Incentivising low-carbon travel

Lessons from a wide range of reward and platform schemes

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1. Introduction

To achieve net-zero greenhouse gas emissions to deliver the Paris Agreement's goals, all sectors must undergo deep emissions reductions. Approximately one-quarter of global CO_2 emissions from fossil fuel combustion come from the transport sector (IEA, 2019). Transport will be challenging to fully decarbonise in the coming decades, owing to the difficulty in substituting low- for high-carbon fuels in freight, aviation and shipping, as well as infrastructural inertia (Grubler, A et al, 2018).

A relatively underexplored opportunity to reduce emissions in the transport sector is through behavioural and societal changes, specifically by encouraging and incentivising lower-carbon travel choices and through disincentivising higher-carbon choices. A variety of studies have considered longer-term behaviour changes in sectors including transport, to achieve ambitious climate targets (Grubler, A et al, 2018), (van Vuuren, D.P et al, 2018), (T.A. Napp et al, 2019) but such behaviour change scenarios are not yet mainstream in the climate change mitigation literature.

The emergence of the Covid-19 pandemic and the imposition of lockdowns across the world have given rise to significant changes in the transport sector, with a large share of personal and business travel replaced by online interactions and activities. This has resulted in considerable reductions in both greenhouse gas emissions as well as local air pollution, and highlighted the potential of longer-term behavioural change in the transport sector to contribute to addressing climate change.

This report assesses the effectiveness and replicability of a variety of schemes that encourage low-carbon travel and disincentivise high-carbon travel, and draws lessons for governments, regulators, businesses and philanthropy.

The rest of this report is structured as follows: Section 2 provides a summary of the different schemes reviewed as part of this study; Section 3 discusses the schemes' shared attributes and recommends potential actions for different actors to ensure that low-carbon schemes are encouraged, whilst those that lead to more carbon-intensive travel are able to transition to becoming lower-carbon. Appendix A compares key attributes of the different schemes, whilst Appendix B describes each scheme in detail.

2. Summary of schemes reviewed

The schemes selected for this analysis are meant to illustrate a broad variety of existing mechanisms that can (dis)incentivize lower-carbon forms of travel in terms of their scope and scale. The list is by no means exhaustive and is not meant to highlight a specific scheme in its category (for instance, there are many global bikeshare programs like Velib, which is highlighted here purely as a case example due to its many years of operation). The 12 selected schemes span the following travel modes: cycling, passenger vehicles, transit, ride-hailing and air travel. They employ the following mechanisms: shared fleets; phone apps; workplace policies; city-implemented road pricing; and member rewards programs. Finally, they represent a mix of government and private sector schemes.

Table 1 sets out high-level attributes of each of the 12 schemes considered in this study. While many of the established schemes such as bikeshare, credit card rewards and carshare are very familiar to policy makers, the list also includes two very nascent and promising schemes in ClimatePerks and the Miles app. Both ClimatePerks and Miles are specifically geared at incentivizing participants to choose lower carbon travel options. In the case of ClimatePerks, employees receive extra holidays ("journey days") to enable them to opt out of flying and instead choose a lower carbon mode of getting to their holiday destination. In the case of Miles app, although users are rewarded for all modes of travel, the

highest number of points are awarded for the lowest carbon modes – accumulated rewards can then be spent on a variety of products.

In fleet sharing schemes, such as Velib for bikeshare and AutoShare for carshare, users are encouraged to utilize a specific transport mode principally for factors such as greater convenience and lower cost. In the case of bikeshare schemes, this is likely to substitute for at least some vehicle use, and therefore reduce emissions. However, it is unclear whether carshare schemes would lead to an increase or decrease in emissions, as although they reduce vehicle ownership (with the associated emissions reductions from reduced vehicle manufacture) and potentially increase vehicle occupancy, they may encourage carbon-intensive vehicle use by those that couldn't otherwise afford it.

App-based schemes such as Citymapper and Hopper, like fleetshare schemes, leverage users' desire for time and cost savings to guide their behaviour towards choices that fulfil those indicators. Citymapper allows easier use of public transport, which is likely to lead to encourage lower-carbon transport, whereas Hopper allows cheaper flying, thereby potentially encouraging higher-carbon travel.

Membership-based rewards schemes, such as credit card (e.g. AMEX) or shopping (e.g. Tesco) schemes, currently encourage higher-carbon travel such as flying, because of their focus on redeeming rewards for air miles. This is also the case for air miles schemes themselves. Another membership-based scheme, Uber rewards, currently encourages higher-carbon travel through awarding more points for larger, more luxurious and often more carbon-intensive vehicles. Membership-based schemed are a closed feedback loop system, cycling through spending and rewarding that enables more spending on the platform. Such rewards schemes could be restructured towards lower-carbon travel choices.

Lastly, the report also illustrates two UK government-operated schemes. The first scheme, London's Ultra Low Emissions Zone, was designed to specifically help reduce transport-related emissions and improve air quality in the city of London. The second scheme, Her Majesty's Revenue and Customs (HMRC) Work Mileage Rebate, was designed to support commuting workers to use their personal vehicles, with the result that in some cases people are encouraged to use higher-carbon transport (i.e. their own cars) rather than lower-carbon public transport and / or walking and cycling.

All the schemes fundamentally fall into two structural categories: they either focus on behaviour shift through disincentives, resulting in a "push" effect, as is the case with the Ultra Low Emissions Zone; or the schemes focus on deriving a desired outcome by focusing on incentives, resulting in a "pull" effect, where users are encouraged to shift their behaviour to reinforce the scheme, as is the case with ClimatePerks.

Table 1: Summary details of low- and high-carbon travel incentive schemes reviewed

Scheme	High/low carbon incentive scheme	Description	Location	Scale	Level of establishment
Vélib Bike Share	Low	Bike share scheme	Paris	City	Established
Citymapper app	Low	App showing quickest, easiest and cheapest way of travelling via public transport	International	Global	Established
ClimatePerks	Low	Collaboration with employers to pay "journey days" for low-carbon holiday travel	International	Global	Pilot
ULEZ	Low	Charges a fine on cars driving within zone that fail to meet certain emission standards.	London	City	Established
Miles app	Low	Earn rewards based on carbon footprint of transport mode.	Sacramento City	City	Newly established
AutoShare	Low/High	Car Share scheme	Toronto	City	Established
Hopper app	High	Predicts the best times to buy flights based upon when the price will be at its lowest	International	Global	Established
Tesco ClubCard	High	Rewards users with leisure airmiles/UberCredit when spending on their card	International	Regional	Established
AMEX Platinum Business card	High	Rewards users with business airmiles when spending on their card	International	Global	Established
HMRC Mileage Rebate	High	Claim mileage rebate when driving personal car for work.	UK	Country	Established
Uber Rewards	High	Rewards you with free/discounted rides or food when using its service	USA	Country	Pilot
Air Miles	High	Rewards frequent flyers with further discounted flights/upgrades	International	Global	Established

3. Discussion and recommendations

Across the schemes analysed in this paper, some emerge with a clear capacity to incentivise low-carbon travel, while others have a clear mandate to do the opposite. On both sides of the spectrum, the schemes have a number of commonalities which are important to highlight in order to understand how these can be replicated or regulated.

For schemes supporting low-carbon travel choices, common factors appear to also be underlying conditions for those schemes to work, which pose both opportunities and challenges for their replication. These include:

- **Data**: Each scheme involves a significant element of personal data collection, in most cases including time-of-use and locational data, as well as longer-term collection of behavioural choices. Such data, whilst making these schemes easier to use from travellers' perspectives, also involves a significant surrendering of personal information and assumes effective data protection laws. The increasing digitalisation of transport services requires a guarantee from all organisations involved that users' privacy should be respected. Governments, as the ultimate guarantors of such protections, have the most critical role to play in ensuring this.

- **Public infrastructure:** Shared fleet incentive schemes rely on physical public infrastructure to support their operation, e.g. widespread, safe bike lanes. Similarly, digital schemes such as Citymapper, ClimatePerks and Miles, rely on availability of many modes of travel (including publicly procured transit) to guide their users to the optimal route and in some cases enable a shift to low-carbon travel choices. Without an existing network and access to public transport and cycle / pedestrian infrastructure, air travel and high-speed rail networks, it is unlikely that the potential of these schemes can be fulfilled. This is a key consideration for lower-income countries in particular, whose transport infrastructures may still be relatively under-developed, with less ability to support effective public transport and alternative modes.

- **Market supply:** Lastly, for low-carbon travel schemes to work, as well as appropriate infrastructure, there must be an available abundance of low-carbon mobility options. This includes, bikes and e-bikes for personal and bikeshare schemes, electric vehicles for purchase to access low-emission zones, and even low carbon flight or delivery options. As with public infrastructure, this presents an additional challenge for resource-constrained lower-income countries, but also potentially an opportunity: e-bikes may provide a more viable low-carbon transport option than electric vehicles or public transport where roads and other transport infrastructures are less well-developed.

There is a clear role for governments in supporting low carbon modes of transport through public investment and this should be closely tied to ensuring continued effort to improve air quality and lower transport-induced respiratory illnesses. However, there is also a critical role for businesses, such as through commercial support of schemes (e.g. bike-share scheme sponsorship), involvement in rail franchises, or public-private sector investment partnerships. There is a direct role for businesses to enhance their low-carbon and corporate social responsibility (CSR) and environmental, social and governance (ESG) credentials by taking up schemes aimed at them, including, for example, ClimatePerks and AutoShare's Customised Business Plan, as well as for businesses to support consumer reward schemes such as Miles, by partnering with them to offer rewards for points earned.

For schemes which tend to incentivize high-carbon travel, such as air miles reward programs and membership-specific rewards, the analysis highlights two unique attributes:

- **Spending:** High-carbon rewards schemes focus on maintaining and growing spending behaviour which is rewarded and guided towards more spending, of which high-carbon travel is an option. The desired outcome is not a shift in behaviour to another behaviour, but an increase in frequency and impact from usage/spending. Low-carbon schemes such as the Miles app also provide rewards based on user mobility choices - however in the case of Miles, the scheme provides different levels of rewards not on the basis of spending, but on the basis of the carbon-intensity of activity.

- **Membership:** In addition, these schemes are tied to a user membership with a specific platform that offers rewards, e.g. air miles programs, credit card reward programs, etc. Incentivizing an increase in spending within a 'bubble' of a membership is both effective and vulnerable. If companies' sustainability practices are highlighted unfavourably in the public realm, their customers might lose trust and opt out of their company services.

Many of these schemes have been operational for decades and are so commonplace that it is as important, if not more important, to weaken these schemes as it is to support newer, low-carbon schemes. Whilst this may be challenging in the case of established schemes with many loyal customers, governments can influence the incentive structure of companies' loyalty schemes, for example by requiring that such schemes include options for lower-carbon rewards for a more balanced selection, or by taxing rewards. Many businesses themselves should take the lead in this transition, given the high reputational risk of their promoting carbon-intensive travel in their operations and promotional activities. This would be an effective mechanism towards transitioning schemes that currently incentivise more carbon-intensive vehicle modes (such as with Uber's current rewards scheme) to lower-carbon, electric vehicle modes (as is already happening with Uber and also the UK government's work mileage rebate schemes). Here, governments should be at the forefront of working with businesses to accelerate this transition.

Lastly, philanthropy can help close the gap between government and private sector incentives for low-carbon travel by supporting the following:

1. Research into regulatory actions that can restructure high-carbon rewards programs to account for climate outcomes;
2. Support of low-carbon travel scheme pilots such as ClimatePerks, and widespread replication and scaling;
3. Convening of key stakeholders to rethink public-private partnership structures shaping behaviour shifts towards lower carbon travel.

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Appendix A: Summary of schemes

Direction of shift:

Pull effect- the scheme focuses on providing incentives that draw people directly towards the scheme.

Push effect- the scheme focuses on disincentivizing people from one thing in order to push them directly away from it towards the proposed alternative.

Enabling- the scheme opens up the option of low-carbon travel, in general, by allowing people to more easily shift towards it.

Mode of transport:
- = Walking/cycling
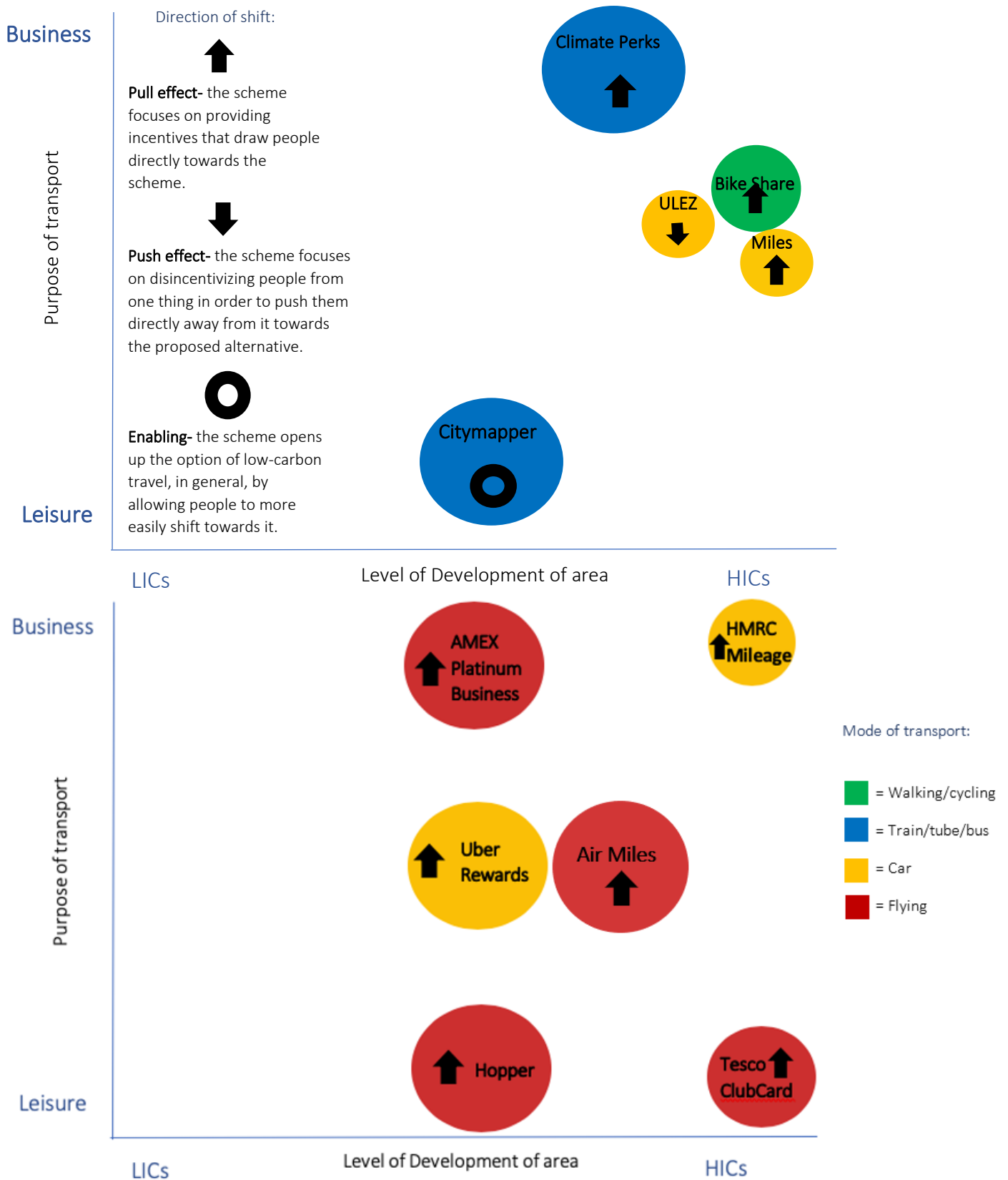- = Train/tube/bus
- = Car
- = Flying

Figure A1: Low-carbon (top) and high-carbon (bottom) travel incentive scheme details.
Note: LICs refers to low-income countries and HICs refers to high-income countries.

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Appendix B: Details of schemes

Appendix B sets out in greater detail the different schemes considered in this study. A summary paragraph of each scheme is followed by a more detailed listing of attributes and considerations, considering the incentives and rewards that it provides, the methods by which it is enabled and monitored, challenges and opportunities for its functioning and potential expansion, and finally entry points for governments and businesses to help ensure the scheme provides low-carbon travel. Schemes B1-5 are likely to incentivise low-carbon travel options and their expansion and/ or replication should be encouraged. Schemes B6-11 are currently designed in such a way that they incentivise higher-carbon travel options, so the key actions on governments and regulators should be to limit such schemes or help drive their transition towards lower-carbon travel options. The report also discusses an example car-sharing scheme, AutoShare (B12), which could potentially be a lower-carbon travel option, if it leads to less carbon-intensive manufacture of vehicles, or a higher-carbon option, if it leads to increased private vehicle transport replacing public or active (cycling / walking) transport modes. Each scheme's description is accompanied by a circular sign which indicates the degree to which the scheme is a pilot or established scheme. It also indicates whether it incentivises low-carbon travel (schemes B1-5) by a green colour, whether it currently incentivises higher-carbon travel (schemes B6-11) by a red colour, or in the case of AutoShare, an amber colour.

B1 *Vélib Bike Share Programme, Paris* - *Scheme that provides mechanical and electric bikes based at automated, self-service bike stations around the city.*

The Vélib bike-hire scheme in Paris is an established scheme consisting of low-cost bike hire, at a cost of €1 per 30 minutes of hire for a normal bike and €2 per 30 minutes for an electric bike. With 230 miles of cycle lanes, and bike stations every 300m, it allows users to get very close to their destinations, and combined with a quick payment and rental app, works out about three times as fast as walking. It is funded by JC Decaux and Paris City Council (at a public cost of €15m per year, covering maintenance, vandalism repair and scheme expansion to the suburbs), and sees about 75,000 trips per day across its nearly 1,300 stations. However, it has had high start-up costs of over €100m, and analysis suggests fewer than 5% of users were motorists (with the majority public transport users), so it has demonstrated limited substitution for private motorised transport. Such schemes are present in many other countries, including some emerging economies (e.g. Medina scheme in Marrakech), indicating replicability, but they require significant funding, both in terms of upfront costs, including in good road infrastructure suitable for supporting cyclists, as well as long-term ongoing costs for maintenance and repair. As such, there is a key role for governments in providing this infrastructure, although there is also a key opportunity for businesses to provide funding in return for advertising and brand recognition, as has happened in London with Santander providing £44m in sponsorship over 7 years to support the city's cycle hire scheme.

Incentive and reward details

- Cost: cheap form of business and leisure travel: €1/30 minutes for a normal (green) bike and €2/30 minutes for an electric (blue) bike (Stimmler, 2019). Free for first 30 mins helps solve first mile/last mile (FMLM) problem. Implicit cost saving is no parking fee (free to drop off bike at all 1,300 bike stations) (Wisniewski, 2019).
- Convenience: bike stations every 300m (Wisniewski, 2019) so can get as close to destination as possible, whilst app allows easy payment and pre-booking.
- Timesaving: quick payment and bike rental over app is ~3x quicker than walking (Schliesman, 2015).

Enabling and monitoring mechanisms

- Funded by JCDecaux and Paris City Council (spends €15 million per year on Vélib (Gee, 2016))
- Paris has 230 miles of cycle lanes (Midgley, 2009).
- Access to user data: age and gender demographic helps better tailor incentives to specific target markets and allows mediation of supply and demand issues to ensure no bike or parking space shortages.

Challenges to continuing success of scheme

- High start-up costs: approx. €102 million (Guay, 2017) could be a particular constraint for LICs with limited finance.
- High-running costs: so far €15 million in maintenance (Gee, 2016) and within 2 years of operation, nearly 80% of bikes needed replacing as a result of vandalism/damage (Guay, 2017) and between 600-1,000 bikes are lost a week due to theft (Up to 1,000 Vélib' bikes are stolen or vandalised every week in Paris, 2019).
- A need for more cycle lanes to maintain road safety.
- Technological barriers: requires smartphone technology for the app, may be an issue in some LICs where societies are less digitalized (e.g. only 11.2% of population of Ethiopia owned mobile phones in 2018 (Newzoo, 2018)).
- Few cultural barriers
- Must invest in safer bike storage facilities
- Legislation issues in relation to on-street bike parking.
- Seasonal weather impacts number of users
- Data analysis indicates that <5% of Vélib users were motorists (Wisniewski, 2019). Most are public transport users so scheme's impact on CO_2 reduction is limited -> to have greatest impact, must explore ways to encourage more motorists to shift.

Opportunities to continue or expand scheme in current form

- So far relatively popular - average of 75,000 trips/day (Midgley, 2009).
- Technology is becoming increasingly engrained in society so unlikely to be an issue looking forward.
- Environmentally friendly as requires minimal energy input.
- E-bikes (blue bikes) allow Vélib to cover larger distances (not just the first and last mile).

Entry points for governments and businesses to support such schemes

- Has great potential to grow further and expand into other areas of the world, provided finance available – role for businesses and HIC governments to fund this.
- Already popular in many HICs, such as Santander bike in London (2010), and even penetrating LIC markets (Medina Bike in Marrakech, 2016).

B2 Citymapper- *An app that advises users on the quickest, cheapest and easiest ways of travelling from A to B via public transport (note - this case study focuses on London's Citymapper app as an example case)*

Currently operating in 41 cities across the world, the Citymapper app advises users on the quickest, cheapest and easiest ways of travelling from A to B via public transport through GPS technology. The app facilitates reducing CO_2 emissions by encouraging a shift away from heavily polluting private vehicles towards public transport. The app is free to download and thus relies on investment as their primary source of income, raising tens of millions of dollars from well-known venture capital firms (Dillet, 2016), but it expects steadier revenue streams further down the line (e.g. from a Citymapper Pass intended to undercut Transport for London ticket prices, as well as from sales of transport data). Its success has largely been a result of its ambitious drive to constantly innovate, earning over £30 million from investment in its first five years of running (Shead, 2019), but its source of income is risky and might struggle to fund its projects looking forward. Citymapper has a huge market potential with growing global urban population, particularly in African countries, and it will be easy to replicate as no physical infrastructure is required. However, lack of public transport infrastructure could limit its potential success in other countries. For this reason, it is important that governments focus on investing in public transport infrastructure and encourage investment into Citymapper to enable its introduction and uptake in other markets. As the scheme gains traction, the government could use the extra revenue from increased public transport users to maintain the quality, capacity and comfort of the network.

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Incentive and reward details

- <u>Convenience</u>: calculates your route for you (no need to memorize bus numbers and tube maps). Very detailed instructions make it easy and simple to follow route. Displays cheapest and quickest journey.
- <u>Time</u>: removes the time it would have taken consumer to plan route, gives quickest route (route otherwise taken may have been longer). Links with live updates on buses/trains/tubes to prevent from being too late/early.
- "Citymapper pass" (Citymapper Pass, n.d.): gives low-cost subscription to all transport modes, saving money and time (no longer buy tickets/top-up oyster).

Enabling and monitoring mechanisms

- <u>Low start-up and running costs</u> as no physical infrastructure to build and maintain.
- Any issues can be solved quickly through software fixes and updates.
- GPS technology enables the app to "find your location" (Toole, n.d.). Keeps up with technological development- continuous updates and development of new features. 2014 award for being one of the first apps available on Apple Watch (Felicia, 2019).

Challenges to continuing success of scheme

- As app is free to download, relies on investment as their main source of income – has been successful in the past, earning them £32 million coming in from investment in the first five years of running (Shead, 2019), but is not sustainable and is a risky source of income. However, to repay this investment Citymapper plans to have more reliable sources of income in the future, such as revenue from the Citymapper Pass (undercuts Transport for London prices) and selling transport data to other companies.
- Lack of public transport infrastructure. To use Niger as an example, despite many proposals, Niger does not yet have any fully functional railways, and only just introduced a bus service on major roads (Williams G. , 2019). Also, lack of mobile phone usage further limits its potential success (only 41% of Niger had mobile phone subscriptions in 2017 (WorldBank, 2017)).
- Potential negative feedback loop: public transport could become over-crowded and people choose to shift back to driving. However, this will not occur so long as the Government uses the extra revenue from public transport users to improve the quality and capacity of these networks and ensure they can comfortably deal with this surge.

Opportunities to continue or expand scheme in current form

- Already runs in 41 cities across the world (Cities, n.d.)
- As the global population is growing, particularly in African countries, e.g. Niger population is expected to grow 53.2% by 2030 (Colb, 2019), there is a huge market that Citymapper has not yet penetrated.
- Once LICs improve their transportation sector and rising GDP/capita increases smartphone uptake, Citymapper is likely to spread->free to install and no physical infrastructure required. Simply must replicate software for these different societies.
- As it grows elsewhere, it will receive more investment which can fund new project ideas (e.g. CM2 (Toole, n.d.) bus which fills transport gaps for areas in high demand and the Citymapper Pass, acting as a travel card subscription (Citymapper Pass, n.d.)).

Entry points for governments and businesses to support such schemes

- Promising future as lots of new areas that would hugely benefit from its low-carbon transport incentives.
- Governments should focus on investing in public transport infrastructure.
- As the scheme gains traction, governments should use the extra revenue from increased public transport users to maintain the quality, capacity and comfort of the network.
- Citymapper must provide a guarantee that users' privacy is respected.

B3 ClimatePerks - *A collaboration with employers to pay "journey days" for low-carbon holidays*

ClimatePerks is a pilot scheme that collaborates with employers to pay "journey days" for low-carbon holidays, so that staff can use alternative modes of transport to avoid flying. The employer can sign up for free to this scheme

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but it has to offer its staff at least two paid "journey days" to travel to/from their holiday destination. In turn, employers are given a stamp of accreditation by ClimatePerks that can promote their environmentally-friendly reputation. This programme is in a pilot stage until Autumn 2021. Businesses may be reluctant to increase holiday time for financial reasons and employees may prefer to fly due to a lack of reliable alternative transport infrastructure or to avoid long journeys by trains, coaches or boats. However, supporting such a scheme could be very beneficial for businesses' environmental, social and governance (ESG) and corporate social responsibility (CSR) credentials, which will become increasingly important in attracting longer-term, lower-risk finance in the low-carbon transition. Governments could help this scheme transition from pilot to mainstream status through measures such as official certification, as well as setting an example by partnering with the scheme themselves. Similarly, policies could be focused on making the scheme an obligatory option for employees of companies of a certain size and long-term profitability (and therefore able to afford to pay the extra "journey days"), as well as subsidising companies below this threshold who sign up. Governments should also support investment into long-haul alternatives to flying (including, for example, high-speed rail infrastructures).

Incentive and reward details

- Time: 50% of people say they are ready to reduce the amount they fly, but only 3% do (Fenton, 2019)->paid "journey days" could allow more people to reduce the amount they fly as it would not be cutting into the little holiday time they have.
- Reward: 2 days a year spent on low-carbon travel to/from holiday destination are paid for by the employer. Free for employer to sign up.
- Employer reputation: given a stamp of accreditation by ClimatePerks, are listed publicly on website and can get press coverage. Environmentally-friendly reputation beneficial in many HICs.

Challenges to continuing success of scheme

- Challenges can easily arise as there are two different groups that must be incentivized (employer and employees).
- Financial barriers: can be expensive for business and may be reluctant to increase holiday time (especially for many businesses struggling to survive / grow).
- Cultural barriers: lack of reliable public transport infrastructure would greatly hinder this scheme as employees will choose to fly instead.
- Employees may choose not to accept as it is less stressful to fly as few connections are needed (e.g. those with young children).
- If holiday destination only accessible by aviation (international) -> given businesses that can afford to sign-up are likely to be well-established and successful, it is likely that employees are earning higher disposable incomes which could be spent on international travel.

Opportunities to continue or expand scheme in current form

- Still in pilot stage (until Autumn 2021 (ClimatePerks, n.d.)) so hard to measure how well it is doing so far, but is currently looking positive; "Green Element, ML's [Advertising firm MullenLowe's] environmental consultancy, has signed up to Climate Perks and encourages it as a positive way of engaging staff and giving them real alternatives to air travel for leisure" (Williams J. , 2020).
- Positive feedback loop: as more businesses sign up, the more influential it could become (greater status).
- Low running-costs.

Entry points for governments and businesses to support such schemes

- African Governments (since 2009) pledged to spend 6-8% of their annual GDP on development of public transport infrastructure (more than double that of 1990s) (Council, 2009) so there is hope that with time many LICs will become a suitable market for ClimatePerks.
- Given 70% of aviation travel is for leisure and 70% of all UK flights are taken by just 15% of the UK population (Carmichael D. R., 2019), this scheme targets the most carbon-intensive sector and therefore has the potential to make the greatest difference.

- Provided this scheme continues to grow its reputation, accreditation and association of ClimatePerks amongst businesses will become increasingly valuable and this scheme will therefore have a very promising future. This may require government certification to help cement its status or perhaps it could use policies and laws to make the scheme an obligatory option for employees of companies earning a certain level of income (and can therefore afford to pay the extra "journey days") and subsidize those below this threshold who sign up.
- Business support would boost ESG and CSR credentials, attracting longer-term, lower-risk finance in the low-carbon transition.

B4 Ultra Low Emission Zone, London - *Scheme that charges vehicles that do not meet certain emission standards driving within specified parts of London*

This is a UK government scheme established in April 2019 that charges vehicles that do not meet emissions standards when driving within specified parts of London. The scheme works in the same area as, and additional to, the London Congestion Charge zone – both charges approximately £12 for non-exempt vehicles. Whilst – as its name suggests, the Congestion Charge is aimed at reducing congestion – the ULEZ is specifically aimed at reducing pollution by discouraging older, higher-emitting vehicles. Its aim is to encourage drivers to switch their vehicle to a newer, lower-emissions vehicle, or use alternatives to travel into London instead, such as public transport or cycling. Camera technology allows for widespread scanning of vehicle number plates, stored in large databases. ULEZ generated £40 million in surplus revenue after just five months, and the scheme is economically self-sustaining as it has few operational costs. Despite being easily enforced once established, there may be widespread driver resistance to such schemes, as well as barriers to their overall impact - for example the HMRC Business Mileage Rates scheme protects many drivers by reimbursing these costs. Moreover, the emission standards are relatively weak, with any petrol car registered with the DVLA after 2005 (2015 for diesel cars) exempt from the charge. Hence, the pressure to shift towards genuinely low-carbon travel is limited. However, the government has the power and responsibility to tighten these standards to maximize the reduction in London's emissions, as well as expand the geographical scope of the scheme – in fact plans are already underway to expand the ULEZ zone boundary form central London to the North and South Circular inner ring roads in 2021. It is equally essential that the revenue is reinvested into further improving London's transport network while utilising data on which journey routes are most popular to direct government funding most effectively to where it is needed.

Incentive and reward details

- Encourages drivers to switch to newer, lower-emission vehicles (e.g. electric car) or take public transport by imposing a penalty roughly equal to (but on top of) the Congestion Zone Charge (CZC) of £12 (Group C. C., 2016). Additional Penalty Charge Notice (PCN) if you fail to pay in time (Cars, n.d.).
- Differs to the CZC as while this is aimed at reducing congestion, the ULEZ is specifically focused on reducing pollution by discouraging older, higher-emitting vehicles.

Enabling and monitoring mechanisms

- Easy enforcement as imposed by Government.
- Minimal start-up costs -> just cost of cameras and database technology.
- To ensure smooth running of scheme, signs positioned before every ULEZ boundary and on main roads 0.5 miles from a boundary to warn drivers.
- Development of camera technology allows for widespread scanning of vehicle number plates and IT advancement has enabled large databases to store this information.
- Continuous updates to the database ensure that all new cars being manufactured are registered on the system.

Challenges to continuing success of scheme

- Many people are protected from this cost-> employers reimburse employees and/or Mileage Rates can be claimed (Work Mileage Tax Rebate, n.d.). Likely to impact those driving for leisure more.
- Risk that if standards are too weak it will slow the shift towards low-carbon travel as drivers will be under the false pretense that they are driving a "low-emission" vehicle -> any petrol car registered with the DVLA after 2005 (2015 for diesel cars) meet the standards (Cars, n.d.)

- Cultural barriers: weak Government control/legislation could mean that the law is not abided by-> scheme cannot be enforced. Also, issues (e.g. in LICs) where the public transport infrastructure is not yet sufficiently developed to offer a sufficient alternative to car travel.
- Few technological barriers: simple cameras and IT databases needed. Should be attainable in most areas of the world (both HICs and LICs).
- Low financial barriers: generated £40 million in surplus revenue after just five months (Prez, 2019).

Opportunities to continue or expand scheme in current form

- Generates revenue which more than covers the operational costs of maintaining/replacing the cameras and signs and updating the database could be reinvested in low-carbon vehicle subsidies and/or improving the quality and capacity of public transport so that those who do shift will not shift back.
- Economically self-sustaining as few costs
- Positive feedback loop: high fines shift drivers towards public transport/cycling/low emission vehicles, while government income is spent on improving public transport/increasing cycle lanes so that more people do the same.

Entry points for governments and businesses to support such schemes

- Government could tighten emission standards and the zone size (e.g. plans to expand to the North and South Circular Roads in 2021 (Cars, n.d.)) to ensure a maximum reduction in London's CO_2 emissions. Also, important to reinvest the revenue into further improving London's transport network while utilizing data on popular travel routes to direct this funding most effectively (Group C. C., 2016). This data should also be explored to understand the types of vehicles in circulation and whether, for example, the OLEV grant needs to increase/decrease to be effective.
- May have to consider how the charge is paid in places where cashless/online payment is not possible.
- Similar schemes already exist- e.g. Hoy No Circular (Mexico City); restricts car use based on "Vehicle Verification Test" and number plate (Davis, 2008).
- Implementing this scheme in LICs requires an effective public transport system – role for government and business to invest in this

B5 Miles app, Sacramento City - *Encourages people to "go-green" while travelling around town through rewards per mile for low-carbon travel.*

The Miles app is a newly-established travel reward scheme in Sacramento City, California, covering all modes of transport. Miles Points (which can be used for a variety of rewards) are collected based on the type of transport used, encouraging people to choose lower-carbon options. For example, users get 10 points/mile for walking versus 0.1 points/mile for flying. Miles partners with local businesses to provide rewards per mile travelled. Miles points are calculated and tracked automatically on the app, offering more points for transit trips during off-peak hours. In 2018, Miles received $2.25 million in funding, led by JetBlue Ventures, and made a number of new partnerships. Since July 2018, users have earned in total more than 375 million miles, redeeming 55,000 rewards, at an average value of $20/reward. Some barriers that could hinder Miles growth are privacy concerns over movement tracking and relatively high start-up costs. As points are earned for any form of transport and on a per mile basis, high-carbon travel over long distances is still incentivised to some degree through the Miles app - for example a flight from London to New York will earn users 347 points (0.1 points/mile over 3,470 miles). In spite of this, around 80% of Miles users are already choosing some form of "clean" transport. To better enable the scheme, the government should invest in publicising it, emphasising and supporting strict privacy rights, and helping to build ties with business partners. Governments also need to improve public transport networks, road safety as well as pedestrian and cycle lanes in order to support those users that shift to these modes, rather than see them dissatisfied and shifting back. Here businesses can also play a role through public-private investment initiatives where appropriate.

Incentive and reward details

- Cost: Miles Points are collected based on mode of transport (e.g. 10 points/mile for walking vs 0.1 points/mile for flying (Martin, 2019)) and users are rewarded with local products and services (e.g. audiobooks, meals and coffee (News, 2019)).

- Convenience: functions smoothly in the background->automatically calculates transport mode used and rewards users points without requiring any inputs. Points can be tracked on the app and do not expire.
- Time: offers more points for transit trips during off-peak hours so journey times (e.g. carpooling) should be quicker.

Enabling and monitoring mechanisms

- AI algorithm is able to automatically determine mode of transport.
- Partners with local businesses to provide rewards.
- Data indicates popular journey routes and hence which services need improving, as well as future potential roadways and bus routes.
- Data allows personalized rewards and offers for individual users.
- Received $2.25 million in funding in 2018 (led by JetBlue Ventures) and made new partnerships-> allowed it to give members $100 in delivery credit for first 14 days of use (Martin, 2019).

Challenges to continuing success of scheme

- Cultural barriers: privacy concerns over movement tracking may cause distrust and limit users. Region may require sophisticated public transport networks, safe roads and pedestrian areas. However, app can adapt easily to region it covers. Not well-known so will take time to establish its presence outside Sacramento City.
- Balancing relationships of partners and users, e.g. participating company may want to limit Miles points earned as they lose revenue, yet making it harder to earn points could lose users.
- Economic barriers: relatively high start-up costs as developing app and providing rewards is costly. Once established, likely to have low running-costs as no physical infrastructure (vulnerable to damage/depreciation) and revenue should exceed any expenses.
- Technological barriers: requires an app-> smartphone technology not prevalent everywhere.
- As points are earned for any form of transport and on a per mile basis, high-carbon travel over long distances still incentivized-> e.g. flight from London to New York earns you 347 points (0.1 points/mile over 3,470 miles) (Distance from New York to London, n.d.).

Opportunities to continue or expand scheme in current form

- Since July 2018, users earned >375 million miles, redeeming 55,000 rewards (average of $20/reward) (Metro, 2019).
- Miles CEO Jigar Shah defends that "the platform looks at anonymous travel pattern data to predict near-future demand and at no time is personal information shared with any third party" (White, 2019) -> if promises such as this are made then publicly aware users may be less anxious of privacy violation.
- Most travel reward schemes are isolated to just one mode of transport, whereas Miles app boasts every kind.

Entry points for governments and businesses to support such schemes

- "Helps the city meet its ambitious climate and mobility goals" - Hector Barron, Public Works Director, City of Sacramento (Trust, 2019) -> will require more relationships with larger businesses/chains (currently on local scale)
- Jessica Gonzalez, spokeswoman for Regional Transit, says that as membership grows "information shared could paint a clearer picture of how streets are used in the city"-> better direct public transport investment to increase shift (positive feedback loop) (White, 2019).
- CEO Jigar Shah hopes it will become a universal rewards platform designed for the shared economy (Metro, 2019).
- Already made a positive impact-> >80% users choosing some form of "clean" transport (Metro, 2019).
- To better enable the scheme, the Government should also improve public transport network, road safety and pedestrian/cycle lanes.
- Businesses can also play a role through public-private investment initiatives where appropriate.
- Miles and other such providers must provide a guarantee that users' privacy is respected.

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B6 Hopper app, Montreal - Predicts the best times to buy flights based upon when the price will be at its lowest.

A Montreal-based company, Hopper's app predicts the best times to buy flights based upon when the price will be at its lowest. Hopper's Artificial Intelligence (AI) algorithm analyses and compares airline price data collected by global distribution systems (which collects and share airline data). Around 10-15 billion different prices are analysed per day, predicting future prices up to a year in advance. Hopper's 95% accurate prediction saves customers on average $50 per ticket, along with its new "secret fares" feature finding last-minute first-class seats at a 10-20% discount. This convenient app saves its more than 20 million active users time flight-searching and enables simple automatic payment of tickets. It is a financially self-sustaining scheme generating strong revenues through a share of ticket sales; some of its nearly $1 billion in ticket sale revenues in 2018 were reinvested in improving its search and predict algorithms and deepening Hopper's influence internationally. Despite this, the Hopper app does not include all airlines and its 5% prediction error could potentially put off customers who fall into this bracket. As with other apps, lack of widespread smartphone ownership in lower-income countries could limit growth in these regions, with cultural pressures having the same effect, notably aviation taxes and flight shaming, 'flygskam'. However, it may not be politically realistic to ban this established scheme altogether. Governments could require that Hopper also makes a price prediction of other, lower-carbon, modes of transport (e.g. rail tickets) so that if used correctly, it could also become a successful low-carbon incentive scheme.

Incentive and reward details

- Cost: 95% accurate prediction of when flights will be at their cheapest -> saves customers on average $50 per ticket (Chaykowski, 2018). Customer satisfaction of receiving the best deal. App free to download.
- Convenience: interactive app, simple automatic payment, notifies you on when to book (average of 42 push notifications sent to users before final price drop (Lejeune, 2017)).
- Comfort: new "secret fares" feature finds last-minute business/first-class seats at 10-20% discount (Chaykowski, 2018).
- Time: finds flights itself saving you time searching, comparing and monitoring price yourself. Quick payment.

Enabling and monitoring mechanisms

- Receives approx. $5/ticket sold (airlines pay a 1-4% commission) (Chaykowski, 2018).
- Analyses and compares airline price data collected by Global Distribution Systems (GDS)-> analyses 10-15 billion different prices per day (Lejeune, 2017).
- Uses Artificial Intelligence (AI) to create algorithm that processes data to predict future prices up to a year in advance (Chaykowski, 2018).
- 95% accuracy maintains customer loyalty (Lejeune, 2017).
- No infrastructure except data processing machines.
- Use their data to improve and tailor service-> 25% of ticket sales are those that users did not explicitly ask for (Lunden, 2018).
- Advertises on social media->95% of its money on its Facebook presence (2017) (Schiff, 2018).
- Tactful approach-> often tells people NOT to purchase a ticket; focuses on lifetime value of consumer (maintains loyalty as appears to put customer first).

Challenges to continuing success of scheme

- 5% systematic error of AI could potentially put off customers who fall into this bracket.
- Vulnerable to internet/software failures.
- Unable to penetrate into business travel sector as airmiles cannot be spent-> given 70% of UK flights are taken by just 15% of the UK population (Carmichael D. R., 2019) it is likely that a large proportion of these people fly frequently and therefore collect airmiles.
- Does not include all airlines (e.g. Delta and Southwest) (Josephs, 2018).
- Cultural barriers: many LICs do not have widespread smartphone ownership so unable to access app.
- Few financial barriers: no physical infrastructure. Low running costs of headquarters as it's a retired factory supplied with cheap energy (Chaykowski, 2018).

- Technological barriers: requires advanced data processing machines and AI. However, headquarters already set up and would not need to be replicated to spread elsewhere.

Opportunities to continue or expand scheme in current form

- More than 20 million active users (Chaykowski, 2018)-> already spread globally.
- Low running costs-> data processing machines run by low-cost energy.
- Rise in digital smartphone technology has allowed app to spread quickly.
- Issues can be solved overnight via software updates.
- Financially self-sustainable; generates strong revenues-> 2018 brought in almost $1 Billion in ticket sales (Lunden, 2018)-> significant reinvestment in improving algorithm and deepening influence internationally.

Entry points for governments and businesses, including to limit scheme or shift to low-carbon

- Aviation taxes (e.g. Sweden, April 2018) flight shame ("Flygskam- 22,500 people signed pledge to go flight-free in 2020 (BBC, 2020)) may restrict success. As could the coronavirus pandemic's effect on aviation.
- Until airmiles can be spent, unlikely to dominate business travel sector.
- This scheme is heavily CO_2 emitting (encourages aviation and high-class flying-> first-class travel >7x more carbon emitting than economy (Carmichael D. R., 2019)). Government should restrict discounted high-class tickets and could incentivize Hopper to make a price prediction of other, lower-carbon, modes of transport (e.g. rail tickets).
- Could be considered unrealistic to ban scheme altogether as, in a lot of cases, it helps those who are going to fly regardless to navigate a complex and fluctuating market and could also become a successful low-carbon incentive scheme if used with alternative transport forms.

B7 Tesco ClubCard, UK – *Supermarket loyalty card scheme that rewards users with points that can go towards travel options (e.g. air miles / taxis).*

Tesco, an international, UK-headquartered supermarket chain, runs this established scheme that accumulates points automatically on any form of spending. Tesco's ClubCard functions as a bank card, rewarding users 1 point per £1 spent, which can be redeemed towards lower-cost travel options such as flights and taxis. Partnerships with British Airways, Virgin Atlantic and Uber have enabled such rewards to contribute towards higher-carbon travel. The development of a user-friendly app has made tracking and spending points simple and the scheme has seen unparalleled growth in popularity and profits, with 16 million users in 2018. Although the programme's high start-up costs amounted to £1 billion in profits lost in its initial stages, lack of physical infrastructure helps keep running costs low and profits high in the long run Tesco ClubCard promotes highly carbon-emitting travel, so there is a clear role for governments to regulate such schemes. Whilst complete bans may be politically difficult, measures such as requiring that airmiles rewards require more points may be more feasible. Such measures could be combined with requirements that businesses running such schemes provide much stronger incentives for low-carbon transport modes (e.g. Eurostar rail fares). Companies such as Tesco could be incentivised to do this through greater CSR / ESG focus.

Incentive and reward details

- Reward: Scheme earns 1 point/£1 spent (Clive Humby, 2003), which can be spent on Uber credit and airmiles to give discounted/free rides and flights. E.g. £2.50 worth of points->600 British Airways Executive Club Avios (Ross, 2019).
- Comfort: airmiles earned can also be spent on higher-class seats and access to airport lounges, improving the comfort and quality of travel experience.
- Convenience: points accumulated automatically on any form of spending. Payment via contactless or using a fob (safe for children to use) (Clive Humby, 2003). User-friendly app makes tracking and spending points simple (Ross, 2019).

Enabling and monitoring mechanisms

- Partnerships with BA, Virgin Atlantic and Uber has allowed these rewards. (Ross, 2019)

- Technological advancement has allowed contactless payment and app development.
- Data used to track demand of different rewards -> vary point-reward ratio to encourage spending while preserving high membership (Fleming, 2019).

Challenges to continuing success of scheme

- Financial barriers: high start-up costs. However, lack of physical infrastructure helps keep running costs low (no damage/depreciation) and profits high in long run.
- Few technological barriers: card payment relatively widespread in both HICs and LICs and app is not necessary.
- Cultural barriers: Tesco's brand restricted primarily to Europe, little presence elsewhere. Until Tesco supermarkets expand their reach, will struggle to grow consumer base. But similar loyalty schemes are becoming widespread.
- Any breakdown in partnerships with airlines/businesses could be problematic. Difficult to balance relationships of partners and members, e.g. Red Letter Days (experience company offering e.g. air balloon flights) has already left. Also, potential for airlines to complain if too many airmiles are being earned as they lose revenue whilst making it harder to earn airmiles could lose customers.

Opportunities to continue or expand scheme in current form

- Has become extremely popular, with 16 million users (2018) (Smithers, 2018).
- Leisure travel accounts for 70% of UK aviation (Carmichael, 2019), other countries also follow similar pattern, so this scheme is targeting those flying most frequently.

Entry points for governments and businesses, including to limit scheme or shift to low-carbon

- Scheme can encourage highly carbon-emitting travel, so it is possible governments could regulate some aspects.
- Banning points being spent on airmiles is challenging as this is Tesco's major incentive. Instead, governments could require companies like Tesco to provide much stronger incentives for low-carbon transport modes (e.g. Eurostar, rail, bus and bikeshare schemes)
- Tesco itself may want to do this through greater CSR / ESG focus.
- Tesco must provide a guarantee that users' privacy is respected – role for regulators to ensure this.

B8 American Express (Platinum Business Card) - Scheme that rewards business users who spend money on their credit card with points that can go towards lower-cost flights.
Similar to the Tesco ClubCard for consumer purchases, this long-established AMEX scheme rewards business users with 1 point per £1 (in the UK) spent on their bank card, with no pre-set spending limit required, and the option to spend points on airmiles to earn discounted flights. Additionally, the AMEX Travel package can be added to Business plans to grant users an extra reward point per £1 spent on flights, hotels, car hire or travel experience bookings. The business scheme grants access to 600 airport lounges worldwide and airmiles can upgrade the class of seat, adding to convenience since purchase payments are deferred for up to 54 days without interest. AMEX Platinum Business Card has a multiplier effect because once one employer signs up, all employees automatically start using it. Moreover, employee cards are linked to one single business account to save time sorting expenses. It is an established scheme with a widespread reputation, with 60.3 million credit cards in circulation outside of the USA in 2018. Some key limitations are that the card is not accepted everywhere due to high transaction costs for retailers. Secondly, as it is hinged upon partnerships with airlines, balancing relationships between partners and members can be challenging. Whilst there is an increasing role for tele-conferencing to reduce business travel, the global transition towards service sector jobs may serve to increase business travel, especially for client-based work. As with the Tesco ClubCard and other airmiles schemes, banning AMEX from rewarding airmiles is politically challenging. An alternative for governments and regulators could be to instead ban claiming points on corporate AMEX cards which can be used for personal use, as this encourages further travel. It should also push for partnerships with low-carbon travel modes, (e.g. Eurostar, other high-speed rail).

Incentive and reward details

- Reward: no pre-set spending limit and a Reward point system of 1 point/£1 spent (Platinum Business, n.d.) which can earn airmiles towards discounted flights. For example for the advertising and marketing communications agency, MullenLowe, using AMEX has hugely cut the cost of their "approximately 900 flights flown in the most recent year" (Williams J. , 2020)
- Comfort: business scheme grants access to 600 airport lounges worldwide (Platinum Business, n.d.) and airmiles can upgrade class of seat to improve experience. MullenLowe estimates that "half" of their "900 flights flown in the most recent year" were in "business class" (Williams J. , 2020), unlikely without airmiles.
- Convenient and timesaving: card purchases have deferred purchase payments for up to 54 days without interest. Employee cards linked to one single business account to save time sorting expenses. (Platinum Business, n.d.)

Enabling and monitoring mechanisms

- Hinged upon partnerships with airlines.
- Big Data and machine learning algorithms protect businesses from fraud and tailored marketing to match customers and merchants, preserving customer loyalty -> e.g. AMEX claims it can identify 24% of Australian accounts that will close within the next four months (Manglani, 2017).
- Data tracks demand for rewards. Can vary point-to-reward ratio to encourage spending while maintaining customers.

Challenges to continuing success of scheme

- Cultural barriers: not accepted everywhere due to high transaction costs for retailers (e.g. Sky).
- Balancing relationships of partners and members, e.g. airlines may complain if too many airmiles are earned as they lose revenue, yet making it harder to earn airmiles could lose customers.
- Financial barriers: high start-up costs, but low running costs (high profits easily cover costs).
- Few technological barriers: central data systems award airmiles against expenditure.
- Alternatives to air travel: Increasing reliance on Audio-Visual (AV) conference technology may reduce business aviation. BCG ask "if they need to travel to the client's site every week or if they can manage more meetings via phone or videoconferencing?". One option is "CISCO's Telepresence, costing £1 million to install" (Mercier, 2020), but this is for larger companies.

Opportunities to continue or expand scheme in current form

- Overall influence of AMEX: High revenue->$40 billion (American Express 2018 Annual Report, 2018) and ranked 86th in the Fortune 500 (2018) (Fortune, 2018).
- Multiplier effect-> employer signing-up means all employees automatically use.
- "AMEX Travel" package grants an extra Reward point/£1 spent on travel (Express, n.d.)-> positive feedback loop towards flying.
- Reputation widespread (60.3 million credit cards in circulation outside of the USA in 2018 (Statista, Number of American Express credit cards worldwide from 2013 to 2018, by region, 2019)), so expanding further is likely.

Entry points for governments and businesses, including to limit scheme or shift to low-carbon

- Global transition towards service sector jobs potentially increases business travel, especially for client-based work-> According to Pierre Mercier, "BCG's model has always been to work shoulder-to-shoulder with the clients which requires travel to/from client's location" (Mercier, 2020) and for MullenLowe "there will always be an element of business travel as they often have to fly abroad for shoots and some clients prefer face to face meetings" (Williams J. , 2020)

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- BCG Pierre Mercier believes "we need to imagine ways to deliver the same impact with less travel, where this can be avoided", so are "encouraging an open conversation with clients and proposing different options for engagement with the associated volume of travel and carbon footprint" (Mercier, 2020).
- Government should invest in excellent broadband infrastructure to support AV conferencing, even from home.
- Banning AMEX from rewarding airmiles may be politically difficult and businesses will continue to fly regardless. Could instead ban claiming points on corporate AMEX card which can be used for personal use (MullenLowe allow), as this encourages even more travel. (Williams J. , 2020)
- Requirement that businesses running such schemes provide much stronger incentives for low-carbon transport modes (e.g. Eurostar, high speed rail fares). Could be incentivized to do this through greater CSR / ESG focus.
- AMEX must provide a guarantee that users' privacy is respected – close regulation required.

B9 HM Revenue and Customs Work Mileage Rebate - *Scheme that allows travel expenses per mile through annual tax rebate when using your own car to drive between workplaces /offices*

ESTABLISHED

This UK government established scheme allows road travel expenses for work purposes to be reclaimed through annual tax rebates, when employees use their own car for work. The reimbursement rate is 45 pence per mile for first 10,000 miles, then 25 pence per mile, and can be reclaimed as a tax rebate when employers don't offer this rate Companies like GoSimpleTax make claiming such tax relief easy by tracking employees' total mileage and calculating the amount to be reimbursed. The scheme has been very popular in the UK so far; business mileage was the most commonly claimed UK business expense in 2015 and the average business mileage claim cost rose over 30% between 2012 and 2015. More importantly, this scheme has introduced higher reimbursement rates, of 4p/mile, for electric company fleet cars suggesting a promising future. One potential barrier is that it is potentially difficult and time-consuming to claim business mileage allowances, however companies such as GoSimpleTax are making this process easier. The scheme incentivises more carbon-intensive travel, since it incentivises personal car use for work rather than public transport. The government, as well as businesses offering per-mile expenses for personal car use, has a potential key role to reduce the emissions impact of this scheme, through offering lower rebate rates for more carbon-intensive cars and particularly high rebates for electric and other ultra-low carbon vehicles to promote lower-carbon business travel.

Incentive and reward details

- Reward: government-guaranteed reimbursement of 45p/mile for first 10,000 miles/year, then 25p/mile beyond (Work Mileage Tax Rebate, n.d.), when driving a personal vehicle for work.
- Comfort: in theory more comfortable than public transport as own space and independent to public transport timings, though road congestion would reduce comfort.
- Convenience: intermediary companies, for example GoSimpleTax, make claiming rebate easy and stress-free by tracking your total mileage and what you are owed (GoSimpleTax, 2019).

Enabling and monitoring mechanisms

- Government operated and guaranteed scheme
- Data on how much is claimed year-to-year can indicate at what mileage rate workers will take public transport instead (useful for other policies).
- Strict regulation to avoid dishonest claims.
- Employers can cover employees via Mileage Allowance Payments (MAPs) to save them from claiming themselves (promotes higher uptake).

Challenges to continuing success of scheme

- Few cultural barriers: driving is prevalent in both HICs and LICs (e.g. Libya has a higher number of motor vehicles per 1,000 people (483) than Sweden (479) even though it is less developed (Eurostat, 2019)
- Financial barriers: high running costs to the government-> average mileage claim cost rose >30% between 2012 and 2015 (Kent, 2015).

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- Expensive for companies to cover via Mileage Allowance Payments (especially small firms) -> business mileage is most commonly claimed expense to UK businesses in 2015 (Kent, 2015).
- Unpredictable running costs as number of claims varies year-to-year.
- Negative feedback loop -> as more people are incentivized and drive to work, more road congestion so people will shift to public transport instead.
- Few technological barriers: potentially difficult to claim without access to internet and mobile/computer, but this is diminishing as an issue.

Opportunities to continue or expand scheme in current form

- More intermediary companies could emerge to make claiming even easier, so more people would take part.
- Governments could in theory use such schemes to help support and promote businesses (leading to higher-carbon operations as less reliance on public transport, at a time when private cars are still too carbon-intensive)

Entry points for governments and businesses, including to limit scheme or shift to low-carbon

- New addition of higher reimbursement rates (> 4p/mile) for the use of electric company fleet vehicles suggests a promising future (Tusker, 2018). This would then transition to a low-carbon incentive scheme, with role for both governments and businesses to support this transition.
- In the same way the electric vehicle grant addresses electric vehicle travel for personal use, this will promote electric business travel. However, Government could extend the higher reimbursement rate to personal electric vehicles (not just fleet).

B10 Uber Rewards- Scheme that rewards customers with Uber points when they use Uber travel services. which can then go towards discounted/free Uber trips and Uber Eats food services
Uber operates in 65 countries and 600 cities, with its Rewards pilot scheme currently restricted to just 25 places in the US. However, this has great potential to expand elsewhere. Users are rewarded with Uber points, earning 1 point per $1 spent which, once accumulated to 500, earns them UberCash. This grants free trips, UberEats delivery and more. The scheme runs by a tiered points system, with UberPool earning 1x points, UberX 2x points and Uber Black 3x points. Thus, more points are earned for more luxurious car models (i.e. those in the Uber Black scheme). Uber revenue increased by 43% on 2017, following the initiation of the Reward scheme. However, it has high start-up and running expenses, including driver incentives and insurance costs; in 2018 Uber spent 50% of its revenue on this. Other key challenges are strong competitors like Bolt and Ola, and being subject to the Congestion Charge and ULEZ scheme in London. Although Uber claims otherwise, by calling itself a 'car-share' service, it remains a relatively high-carbon emitting scheme since it encourages car travel. Governments could regulate Uber's point tier system, to favour Uber Pool, as well as supporting Uber's "Clean Air Plan" (all London cars electric by 2025) to transition it to a lower-carbon incentive scheme.

Incentive and reward details

- Reward: 1 points/$1 spent earned which once accumulated to 500, earns you UberCash (Uber Rewards, n.d.). This grants free trips, UberEats delivery and more.
- Convenience + timesaving: Uber for Business automatically bills company rather than individual-> saves time and effort sorting expense claims. Interactive app allows quick payment, point tracking and car/food orders (Uber For Business, n.d.).
- Comfort: more points earned for luxurious car models (e.g. Uber Black) which provide more comfortable experience (Uber Rewards, n.d.) but tend to be more CO_2-intensive.

Enabling and monitoring mechanisms

- Tier points system: UberPool 1x point, UberX 2x point and Uber Black 3x point.
- Digitalized society allowed Uber's growth-> functions entirely on app for both drivers and customers.

- Social media enabled to spread presence-> gained >8 million followers on Facebook as of 2018 (Pratapc, 2018).
- Sophisticated Information Technology (IT) made developing the app possible.
- Data created an algorithm to link customers with most suitable/nearby driver to tailor service and reduce waiting time.
- Data identifies and predicts times, routes and areas with high demand to mediate supply and demand issues-> maintains customer loyalty.
- Referral rewards has also gained popularity-> one user earnt $50,000 in Uber Credit (Miller, 2016).

Challenges to continuing success of scheme

- Financial barriers: high start-up and running expenses with "cost of revenue" (driver incentives, insurance costs etc.) costing the most -> in 2018 Uber spent 50% of its revenue on this (Griswold, 2019).
- Strong competition, e.g. Bolt and Ola, drives down profits as Uber must spend more incentivizing -> Bolt outcompeted Uber across Europe by charging drivers less to join platform (Bond, 2019).
- London Congestion Charge and ULEZ scheme pose a challenge due to £11.50 daily fee (Congestion Charge Payments, n.d.) (with car emission standard fine on top). Uber has responded by charging £1 surcharge if user journey goes through boundary.
- Cultural barriers: taxi licensing issues due to competition with local taxis (e.g. Uber's London license withdrawn in 2017 for failing to be "fit and proper" (Bond, 2019). Has since won license back but risk of repeat of withdrawal). Requires safe roads and drivers (limited capability in many LICs).
- Technological barriers: requires an app to function which limits its potential uptake in many LICs where smartphones are not so prevalent.

Opportunities to continue or expand scheme in current form

- Uber 2018 revenue increased by 43% on 2017, following initiation of Reward scheme (Iqbal, 2019)
- Operates in 65 countries and 600 cities (Iqbal, 2019), but Rewards restricted to just 25 places in the US (Constine, 2018), so great potential to expand Reward scheme elsewhere.
- High costs of Rewards and incentives are considered a "relationship-oriented investment" (Holly Ormseth) (Hawkins, 2018) -> will generate profit in the long-run.

Entry points for governments and businesses, including to limit scheme or shift to low-carbon

- Strong incentives and success so far suggest it will continue to prosper and grow.
- Already expanded into LICs and introducing Rewards will only speed this up.
- High-carbon emitting scheme, although Uber claims otherwise by calling itself a 'car-share'. The Government could regulate Uber's point tier system (to favor smaller Uber Pool vehicles) and support its 'Uber's Clean Air Plan' (all London cars electric by 2025 (Uber, 2018))->transition to a low-carbon incentive scheme.
- Uber must provide a guarantee that users' privacy is respected.

B11 Air Miles- Schemes that reward frequent flyers with Air Mile points that can go towards cheaper aircraft travel and upgrades.

Air miles schemes, also known as 'frequent flyer programmes', build loyalty of aviation travellers to a particular airline, for example Emirates Skywards, or a range of airlines within an Alliance, including Oneworld and Star Alliance. Similar to Tesco's Clubcard and AMEX, this is achieved by automatically rewarding flyers with Air Mile points based on their accumulated aviation mileage which in turn can go towards future lower-cost flights, upgrades and access to airport lounges and other privileges (Morris, 2020). The airline benefits from stronger customer loyalty and greater flight demand, particularly on long-distance flights which tend to bring in more revenue. Star Alliance, for example, unites 26 different airlines and boasts more than 1,000 lounges worldwide (Alliance, Star Alliance, 2020) with Air Canada flights earning flyers up to 150% of the miles they fly (Aeroplan, 2020). The development of mobile apps compatible with any particular air mile scheme has made the process of earning, tracking and spending air mile points easier than ever, facilitating increasing popularity amongst

business and leisure travellers. The concept of air miles is well established, emerging in the 1970s, and an increasingly attractive market offering high revenue from repeat purchase for airlines involved, with Star Alliance earning $213.2 billion in 2018 (Statista, 2018). Alliances particularly benefit small airlines as the cost of marketing is shared and there is a greater pool of customers to access. Low running and maintenance costs are paired with (in the case of alliances) shared start-up costs of marketing and high revenue. Since these schemes are significantly encouraging high-carbon travel, there is a clear role for governments and businesses. Whilst removing air mile schemes may be challenging, businesses could strive to improve their CSR/ESG rating by opting out of such schemes for business travel. Likewise, governments could introduce an Air Miles Levy on those excessive flyers and the most polluting seats (business/first class) and could potentially spend the tax income on investing in R&D of low-carbon polluting fuels and inter-city railway infrastructure investment.

Incentive and reward details

- Reward: Flyers earn air mile points based on accumulated aviation mileage, which can be spent on future flights, upgrades and more (Morris, 2020). E.g. Star Alliance offers access to more than 1,000 lounges (Alliance, Star Alliance, 2020) worldwide across the 26 member airlines and Air Canada rewards up to 150% of the miles flown (Aeroplan, 2020).
- Comfort: airmiles earned can be spent on higher-class seats and access to airport lounges, improving the quality and comfort of the travel experience.
- Convenience: points accumulated automatically on any flight mileage. User-friendly apps make tracking and spending points quick and easy.
- Time: airline alliances promote quicker and more seamless flight connections between those airlines within the same alliance. Star Alliance, for example, has made this their new priority of their strategy looking forward (Group A. , 2018).

Enabling and monitoring mechanisms

- Apps have made the process of tracking and collecting miles smoother.
- Data used to track demand for flights-> airlines can vary point-reward ratio to encourage flying without losing revenue from ticket sales.
- Has been a shift towards rewarding air mile points based on cost of flight ticket purchase, rather than mileage of flight, as airlines providing cheap long-haul flights are emerging (e.g. Norwegian Air offers economy fares to Madrid from New York City for as low as $229 one-way) (Coolidge, 2018). Airlines must adapt to these market changes to stay profitable.
- Balancing the quality of travel experience and reputation of frequent flyer programs versus the number of customers is achieved through the introduction of tier systems- e.g. Star Alliance offers a silver and gold status (Alliance, 2020) to offer differentiated privileges to different customer segments, conserving the elite brand reputation of gold status whilst maintaining a grasp of those consumers who are looking simply for cheap flights.

Challenges to continuing success of scheme

- Financial barriers: few start-up costs, with marketing/advertising and IT infrastructure taking up the largest proportion. Lack of physical infrastructure helps keep running costs low and profits tend to remain high in long run. However, schemes must adapt to emergence of low-cost airlines and shift away from points based on distance of flight towards points/cost of flight ticket to stay profitable (Mills, 2018).
- Few technological barriers: access to internet widespread (however may be some issues in some LICs, although app is not necessary).
- Cultural barriers: With air mile schemes offered by a geographically diverse range of airlines, there is a strong international presence. For emerging air mile schemes by existing airlines, a consumer base is already set-up so attracting users should not be a problem.
- Air mile scheme market is already heavily saturated with high competition from all directions- can be difficult to find a comparative advantage without compromising profit.

- Any breakdown in partnerships between airlines within alliances could be problematic. Difficult to ensure all airlines offer equal incentives and coming to agreements, for example on how to split up revenue, between all parties can be complex (Tieman, 2006).
- Potential for too many airmiles to be earned and will result in a loss in revenue, whilst altering the air mile reward system could lose customers.

Opportunities to continue or expand scheme in current form

- Has become extremely popular, with e.g. Emirates Skywards reaching 20 million members (2018) (Emirates, 2018).
- Leisure travel accounts for 70% of UK aviation (Carmichael, 2019), other countries also follow similar pattern, so this scheme is targeting those flying most frequently.
- Partnerships between airlines and commercial companies looking to attract the same customers, such as Qantas Health Insurance earning you 120,000 Qanats Air Mile points (Insurance, 2020) (became Australia's de facto 2nd biggest currency in 2014 (Wolverson, 2014)), encourage further involvement with the Air Miles scheme, and therefore flying.

Entry points for governments and businesses, including to limit scheme or shift to low-carbon

- The UK Committee on Climate Change (CCC) argue that an "escalating Air Miles Levy", such as a 'Green Flying Duty', should be introduced by governments to penalize frequent flyers, leaving those travelling for annual holidays untouched (Dickinson, 2019). They also suggest that this charge should proportionately fall on more polluting seats (e.g. business/first class). The income from this charge could fund further research into electric aviation and investment into improved inter-city railway connectivity.
- Governments could also make it a law for airlines to clearly detail the carbon dioxide emissions of the flight when a passenger is booking so they are aware of their carbon impact and can make informed decisions off this.
- Businesses should ideally opt out of Air Miles schemes, reducing aviation travel to only the most essential trips, thereby improving their CSR/ESG rating.

B12 AutoShare, Toronto- *Car share scheme whereby people buy a subscription allowing them to pick up and use any car from a fleet of cars parked in AutoShare locations within the city.*

AutoShare is an established car-share scheme in Toronto, Canada, allowing its more than 10,000 members to use any car, including electric and hybrid vehicles, from a fleet of cars parked in over 200 locations within the city. The AutoShare interactive app locates vehicles nearest to users and allows them to make reservations, cancellations and payments in advance. Data is used to analyse family size and income demographics of particular areas to tailor car options for users; its customised Business Rate Plan offers lower travel costs for employees. AutoShare offers a quick mode of transport for remote areas not easily accessible by public transport and is a convenient option for people who do not own a car or do not want to invest in one. It is estimated to save over $6,400 per year versus car ownership. In addition, AutoShare is partnered with ZeroFootprint, which provides users the option to offset their emissions at a cost of C$0.5 per km. Key shortcomings of AutoShare are high start-up and maintenance costs to cover car fleet purchases, parking spaces, insurance and fuel. It might also become less convenient if parking space availability becomes more limited. The government could promote this car-share scheme by incentivising or regulating businesses with a certain level of mileage to join the Customised Business Plan, instead of using private fleets of cars.

Incentive and reward details

- Reward: estimated to save >$6,400 versus car ownership for a year (AutoShare, n.d.). Low fuel costs. Cheap option for young people who do not want to invest in buying a car for themselves. Also, cheaper for a family/group than public transport. Customized Business Rate Plan offers lower travel costs for employees.
- Convenience: >200 parking locations throughout Toronto (Cindy Costain, 2012) ensures users are always nearby a parking point. Interactive app allows reservations, cancellations and payments in advance. Helps those who may need easy access to a car in different places at different times.

- Time: quickest mode of transport for remote areas not easily accessible by public transport.
- Comfort: for long journeys car travel is the most comfortable, especially with children.
- Environmental: partnered with ZeroFootprint to give users option of carbon offsetting emissions (0.5C$ per km) (Cindy Costain, 2012) and also offers electric and hybrid vehicles.

Enabling and monitoring mechanisms

- Technological advancement in geolocation has allowed this scheme to locate vehicles nearest to user.
- Effect of Business Rate Plan means lots of employees join as a result of the decision of just one employer.
- Data is used to analyze family size and income demographics of particular areas to tailor car options.

Challenges to continuing success of scheme

- Financial: high start-up costs of purchasing cars and parking spaces. Would not have succeeded in growing without funds paid by first members. High maintenance costs of C$1,000/month/car on the road (covers lease, insurance, parking, maintenance and gas) (Pachner, 2018).
- Cultural: finite number of parking space in Toronto and has had to become increasingly competitive as other car-share schemes emerge (14 schemes in Canada, as of July 2008 (Susan A. Shaheen, 2009)). Risk that it no longer becomes convenient as not enough parking spaces.
- Weak law enforcement in LICs may result in issues regarding insurance and health and safety. Lack of safe roads limit the potential of carshare.
- Technological: requires smartphone technology and geolocation.
- Data indicates an inversely proportionate relationship between income and carsharing activities (Cindy Costain, 2012)-> as global wealth (GDP) rises there are concerns that private ownership will continue to be preferred.

Opportunities to continue or expand scheme in current form

- Membership risen to >10,000 (Pachner, 2018) since starting and has generated profits since 2005 (reinvested) (Pachner, 2018).
- Helps solve first mile/last mile (FMLM) problem which continues to hinder use of public transport-> given 60% of trips are <40km in Toronto (and also true in other cities), it is likely this is helping (Cindy Costain, 2012).
- To further encourage low-carbon travel, could reduce hiring costs of electric vehicles (vs alternatives).
- Since 1/3rd of carbon dioxide emissions involved in car ownership comes from manufacturing the vehicle (Berners-Lee, 2019), carsharing remains a better option than purchasing a personal electric car.

Entry points for governments and businesses, including to limit scheme or shift to low-carbon

- AutoShare and other such providers must provide a guarantee that users' privacy is respected.
- Government could make it obligatory for businesses with a certain level of mileage to join the Customized Business Plan instead of using personal fleet of cars.
- AutoShare and similar schemes could award points to those who hire electric cars-> could go towards discounted journeys.

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