DESTI-SMART
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Delivering **E**fficient **S**ustainable **T**ourism with low-carbon transport **I**nnovations:
Sustainable **M**obility, **A**ccessibility and **R**esponsible **T**ravel

Thessaloniki - Sardinia - Bremerhaven - Madeira - Hastings - Mallorca - Vidzeme - Balaton - Pafos - BU

Policies Review Report:

A review of developing theory, practice and policy to deliver sustainable mobility and accessibility in tourist destinations

Derek Robbins (Advisory Partner)
Senior Lecturer
Dept of Tourism & Hospitality
Bournemouth University

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Bournemouth University

1. Introduction.

DESTI-SMART is an important project to improve understanding and contribute to the development of policy to achieve sustainable mobility in the tourist destination. This is not a newly identified issue. References can be found to the need to restrain car use and manage and control traffic growth in destination areas over 70 years ago. For example in the UK the Dower Commission was calling for Traffic constraint in National Parks in 1945 (Dower 1947 as cited in Cullinane 1997). Another seminal UK study, the Traffic in Towns Report chaired by Colin Buchanan in 1963, analysed that car restraint would be essential for urban areas. Whilst the Buchanan study was an analysis of all mobility needs in an urban area and did not particularly focus on leisure and tourism traffic, this early realisation that urban environments did not have the land space and capacity to meet mobility requirements with private car use had important implications for tourists, their mobility and their experience in the destination. High car shares in urban areas inevitably resulted in a number of negative externalities such as congestion, noise pollution and poor air quality and therefore had an immediate and important impact on the quality of the visitor experience.

Clearly then the dominance of the private car generates problems for all types of destination areas ranging from designated areas such as National Parks or areas of outstanding natural beauty, through other low density rural destinations, coastal and resort areas to large urban areas with high population densities. A key strength of DESTI-SMART is that the nine destination partners include a wide variety of destinations and area types, with the potential for different types of area to learn from each other through good practice and knowledge exchange. The transferability of policy approaches initially developed for one type of area can be experienced and tested in others.

Whilst the knowledge that mobility needs cannot be met sustainably with a dominant market share for private car use is well established, it is a problem that to date that has defied progress. Car ownership within the EU has continued to grow as has car use as reflected in increased average kms driven per annum (Eurostat 2006) hence the continuing need for more studies such as DESTI-SMART, along with a range of other EU studies such as CIVITAS, FP, STEER, H2020 to address previous policy failings. There is some evidence that car use is peaking or even reducing in some of developed countries such as UK, Germany or Holland. In the UK both trips and passenger kms by car have been have fallen by 12% since 2002 (DfT 2017). This mirrors trends elsewhere in Western Europe (Belgium and The Netherlands) where the number of car trips and car kms had stagnated or fallen although they are beginning to rise since 2015 (CBS 2018).

There is much to do to reduce dominance of car use.

2. **The Problem**.

The key driving forces and motivations for developing sustainable transport have changed over time. The initial Dower Commission focused on landscape, peace and quiet, and enjoyment of the natural environment. The noise and visual intrusion impacts of increased traffic were seen as potentially damaging barriers for the ultimate success of the destination.

Over time, congestion emerged as the most important externality of growing car dominance. Studies began to measure the economic costs of slower traffic speeds and gridlock. The additional costs to the local economy such as less reliable 'Just in Time' deliveries and less productive delivery staff have implications that are set to increase with congestion costs forecast to increase by 50% by 2050 (COM 2011). Local lifestyles are likewise impacted by increased employee commute and travel to work time times and slower travel for social or personal business. Tourists experience of the destination is impacted by congestion in a number of ways as slower traffic speeds slow their mobility around the destination meaning they can include less in their daily itinerary. Specialist tourist services such as open top bus tours with commentaries are potentially less enjoyable for the tourist and less efficient and more expensive for operators. Tourists will gain less enjoyment from travelling around the destination and the noise and visual intrusion aspects remain important.

Air quality has also become an important externality of dominant car shares. The link between increased road traffic and respiratory diseases (such as asthma) is well established (Wardlaw 1993) with particulates from diesel vehicles creating by far the greatest problems (Brand & Hunt 2018).

Most recently, the role of car dominance and its increased contribution to Greenhouse gas emissions (GHG) and thus to climate change has become the dominant driver to reducing car dominance. It is estimated that Tourism contributes between 5% and 8% of global GHG emissions , mostly CO2 emissions (UNWTO 2008: Lenzen et al. 2018) and is forecast to rise to 12% by 2025. Whereas most sectors are reducing carbon emissions attempting to meet the targets set out in the Paris accord tourism emissions continue to grow, from 3.9 to 4.5 GtCO2e between 2009 and 2013. Table 1 reflects the very high importance of surface transport to the tourism contribution as estimated by UNWTO . (Table 1).

Table 1: Tourism Contribution to Global CO_2 Emissions by Sector

	CO_2MT	%
Air Transport	517	39.5
Other (Surface) Transport	468	36.0
Accommodation	274	20.0
Activities	45	3.5
Total Tourism	**1,307**	**100%**
Total Global	26,400	4.95%

Source: (UNWTO 2008)

Tourism is of course very dependent on climate and is vulnerable to climate change. Therefore the UNWTO places great emphasis on tourism playing its full role in reducing its emissions and thus to mitigating this contribution to climate change (UNWTO 2008).

Whilst the principle motivations to reduce car dominance and move to more sustainable mobility practices may have changed over time, the realisation that this is necessary for destinations to grow and thrive whilst improving the ambience, environment and visitor experience has increased.

However there is a danger that the multiple policy objectives from a sustainable transport policy can be blurred, unfocussed and contradictory.

3. Traditional Approaches for sustainable transport and reduced car dependency

As stated, the need to establish sustainable transport practices has been accepted for many years. Policy developments to restrict and restrain private car use have a long history of development, implementation and experimentation and their evaluation is well established in the academic literature. Initial policy approaches tended to fall under two headings, 'the carrot and the stick' although many would argue that the most successful results emerged from a combination of both approaches (Holding & Kreutner 1998).

3.1 The Carrot

The carrot can best be summarised as an approach to encourage modal shift from car to public transport use by making the public transport option more attractive. This can be achieved in a number of ways:

i) Establishing more frequent and cheaper public transport options

Whilst more frequent and cheaper services will be attractive, there is a potential cost implication for either transport providers or the Local Authority if it requires increased subsidy to operate. Ideally the tourists will use the established local transport network. This network is primarily designed for use by the local population so increasing patronage of local transport services with additional passengers who are tourists has both potential advantages and disadvantages. The main advantage is the potential to increase revenue and improve economic viability. There are clear advantages of attracting tourists, particularly if their use of the service is at off peak times when there is spare capacity. For example in London tourists are estimated to contribute significant revenue in for Transport for London with over half the visitors using bus or tube (TfL 2016). However the potential for conflict arises when additional tourist passengers travel at the same time as local demand and contribute significantly to overcrowding on services. Over time the increased revenue has the potential to enable capital investment in infrastructure and vehicles, increasing both capacity and frequency. However tourism demand is seasonal, and whilst some destinations such as cities with an all year tourist market may benefit from a steady stream of additional revenue more seasonal destinations such as coastal resorts find short peak seasons of increased tourist demand difficult to accommodate. Furthermore the temporary nature of the increased demand means significant investment in extra capacity is less viable because it will be underutilised for much of the year.

One approach to reduce the clashes in local and tourist demand leading to overcrowding is to develop specialist tourist tickets offering lower price travel outside the peak periods, such as an off peak ticket like London's off peak travel card valid from around 09.30am after the journey to work peak has concluded. By and large the later start time is also the preferred option of the tourist and the off peak travel card is the most used option by tourists to London (TfL 2016).

There can be specific conflicts between local and tourist use such as the journey from the arrival hub to the tourist accommodation. Tourists often have luggage and this can contribute further to overcrowding on services from major arrival hubs such as airports to city centres, as evidenced on the Piccadilly Line to Heathrow Airport in London or indeed as observed on bus services from the airport to city centre in Thessaloniki.

One innovative approach to attract tourists to use public transport in the destination area is the development of tourist cards (for example, KONUS in the Black Forest, Germany) offering free public transport to tourists financed by a visitors tax (Durkop & Gross, 2012).

ii) Establishing new and innovative services specifically designed for tourists.

There are numerous examples of the development of special tourist networks of services, particularly in rural low density population areas including National Parks such as MoorBus (Robbins & Dickinson, 2007), the Alpine Pearls association of 22 villages (Verbeek, Bargeman & Mommaas 2011) or a specifically designed network of bus services such the Island Explorer in Arcadia National Park, USA (Holly, Hallo, Baldwin & Mainella, 2010) but there can be financial constraints. Innovative services designed for visitors will predominantly attract occasional or even 'once only' users and such services therefore need to attract a much bigger base of occasional users compared to services for the local population which are viable from a smaller base of regular users. Therefore innovative or specialist tourist services take much longer to build up a large customer base and attract viable passenger loads. There are multiple examples of services coming to an end, especially when grants, subsidies and financial start-up support come to an end with the service having failed to achieve financial viability (Cullinane & Stokes, 1998: Dickinson & Dickinson 2006).

A more integrated approach is WERFENWEN - Gentle Mobility (Austria) which combines arrival by modes such as rail with SMART solutions such as electric car hire to offer mobility within the destination. From 1995 to 2013 it is reported the share of non-car arrival rose from 6% to 25%.

iii) Developing transport as a visitor attraction.

Much can be achieved by developing the vehicle as an attraction which tourists and visitors choose to use and enjoy as part of the leisure experience. Examples include:

- the use of heritage vehicles (steam railways, vintage buses). The reliability and costs of using heritage vehicles can bring operational difficulties such as high operating costs and poor reliability (for example the Trossachs Trundler service in Scotland in the 1980s where the vintage bus was replaced by a modern vehicle) The use of replicas of heritage vehicles (Sorrento, Italy) is an alternative approach.
- open top buses offering a leisure experience, commentary and a view from the top deck. Most are hop on – hop off services with a ticket valid for the whole day, so meet mobility requirements between visitor attractions in addition to the bus trip serving as a visitor attraction in its own right.
- the use of leisure fun vehicles such as a land trains.

iv) Combine transport use and tourism activities.

A number of transport operators and services have developed joint ticketing initiatives with discount entry to tourist attractions for those arriving by public transport on production of the ticket.

v) Park and Ride

Park and ride produces a mixed response among planners, policy makers and academics. Clearly park and ride has the option to relocate traffic and parking and generates arrival in the town or city centre by public transport. The relocation of the traffic reduces noise and visual intrusion and meets the policy objective of improving air quality and reducing pollution. However studies indicate that only a proportion of car journeys are shortened by use of park and ride, with some users driving further to use the park and ride site and as a consequence P&R does not reduce GHG emissions (Parkhurst & Meek 2014). Dijk and Parkhurst (2014) concluded P&R worked most effectively when introduced for traffic management reasons and were particularly successful in heritage or historic city centres. Winchester, Salisbury, York & Oxford are all long standing examples of UK historic cities using a P&R strategy. The approach can also be used at very busy 'honeypot' sites which attract large numbers and the National Trust uses P&R to manage access to the Giant's Causeway in Northern Ireland. Ravenna, a partner in the EU InnovaSUMP project has developed Park and ride access for the previously traffic congested beach areas.

Active Transport

Strategies to encourage modal shift from car to increased use of active transport (cycling and walking) can be encouraged, often through infrastructure developments such as segregated (safer) routes or short term demand responsive cycle hire (Beroud & Anaya 2012). Demand responsive cycle hire has predominantly been confined to urban locations, with schemes in major cities such as London and Paris being the most high profile and well known examples, although proposals to transfer the concept to rural areas such as the New Forest have been proposed. Schemes usually involve docking mechanisms at the pick-up/drop-of locations, which improves security and control but this requires managing and can lead to significant operating costs, particularly where there are flows of cycle demand predominantly in one direction. The docking stations at one end of the flow quickly empty of available cycles whilst at the other end docking stations become full and consumers are unable to return their cycles. Management of the scheme requires monitoring and a system of moving the cycles between docking stations to resupply key start points and empty the busiest drop of points. The investment in infrastructure is also significant as a typical bicycle dock with capacity for 25 bikes, costs about £100,000 to install and maintain (BBC 2018).

There are now a number of trials utilising a new breed of 'dockless cycle hire schemes where the cycle is found and unlocked with a few taps on a smartphone and then locked up and left wherever the journey ends, rather than a special docking area. Whilst the numbers have shown a rapid increase with an estimated rise from 2 million cycles in 2016 to 18 million in 2018 and schemes in over 1,500 cities much of this growth has been in China (BBC 2018). Experience from various

schemes appears mixed, with some concerns of vandalism, security and theft. Furthermore there have been issues over how and where to find a cycle and the leaving of cycles inappropriate locations causing obstructions. The operation of schemes may require refinement, possibly with designated marked areas as pick-up and drop-of points in central areas. Nevertheless the lower start up and infrastructure costs may well assist in the migration of demand responsive cycle schemes to smaller settlements and rural areas. Some early examples of schemes in Europe include Manchester, Berlin and Oslo.

Cycling in tourist destination areas serves several purposes. It is used as a means of transport and those cycle journeys which are a substitute for motorised transport meet sustainable aims. However it is also a leisure activity in its own right and undertaken for its own enjoyment. Whilst leisure cycle trips as a tourist experience are to be encouraged, sometimes the cycling is preceded by a motorised journey with cycles carried on car racks. The link with car trips maybe necessary to transport the tourist to the desired start point for the cycle ride and reasons for undertaking it are varied. One reason that has been identified is distance, particularly in the case of day visitors who regard the distance between their home and the tourist destination as too far to cycle. Another reason is to avoid busy roads or roads that are perceived as unsafe prior to the start point of the cycle ride which maybe in scenic countryside possible utilising a dedicated and segregated cycle path.

Analysis of a high share of travel by cycle needs very careful analysis and evaluation, as the motorised journey component may mean that for example the cycling activity generates an increase in CO_2 emissions. Modal shift to public transport is an option, particularly rail, but it is dependent on the rail and bus services being able to accommodate cycles, and this facility is very variable between services and operators.

3.2 The Stick

The stick on the other hand involves a range of measures directly developed to discourage private car use, most notably in the most sensitive areas. This can involve direct constraints on car use through to policies to discourage it.

i) Parking Control

The most successful approach to reduce car dependency at a destination is to control vehicular capacity through parking control (DETR 1998). This can be achieved by either limiting car park capacity, or discouraging car use and parking through high parking charges. For example traffic levels entering major Metropolitan cities such as London where the central area is the planned destination were restricted by the number of legal parking spaces available long before any further constraints and discouragements were introduced in the form of congestion charging.

Tourism attractions with limited landspace have also opted to offer no parking facilities to customers (Prior Park, Bath). However the impact of this strategy is less clear and requires careful monitoring. Tourists may arrive by alternative modes of transport as desired, but may utilise alternative car

parks nearby in destinations where that is available and walk to the attraction (so although technically park and walk it is not reducing the car share) or simply not visit thus impacting on visitor numbers and the economic viability of the tourist attraction.

ii) Prevent or Limit Car Access

One approach is to exclude cars from certain very busy or very sensitive areas. An early example from the 1970s is the Derwent Valley in the Peak District National Park in the UK, an environmentally sensitive destination where car access was generating too many externalities. A project in the Bayerischer Wald National Park, Germany also comprised of both a high-quality bus system and the seasonal closure of selected roads to cars (Holding & Kreutner 1998) and the Swiss association GAST (Gemeinschaft Autofreier Schweizer Tourismusorte) encompasses nine virtually car free tourist resorts where the number of permits granted for combustion engines is kept to an absolute minimum (Høyer 2000).

There are strategies in urban areas to restrict car from certain areas, perhaps historic towns with narrow streets although a further motive for introducing car free areas is to create social spaces and meeting places by creating pedestrianised areas. The overall objective is to improve the quality of place (Bannister 2008) which is important for the tourist experience.

4. The Emergence of SMART Strategies

A new range of SMART policy tools are emerging to promote sustainable mobility. Much of the literature focuses on urban areas and cities linking with the SMART cities agenda, although they are equally implementable at all types of destination such as costal resorts and rural destinations.

4.1 SMART technologies for real time information

SMART technology approaches can assist modal shift making public transport options much more attractive. They can contribute to the quality and ease of use of public transport use with improved real time timetable information to help plan and optimise journeys. Estimated time of arrival (ETA) information has become familiar, often displayed on electronic display boards at bus stops but also with the potential to be relayed to passengers by SMART phones. The accuracy of ETA is improving all the time with improving automatic vehicle location (AVL) technology and more accurate prediction algorithms and improved information will improve passenger satisfaction. Even if the vehicle is late passenger dissatisfaction is reduced if they are informed and in general they accept short delays within reason as long as they know for how long (Rabi et al. 2006). Furthermore, reliable real-time travel information delivered to passengers reduces the perceived waiting time as well as the actual waiting time as passengers can arrive more closely to the departure time (Watkins et al. 2011).

Buses are affected by a large number of external influences such as weather, traffic conditions, traffic accidents, road closures, passenger loads and even payment methods influencing boarding times at bus stops making predicting their arrival time challenging (Song, Teng, Chen & Shu 2013).

As real time information improves in accuracy there is scope for journey planning or adaption during the course of a trip, particularly trips involving interchange , where one potential route option has suffered severe disruption or significant delays.

4.2 SMART technologies for ticketing, information and Multi Modal Solutions – Mobility as a Service (MaaS).

SMART ticketing brings many advantages with an ever increasing range of payment options ranging from ticketless payment to prepayment cards and SMART phone apps. In addition to the faster journey times that result from improved boarding times SMART ticketing is also a potential enabler for much greater integration of the purchase and use of mobility services across many modes using the same booking and payment system. Mobility as a Service (MaaS) aims to facilitate seemless mobility and improved connectivity and potentially can incorporate rail, bus, cycle hire and car hire into one integrated provision with ticketless payment and common validity.

Although there are a number of MaaS schemes operating there is still some ambiguity surrounding the MaaS concept. The first comprehensive definition of MaaS is offered by Hietanen (2014) who describes MaaS as a mobility distribution model that deliver users' transport needs through a single interface of a service provider. Jittrapirom et al. (2017) presented an overview of 12 schemes, eleven located in Europe and one from the United States. Eight of these are operational schemes, three are pilot schemes, and one is a scheme that was planned but cancelled before its operation even began. Furthermore three of these schemes have already ceased their operations. Whilst MaaS presents enormous opportunities for integrated mobility to offer much increased flexibility as an alternative to the private car, this high level of churn shows that developing a successful and viable operating approach remains work in progress.

Jittrapirom et al. (2017) identified large variations in the criteria of the schemes although , certain patterns can be observed. For example, public transport is nearly always included and the majority of schemes include bike sharing (seven current, one planned), car sharing (eight current, one planned), and taxi (ten current, one planned) although other components like car rental are included in a minority of schemes.

4.3.1 SMART Technical Solutions - Decarbonise Transport through electromobility.

SMART technology offers the opportunity to reduce the reliance of transport services on fossil fuels particularly through the continued developments in Electric Vehicles (EV). In 2009 the EU calculated that transport was 97% dependent on fossil fuels (COM, 2009), although the Commission had set a target for a 10% share from renewable energy sources by 2020. The Transport White Paper published in 2011 (COM 2011) argued at that that on current trends renewable sources would be little above 10% in 40 years time, but there has been significant progress since. The White Paper set a target to halve of conventionally fuelled cars by 2030 in urban areas.

The emergence of alternative fuel sources for the private car meets a number of sustainable objectives. CO_2 emissions should be reduced, although the size of CO_2 reduction by EVs is

dependent upon the source of electricity generation used to power the EVs. There is some evidence that EV owners also adjust behaviour and drive less (Scott, Hopkins, & Stephenson 2014).

Perhaps an even bigger contribution from EVs is the impact on pollution and local air quality. Brand & Hunt (2018) calculate that the health costs from externalities of EVs in the UK are £13 pa whereas petrol vehicles generate three times that cost (£37 pa) whilst diesel cars impose almost 20 times the cost (£258 p.a.).

There are some examples of EVs contributing to the mobility needs of disabled visitors. For example Cordoba three different types of vehicle are available for visitors with reduced mobility which run on 10 different routes throughout the historic city centre. GP tracking systems identifies the location of vehicles to a traffic coordinator in case assistance is required . (Hall, Le-Klah & Ram 2017). Specially adapted e-bikes have also been trialled in Las Palmas as part of the CIVITAS destinations project.

Whilst the move to electromobility for motorised transport brings clear benefits to the destination in term of air quality and noise, nevertheless they perhaps embed high levels of private car ownership even though owners feel they are making a positive contribution to reducing CO_2 emissions. Nevertheless cars remain inefficient users of road space, and in large cities around 30% of land area is dedicated to roads, streets and parking areas for the car. Therefore other objectives of sustainable destinations such as the creation of social space and reduced levels of congestion are not directly addressed by electric cars.

The use of electric propulsion by public transport is also beneficial for reducing emissions and improving air quality. In large cities this has been common place through the medium of light rail, tram and at times trolley bus services. However such options require heavy infrastructure development and are only justified in large cities with a high population density. The lead partner for DESTI-SMART, Thessaloniki has a light rail network under construction. However increasing attention is being paid to the introduction of electric buses in smaller destinations with a range of trials to explore operational issues such as reliability and comparative costs. Two electric buses were tested in Madeira as part of the CIVITAS destinations project. However discussions with operators of large fleets indicate that many proposals underestimate the infrastructure requirements for such an approach. Whilst the charging of a few trial vehicles is straightforward, there can be significant investment costs when converting a whole fleet, perhaps requiring dedicated electricity generating sub stations. A more detailed summary of the viability of EV buses will be undertaken in the state of the art research for semester 2 on electromobility.

Autonomous vehicles are an increasing focus of research for a longer term application and their potential will be investigated further as this project proceeds.

4.3.2 SMART Solutions for walking and cycling.

SMART technology is contributing to developments in active travel such as demand responsive cycle hire including the development of new systems for cycle hire including the systems without the need for docking infrastructure as outlined earlier.

SMART developments also assist payment mechanisms and phone apps are important, both to unlock cycles and as an information source, possible helping locate cycles available for hire. Walking of course is also assisted with the map information available on the mobile phone.

Other interesting developments include electric cycles which extend the range of use and thus perhaps further reduced the need for car or public transport journeys, and demand responsive hire of e-bikes has been introduced in some destinations (Exeter which is a member of the InnovaSUMP project). Novel developments such as micro-scooters offer interesting new possibilities.

4.3.3 SMART Mobility Hubs

To both aid the interchange between mode and also to develop social spaces where transport users can meet and mix, the concept of developing mobility hubs within destinations incorporating multiple recharging facilities for car, cycle and micro-scooter are being explored.

5 Policy Objectives and Conclusions.

DESTI-SMART aims at improving transport and tourism policies at destinations by integrating strategies for sustainable mobility, accessibility and responsible travel in sustainable tourism development, and through efficiency, resilience, intermodality, novel transport systems, cycling and walking for visitors.

From a policy objective it is important to identify and define what constitutes sustainable mobility. Bannister (2008) explored sustainable mobility in 2008 and developed a sustainable mobility paradigm where he identified seven key elements of sustainable mobility (Table 2). Whilst there have been significant developments over the last decade in technology and in land-use and traffic planning the elements identified by Bannister retain their relevance and offer a useful starting point to develop a framework to both identify policy objectives and develop approaches to achieve these objectives.

Some elements such as reducing the need to travel, whilst potentially important for their potential to substitute some travel such as business travel perhaps through video meetings are not appropriate objectives for the leisure and tourism sector. A reduction in visitor numbers will damage the visitor economy and is not an acceptable approach. Likewise objectives on travel time which seek to reduce the costs of congestion on the local economy are less critical for the leisure and tourism market. However the remaining five elements all inform strategies for leisure and tourist mobility and inform the policy approaches for DESTI-SMART.

Table 2. Seven key elements of Sustainable Mobility.

- Achieve reasonable travel time (not fastest travel time)
- Indentifying travel as a valued activity
- Reduce need to travel

- Achieving modal shift from private car to public transport or to walking and cycling
- Lowering pollution and noise
- More efficient management of transport services achieving higher load factors
- Quality of place

Source: Summarised from Bannister 2008.

New and developing technologies and the increasing prominence of SMART solutions are the SMART cities research agenda must also inform the policy objectives for DESTI-SMART.

5.1 Policy Objectives and Policy Instruments.

This state of the art paper has reviewed the policy objectives and the implementation of policy through a wide range of case studies and approaches over a period of 70 years. Clearly the principal motivations and driving forces to achieve sustainable mobility may have changed over time (section 2) and the urgency to address sustainable mobility has grown, although the original motives over noise, ambience and peace and tranquillity remain despite the emergence of alternative objectives.

Summarising the objectives of sustainable mobility for the destination must be to:

1. Reduce CO_2 emissions
2. Improve air quality and reduce vehicle emissions and noise intrusion
3. Reduce congestion
4. Achieve modal shift with less use of the private car and greater use of alternatives
5. Improve the quality of the destination and its ambience, visual appearance and increased social space making it a more attractive place for tourists to visit.
6. Increase social inclusion and decrease inequality of access to destinations. This also includes increased accessibility for the mobility impaired and disabled visitors.

This state of the art paper has reviewed a multitude policy instruments available to achieve these objectives in Section 3 & 4 and discussed examples of their application. Policy instruments include:

1. Making public transport more attractive through price, frequency and comfort improvements
2. Making public transport more attractive through SMART technologies improving real time information and ticketing
3. Making public transport more attractive through integration between operators and modes and common ticketing
4. Creating increased integrated multi modal services with common ticketing or payment systems (MaaS).
5. Creating transport services and networks specifically designed for tourists that maybe a tourist attraction in their own right – perhaps through tours, or distinctive, vintage and novel vehicles

6. Linking transport and tourist services using combined or discounted ticketing
7. Encouraging the adoption of active transport modes (cycling and walking) through a range of approaches such as infrastructure investment into segregated routes, demand response cycle hire and integration with other modes by developing bike carrying capacity on bus and rail.
8. Discouraging car use through parking policy (capacity and charges)
9. Exclusion of cars from certain areas which may be vulnerable or overcrowded
10. Decarbonise private transport with an increased share of EVs
11. Decarbonise public transport services
12. Improve access for mobility impaired and disabled visitors through infrastructure developments (ramps, surfaces), and specially adapted vehicles.

This review has established that there is no single approach to achieving sustainable mobility in the destination. All destinations will require and a mix of the above policy approaches and not all approaches are appropriate or applicable to all destinations.

DESTI-SMART has 4 key themes (Table 3) which have been informed by the 6 objectives and all of the identified potential policy instruments fit into the core themes.

Table 3. DESTI-SMART – 4 key themes

A. Investments in low-carbon transport systems for visitors shifting from private cars to sustainable mobility means, including electromobility, flexible and mass transportation (led by Hastings Borough Council, UK).
B. Infrastructure and Intermodality Services for Visitors, Information and Communication Technologies and Mobile Applications, Mobility as Service (Mobility as a Service - MaaS) in tourism (led by Bremerhaven, Germany).
C. Accessibility to tourist attractions and services, accessible tourism for all (disabled, elderly, families with young children), (led by Mallorca Council, Spain).
D. Cycling and hiking facilities for guests, including cycling tourism and 'Greenways' (led by Latvian Greenways Association, Latvia).

It is equally clear that most of the available policy approaches meet some but not all of the 6 objectives of sustainable mobility and there is potential for some policy approaches to conflict with some objectives. Examples discussed in the review include possible increased emissions from increased cycling if linked to a motorised journey or whether EVs which reduce emission also contribute to reduced congestion or visual intrusion. The development of effective evaluation strategies for sustainable mobility policies will be an important contribution from DESTI-SMART

5.2 EU projects informing Sustainable Mobility and DESTI-SMART.

DESTI-SMART will contribute to the demonstration and application of sustainable mobility policies. It should not be seen in isolation, but as a contribution to sustainable mobility alongside other

important EU projects, many of which have trialled similar policies in different destinations and scenarios from which DESTI-SMART can learn.

For example the STEER programme under the Intelligent Energy Europe Programme (IEE) targets energy savings and energy efficiency in Europe. The DESTI-SMART project addresses energy efficiency with policies to implement modal shift, reduce private car use and also increase energy efficiency through improved public transport management and therefore improved load factors. In addition there is a clear work-stream theme to diversify energy sources with an increased share of electromobility.

The clearest links and synergy are with H2020 CIVITAS DESTINATIONS. The 5th wave of this project (2016 – 2020) involves 29 partners from 12 European countries (plus one from China) and the project tests SMART and intelligent solutions in 6 tourist cities. The project has included the introduction of EV charging points, two trial EV buses, accessibility projects for the disabled plus cycle infrastructure developments. DESTI-SMART and CIVITAS DESTINATIONS share a common partner in Horários do Funchal, Transportes Públicos S.A. (PT) enhancing cooperation and sharing information.

InnovaSUMP (2017 – 2021) is another important EU project with 9 partners with close synergies to DEST-SMART. There is a focus on the differing needs of local residents and tourists and an approach that addresses seasonality proposing significantly different provision during peak and off peak periods in addition to a focus on seemless travel. One of the demonstration projects (Ravenna) has address issues around the land area dedicated to parking in central areas combined with a strategy of park and ride for access to the principal attraction, the beaches.

LASTMILE (2010 – 2020) with the focus on missing links on the last stretch of the journey, for the tourist i.e. from the hubs such as the regional railway station to the final destination has close and important synergy with DESTI-SMART. Proposals for the effective integration of modes of transport offering flexibility and seemless travel at the destination without requiring access to a private car include as good practice demand responsive shuttle services, ride share and potential car or bike pooling.

TRAM (2018 – 2021) is another project (5 partners) with a focus on a low carbon economy again with synergies to DESTI-SMART theme A. Issues addressed include fleet renewal for public transport, replacing older less efficient vehicles to improve energy efficiency along with approaches to promote EVs for public and private use. The role of interchange and infrastructure hubs is also a focus with potentially important links to DESTI-SMART theme B.

CYCLEWALK (2017 – 2021) has clear synergies with DESTI-SMART theme D and aims to develop best practices and an action plan for the development of cycling and walking infrastructures in urban areas such as cycling-friendly road infrastructure and investments oriented to the creation of pedestrian areas and paths.

The SEEMORE (2012 – 2015) EU project with 14 aimed at promoting and enhancing sustainable mobility in tourist destinations. The main approach was integrated transport services, parking control and encouraging cycling including short term bike rentals.

Eurovelo. The EU has contributed to the funding of the development of the Eurovelo network of high-quality 15 long distance cycle routes covering 70,000 kms in 42 counties. Whilst the focus is clearly on longer distance cycle tourism, the network provides useful experience in the development of segregated cycle infrastructure and has included approaches to bike rail integration with a scheme introduced in Austria.

There is a tendency for many of the EU projects to focus on Sustainable urban mobility plans (SUMP) and one strength of DESTI-SMART is the range in the type of destinations and the scope to develop demonstration projects and feasibility studies around four key SMART themes in a diverse range of nine destinations.

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