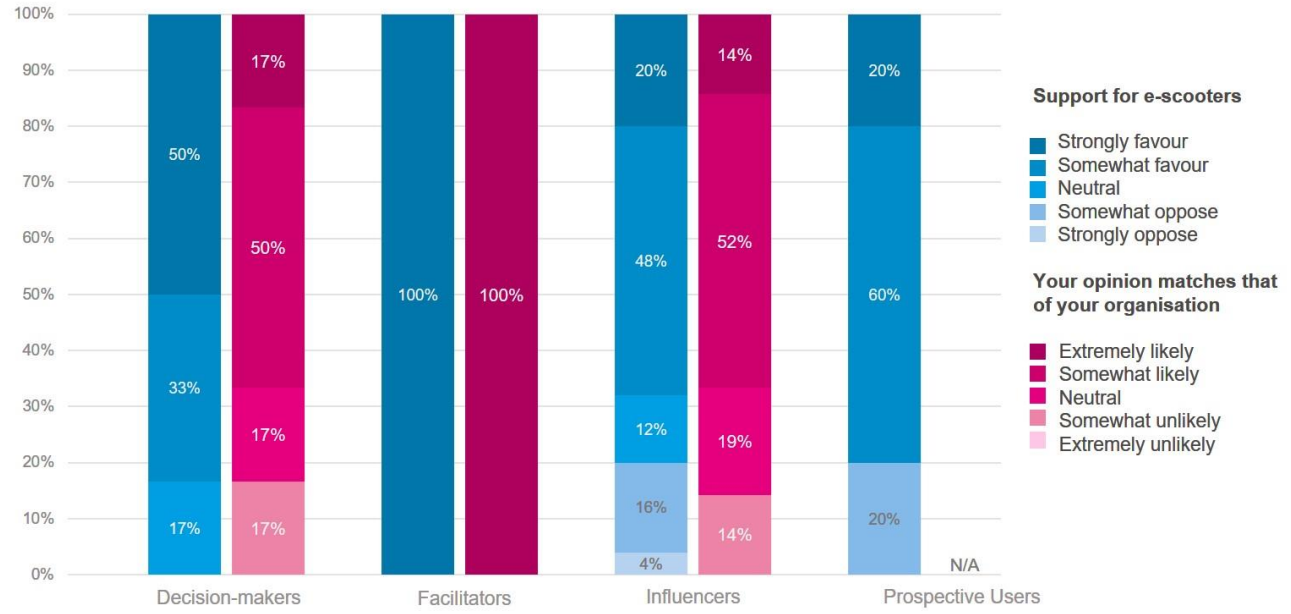
The stakeholder survey sought to establish the 'role' that the respondent plays in the future of e-scooters. Based on their responses, each respondent was allocated into one of four stakeholder groups as set out in Table 3. The survey received a total of 42 responses with 52% indicating they were a Transport Consultant, reflecting the author's professional network. Those that responded with 'Other' indicated their role using a comment box and were grouped accordingly.

Table 3: Stakeholder groups

	Decision-makers	Facilitators	Influencers	Prospective Users
Respondent category	Local Authority Greater London Authority and its organisations (e.g. TfL) Central Government Department (e.g. DfT)	E-scooter retailer E-scooter manufacturer Shared e-scooter system operator	Campaigning organisation Transport consultant (private company) Think tank Mobility industry professional	Prospective e-scooter user
Total group responses	6	6	25	5

The level of support for e-scooters was high with 76% indicating they were somewhat/strongly in favour. As shown in Figure 7, 83% of Decision-makers indicated their support albeit only 67% suggested their personal opinion matched that of their organisation. Similarly, 66% of the Influencers also indicated that their opinion matched their organisations stance on the topic.

Figure 7: Stakeholder level of support and opinion



Whilst typically surveys do not provide a very 'considered' input into planning (Ward, 2001), the method is restricted due to social-distancing requirements. Notwithstanding this, the anonymous surveys allow the respondent to provide their view without being influenced by the answers of those around them, particularly for the 13% of respondents who indicated that their opinion was unlikely to reflect that of their organisation. This removes the influence of 'group-think' which can occur during in-person participatory exercises, particularly when a core stakeholder attempts to lead their group towards a consensus. This can cause problems in the future (van der Heijden, 2000).

4.2. The short-term and long-term

Setting aside the present uncertainty, there is a lack of clarity regarding the future of e-scooters. To enhance the knowledge of stakeholders and to avoid misinterpretation, there needs to be more transparency regarding the expected futures of this mode. Bringing these anticipated futures to light through scenario analysis allows for strategic conversations to be had. Importantly, these conversations will not prevent future uncertainties which occur when an alternative future relies on its capacity to fulfil objectives (i.e. it might rely on technological breakthrough, social acceptance, legal context) (Baudry, Macharis and Vallée, 2018).

Scenario analysis is classically defined as a description of society's current situation, of possible and desirable future societal situations, and the series of events between current and future situations (Becker, van Houten and van der Linden, 1982). But how do we start this process of analysis when our current situation is somewhat 'up in the air'? It is for this reason that the stakeholder survey aims to establish if there was a general consensus surrounding the use of e-scooters in the short-term as well as the long-term. This helps to establish a starting point upon which the future can be built.

It is highly relevant that e-scooters are not yet legal in their entirety in the UK, with only shared e-scooter systems being trialled within strict parameters. At the time of writing, fewer than 10 shared e-scooter schemes

are operational in the UK, none of which are in London. The survey therefore allows us to establish stakeholder expectations on the use of e-scooters when (and if) they are more widely used.

E-scooter uses

For both the short-term and long-term stakeholders were asked '*In your opinion, what are the top three reasons for the use of e-scooters (privately owned or shared-system)?*'. Results have been analysed to determine the vote share assigned to each category, based on each respondent selecting three options. For example, an option chosen by all stakeholders would have a vote share of 33%.

Collectively, stakeholders indicated in the short-term that the main e-scooter uses were to facilitate independent, socially-distanced travel and to replace public transport journeys. Both these options were chosen as one of their top three choices by more than half of all respondents (Figure 8). The third most popular choice was 'to increase accessibility of areas with low public transport provision'. The Influencer and Facilitator groups concurred with this overall result albeit two-thirds of the Decision-makers indicated that a main use was to complement public transport. To a point, this conflicts with the Government's reasoning for bringing forward the e-scooter trials in the wake of the pandemic which was to provide alternative options to public transport though it is important to be mindful of the respondents perception of the short-term as this was not defined with a specific year.

Figure 8: Stakeholder perceptions on the top three most likely e-scooter uses in the short-term

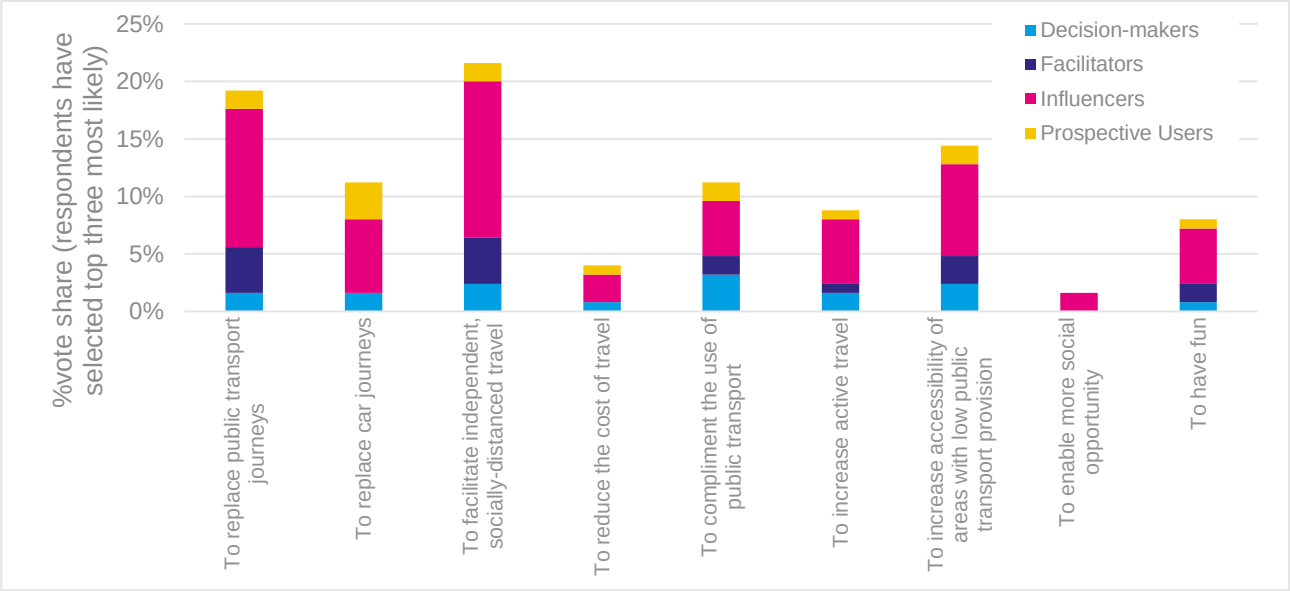


Figure 9: Stakeholder perceptions on the top three most likely e-scooter uses in the long-term

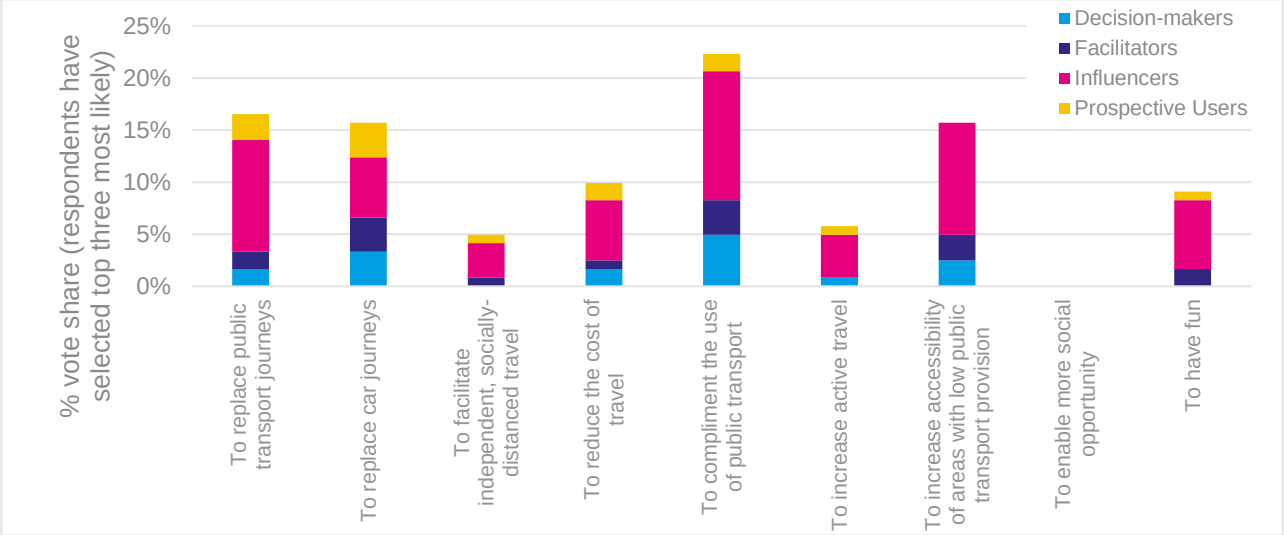
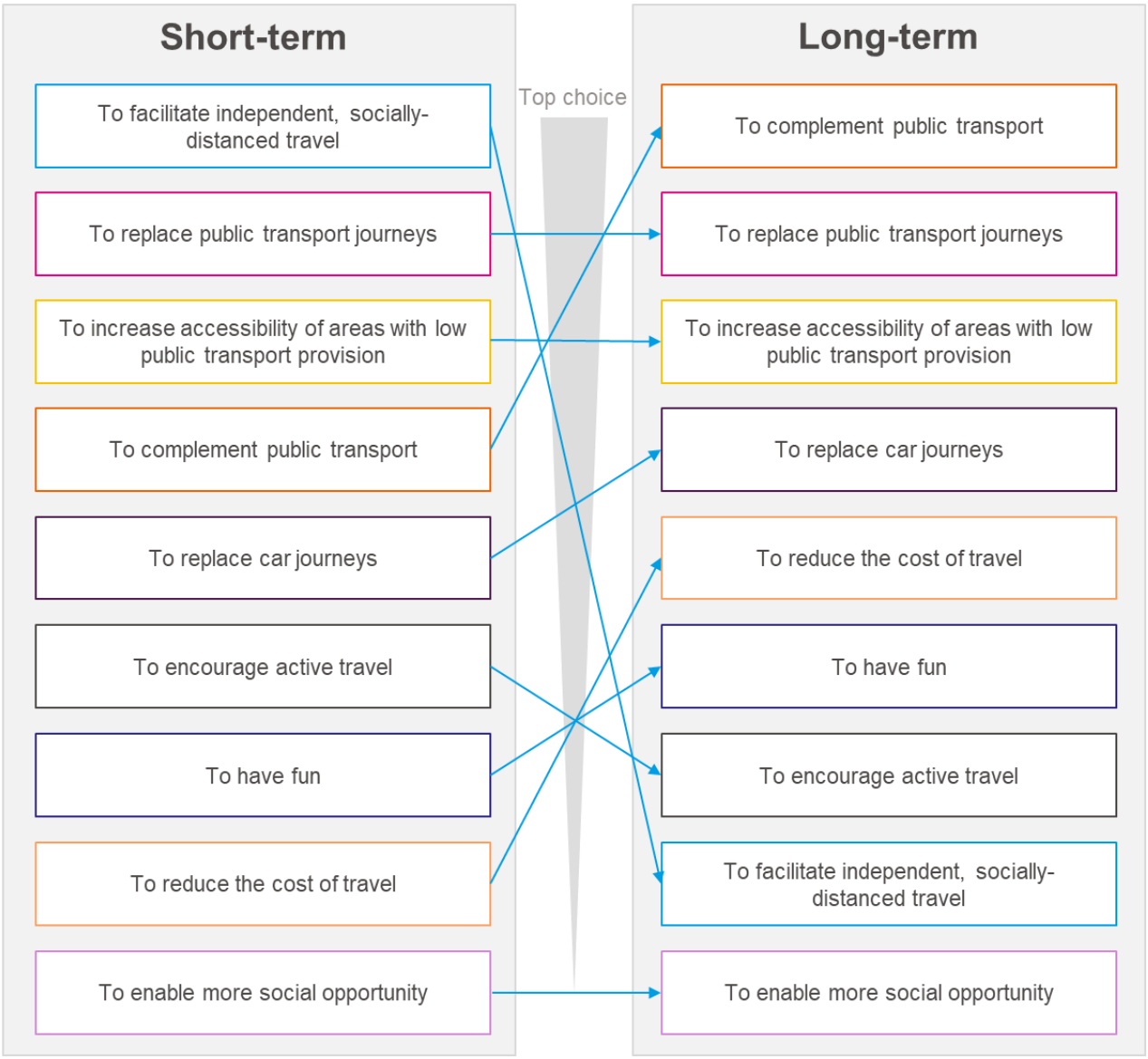


Figure 9 shows that stakeholders anticipate the use of e-scooters to shift between the short-term and long-term. In the long-term, e-scooters are expected to complement public transport which was chosen as a top three choice by two-thirds of all stakeholders, representing 22% of the overall vote share. This contrasts to the short-term when only a third of stakeholders chose this option. Notably, 'to replace public transport journeys' was the second most popular choice, gaining 17% of the vote share, perhaps reflecting the resonance of the current social distancing requirements. Though seemingly a conflict of interest, a total of 9 respondents indicated e-scooters would both complement and replace public transport suggesting the importance of spatial variability and the transportation needs across London. Prospective Users expect that in the long-term e-scooters will continue to replace car journeys. Significantly, 'to facilitate independent, socially-distanced travel' gained a much lower proportion of the vote share, decreasing from 22% in the short-term to 5% in the long-term. Figure 10 shows the changing perspective of e-scooters uses over time.

Figure 10: Top e-scooter uses ranked by all stakeholders



E-scooter trip purposes

Respondents were asked "*In your opinion, what do you expect to be the top three most common e-scooter trip purposes?"* in both the short-term and long-term (Figure 11 and Figure 12 respectively). In the short-term, stakeholders suggested that e-scooters will primarily be used to commute to/from the workplace, travel to/from friends and family houses and travel to/from green spaces. The latter was the most commonly chosen choice amongst the Decision-makers with all but one respondent choosing this option. Only one respondent chose 'travelling to/from other retail shops', perhaps reflective of non-food shopping being linked with other activities which would not be practical to travel to on an e-scooter due to distance or travelling with others.

Figure 11: Stakeholder perceptions of the top three most likely e-scooter trip purposes in the short-term

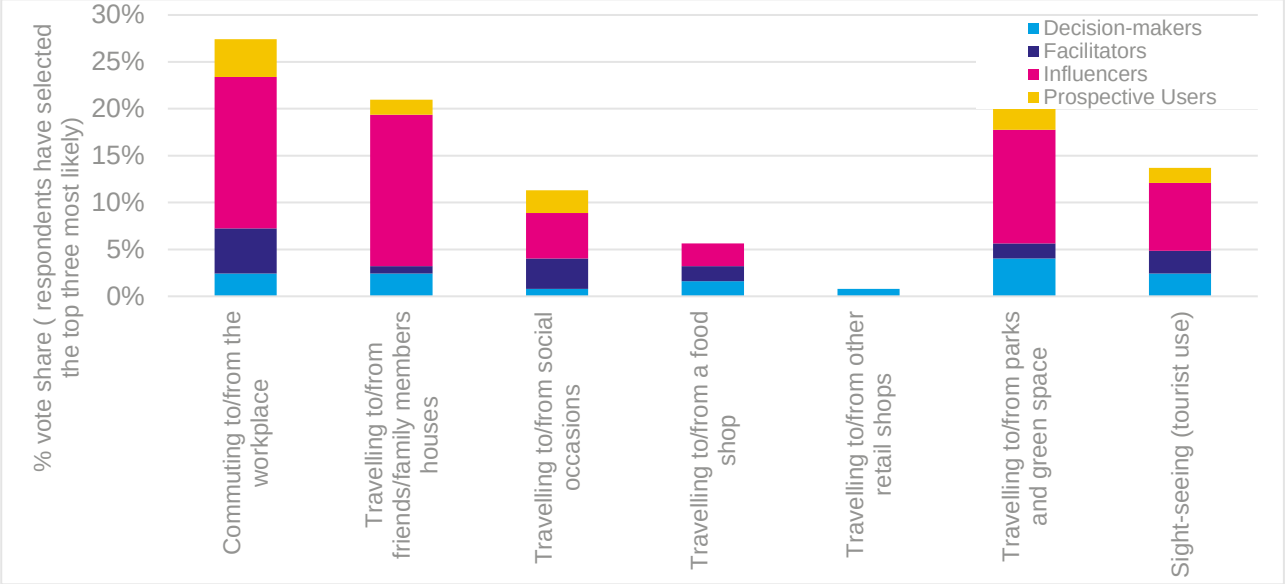
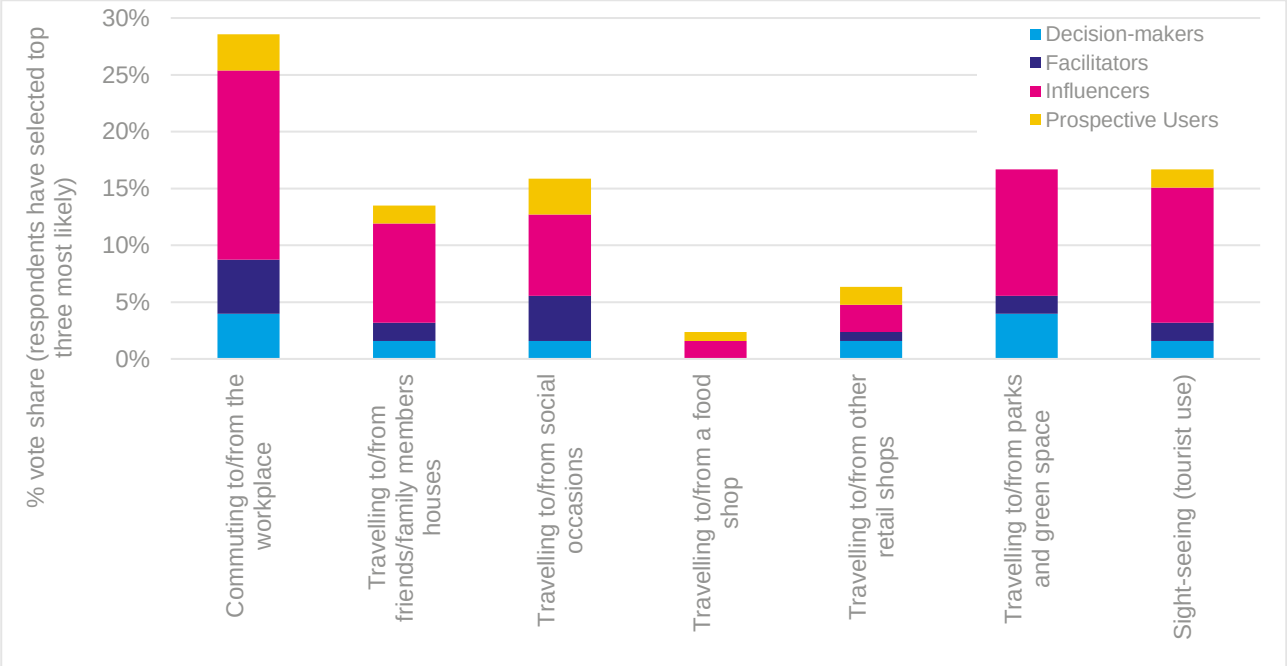
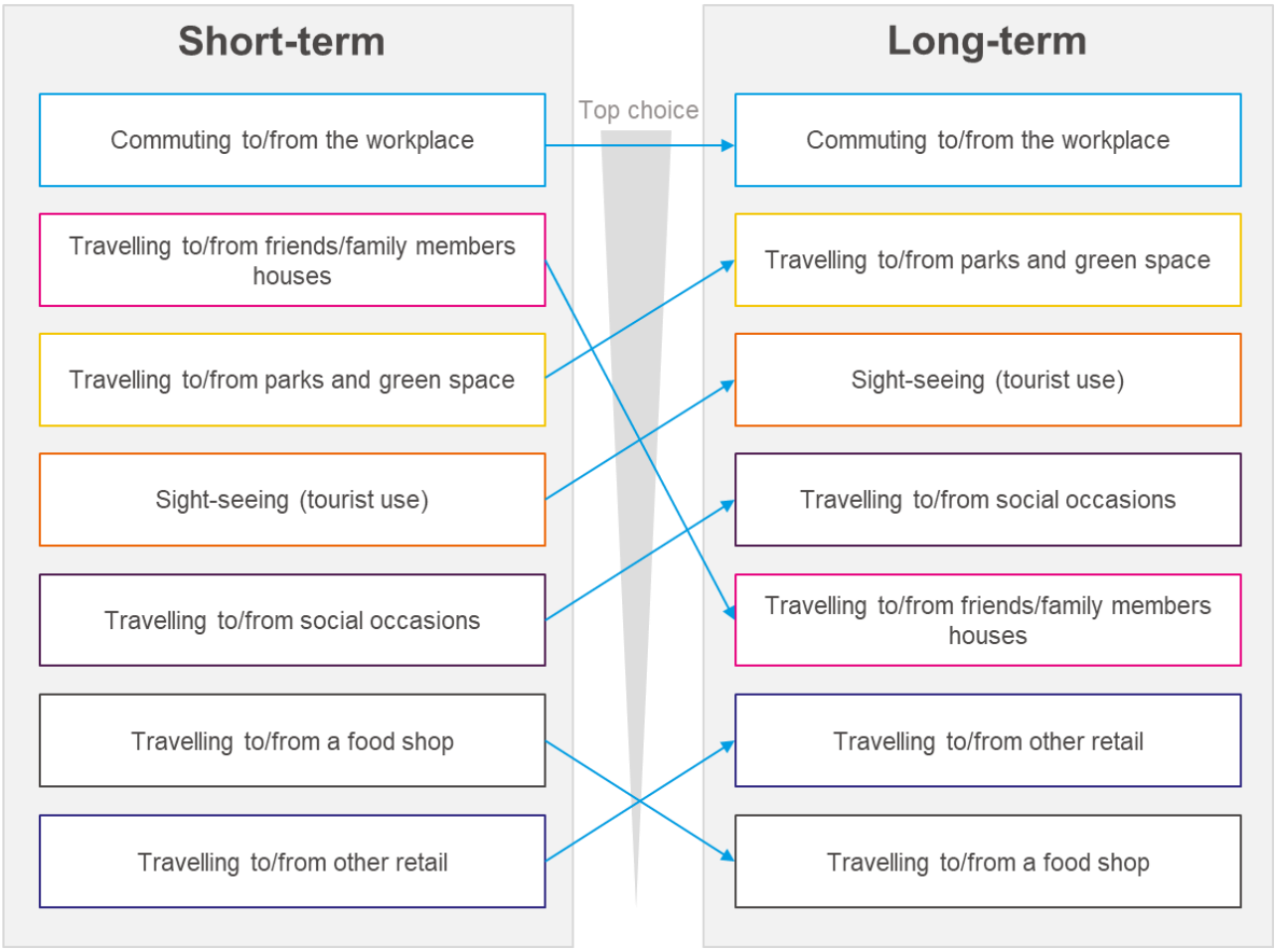


Figure 12: Stakeholder perceptions on the top three most likely e-scooter trip purposes in the long-term



Stakeholders anticipate only a slight shift in the primary e-scooter trip purposes in the long-term. 34% of respondents chose not to change their options for the long-term and those that did only changed one or two choices. Overall, stakeholders expect e-scooters to be primarily used for commuting to/from work as well as travelling to/from green space. Fewer indicated they will be used to travel to/from friends/family houses which questions how these trips will be fulfilled if not by e-scooter; will they return to public transport or will they be fulfilled by car? Whilst still representing only 6% of the vote share, stakeholders expect an increase in the use of e-scooters to travel to/from retail shops. Figure 13 summarises the anticipated change of e-scooter trip purposes over time.

Figure 13: Top e-scooter trip purposes ranked by all stakeholders



Expected impacts

Respondents were asked to identify on a 5-point Likert scale (from 1-Extremely unlikely to 5-Extremely likely) their opinion surrounding the potential impacts of e-scooters. Overwhelmingly, Figure 14 shows that all stakeholders suggested that nearly all the statements were likely/extremely likely to happen in the short-term. In particular, 93% suggested that a travel mode shift from public transport to e-scooter was likely. This view of the short-term reflects studies undertaken in cities similar to London in terms of public transport provision (6t-bureau de recherche, 2019). 45% of respondents indicated that a travel mode shift from car to e-scooter was unlikely. This question, however, does not take account of spatial variability across London in terms of car ownership. Generally, there is lower ownership in central London and higher ownership in outer London, as discussed in Chapter 2.

The average scores grouped by stakeholder for the short-term are shown in more detail in Table 4. Facilitators and Prospective Users are positive about modal shift from car and public transport to e-scooter, though sceptical about the shift from walking. Contrasting views regarding the likelihood of e-scooters having users of a wider demographic are indicated with Facilitators generally agreeing (average score of 3.8) and Influencers somewhat disagreeing (average score of 2.7). Regarding safety, divergent views across groups were found, with Facilitators disagreeing with the other stakeholder groups by indicating that conflicts with automobiles, pedestrians and cyclists were not likely.

Figure 14: Percentage of all respondents choosing a particular viewpoint regarding the likelihood of an impact in the short-term (all stakeholder types)

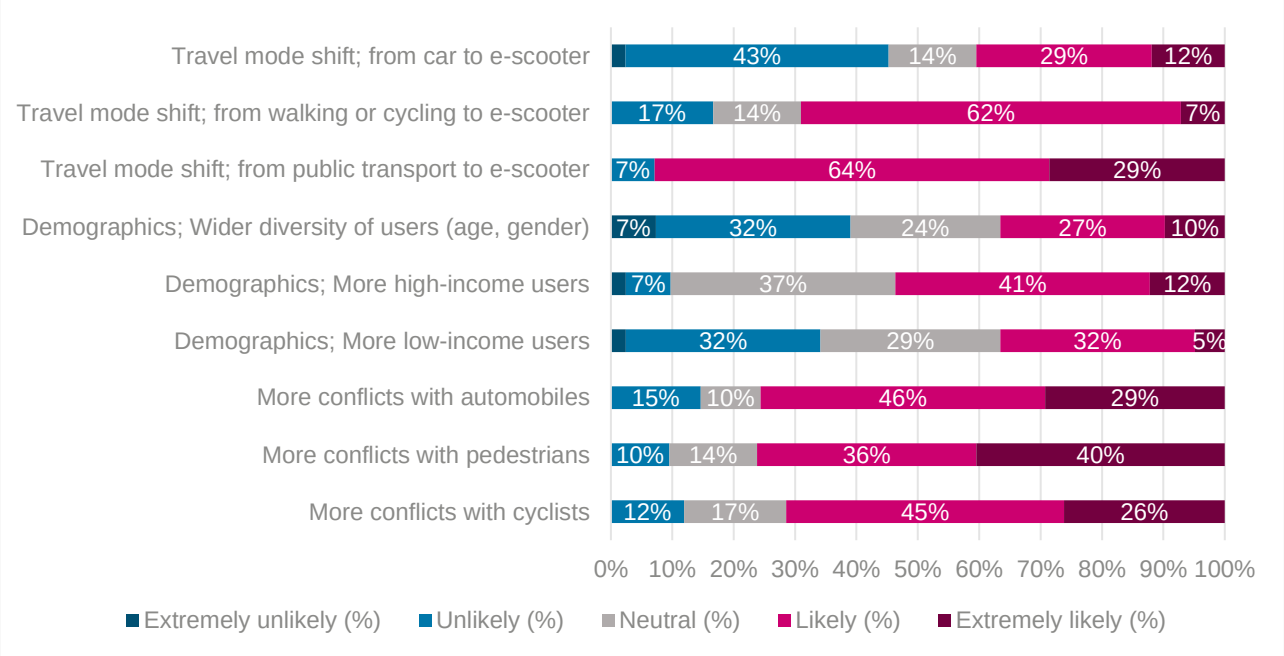


Table 4: Perceived likelihood of impacts in the short-term by stakeholder type (from 1-Extremely unlikely to 5-Extremely likely)

Short-term	**Stakeholder Group**				
	Decision-makers	Facilitators	Influencers	Prospective Users	All stakeholders
Travel mode shift					
From car to e-scooter	3.2	4.2	2.6	3.8	**3.0**
From walking or cycling to e-scooter	3.8	3.0	3.8	3.0	**3.6**
From public transport to e-scooter	3.7	4.5	4.2	4.2	**4.1**
Demographics					
Wider diversity of users (age, gender)	3.2	3.8	2.7	3.4	**3.0**
More high-income users	3.8	3.7	3.5	3.4	**3.5**
More low-income users	2.8	3.5	2.8	3.8	**3.0**
Safety					
More conflicts with automobiles	4.3	2.5	4.3	3.4	**3.9**
More conflicts with cyclists	4.2	2.7	4.1	3.6	**3.9**
More conflicts with pedestrians	4.2	2.7	4.4	4.0	**4.1**

Figure 15: Percentage of all respondents choosing a particular viewpoint regarding the likelihood of an impact in the long-term (all stakeholder types)

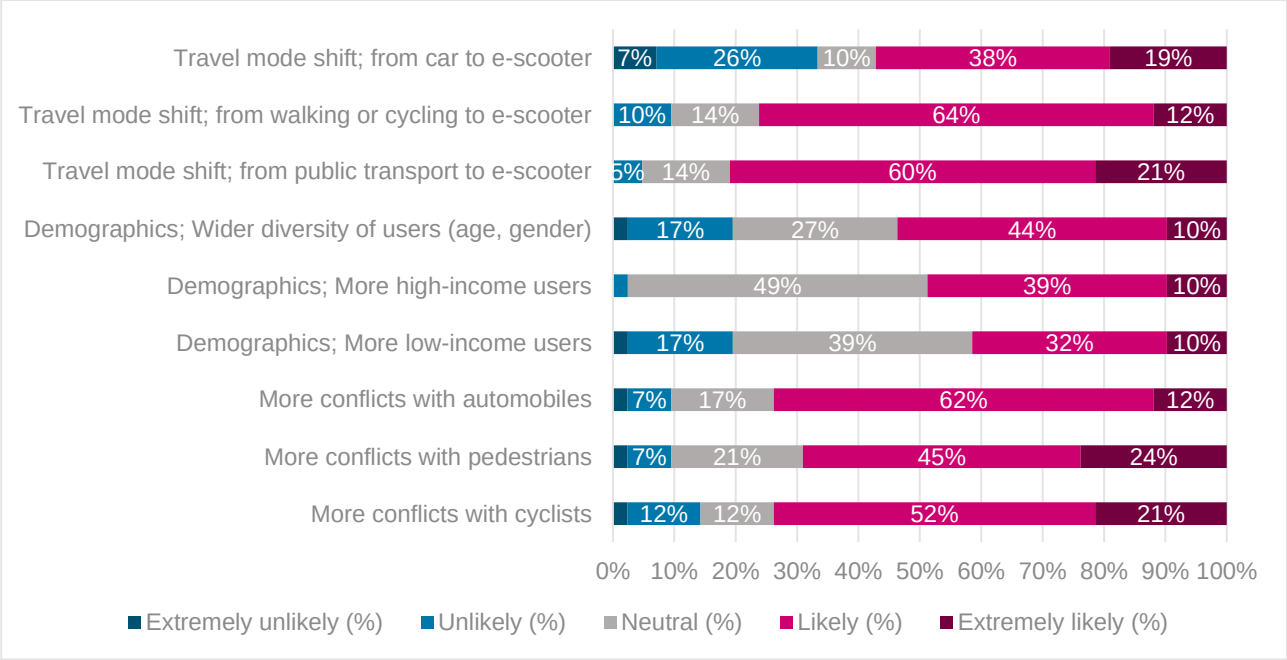


Table 5: Perceived likelihood of impacts in the long-term by stakeholder type (from 1-Extremely unlikely to 5-Extremely likely)

Long-term	**Stakeholder Group**				
	Decision-makers	Facilitators	Influencers	Prospective Users	All stakeholders
Travel mode shift					
From car to e-scooter	3.5	4.5	3.0	3.8	**3.4**
From walking or cycling to e-scooter	3.7	3.2	4.0	3.8	**3.8**
From public transport to e-scooter	4.0	4.0	3.9	4.4	**4.0**
Demographics					
Wider diversity of users (age, gender)	3.8	4.0	3.1	3.8	**3.4**
More high-income users	3.7	3.5	3.5	3.6	**3.6**
More low-income users	3.3	3.5	3.0	4.2	**3.3**
Safety					
More conflicts with automobiles	4.0	2.5	3.9	4.0	**3.7**
More conflicts with cyclists	4.3	2.7	3.9	3.8	**3.8**
More conflicts with pedestrians	4.2	2.5	4.0	3.8	**3.8**

In the long-term (Figure 15), results suggest that more stakeholders anticipate a higher travel mode shift from e-scooter to car, though are less certain about the shift from public transport, possibly given that public transport no longer poses a risk once the pandemic has subsided. More stakeholders selected 'neutral' when responding to the demographical questions suggesting greater uncertainty.

Table 6 shows the difference between the short-term and long-term results, indicating a change in perspectives over time. There are several notable observations. The Facilitators and Influencers anticipate a reduction in likelihood of e-scooters replacing public transport trips which contrasts to the Decision-makers and Prospective Users. Particularly, the latter anticipate an increase in likelihood of e-scooters replacing walking and cycling trips over time. Furthermore, both the Decision-makers and Influencers anticipate the likelihood of conflicts with automobiles to reduce slightly in the long-term, though the Decision-makers still anticipate a similar level of likelihood of conflicts with cyclists and pedestrians. Influencers, expect this likelihood to reduce slightly, perhaps through infrastructure development and improving rider behaviour.

Table 6: The change in perceived likelihood of impacts over time (increase in likelihood and decrease in likelihood)

Short-term to long-term change	**Stakeholder group**				
	Decision-makers	Facilitators	Influencers	Prospective Users	All stakeholders
Travel mode shift					
From car to e-scooter	0.3	0.3	0.4	0.0	0.4
From walking or cycling to e-scooter	-0.1	0.2	0.2	0.8	0.2
From public transport to e-scooter	0.3	-0.5	-0.3	0.2	-0.1
Demographics					
Wider diversity of users (age, gender)	0.6	0.2	0.4	0.4	0.4
More high-income users	-0.1	-0.2	0.0	0.2	0.1
More low-income users	0.5	0.0	0.2	0.4	0.3
Safety					
More conflicts with automobiles	-0.3	0.0	-0.4	0.6	-0.2
More conflicts with cyclists	0.1	0.0	-0.2	0.2	-0.1
More conflicts with pedestrians	0.0	-0.2	-0.4	-0.2	-0.3

It is clear that the views of each stakeholder group reflect their level of support (see Figure 7). Facilitators and Prospective Users who have a higher level of support for e-scooters indicated that they expect e-scooters to have more positive impacts (e.g. modal shift from car, wider diversity of users etc.). Influencers who had a more neutral level of support (though still favourable), had the strongest views regarding impacts perceived to

be negative i.e. unsustainable or less equitable (e.g. mode shift from walking likely, wider user demographics unlikely). This is anticipated given those with 'Influencer' industry roles are not directly impacted by the uptake of e-scooters like those in the Facilitators group would be. An Influencers role in the industry is likely to be broader and their views more rounded and less biased.

Result Sensitivity

Thought must be given to the influence of group size on the results where conclusions are drawn for stakeholders as a whole. Given Influencers represent 52% of the respondents, the removal of these answers has the potential to impact results. Arguably, whilst this might reflect the size of the groups outside of this survey and in the industry as a whole, it does not reflect their 'power'. Ultimately, decision-makers have the greatest 'power' to influence the future of e-scooters, though it is emphasised that when wider stakeholders are involved, there is a greater chance of buy-in and subsequent successful policy-making (Macharis and Kin, 2017).

A sensitivity test has been undertaken to understand if there are any significant changes to the above results if the Influencers were removed from the dataset.

During both the short-term and long-term, only two notable changes occurred to the results:

- Regarding long-term uses, 'to reduce car use' ranked 1st in the sensitivity test compared to 4th shown at Figure 10.
- Regarding short-term trip purposes, 'travelling to friends/family members houses' ranked 5th in the sensitivity test compared to 2nd as shown at Figure 13.

Whilst the sensitivity test does not show a significant change to the results when the Influencers are removed from the dataset, it remains important to understand, particularly if policies are to be influenced by the results.

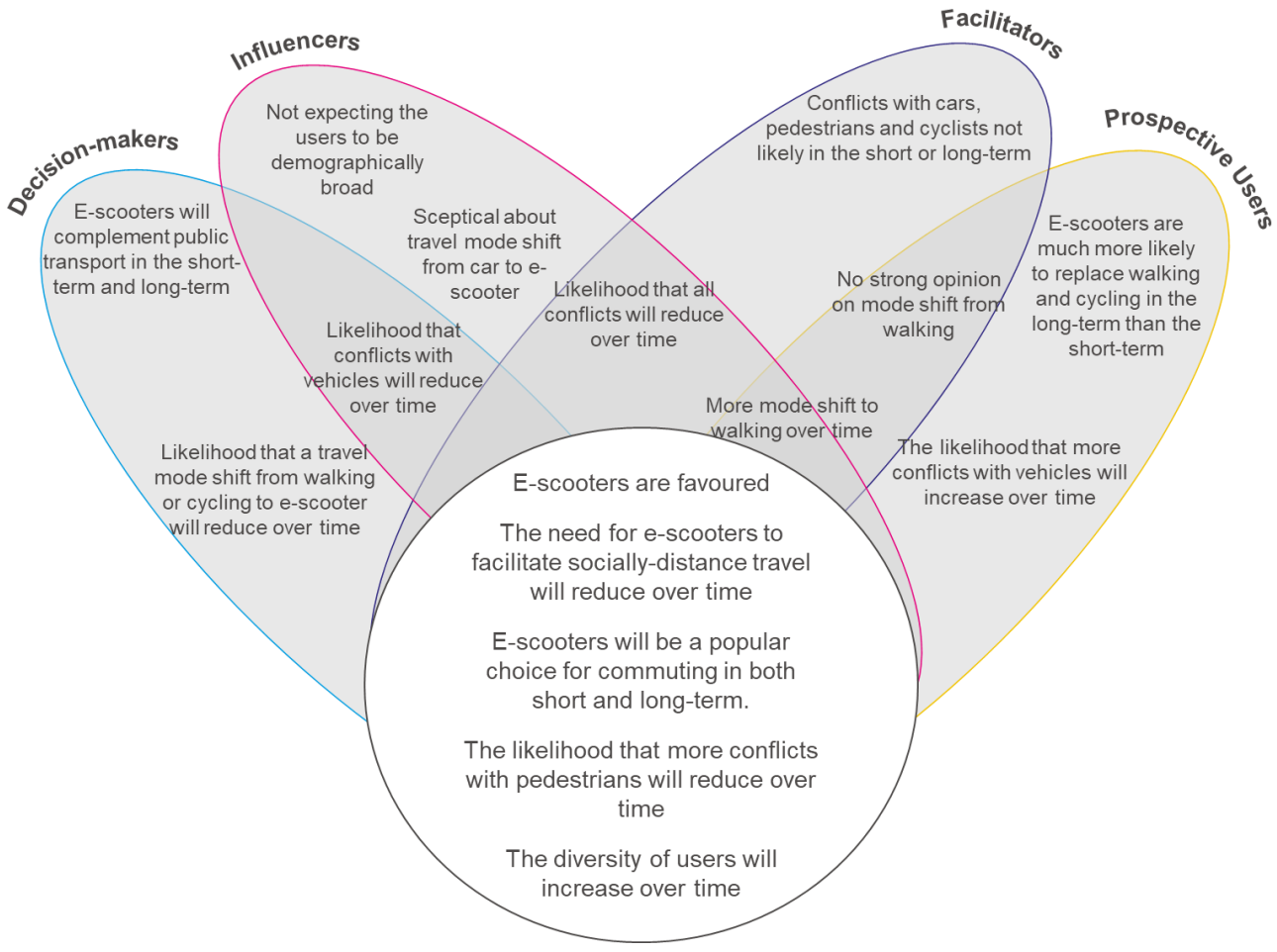
4.3. Consensus

In a pandemic impacted world, the business-as-usual path has been uprooted. The need to rally together, share our knowledge and increase our understanding of our potential futures is now of upmost importance. The challenge when scenario planning, is gaining consensus amongst groups. Indeed, one group's sustainability advocate might be another group's disruptive, tree-chained protestor. Consensus through stakeholder dialogue is defined as the process of seeking unanimous agreement involving a good-faith effort to meet the interests of all stakeholders (van de Kerkhof, 2006). In transport, participatory exercises aim to increase consensus to reduce the antagonistic and time-consuming consultations which can cause indecision and deadlock (Ward, 2001). Notwithstanding this, it is important to understand that too much consensus can lead to restrained adaptability whilst too little could lead towards group fragmentation where direction and leadership is lost (van der Heijden, 1996).

It is recognised that there is difficulty gaining consensus through a survey given that individual thoughts cannot be tabled and compromises made in-situ. The survey does however allow for individuals to express their true opinion behind the curtain of anonymity.

The main points of alignment and misalignment between stakeholder perspectives are summarised at Figure 16. Encouragingly, elements of consensus were found between all stakeholder groups, confirming the research hypothesis. Unsurprisingly, however, diverging views were also found. Broadly speaking, all stakeholder groups indicated they were in favour of e-scooters which is encouraging for acceptability. Stakeholders also aligned with the view that the need for e-scooters to facilitate socially-distanced travel will reduce over time. This was to be expected, particularly given that the DfT instigated the rapid emergence of e-scooter trials in order to mitigate reduced public transport capacity due to social distancing requirements (Department for Transport, 2020). Decision-makers indicated that e-scooters will complement public transport both in the short-term and long-term, perhaps indicative of the spatial variability and public transport accessibility across London. This reflects studies in both Europe and the US (6t-bureau de recherche, 2019; Chester, 2019).

Figure 16: Key alignments and misalignments in stakeholder perceptions



Stakeholders aligned on their perception of e-scooter uses with all anticipating they will facilitate commuting both in the short and long-term. This reflects results of a German-based study which saw e-scooters largely used for commuting, as well as leisure trips (Hardt and Bogenberger, 2019). Conversely, McKenzie (2019) found that in a US-based study, membership-based scooter-share travel patterns do not suggest standard commuting patterns but instead leisure, recreation and tourism activities.

Further alignments were found regarding pedestrian conflicts and user diversity. As society learns through the increased presence of e-scooters, pedestrians and indeed e-scooter and road users will likely adapt and become more aware of the new risks. Enhanced infrastructure may assist this through separation of road users. Similarly, as e-scooters gain popularity they will gradually become the 'norm', encouraging more users of all ages and backgrounds to use them.

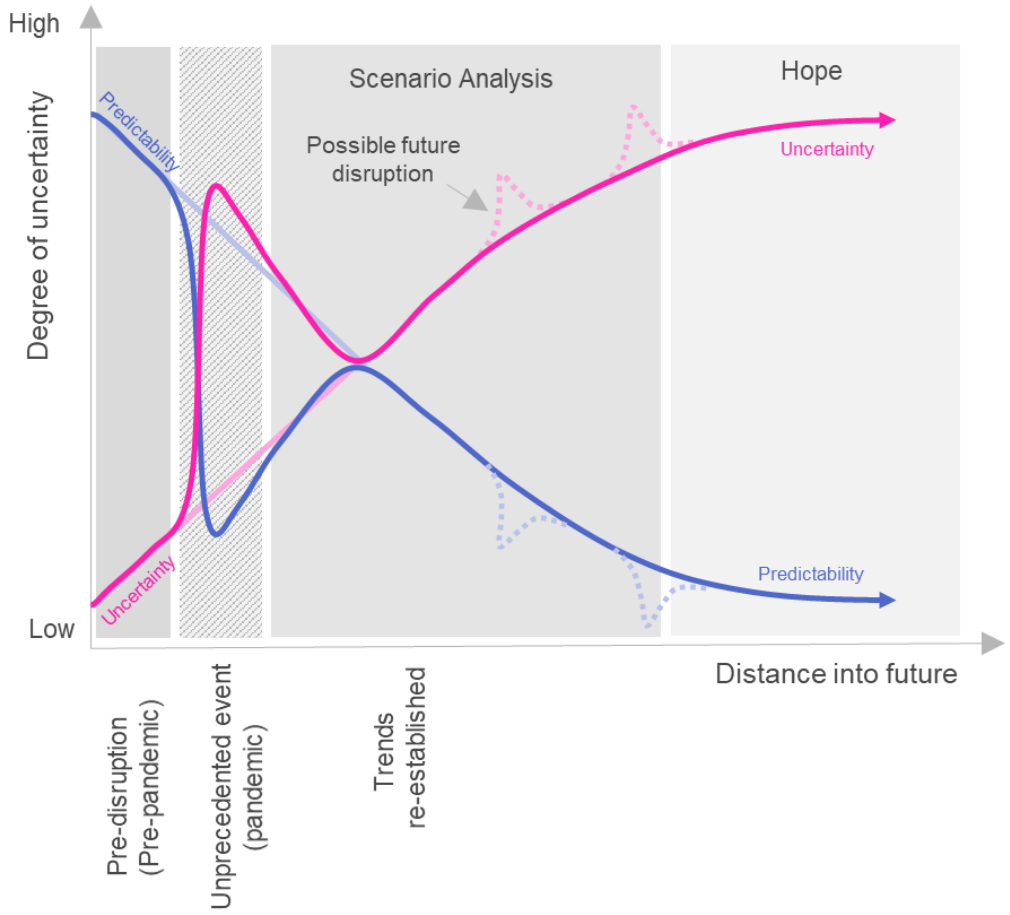
Misalignments were found regarding modal shifts. All stakeholders perceive a shift from cars to e-scooters to be likely aside from the Influencers who believe it to be unlikely in the short-term and remained sceptical in the long-term. These results reflect a similar study undertaken by Aono & Bigazzi (2019) who investigated stakeholder viewpoints surrounding e-bike adoption in British Colombia, Canada. They too found misalignments amongst stakeholders regarding mode shift although it was the government agencies that were least optimistic about mode shift from automobiles.

It is highlighted that stakeholder participation processes such as that included in this research are often imperfect and commonly do not yield any consensus, or at least a strong consensus across participating groups (The National Academy of Sciences, 2004). A total of 42 stakeholders contributed towards this research which is deemed to be acceptable. Similar consensus-finding methods such as the Delphi Technique generally consist of 10-100 respondents with smaller groups also obtaining good results if expert respondents are well chosen (Akins, Tolson and Cole, 2005).

4.4. Uncertainty and the present/future

Given the present pandemic and the impacts on our daily lives, thoughts return to (van der Heijden, 1996) view of predictability versus uncertainty (Figure 3). Perhaps this view is optimistic. An unprecedented event, the pandemic has caused predictability to rapidly decline and uncertainty to swiftly rise. As the pandemic subsides, our predetermined aspects will reappear (though potentially distorted) as society adapts to a new normal. But who is to say that other future shocks and events, maybe caused by climate change, economic downturns or other pandemics will not reoccur and further affect this simplistic view of futures forecasting? An alternative view of van der Heijden's (1996) predictability vs uncertainty graph is shown in Figure 17.

Figure 17: The temporal impact of unprecedented events on uncertainty and predictability



4.5. Bridging the implementation gap

Research surrounding transport sustainability highlights the fundamental gap between scientific research and policy actions and outcomes (Banister, 2008). It is particularly important that participatory methods involving a wide range of stakeholders work to provide an essential bridge. The innovations at the heart of these policy actions however, come with fundamental uncertainty because it is difficult to understand user behaviours and how routines will change, if at all (Schwanen, Banister and Anable, 2011). It is important that the social science aspect of it is understood. New technologies do not impact immediately, they are required to be socially accepted, constructed further by society themselves (Geels and Verhees, 2011). Hence, they need to be embedded within existing societal norms. This is key to framing policies which assist the pathways to desired futures.

This study continues to extend the conversation from the anticipated short-term and long-term impacts of e-scooters in London, through to the championed futures and associated policies. In order to do this, the two research methods were combined. The participatory scenario planning was undertaken by 30 transport consultants (Influencers). Some, though it is not known how many due to anonymity, completed the stakeholder survey. Through 'visioning', the development of scenarios (Figure 6) against set uncertainties (technology and behaviour) allowed participants to think imaginatively and thus innovatively (Bishop, Hines and Collins, 2007) establishing further conversation about the future and what our response should be.

Participants were asked to backcast and develop policy pathways associated with each scenario whilst the stakeholder survey established the policy pathways deemed to be the most important. By combining these datasets, we can begin to understand the future scenarios the stakeholders are championing through their policy choices. The future e-scooter scenarios and their policy pathways as indicated by workshop participants are summarised below (Table 7).

Table 7: Scenario policy pathways

	PP1	PP2	PP3	PP4	PP5	PP6	PP7	PP8	PP9	PP10
	Regulation	Transport Tech Innovation	Active Transport	Urban Planning	Hard infrastructure investment	Public Transport	Behavioural measures	ICT	Logistical/ delivery solutions	Clean alternative fuels
Technology Rules		■						■	■	■
All in this Together	■	■			■	■				
Self-Care			■	■	■					
New Age of Environmental Warriors	■		■			■	■			

The stakeholder survey asked respondents to rank the policy packages in order of importance with results shown in Figure 18 and group responses in Table 8. Individual stakeholder group rankings are shown graphically in Appendix C.

Figure 18: Ranked importance of policy packages (all stakeholders)

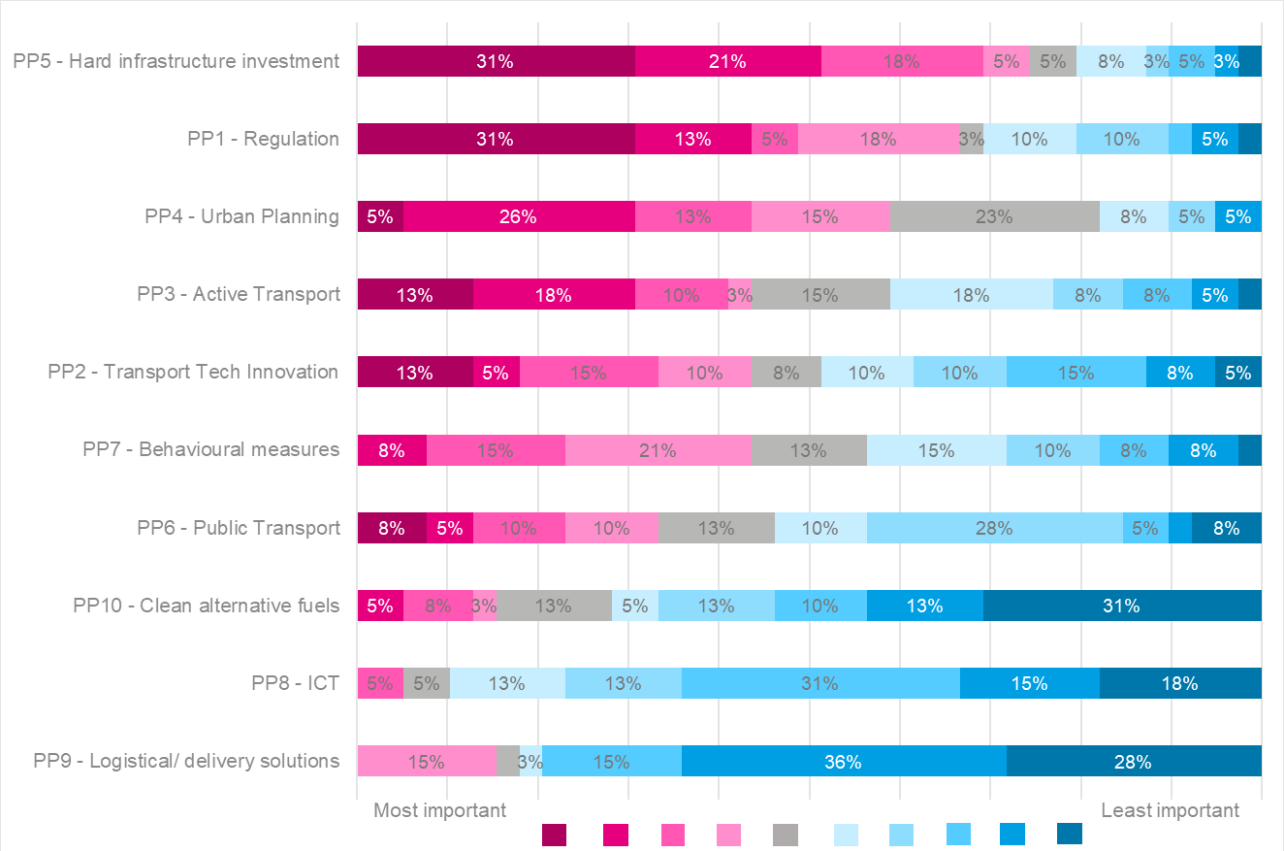


Table 8: Stakeholder group rankings

Policy packages: ranked choice (1st = most important, 10th = least important)	**Stakeholder Group**			
	Decision-makers	Facilitators	Influencers	Prospective Users
1st	PP3	PP5	PP1	PP5
2nd	PP5	PP2	PP5	PP1
3rd	PP6	PP4	PP4	PP4
4th	PP2	PP1	PP3	PP3
5th	PP7	PP7	PP7	PP7
6th	PP4	PP3	PP6	PP2
7th	PP10	PP6	PP2	PP6
8th	PP1	PP9	PP8	PP10
9th	PP8	PP10	PP10	PP8
10th	PP9	PP8	PP9	PP9

Stakeholders largely agree on the importance of policies. Hard infrastructure (PP5), regulation (PP1), active transport (PP3) and urban planning (PP4) generally ranked high across all groups. Overall, hard infrastructure investment and regulation were chosen as the most important in developing desirable futures of e-scooters in London. Whilst there was consensus amongst groups, there was also a notable result regarding regulation. The top two ranked policy packages are discussed further below. All groups also concurred that ICT (PP8) and Logistical/delivery solutions (PP9) ranked the lowest in importance.

Hard Infrastructure

It is unsurprising that all stakeholders chose infrastructure investment as their first or second choice given the plethora of research relating to the positive impacts of cycling infrastructure on cycle mode share (Yang *et al.*, 2010; Pucher, Buehler and Seinen, 2011; Heinen *et al.*, 2017; Song, Preston and Ogilvie, 2017). Infrastructure was also chosen as a top priority by all respondents in the aforementioned Aono & Bigazzi (2019) e-bike study. One is likely to assume that infrastructure that segregates e-scooters from general traffic increases safety and encourages use, similar to the effects of cycling infrastructure (Aldred *et al.*, 2017). In a Parisian e-scooter study, 82% of e-scooter users indicated they wanted to ride on a bicycle lane/track (6t-bureau de recherche, 2019).

The wider impacts are also clear. Farla et al (2016) indicates that investment in cycling infrastructure benefits the economy and enhances the attractiveness of areas for people to live and work in, also reducing congestion. It also boosts social inclusion by providing better access to public services and cutting travel costs.

Regulation

Amongst most stakeholders, regulation was deemed to be an important policy package, ranking 2nd overall. Generally, there is agreement that the regulation of e-scooters is necessary to ensure increased safety, decarbonisation and competition (ITF, 2020). However, there remains to be significant debate regarding how these regulations impact private e-scooter scheme operators and the individual users themselves (London Cycling Campaign, 2020).

Surprisingly, the Decision-makers ranked regulation as fairly unimportant in 8th position, the reasons for which have been hypothesised. The regulation aspect of e-scooters, such as overall vehicle class and associated design and speed restrictions remain a key challenge because it changes regulations which have sat unchanged for many years. Primarily, transport regulation aims to protect the public (Padam, 1998) and solve a problem. Nevertheless, e-scooters are new and thus we are yet to obtain a grasp of what problems might arise.

Stakeholders are likely to have different understandings of regulation and how it is applied in different contexts. Governmental departments or local authorities are exposed to different levels of regulation. A wider survey should seek to gain the opinions of those within direct regulatory organisations including the Office for Rail and Road for example. It is key to understand this diversion in stakeholder opinion given that ultimately, these stakeholders make the decisions and implement the policies.

4.6. Championed futures

Overall, the ranked most important policies (PP1, PP3, PP4, PP5) suggest the future of e-scooters extends to a scenario of 'Self-care' (Table 7) built upon low technology use within an individualistic society. Perhaps reflective of the ongoing impact of the pandemic, in the 'new-normal' individuals have settled into their new habits, with fewer numbers returning to public transport. The importance of self-protection remains when travelling so private e-scooter use is popular, yet, shared systems and indeed public transport fail to significantly increase use. Still, regulation is indicated as important (by most).

Having chosen the same top 4 most important policy packages (as above), the Prospective Users and Influencers have also suggested a pathway towards a scenario of 'Self-care'. Facilitators have indicated they find transport tech innovation (PP2) more important which they ranked 2nd. The inclusion of this policy package might therefore set out a pathway towards a scenario of enhanced technology, though these packages do not set out a clear-cut route towards the workshop built scenarios. Further to this, the Decision-makers rank Public Transport as 3rd most important beneath Active Transport and Hard Infrastructure. Again, these package choices do not directly align with a workshop-developed scenario.

It is emphasised that the use of scenarios in this methodology are simply for exploratory purposes and are not intended to define the 'chosen' future. They have been used to allow stakeholders to think about the possible futures if particular policy packages were chosen and act as a useful 'state' upon which comparisons with other stakeholder opinions can be compared. The scenarios are plausible, but by no means correct. Indeed, the scenarios were developed against two profound uncertainties, yet there are many more upon which scenarios could be developed.

In summary, it is clear that hard infrastructure (PP5) is indicated as very important by all groups and thus it is recommended that this is prioritised in policy-making. Policies ranked as largely unimportant by all stakeholders should not be side-lined completely as their level of importance might grow over time. E-scooters and wider e-mobility provide great opportunity to reduce the carbon emissions of logistical vehicles, though load dependent (LCC, 2020). It is emphasised that a flexible, participatory approach to policies is required. This ensures there are no lock-ins if any policies might lead to unsustainable outcomes (Åkerman and Höjer, 2006). Whilst few papers reflect on how the choice of stakeholders might have influenced the outcomes, stakeholder participation remains key for buy-in, social learning and empowerment (Wangel, 2011).

4.7. Limitations and future research

The methodology sought to identify stakeholder perspectives, though the sample size was small and insufficient for statistical modelling. Small groups of semi-qualitative data are particularly sensitive to change (Clifton and Handy, 2001). Whilst contrary to the aims of participatory methods, the weighting of stakeholder influence, which would be difficult to determine in any case has not been factored. Participatory studies have many potential merits. yet particularly powerful actors might undermine participatory initiatives in transport planning (Ward, 2001). Decision-makers made up 14% of the overall stakeholder response, perhaps unrepresentative of the industry. A further study would ensure a larger number of diverse participants to enhance stakeholder group representation.

Whilst the study sought to fulfil a research gap, the use of stakeholder perspectives has two key limitations. Firstly, when analysing the importance of policy packages, there is a potential that stakeholders have a lack of insight into the effectiveness of measures (Macharis and Milan, 2015). To complicate matters further, data recording the success of e-scooter policies is lacking, thus stakeholder opinions are likely to be based on policies for other modes. Secondly, stakeholder bias is likely to influence the results. When exploring futures the use of stakeholders could be a hindrance because their thinking is somewhat bound to reasons they are a stakeholder in the first place.

With regard to the methodology, the use of a survey perhaps restricts the range of answers. Surveys can limit insight and are particularly susceptible to wording biases, order, and context effects (Mokhtarian and Salomon, 2001). To combat this, interviews were used to identify key variables and discussion points as encouraged by Clifton and Handy (2001) prior to the survey. Semi-structured interviews for all respondents might provide greater insight, however, these themselves come with limitations. A survey was deemed the most suitable method considering the social-distancing requirements and time limitations.

This methodology has been constructed to suit the present situation. It therefore might not be suitable for a study at another point and should be adapted to the situation. Notwithstanding the limitations, it is concluded that the study acts as a successful conversation starter and provides a multitude of gateways to further research. It is also anticipated that the upcoming e-scooter trials will provide a rich source of data for research. The anticipated e-scooter uses and trip purposes could be compared against actual user survey data to provide an understanding about the accuracy of stakeholder anticipations. Similarly, as undertaken by van Lier, *et al* (2018), further research could allow a comparison of expectations against real life results of policy implementation in other cities and checks to understand if stakeholder perceptions are grounded.

As per Montibeller, Gummer and Tumidei (2006); Hickman et al., (2012) and Soria-Lara and Banister (2018), the future scenarios can be evaluated using multi-criteria analysis (‘MCA’) to determine their physical, technological and socio-economic feasibility. In these methods, scenarios are compared against the BAU-state to determine their potential success, though the drive behind this study is the lack of this BAU-state. Nonetheless, it is recommended that MCA is undertaken as part of a similar study in the future, once the ‘new-normal’ is established.

5. CONCLUSION

The topics of sustainability and uncertainty have become increasingly important in 21st century transport discussions, and even more so during the current pandemic. COVID-19 has thrust the need for personal mobility devices such as e-scooters into the spotlight as individuals alter how and why they move. The UK Government has responded by bringing forward e-scooter trials, yet, the impact of these micro-modes, both in the short-term and long-term is unknown.

This research provides an insight into the views of stakeholders in order to establish conversations that may contribute to the future e-scooter landscape in London. As a new mode in the UK, this study seeks to fill a research gap with no UK-based e-scooter studies having taken place at the time of writing. Even within international literature, very few e-scooter studies have sought to gain stakeholder perspectives which is crucial to buy-in and subsequent policy success (Macharis and Kin, 2017).

Through a stakeholder survey, alignments and misalignments regarding the expected use and impacts of e-scooters are understood. Importantly, the survey found that all stakeholder groups favoured e-scooters which is encouraging for acceptability. Groups largely aligned on the use of e-scooters for commuting both in the short-term and long-term with all expecting that the need for e-scooters to primarily facilitate social-distanced travel would subside in the long-term. Divergent views on the likelihood of modal shift were found and it is this understanding that is crucial to evaluating the sustainability benefits of e-scooters (Moreau *et al.*, 2020). Other international research may offer an insight, however, it is important to note that mode shift is highly influenced by spatial variations, density, accessibility and car-ownership; all of which vary from city to city and indeed within cities themselves.

The conversation is extended from the anticipated short-term and long-term impacts of e-scooters in London, through to the championed futures and associated policy pathways. All stakeholders indicate that hard infrastructure is very important for the future of e-scooters, reflecting the results of e-bike studies. Whilst this participatory exercise helps establish conversations regarding the future, it is also important to note that the pandemic represents only a single unprecedented event that has caused disruption to our view of the future. Van der Heijden's (1996) temporal view of predictability versus uncertainty is seen to be optimistic and an alternative view, which accounts for future unprecedented events has been presented.

This study has been conducted during a global pandemic and as such, the methodology has been constrained. Nevertheless, it is emphasised that the findings provide a sound conversation starter to aid policy-building and suggest pathways to further research. In a time of great uncertainty and disruption, society is presented with a unique opportunity to remould previously established trends, particularly in the car-dominated mobility landscape. Whilst for now society focuses on individual travel, responsibility lies with stakeholders to work collaboratively, to look to the future and build policy pathways to encourage sustainable, equitable and responsible uses of e-scooters.

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APPENDIX A Stakeholder interview – prompts

- Do you think that the broad use of e-scooters will differ in the COVID-impacted short-term and the 'new-normal' long term? Why?
- What do you think are the key uncertainties which will impact the future of e-scooters in London?
- Do you think covid-19 has had a positive impact on the use of e-scooters in London? Perhaps on how the public sees them
- Do you think that London has acted too late for scooters to have had a significant impact?
- Do you think that e-scooters have potential to contribute towards the fight against climate change?

APPENDIX B Stakeholder survey

Planning for the short-term and long-term use of e-scooters in London

This survey seeks to understand different stakeholder viewpoints surrounding the anticipated use and impacts of e-scooters (both shared-use and privately owned) in the short-term and the long-term in London. Following this, you will be asked to indicate the policy packages you rank as being important to setting out a pathway towards your preferred future scenario of e-scooter use in London.

Your answers will help facilitate discussions surrounding policy planning for this transition and bridge the gap between the current situation and future scenarios.

All answers will be anonymous. Thank you for your contribution.

Required

Your background

1

Please indicate the category below which best indicates 'the part you play' in the future of e-scooters.

- ◯ Local Authority
- ◯ Greater London Authority and its organisations (e.g. TfL)
- ◯ Central Governmental Department (e.g. Department for Transport)
- ◯ Shared E-scooter System Operator
- ◯ E-scooter retailer
- ◯ Think tank
- ◯ Transport Consultant (Private company)
- ◯ Investor

- ◯ Campaigning organisation
- ◯ Prospective E-scooter user
- ◯ Academic Researcher
- ◯ Other (Please provide further details in Q2)

2

Please provide additional details if you answered 'Other' in Q1.

Enter your answer

3

In general, how would you rank your level of support for e-scooter use in London

	Strongly oppose	Somewhat oppose	Neutral	Somewhat favour	Strongly favour
Support for e-scooter use	◯	◯	◯	◯	◯

4

How likely would you say it is that your opinion on e-scooters matches that of your organisation (if relevant)?

	Extremely unlikely	Somewhat unlikely	Neutral	Somewhat likely	Extremely likely
Your own opinion matches that of your organisation	◯	◯	◯	◯	◯

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Defining the short-term (Semi-social phase)

Defining the short-term:
London is in recovery and e-scooters are being used. Whilst coronavirus is still prevalent, steps are being taken to ease London's lockdown and pave the way for economic recovery albeit the pandemic still impacts daily lives. Aspects of social distancing remain whilst transport is focussed on transporting key workers in a socially distanced way. Businesses are opening but footfall is low and remote working remains the default option for offices.

5

In your opinion, what are the top three reasons for the use of e-scooters (privately owned or shared-system) in the short-term, semi-social phase. Please choose three answers from the following:

- [ ] To replace public transport journeys
- [ ] To replace car journeys
- [ ] To facilitate independent, socially-distanced travel
- [ ] To reduce the cost of travel
- [ ] To compliment the use of public transport
- [ ] To increase active travel
- [ ] To increase accessibility of areas with low public transport provision
- [ ] To enable more social opportunity
- [ ] To have fun

6

In your opinion, what do you expect to be the top three most common e-scooter trip purposes in the short-term, semi-social phase?

- [ ] Commuting to/from the workplace
- [ ] Travelling to/from friends/family members houses

- [ ] Travelling to/from social occasions
- [ ] Travelling to/from a food shop
- [ ] Travelling to/from other retail shops
- [ ] Travelling to/from parks and green space
- [ ] Sight-seeing (tourist use)

7

If e-scooters were used across London in the short-term (semi-social phase), how likely would you consider the following to occur:

	Extremely unlikely	Unlikely	Neutral	Likely	Extremely likely
Travel mode shift; from car to e-scooter	◯	◯	◯	◯	◯
Travel mode shift; from walking or cycling to e-scooter	◯	◯	◯	◯	◯
Travel mode shift; from public transport to e-scooter	◯	◯	◯	◯	◯
Demographics; Wider diversity of users (age, gender)	◯	◯	◯	◯	◯
Demographics; More high-income users	◯	◯	◯	◯	◯
Demographics; More low-income users	◯	◯	◯	◯	◯
More conflicts with automobiles	◯	◯	◯	◯	◯
More conflicts with pedestrians	◯	◯	◯	◯	◯
More conflicts with cyclists	◯	◯	◯	◯	◯

Envisaging the long-term ('new-normal')

Defining the long-term, 'new-normal' phase
The Coronavirus infection rate is very low thanks to a successful vaccine and herd immunity. No movement restrictions are in place, social-distancing is no longer recommended and workers are able to return to their places of work. The pandemic has altered some societal norms but the threat of a new COVID-19 ‘wave’ has disappeared.

8

In your opinion, what are the top three reasons for the use of e-scooters (privately owned or shared-system) in the long-term, new-normal phase. Please choose 3 answers from the following:

- [ ] To replace public transport journeys
- [ ] To replace car journeys
- [ ] To facilitate independent, socially-distanced travel
- [ ] To reduce the cost of travel
- [ ] To compliment the use of public transport
- [ ] To increase active travel
- [ ] To increase accessibility of areas with low public transport provision
- [ ] To enable social inclusion and social opportunity
- [ ] To have fun

9

In your opinion, what do you expect to be the top three most common e-scooter trip purposes in the long-term, new-normal phase?

- [ ] Commuting to/from the workplace
- [ ] Travelling to/from friends/family members houses
- [ ] Travelling to/from social occasions

- [ ] Travelling to/from a food shop
- [ ] Travelling to/from other retail shops
- [ ] Travelling to/from parks and green space
- [ ] Sight-seeing (tourist use)

10

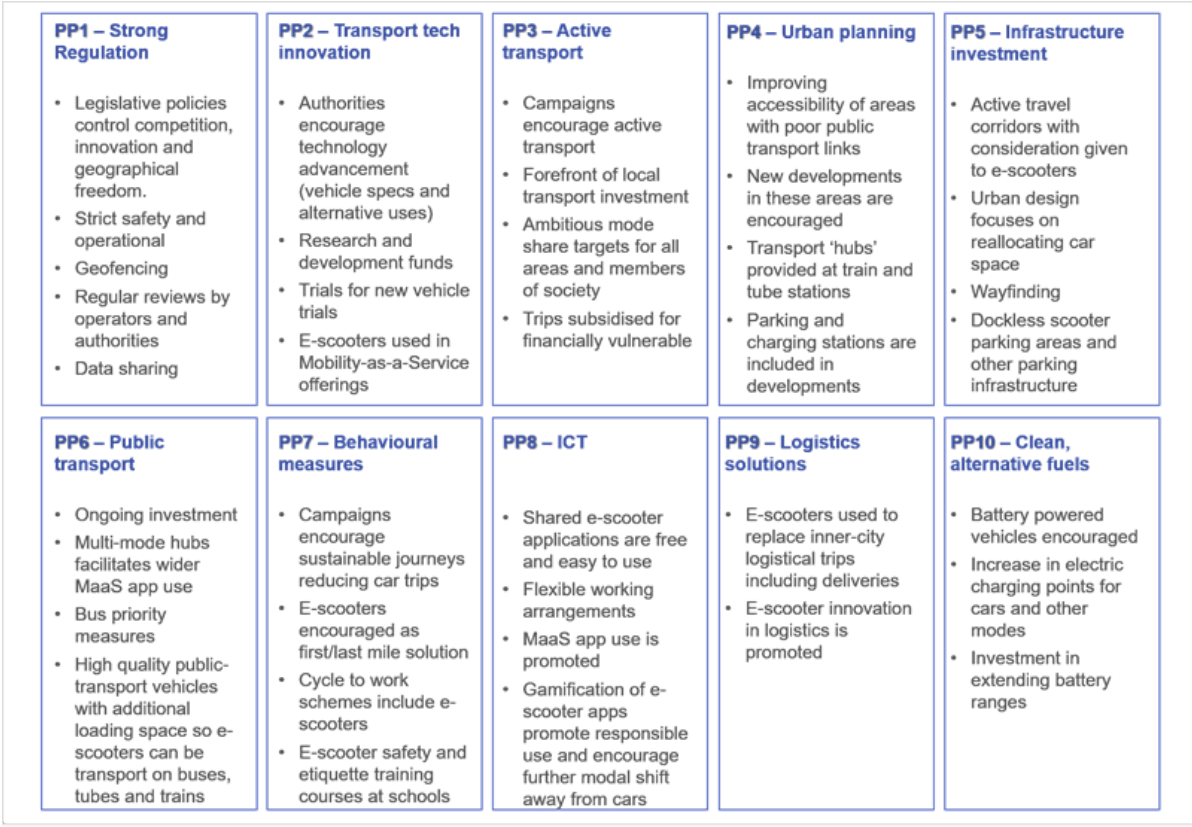
If e-scooters were used across London in the long-term (new-normal phase), how likely would you consider the following to occur:

	Extremely unlikely	Unlikely	Neutral	Likely	Extremely likely
Travel mode shift; from car to e-scooter	○	○	○	○	○
Travel mode shift; from walking or cycling to e-scooter	○	○	○	○	○
Travel mode shift; from public transport to e-scooter	○	○	○	○	○
Demographics; Wider diversity of users (age, gender)	○	○	○	○	○
Demographics; More high-income users	○	○	○	○	○
Demographics; More low-income users	○	○	○	○	○
More conflicts with automobiles	○	○	○	○	○
More conflicts with pedestrians	○	○	○	○	○
More conflicts with cyclists	○	○	○	○	○

Policy packages - Bridging the gap between the short-term and the long-term

In order to reach one's desired future vision, a policy pathway needs to be set out which provides a guide between the short-term and the long-term. For example, in order to achieve a reduction in carbon emissions, a policy package which includes investment in renewable energy might be chosen. The policy packages chosen and their outcomes will contribute towards the future goal.

The following section aims to understand your chosen path towards your desired long-term (new-normal) future of e-scooters in London. A total of 10 policy packages have been chosen for this study. Their descriptions are included below.



PP1 – Strong Regulation

- Legislative policies control competition, innovation and geographical freedom.
- Strict safety and operational
- Geofencing
- Regular reviews by operators and authorities
- Data sharing

PP2 – Transport tech innovation

- Authorities encourage technology advancement (vehicle specs and alternative uses)
- Research and development funds
- Trials for new vehicle trials
- E-scooters used in Mobility-as-a-Service offerings

PP3 – Active transport

- Campaigns encourage active transport
- Forefront of local transport investment
- Ambitious mode share targets for all areas and members of society
- Trips subsidised for financially vulnerable

PP4 – Urban planning

- Improving accessibility of areas with poor public transport links
- New developments in these areas are encouraged
- Transport 'hubs' provided at train and tube stations
- Parking and charging stations are included in developments

PP5 – Infrastructure investment

- Active travel corridors with consideration given to e-scooters
- Urban design focuses on reallocating car space
- Wayfinding
- Dockless scooter parking areas and other parking infrastructure

PP6 – Public transport

- Ongoing investment
- Multi-mode hubs facilitates wider MaaS app use
- Bus priority measures
- High quality public-transport vehicles with additional loading space so e-scooters can be transport on buses, tubes and trains

PP7 – Behavioural measures

- Campaigns encourage sustainable journeys reducing car trips
- E-scooters encouraged as first/last mile solution
- Cycle to work schemes include e-scooters
- E-scooter safety and etiquette training courses at schools

PP8 – ICT

- Shared e-scooter applications are free and easy to use
- Flexible working arrangements
- MaaS app use is promoted
- Gamification of e-scooter apps promote responsible use and encourage further modal shift away from cars

PP9 – Logistics solutions

- E-scooters used to replace inner-city logistical trips including deliveries
- E-scooter innovation in logistics is promoted

PP10 – Clean, alternative fuels

- Battery powered vehicles encouraged
- Increase in electric charging points for cars and other modes
- Investment in extending battery ranges

Please read through the policy packages which might be used to drive the future of e-scooter use in London over the long-term (new-normal phase).

By moving the options below up and down, please indicate how you would rank the importance of each policy measure.

PP1 - Regulation

PP2 - Transport Tech Innovation

PP3 - Active Transport

PP4 - Urban Planning

PP5 - Hard infrastructure investment

PP6 - Public Transport

PP7 - Behavioural measures

PP8 - ICT

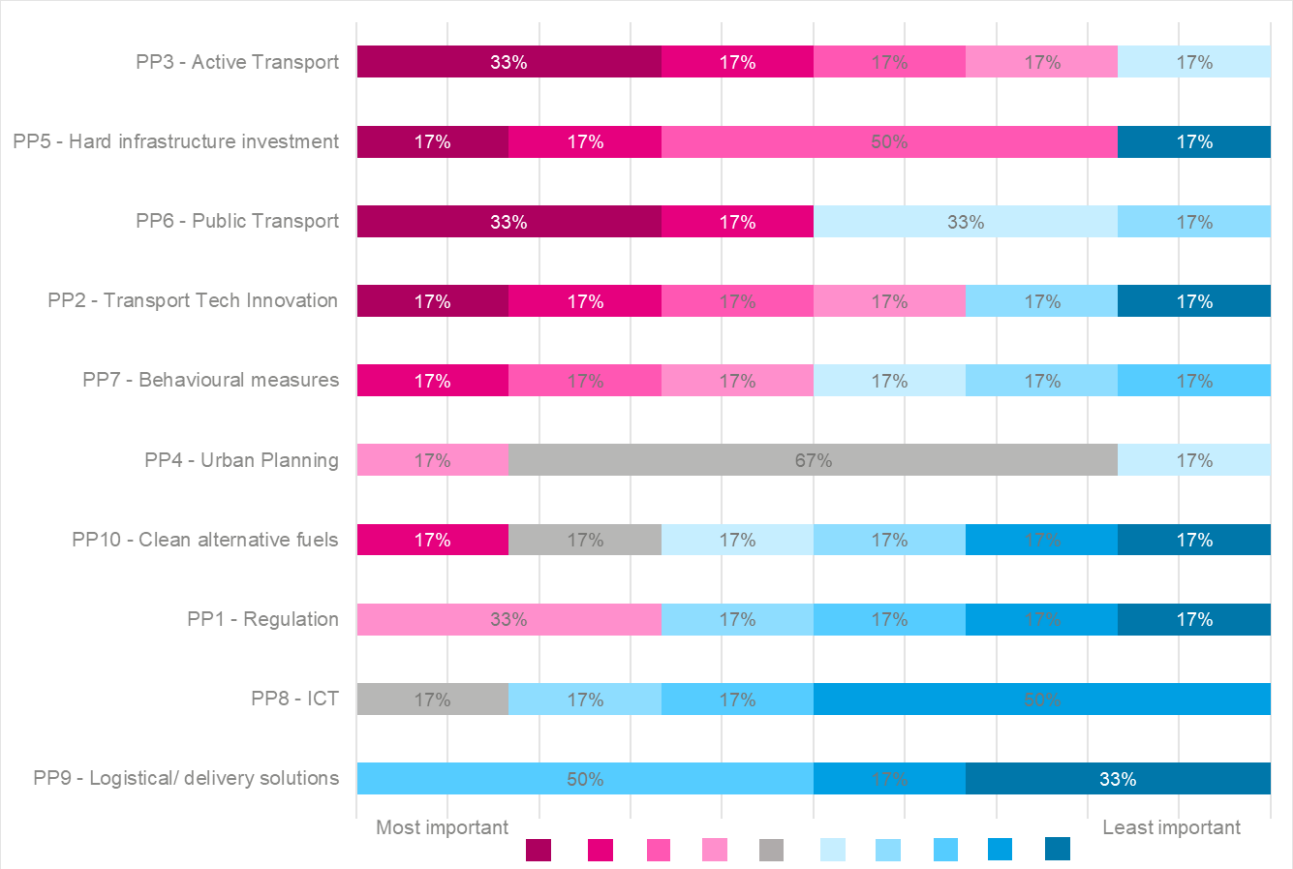
PP9 - Logistical/ delivery solutions

PP10 - Clean alternative fuels

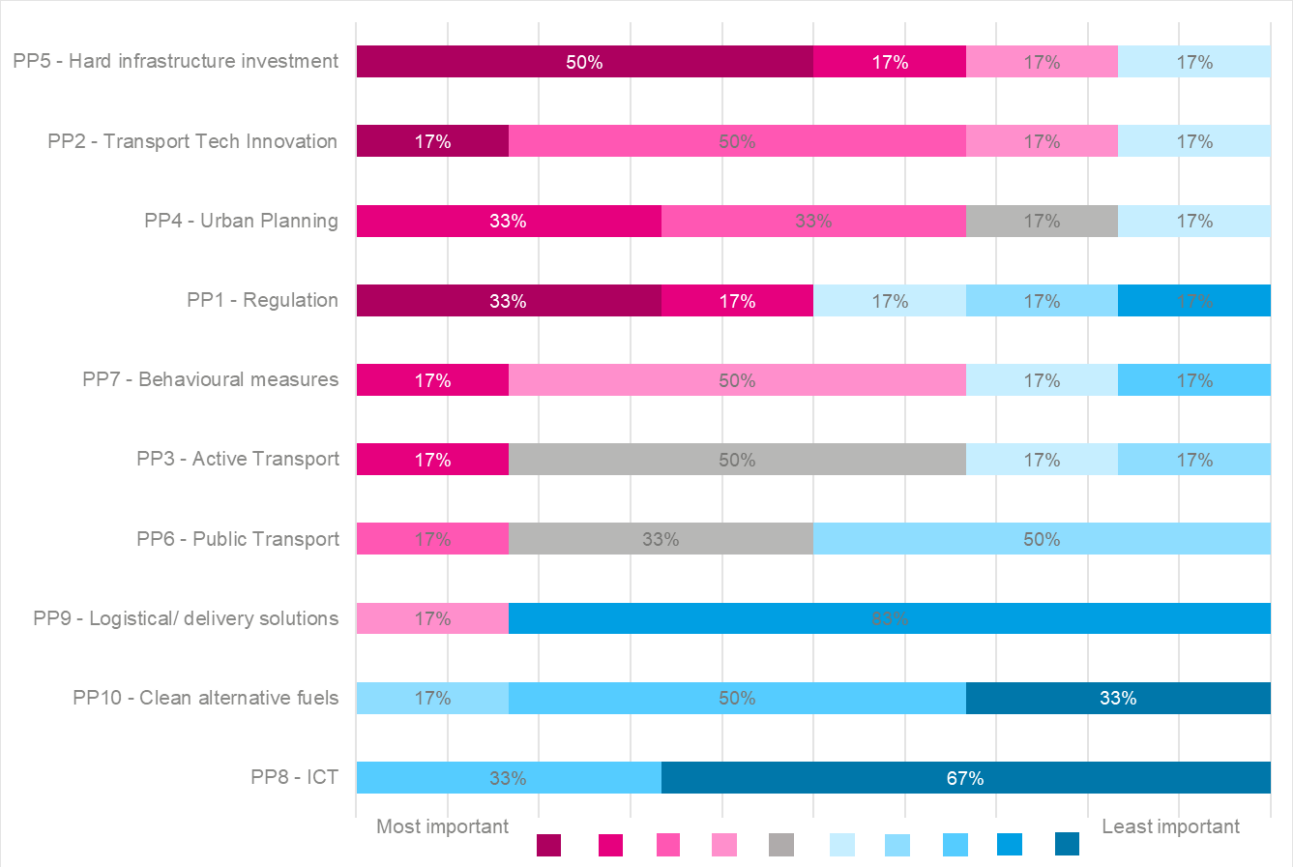
Back Submit

APPENDIX C Policy package rankings

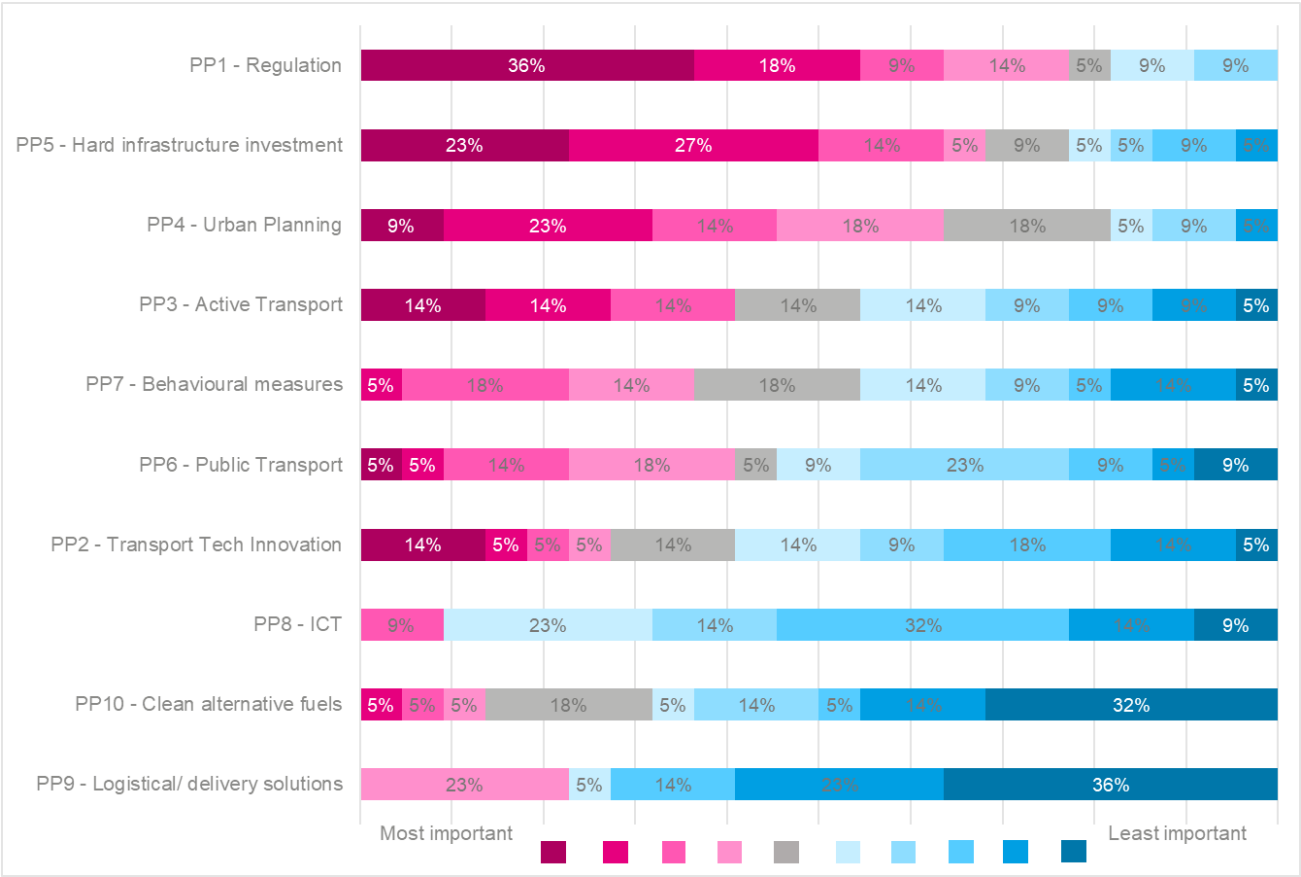
Appendix Figure 1: Ranked importance of policy packages (Decision-makers)



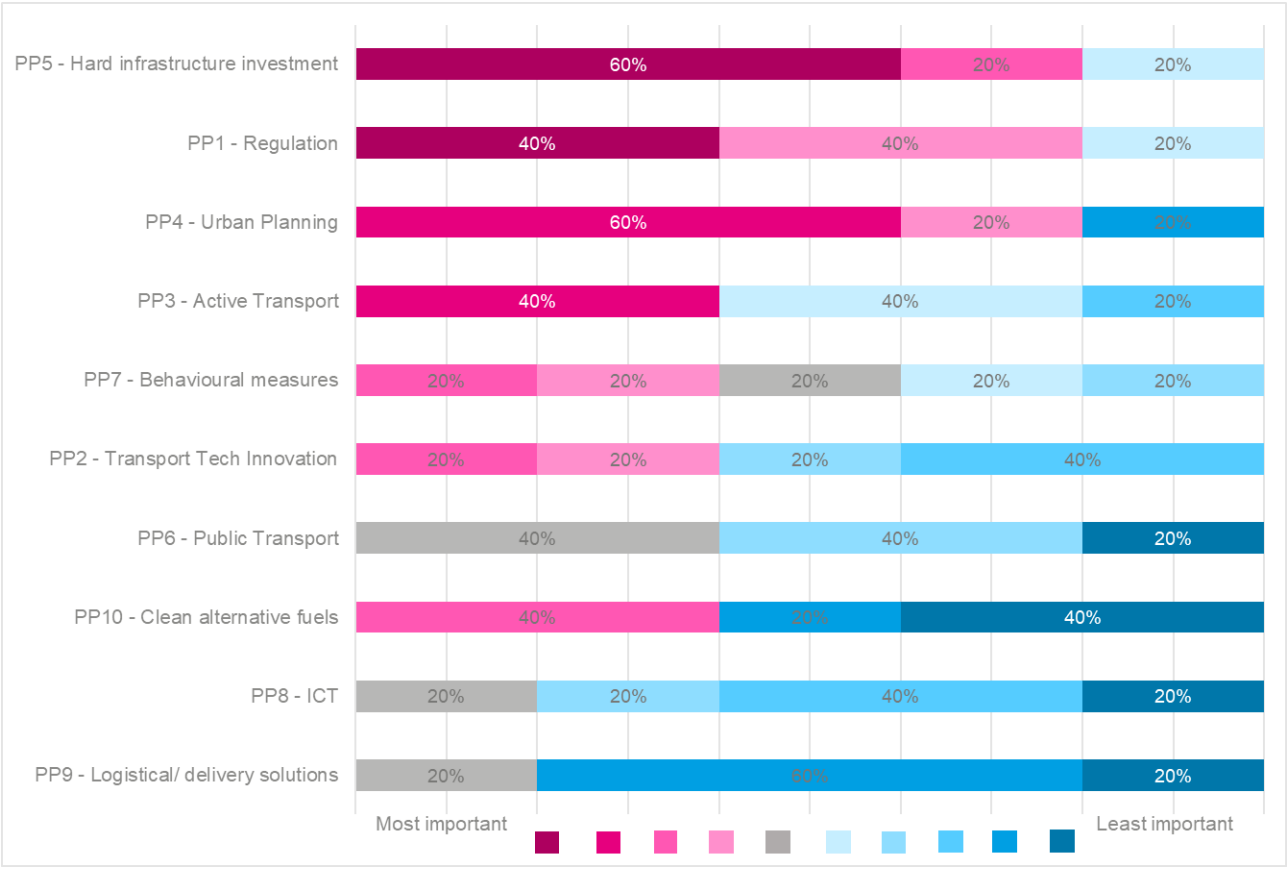
Appendix Figure 2: Ranked importance of policy packages (Facilitators)



Appendix Figure 3: Ranked importance of policy packages (Facilitators)



Appendix Figure 4: Ranked importance of policy packages (Prospective Users)



APPENDIX D Interview consent form

UNIVERSITY COLLEGE LONDON
FACULTY OF THE BUILT ENVIRONMENT
BARTLETT SCHOOL OF PLANNING

CONSENT FORM FOR RESEARCH STUDIES

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Study: *The changing use of e-scooters in London: Stakeholder perspectives and future scenario pathways*
Department: Bartlett School of Planning
Name and Contact Details of the Researcher(s): Grace Packard (ubcqgep@ucl.ac.uk)
Name and Contact Details of the Principal Researcher: _____
Name and Contact Details of the UCL Data Protection Officer: _____
This study has been approved by the UCL Research Ethics Committee: Project ID number: _____

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

I confirm that I understand that by ticking/initialling each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.

		Tick Box
1.	*I confirm that I have read and understood the Information Sheet for the above study. I have had an opportunity to consider the information and what will be expected of me. I have also had the opportunity to ask questions which have been answered to my satisfaction and would like to take part in an individual interview.	
2.	*I understand that I will be able to withdraw my data up to *[insert date if stated on the Information Sheet]* OR *[insert text clearly defining time limit e.g. 4 weeks after interview]*	
3.	*I consent to participate in the study. I understand that my personal information will be used for the purposes explained to me. I understand that according to data protection legislation, 'public task' will be the lawful basis for processing.	
4.	**Use of the information for this project only** *I understand that all personal information will remain confidential and that all efforts will be made to ensure I cannot be identified. I understand that my data gathered in this study will be stored anonymously and securely. It will not be possible to identify me in any publications.	
5.	*I understand that my information may be subject to review by responsible individuals from the University or monitoring and audit purposes.	
6.	*I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason. I understand that if I decide to withdraw, any personal data I have provided up to that point will be deleted unless I agree otherwise.	
7.	I understand the potential risks of participating and the support that will be available to me should I become distressed during the course of the research.	
8.	No promise or guarantee of benefits have been made to encourage you to participate	
9.	I understand that the data will not be made available to any commercial organisations but is solely the responsibility of the researcher(s) undertaking this study.	
10.	I understand that I will not benefit financially from this study or from any possible outcome it may result in in the future.	
11.	I understand that I will be compensated for the portion of time spent in the study (if applicable) or fully compensated if I choose to withdraw.	

12.	I agree that my anonymised research data may be used by others for future research. [No one will be able to identify you when this data is shared.]	
13.	I understand that the information I have submitted will be published as a report and I wish to receive a copy of it. Yes/No	
14.	I consent to my interview being audio/video recorded and understand that the recordings will be stored anonymously, using password-protected software and will be used for training, quality control, audit and specific research purposes. To note: If you do not want your participation recorded you can still take part in the study.	
15.	I hereby confirm that I understand the inclusion criteria as detailed in the Information Sheet and explained to me by the researcher.	
16.	I hereby confirm that: (a) I understand the exclusion criteria as detailed in the Information Sheet and explained to me by the researcher; and (b) I do not fall under the exclusion criteria.	
17.	I agree that my GP may be contacted if any unexpected results are found in relation to my health.	
18.	I have informed the researcher of any other research in which I am currently involved or have been involved in during the past 12 months.	
19.	I am aware of who I should contact if I wish to lodge a complaint.	
20.	I voluntarily agree to take part in this study.	
21.	No personal data will be used within this study. I understand that other authenticated researchers will have access to my anonymised data.	

If you would like your contact details to be retained so that you can be contacted in the future by UCL researchers who would like to invite you to participate in follow up studies to this project, or in future studies of a similar nature, please tick the appropriate box below.

	Yes, I would be happy to be contacted in this way	
	No, I would not like to be contacted	

_____ _____ _____

Name of participant Date Signature

APPENDIX E Risk assessment

RISK ASSESSMENT FORM

FIELD / LOCATION WORK

The Approved Code of Practice - Management of Fieldwork should be referred to when completing this form

http://www.ucl.ac.uk/estates/safetynet/guidance/fieldwork/acop.pdf

DEPARTMENT/SECTION **BARTLETT SCHOOL OF PLANNING**

LOCATION(S) **LONDON**

PERSONS COVERED BY THE RISK ASSESSMENT

BRIEF DESCRIPTION OF FIELDWORK No fieldwork involved

Consider, in turn, each hazard (white on black). If **NO** hazard exists select **NO** and move to next hazard section.

If a hazard does exist select **YES** and assess the risks that could arise from that hazard in the risk assessment box.

Where risks are identified that are not adequately controlled they must be brought to the attention of your Departmental Management who should put temporary control measures in place or stop the work. Detail such risks in the final section.

ENVIRONMENT	**The environment always represents a safety hazard. Use space below to identify and assess any risks associated with this hazard**
e.g. location, climate, terrain, neighbourhood, in outside organizations, pollution, animals.	COVID-19 (Low risk)

CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**
	work abroad incorporates Foreign Office advice
	participants have been trained and given all necessary information
	only accredited centres are used for rural field work
	participants will wear appropriate clothing and footwear for the specified environment
	trained leaders accompany the trip
	refuge is available
	work in outside organisations is subject to their having satisfactory H&S procedures in place
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented: Social distancing

EMERGENCIES	Where emergencies may arise use space below to identify and assess any risks
e.g. fire, accidents	Low risk

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk
	participants have registered with LOCATE at http://www.fco.gov.uk/en/travel-and-living-abroad/
	fire fighting equipment is carried on the trip and participants know how to use it
	contact numbers for emergency services are known to all participants
	participants have means of contacting emergency services
	participants have been trained and given all necessary information
	a plan for rescue has been formulated, all parties understand the procedure
	the plan for rescue /emergency has a reciprocal element
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

EQUIPMENT	Is equipment used?	NO	If 'No' move to next hazard If 'Yes' use space below to identify and assess any risks
e.g. clothing, outboard motors.	Examples of risk: inappropriate, failure, insufficient training to use or repair, injury. Is the risk high / medium / low ?		

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk
	the departmental written Arrangement for equipment is followed
	participants have been provided with any necessary equipment appropriate for the work
	all equipment has been inspected, before issue, by a competent person
	all users have been advised of correct use
	special equipment is only issued to persons trained in its use by a competent person
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

LONE WORKING	Is lone working		If 'No' move to next hazard

	a possibility?	NO	If 'Yes' use space below to identify and assess any risks
e.g. alone or in isolation *lone interviews.*	Examples of risk: difficult to summon help. Is the risk high / medium / low?		

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk
	the departmental written Arrangement for lone/out of hours working for field work is followed
	lone or isolated working is not allowed
	location, route and expected time of return of lone workers is logged daily before work commences
	all workers have the means of raising an alarm in the event of an emergency, e.g. phone, flare, whistle
	all workers are fully familiar with emergency procedures
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

ILL HEALTH	**The possibility of ill health always represents a safety hazard. Use space below to identify and assess any risks associated with this Hazard.**
e.g. accident, illness, *personal attack, special personal considerations or vulnerabilities.*	COVID-19 (Low risk)

CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**
	an appropriate number of trained first-aiders and first aid kits are present on the field trip
	all participants have had the necessary inoculations/ carry appropriate prophylactics
	participants have been advised of the physical demands of the trip and are deemed to be physically suited
	participants have been adequate advice on harmful plants, animals and substances they may encounter
	participants who require medication have advised the leader of this and carry sufficient medication for their needs
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

TRANSPORT	**Will transport be required**	**NO**	**/**	**Move to next hazard**
		YES		**Use space below to identify and assess any risks**
e.g. hired vehicles	Examples of risk: accidents arising from lack of maintenance, suitability or training Is the risk high / medium / low?			

CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**
	only public transport will be used
	the vehicle will be hired from a reputable supplier
	transport must be properly maintained in compliance with relevant national regulations
	drivers comply with UCL Policy on Drivers http://www.ucl.ac.uk/hr/docs/college_drivers.php
	drivers have been trained and hold the appropriate licence
	there will be more than one driver to prevent driver/operator fatigue, and there will be adequate rest periods
	sufficient spare parts carried to meet foreseeable emergencies
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

DEALING WITH THE PUBLIC	**Will people be dealing with public**	**YES**	**If 'No' move to next hazard** **If 'Yes' use space below to identify and assess any risks**

e.g. interviews, observing	Being misinterpreted

CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**
	all participants are trained in interviewing techniques
	interviews are contracted out to a third party
	advice and support from local groups has been sought
/	participants do not wear clothes that might cause offence or attract unwanted attention
/	interviews are conducted at neutral locations or where neither party could be at risk
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

WORKING ON OR NEAR WATER	**Will people work on or near water?**	**NO**	**If 'No' move to next hazard** **If 'Yes' use space below to identify and assess any risks**
e.g. rivers, marshland, sea.	Examples of risk: drowning, malaria, hepatitis A, parasites. Is the risk high / medium / low?		

CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**
	lone working on or near water will not be allowed
	coastguard information is understood; all work takes place outside those times when tides could prove a threat
	all participants are competent swimmers
	participants always wear adequate protective equipment, e.g. buoyancy aids, wellingtons
	boat is operated by a competent person
	all boats are equipped with an alternative means of propulsion e.g. oars
	participants have received any appropriate inoculations
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

MANUAL HANDLING (MH)	**Do MH activities take place?**	NO	**If 'No' move to next hazard** **If 'Yes' use space below to identify and assess any risks**
e.g. lifting, carrying, moving large or heavy equipment, physical unsuitability for the task.	Examples of risk: strain, cuts, broken bones. Is the risk high / medium / low?		

CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**

	the departmental written Arrangement for MH is followed
	the supervisor has attended a MH risk assessment course
	all tasks are within reasonable limits, persons physically unsuited to the MH task are prohibited from such activities
	all persons performing MH tasks are adequately trained
	equipment components will be assembled on site
	any MH task outside the competence of staff will be done by contractors
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

SUBSTANCES	Will participants work with substances	NO	If 'No' move to next hazard If 'Yes' use space below to identify and assess any risks
e.g. plants, chemical, biohazard, waste	Examples of risk: ill health - poisoning, infection, illness, burns, cuts. Is the risk high / medium / low?		

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk

	the departmental written Arrangements for dealing with hazardous substances and waste are followed
	all participants are given information, training and protective equipment for hazardous substances they may encounter
	participants who have allergies have advised the leader of this and carry sufficient medication for their needs
	waste is disposed of in a responsible manner
	suitable containers are provided for hazardous waste
	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

OTHER HAZARDS	Have you identified any other hazards?	NO	If 'No' move to next section If 'Yes' use space below to identify and assess any risks
i.e. any other hazards must be noted and assessed here.	Hazard: Risk: is the risk		

CONTROL MEASURES	Give details of control measures in place to control the identified risks

Have you identified any risks that are not adequately controlled?			
	NO	/	Move to Declaration
	YES		Use space below to identify the risk and what action was taken

Is this project subject to the UCL requirements on the ethics of Non-NHS Human Research?

If yes, please state your Project ID Number

For more information, please refer to: http://ethics.grad.ucl.ac.uk/

DECLARATION	The work will be reassessed whenever there is a significant change and at least annually. Those participating in the work have read the assessment.

Select the appropriate statement:

/	I the undersigned have assessed the activity and associated risks and declare that there is no significant residual risk
	I the undersigned have assessed the activity and associated risks and declare that the risk will be controlled by the method(s) listed above

NAME OF SUPERVISOR Tim Pharoah