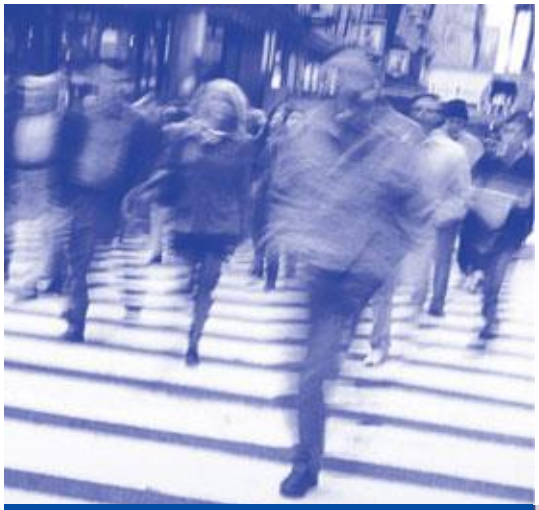

SUMP-PLUS

Initial conceptual framework to map and establish cross-sector Links between major trip-generating sectors of the economy

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2020 CiViTAS Cleaner and better transport in cities SUMP-PLUS

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Disclaimer

Abstract

Transport is largely a derived demand and serves the needs of producers and consumers across the various sectors of the economy. Hence, business decisions taken by these non-transport sectors can have a major influence on passenger and freight travel patterns (particularly in terms of the numbers and location of trips); yet these transport consequences and the impacts on traffic congestion, accidents, air pollution and CO_2 emissions, are rarely taken into account when these sectors develop their models for (public) service delivery and business models. This deliverable provides an initial conceptual framework to help address this problem.

It first presents (Chapter 3) an international review of locational and service delivery decision-making in several sectors, with a more in-depth analysis of case studies from the health sector. It concludes that, while there is a credible academic literature, there is limited public documentation about actual business decision-making processes and no underpinning conceptual framework. The latter issue is addressed in Chapter 4, where seven conceptual cornerstones are introduced, as inputs to a proposed conceptual framework.

Chapter 5 considers the applicability of this embryonic conceptual framework to four sectors (health, education, retail and tourism), while Chapter 6 explores existing forms and degrees of cross-sector coordination in each of the six SUMP-PLUS cities.

The conceptual framework and findings presented in Chapter 6 will be applied as part of the Co-creation Laboratories being set up in each SUMP-PLUS partner city (within WP2), which will provide the opportunity to test and further develop the ideas set out in this deliverable.

We would like to thank those partners who have made detailed comments on an earlier draft of this report.

List of beneficiaries

No	Name	Short name	Country
1	STAD ANTWERPEN	ANT	Belgium
2	MUNICIPALITY OF ALBA IULIA	ALBA IULIA	Romania
3	KLAIPEDOS MIESTO SAVIVALDYBES ADMINISTRACIJA	KLAIPEDA	Lithuania
4	COMUNE DI LUCCA	COMUNE DI LUCCA	Italy
5	DIMOS PLATANIAS	PLATANIAS CRETE	Greece
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1 Executive Summary

Introduction (Chapter 2)

The travel patterns we observe in cities, both passenger and freight, are largely the result of decisions taken by goods/service providers and their consumers *outside* the transport sector – in other words, transport is a 'derived demand', and not an activity undertaken for its own sake. Yet the transport system is expected to accommodate the transport demands that result, and attempt to limit the associated negative externalities – even though municipal transport planners have relatively little influence over the levels and patterns of travel generated by other sectors' decisions.

Very little attention has been paid to examining how decisions taken in other sectors impact on passenger and freight travel demand, and give rise to the associated negative externalities, such as traffic congestion or public transport overcrowding, traffic accidents, poor air quality and CO_2 emissions. It is recognised that there is a lot that the transport sector can do to contribute to a vision of a carbon-neutral economy; but transport policies can only go so far, as most travel demand is generated by activities associated with other sectors of the economy. We therefore need to take a more holistic approach – and avoid one sector simply exporting its carbon to another.

The focus of this deliverable is on developing a conceptual framework to assist in exploring cross-sector links between transport and the more consumer-oriented sectors, where individuals can exercise more control over their behaviour, rather than with, for example, manufacturing sectors. The Grant Agreement referred explicitly to education and health, to which we have added retail and tourism, in part reflecting the priorities of SUMP-PLUS partner cities.

What we already know (Chapter 3)

A review of the relatively sparse international literature – across health, education, retail and tourism sectors in many different countries – finds some evidence of transport being considered as part of decision-making criteria for the location of new services and facilities in different sectors. However, there is little evidence that these decision-making models developed within academic research have been applied in practice. Real-life case studies indicate that transport impacts are considered on an ad-hoc basis within locational decision-making; however, there is little evidence of systematic coordination across transport and other sectors, or formal governance and coordination mechanisms.

In particular, the following conclusions emerged:

1. There are many academic modelling tools that take into consideration transport-related criteria within locational decision-making across all sectors, but it is unclear to what extent these are used in real-life decision-making
2. Within the UK's healthcare sector, there are instances of transport accessibility being considered in locational decision-making, yet this appears to be limited to ad-hoc assessments and does not constitute systemic cross-sector coordination. Other criteria are given much greater weight within decision-making regarding hospital relocations.

3. When designing coordination mechanisms, aspects to take into consideration are: the levels of strategic policy-making, spatial and investment planning, and continuous operational decision-making; the appropriateness of temporary vs permanent and hierarchical vs network arrangements; and the specific practical mechanisms through which coordination can be achieved. While the many barriers to coordination 'across silos' is recognised, much less is known about the types of incentive structures that could facilitate it.
4. Recent developments in ICT and vehicle technologies are reshaping the way that services are delivered in different sectors, and thus the consequent impacts of those sectors on transport systems and the substantive issues that require coordination, recent experiences brought about by COVID restrictions have accelerated moves to digitally-based service provision.

Towards a Links conceptual framework (Chapter 4)

This requires a shift in perspective when thinking of transport and travel demand:

- Recognising that travel is a derived demand – a means to an end, or a 'space-shifting mechanism' that enables people to take part in successive primary activities at different locations
- Further recognising that there are different ways in which some of these primary activities can be realised, including on-line or in-home
- Taking more account of the temporal (i.e. timing) dimension of travel, alongside the spatial dimension
- Exploring various forms of interdependencies, between people and their activities; for example, a shift in focus from conceptualising travel as a series of discrete trips, to looking at household patterns of daily travel behaviour

Seven key conceptual cornerstones relating to interdependencies and cross-sector links are introduced in this chapter:

- Travel as derived from consumption and production activities
- Focusing on accessibility, not mobility
- The importance of the temporal dimension
- Non-transport barriers preventing sustainable travel choices
- Interdependencies in daily life, at the household level
- Aggregate, multi-sector ramifications of policy decisions taken by one sector
- Longer-term factors: the influence of socio-technical clusters and business practices

Figure 4.11 below summarises the resulting conceptual framework and brings together these various conceptual cornerstones. It focuses on certain household consumption patterns and the person and freight trips that these can generate, with only implicit consideration of production-generated trips

(e.g. commuting and business trips and freight movements). Figure 4.11 starts with the representation of several sectors of the economy, that provide goods and services to households (with the support of household members as employers and employees), which are consumed in various ways through activity. The red arrows indicate links between these sectors and the existence of various barriers to effective cross-sector collaboration - shown as double brown lines.

Having produced a wide range of goods and services, the issue arises of how households can access them. Five types of access are identified, including personal travel to a physical facility, the conveyance of the service or good to the home (involving a personal or freight trip), and provision within the home, either physically (e.g. food preparation relying on a cooker and refrigerator), or digitally via the internet (e.g. on-demand streaming of a film). Again, there may be various space (shown in red) and time (shown in blue) constraints and other barriers that make it difficult for a household to secure some forms of access – shown as double brown lines, both originating within the transport sector and outside.

Collectively, the various forms of household access to goods and services enables a daily pattern of consumption and activity participation, that results in various types of interactions both between activities and among household members and other people and organisations. Finally, all this activity takes place within a sector-led set of current socio-technical clusters. As these change over time, they can give rise to major modifications, or sometimes discontinuities, in consumption and activity patterns, many of which are presently unanticipated.

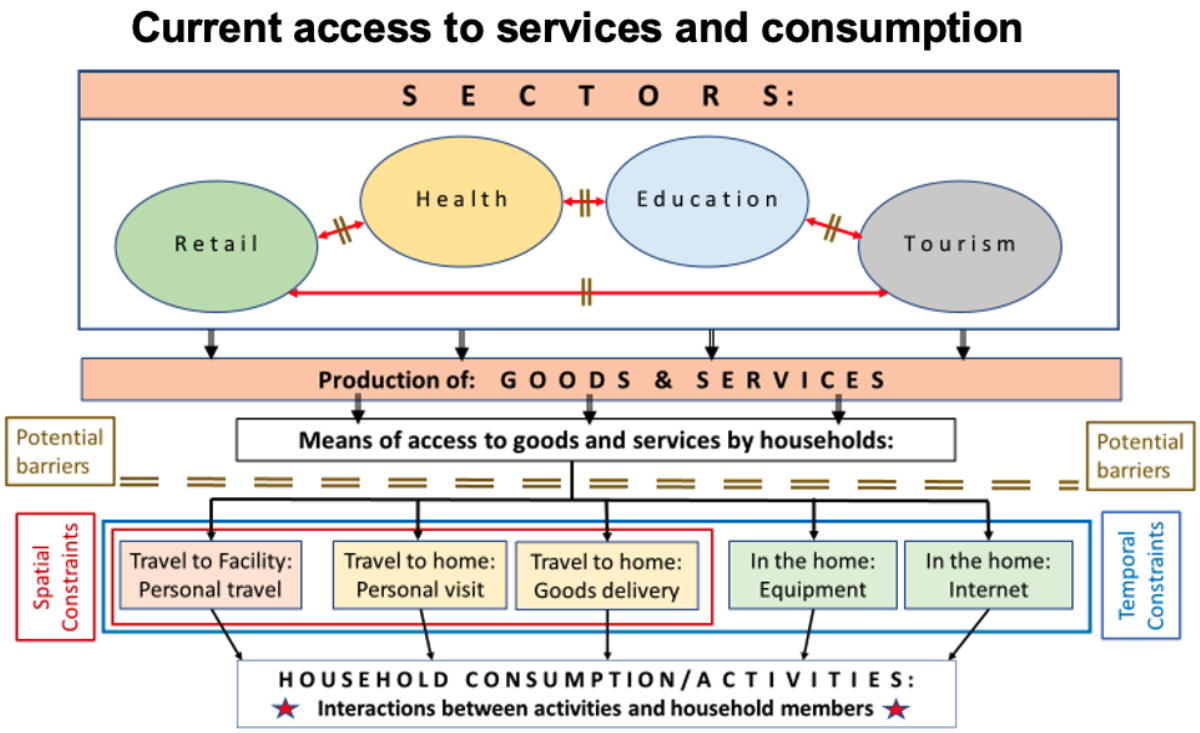

Figure 4.11: SUMP-PLUS conceptual framework for cross-sector analysis, in relation to both current and future services and consumption.

What does this mean for different sectors? (Chapter 5)

Table 5.1 summarises the range of ways in which transport is associated with other societal/economic sectors. This deliverable focuses on the SUMP-PLUS LINKS concept, which is captured by the part of the Table highlighted **in yellow** (Type C impacts)**.** The dimensions included in the upper part of the table (Type A and B impacts) relate to SUMP-PLUS PARTNERSHIPS activities, which are included in the city CLs (WP2). The precise form of these impacts will vary by sector and from one country to another.

Direction of impact	Type of impact	Examples of impacts
Transport → Sector =>SUMP-PLUS PARTNERSHIPS	**A**: Vehicle-related impacts	Traffic accidents Air quality Noise levels CO_2 emissions Congestion & Delays
	B: Mobility- and access-related impacts	Provision for walking, cycling and public transport Access to sector facilities
Sector → Transport => SUMP-PLUS LINKS	**C**: Impacts of decision-making regarding facility locations and service/business delivery models (freight and passenger)	Number of trips to sector facilities Trip lengths to sector facilities Scope to walk, cycle or use public transport

Table 5.1: Three types of association (A, B, C) between transport and other sectors.

The forms and strengths of 'Type C' interventions that might be found in four non-transport sectors is shown in Table 5.2.

SECTOR	TYPE OF PROVISION				
	Patterns of service provision	**Location of physical facilities**	**Online service provision**	**Deliveries to homes**	**Provision in the home**
Health	***	***	**	*	*
Education	**	**	*	-	*

Retail	***	**	-	***	-
Tourism	*	*	*	-	-

Table 5.2: Scope for flexible service provision, by sector.

What is the current state-of-play in each SUMP-PLUS city? (Chapter 6)

Three SUMP-PLUS cities are examined in this chapter: Greater Manchester, Alba Iulia and Platanias – based on the interest of each city partner. For Greater Manchester, links between transport and the healthcare sector are considered. For Alba Iulia, links with both tourism and education sectors are discussed, whereas the Platanias case also focuses on tourism.

The chapter first reviews the governance structures for each city's transport system and the other sector(s) of interest, providing an overview of key institutions and policy strategies. The chapter then analyses to what extent existing coordination between transport and the sector chosen for action in that city, includes Type C impacts and potential Links. Finally, it presents a SWOT analysis, including strengths and weaknesses of existing cross-sector coordination, and opportunities and threats with respect to future coordination.

The concepts outlined here have been presented to city partners and have been incorporated into most cities' Co-created Laboratory Plans. The success of these cross-sector initiatives will be closely monitored, with the main findings presented in D5.3 (results of city laboratory evaluation). These will then be incorporated into D1.7 (validation of the SUMP-PLUS conceptual/analytical framework), where the conceptual framework developed here will be refined, for wider application. It is also intended to provide some form of SUMP guidance on Cross-Sector Links (as part of D6.1), drawing on the updated conceptual framework and the practical experiences of city partners.

2 Introduction

2.1 Aim of the deliverable

The LINKS component of the SUMP-PLUS project (Task 1.4) aims to develop *a conceptual framework establishing cross-sector 'links' (at planning and operational levels) between major trip generating sectors of the economy.* This deliverable D1.4 reports on the two first Sub-Tasks 1.3.1 (Evidence review of cross-sector impacts and governance structures) and 1.3.2 (Conceptual framework for developing successful cross-sector planning and operation). Sub-Task 1.2.3 relating to supporting Analytical tools is reported on separately.

SUMP-PLUS D1.2, on Transition Pathways, reported on what the transport policy can do to contribute to carbon-neutral mobility; but action within the transport sector can only go so far, as most movement is generated by activities associated with other sectors of the economy. We therefore need to take a more holistic approach – and avoid one sector simply exporting its carbon to another.

The focus in this report is on exploring cross-sector links with the more consumer-oriented sectors, where individuals can exercise more control over their behaviour, rather than with, for example, manufacturing sectors. The Grant Agreement referred explicitly to education and health, to which we have added retail and tourism, in part reflecting the priorities of SUMP-PLUS partner cities.

2.2 The concept: cross-sector links

The travel patterns we can observe in a city, both passenger and freight, are largely the result of decisions taken by goods/service providers and consumers *outside* the transport sector – in other words, transport is a 'derived demand', and not an activity undertaken for its own sake. Yet the transport system is expected to accommodate the transport demands that result, and attempt to limit the negative impacts of the associated congestion, air quality, etc – even if municipalities have relatively little influence over the levels and patterns of travel generated by others' decisions.

Very little attention has been paid to examining how these patterns arise and – more importantly, in the context of SUMP-PLUS – how decisions taken in other sectors impact on observed travel demands, both for passenger and freight movements, and give rise to the associated negative externalities, such as traffic congestion or public transport overcrowding, traffic accidents, poor air quality and CO_2 emissions.

Although the transport sector can attempt to provide an attractive range of modal alternatives to private car use, in order to reduce congestion, promote sustainable mobility and encourage active travel, if new hospitals, colleges, retail parks and housing developments are located away from existing settlements and major travel corridors, then when making personal visits, users of those facilities will inevitably be locked into car-dependent lifestyles. Thus, the types of service delivery

models developed in other sectors can have a major impact on travel patterns – in some cases, with far greater influence than policy decisions under the control of the transport sector.

For example:

- Education: changing educational policy from requiring children to attend their nearest suitable school, to allowing full parental choice of school location across the city or sub-region
- Health: improving health outcomes through concentration of skills into fewer; larger specialist hospitals
- Retail: building major out-of-town shopping centres, with a very wide range of goods and providing free parking
- Tourism: developing resort hotels in remote locations

All of the above result in longer trips for customers/consumers, less scope for walking and cycling, or direct access by rail services, and a greater reliance on car-based mobility.

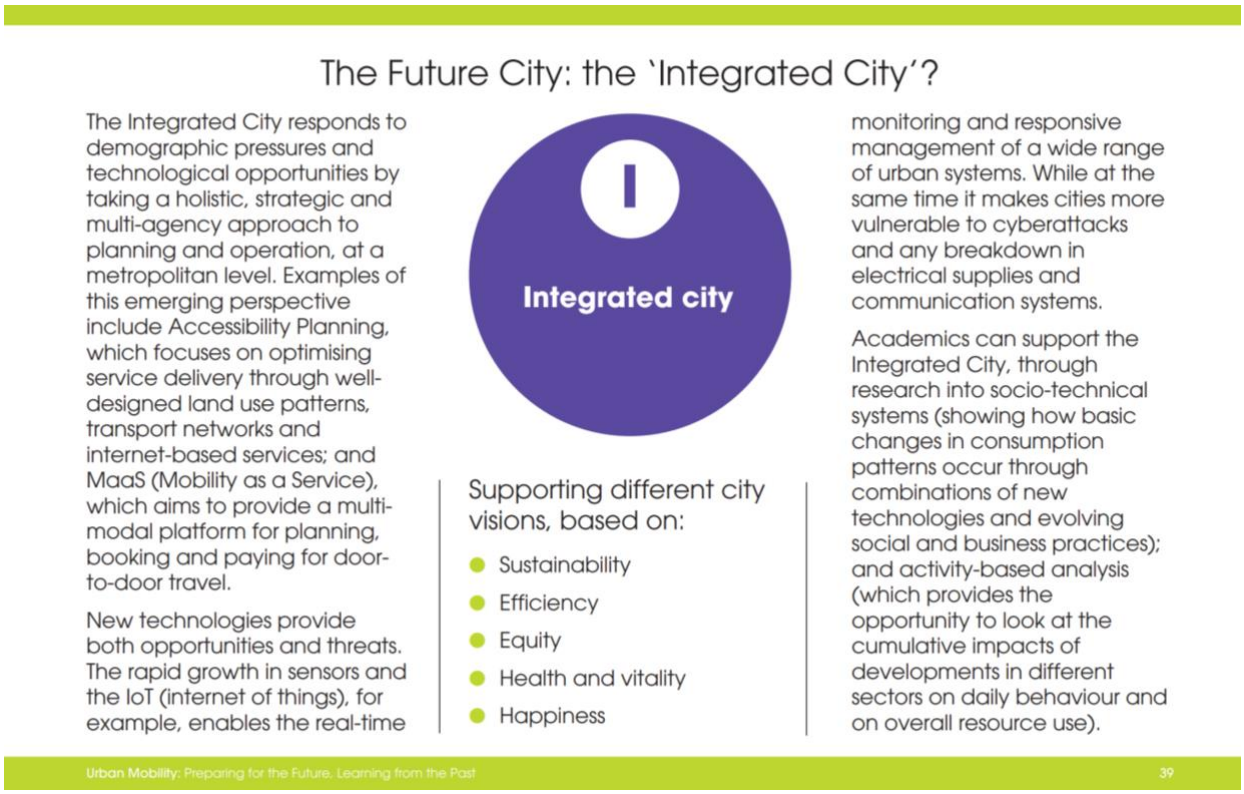

Figure 2.1: CREATE 'Stage 4': the concept of an 'Integrated City'. Image © CREATE project. Source: Jones et al. (2018, p.39).

The H2020 CREATE project, which traced the evolution of urban transport policy making from car-based (Stage 1), through sustainable mobility-based (Stage 2) to place-based (Stage 3) planning, suggested the emergence of a fourth stage: the 'integrated' city. Figure 2.1 above, taken from the CREATE report on 'Project Summary and Recommendations for Cities' (Jones et al., 2018) summarises the case for the emergence of the 'Integrated City', both at the level of the transport system (e.g. through Mobility-as-a-Service initiatives) and the broader cross-sector level of the urban

economy as a whole, with a heightened interest in accessibility planning, as opposed to mobility planning. Here we are talking not just about policy integration, but also digital integration and governance integration (see also Halpern, Sarti and Rodriguez, 2021).[1] This SUMP-PLUS deliverable explores and expands on this concept of cross-sector integration, the various forms it might take and the potential consequences.

In considering various types of cross-sector engagement, it is important to make a distinction between 'Partnerships' and cross-sector 'Links', both of which are being addressed within SUMP-PLUS.

Since travel enables other sectors of the economy and society to function, then transport policies directly interact with those sectors and can be more successfully implemented with the active support of those sectors. We describe this type of support, to enhance the provision and effectiveness of transport-led measures as being enhanced through formal 'Partnerships'. For example, electrification of the national car fleet would benefit from the provision of EV charging points in hospital car parks or in retail centres; and encouragement of cycling to work is enabled not only through providing safe cycle routes, but also by employers providing safe cycle parking and suitable shower and locker room facilities. Here, the actions of other sectors can help to support and reinforce transport policies. Partnerships are being addressed in D1.3.

This deliverable focuses on Links. Cross-sector 'Links' go beyond just supporting transport policy measures, to ensure that the measures implemented to deliver business service delivery models consider the implications of those decisions for the transport sector. For example, when considering, say, the location of a new hospital or shopping centre, by taking into account the consequences of that locational decision for traffic congestion, air pollution, physical activity, etc. While, historically, most sectors would have regarded such consequences as externalities that lay outside their areas of interest or responsibility, growing commitments to achieving net zero carbon are encouraging many companies and organisations to take transport carbon emissions into account in their forward planning, when they adopt 'Scope 3' carbon accounting.

This whole area has been relatively little explored by transport professionals and is the focus of this SUMP-PLUS deliverable.

2.3 Relevance to SUMPs and practical benefits for cities

The SUMP 2.0 guidance recognises that there are links between transport and other sectors, but largely from a 'Partnership' perspective: enlisting the support of other sectors to better deliver transport policy measures and outcomes. See, for example, Davis et al (2019), for SUMP guidance on how to engage with the health sector.

In the case of the health sector, for example, the negative health impacts of poor air quality, high noise levels and traffic accidents are recognised, as well as the health benefits of increased walking and cycling. However, when the administrations responsible for healthcare planning take decisions

[1] SUMP-PLUS Deliverable D3.1/3.2 on governance and capacity-building.

about where and how services should be delivered (e.g. small clinics across the city or a few large health centres and hospitals), they usually do not consider the impacts on the transport sector - and this aspect is not addressed explicitly in the SUMP2.0 Guidelines.

In this deliverable, we are encouraging cities to ask questions of other sectors, such as: are healthcare services located where they are accessible by foot/cycle and via public transport, or only by car - when the latter would increase social inequity and congestion and air pollution? Can elderly people access services close to their home on foot? The COVID-19 pandemic has highlighted the importance of such cross-sector planning between transport and health.

Strengthening cross-sector Links can provide many practical benefits for cities:

- Optimising the provision of urban mobility, and assist in meeting other important urban policy objectives.
- Improving the everyday life of citizens – ensuring that they can access public services such as healthcare and education, using sustainable transport systems is an important core function of the public sector. In sectors like tourism, actions by the private sector that impact on the transport system need to be coordinated with public sector mobility strategies, to ensure sustainable development for the city as a whole
- Encouraging dialogue with other sectors should help to reduce the costs of transport infrastructure provision and its operation, and generally increase the efficiency and effectiveness of urban mobility systems. It could also potentially identify new sources of funding for transport measures from the users that stand to benefit most from their provision.
- In cities aiming to achieve net-zero CO_2 emissions, it is important to look at emissions from a multi- and cross-sector viewpoint, to avoid carbon reduction business plans in one sector simply exporting carbon to the transport sector (e.g. by building zero carbon facilities on the edge of the city that is reliant on access by private car) – or to another sector. This is particularly important in the context of the 2030 and 2050 climate targets part of the EU Green Deal.

2.4 Structure of the deliverable

The structure of the remainder of this deliverable is as follows:

Chapter 3. Literature Review: locational and service delivery decision-making in different sectors

Chapter 4. Conceptual Framework for Cross-Sector Analysis

Chapter 5. Applicability of the concepts to different sectors

Chapter 6. Cross-sector coordination in the SUMP-PLUS cities

3 Literature review: locational and service delivery decision-making in different sectors

3.1 The challenge of coordinated cross-sector planning

In today's complex society, characterized by growing connectivity and interdependencies amongst actors, organisations, activities and resources (Koppenjan and Klijn, 2004), and the emergence of major policy problems having a multidimensional and 'wicked' character (Rittel and Webber, 1973), cross-sectoral collaboration is increasingly seen as the preferred strategy to policy-making and service delivery (Huxham and Macdonald, 1992; Alter and Hage, 1993; Hudson et al., 1999). However, whilst the use of an integrated approach has been advocated by several government agencies in many countries (see e.g. HCCPA, 2013, in the case of the UK government), inter-agency collaboration has remained conceptually elusive (May et al., 2006) and perennial difficult to achieve due also to financial constraints and several other barriers (Hardy et al., 1992). This impasse is particularly evident in the case of the transport sector, where, in recent years, there has been growing interest in the development of integrated transport strategies (e.g. DETR, 1998 and 2000; ECMT, 1998 and 2004; DfT, 2017) so as to better manage the multifold interactions between transport and the other sectors.

Indeed, **transport is primarily a derived demand whose underlying drivers are the result of decisions and actions in other parts of the economy – this is particularly important for sectors that provide a key social function (e.g. education and health), and those generating a large proportion of the trips made as part of everyday life, across the population (e.g. retailing). However, previous research on the UK context has found very little evidence of cross-sectoral coordination, particularly with reference to the management of transport implications of decisions regarding where to locate facilities and services – e.g. clinics, schools and supermarkets (NERA, 2004; Jones and Paskin, 2008; Jones, 2012).**

Individual organisations and government departments generally struggle to look beyond their own thematic silo so that, in many cases, decisions about education, health and other service locations (or relocations) are taken without considerations of the associated impacts and costs for the transport network. Often, factors such as land values and cost development turn out to be the dominant decision criteria and lead to the selection of unsustainable locations, usually out of town. If new facilities are built (or existing facilities relocated to) such locations with poor transport accessibility, this can have negative implications for social inclusion, traffic congestion, and air pollutant and greenhouse gas emissions.

As highlighted by a study carried out for the UK Commission for Integrated Transport (MRC Mclean Hazel, 2009), the general practice is to pass the analysis and mitigation of the transport implications of non-transport policy decisions to the competent transport planning agency. However, as a result of this transfer of responsibility, the issue is reframed from a non-transport service location/relocation

decision to a transport problem. Therefore, the possible solutions are sought in the provision of additional transport routes, facilities and services, rather than in the re-examination of the site selection decision-making process. This obviously may have a negative impact on the transport sector's overarching policy goal of promoting a sustainable transport system.

This Chapter follows up on this previous UK-focused research with a more comprehensive, international review of evidence regarding decision-making criteria for where (locations) and how (delivery models) services are provided to the public, in different sectors. However, evidence is sparse in many sectors, so more detailed investigation is limited to the health sector (section 3.3).

3.2 Location Decision Models and Criteria

3.2.1 Location-Allocation Models

Determining the best locations for new facilities often can turn out to be a difficult decision. The acquisition and development of a new facility is generally costly. Moreover, whereas new facilities are expected to remain in operation for an extended time, multiple contextual changes and events occurring during the facility's lifetime can drastically alter the appeal of a particular site, thus turning today's optimal location into tomorrow's investment blunder. In the course of time, various types of mathematical models have been proposed in the literature to aid location decisions (Owen and Daskin, 1998). Typically, location-allocation models seek to identify the most favourable site for facilities and/or services (e.g. schools, hospitals, and warehouses) by trying to optimise one or several objectives generally related to the efficiency of the system or to the allocation of resources.

According to Marianov and Serra (2002), public and private sector applications adopt different optimisation criteria. Profit maximization and capture of larger market shares from competitors are the main criteria in private applications, whilst social cost minimisation, universality of service, efficiency and equity are the typical goals in the public sector. During the past decade, due to the growing interest in sustainable development, environmental objectives (e.g. to minimise environmental impacts, such as the release of transport emissions, generated as a result of the location decisions) have started being integrated into location-allocation models. However, many steps remain to be taken toward developing models that fully integrate sustainability aspects into decision-making (Terouhid et al., 2012). Tables 3.1 and 3.2 below list the key objectives considered by several location-allocation models dealing respectively with healthcare and education facilities.

References	Purpose	Objectives considered in the Analysis	Modelling Approaches
Calvo and Marks (1973)	Location of health care facilities in a generic region	• to minimise the distance (or travel time) to the facility; • to minimise service and transport costs for users; • to maximise demand in the region upon health facility service.	Multi-criteria Optimisation model

Berlin (1976)	Location of emergency vehicles and hospitals for expediting the delivery of medical treatment	• to minimise the total travel time (depot-point of demand + point of demand-hospital)	Network models
Tien and El-Tell (1984)	Location of primary health care facilities in developing countries	• to minimise the distance between primary health care facilities and the attached villages; • to minimise the distance between primary health care facilities and the attached village clinics; • to maximise facility differentiation; • to maximise the efficiency of physicians' time utilization	Hierarchical Linear Program model
Stummer et al. (2004)	Location and size of medical departments in a given hospital network in Germany	• to minimise total travel costs for users; • to minimise total costs associated with a location-allocation hospital plan; • to minimise the number of patients rejected due to low service capacities; • to minimise the number of unit moves necessary to restructure the current allocation	Multi-Criteria Programming model
Smith et al. (2009)	Planning and location of community health and development schemes in rural areas of developing countries	• to minimise the distance (or travel time) to the facility; • to maximise the healthcare coverage	Hierarchical Location model
Wissem et al. (2011)	Site selection of a new hospital in Tunisia	• to maximise the supply of natural gas to the new building; • to maximise the accessibility of the new building to the road network; • to minimise emissions; • to maximise distance between new hospital and other hospitals; • to minimise distance between new hospital and the Faculty of Medicine; • to maximise the public transport availability; • to maximise the healthcare coverage across the most populated areas.	Goal Programming
Shariff et al. (2012)	Location-allocation Of healthcare facilities in Malaysia	• to maximise population to be covered	Maximum Covering Location problem model

Kim and Kim (2013)	Public healthcare facility location in Korea	• to maximise the number of served patients	Lagrangian Heuristic Algoritm
Haase and Muller (2015)	Preventive healthcare facility location	• to maximise preventive healthcare program participation	Multinomial Logit models
Mestre et al. (2015)	Location-allocation for hospital planning under uncertainty in Portugal	• to minimise expected travel time, • to minimise expected cost and capital costs	*P*-Median models
Zhang et al. (2016)	Healthcare facility Location-allocation in developed cities	• to maximise accessibility for the entire population; • to minimise inequity of accessibility; • to minimise the uncovered population, • to minimise building cost	Multiobjective optimisation model
Wang et al. (2017)	Spatial relocation of hospitals to reduce urban traffic congestions in China	• to minimise region's traffic congestion condition (based on indicators assessing traffic volume) • to maximise the overall hospital accessibility (based on travel time)	Multi-Objective Spatial Optimization model

Table 3.1: Summary of healthcare facility location studies. Source: authors.

References	Purpose	Objectives considered in the analysis	Modelling Approaches
Muller et al. (2009)	School location problem in Germany	• to minimise the location and transport costs	Multinomial Logit model
Sadahiro and Sadahiro (2012)	School relocation planning in Japan	• to no exceed maximum distance from home to school • to keep schools' size within certain limits (based on minimum and maximum number of students)	Simple Capacitated Set Covering Problem model
Bruno et al. (2014)	Reorganization of a school system located in a given region, with application to an Italian case study	• To minimise the distance between the schools and their assigned cluster's centre	District and Clustering model

Delmelle et al. (2014)	School location problem for rapidly growing urban areas in the US	• to minimise travel times; • constraint: student expenditure must be contained within the overall school budget • constraint: demand allocated to each school cannot exceed its actual capacity	Vintage Flexible Capacited Location Problem model
Castillo-Lopez and Lopez-Ospina (2015)	School location and capacity modification for rural zones of Chiles	• to minimise operating costs; • to minimise travel times; • to maximise average amount of enrolled students per school, • to minimise number of schools with multi-grade classes • constraints: time and income	Multinomial Logit Discrete Choice model
Qi et al. (2016)	School location for rural zones of China	• economic benefits • transportation costs • environmental impacts • culture benefits	Multiple Attribute Decision Making method

Table 3.2: Summary of education facility location studies. Source: authors.

3.2.2 Other studies investigating decision criteria

Health sector: site selection for healthcare facilities

Calvo and Marks (1973) developed a hierarchical system of social, economic, and political criteria for proper health care facility planning (see Figure 3.1). These criteria account mainly for three sectors of society which are involved in, or affected by, health facility location decisions:

- the user, or consumer sector, which comprises the patient population and the general public making use of the facility.
- the operator sector, which includes the health facility's management and administrative staff, physicians, nurses, paramedical and general personnel.
- the community sector, which encompasses the resident population and local businesses. This former sector is influenced by the socio-economic impacts resulting from the increased pattern of activity that the health care facility generates in the area. This activity may produce, for example, damaging effects on the local environment and outlook of the community, resulting from the increased traffic and flow of people from neighbouring communities.

However, as also recognized by Calvo and Marks (1973), the incorporation of all these criteria into a mathematical model can become problematic, due to also the fact that factors such as convenience and comfort, environmental effects, and other social attributes are not amenable for direct quantification. Hence, most often, only a few criteria are taken into account by location-allocation models so that, ideally, planners and decision-makers would then be required to consider separately the criteria not captured by such models.

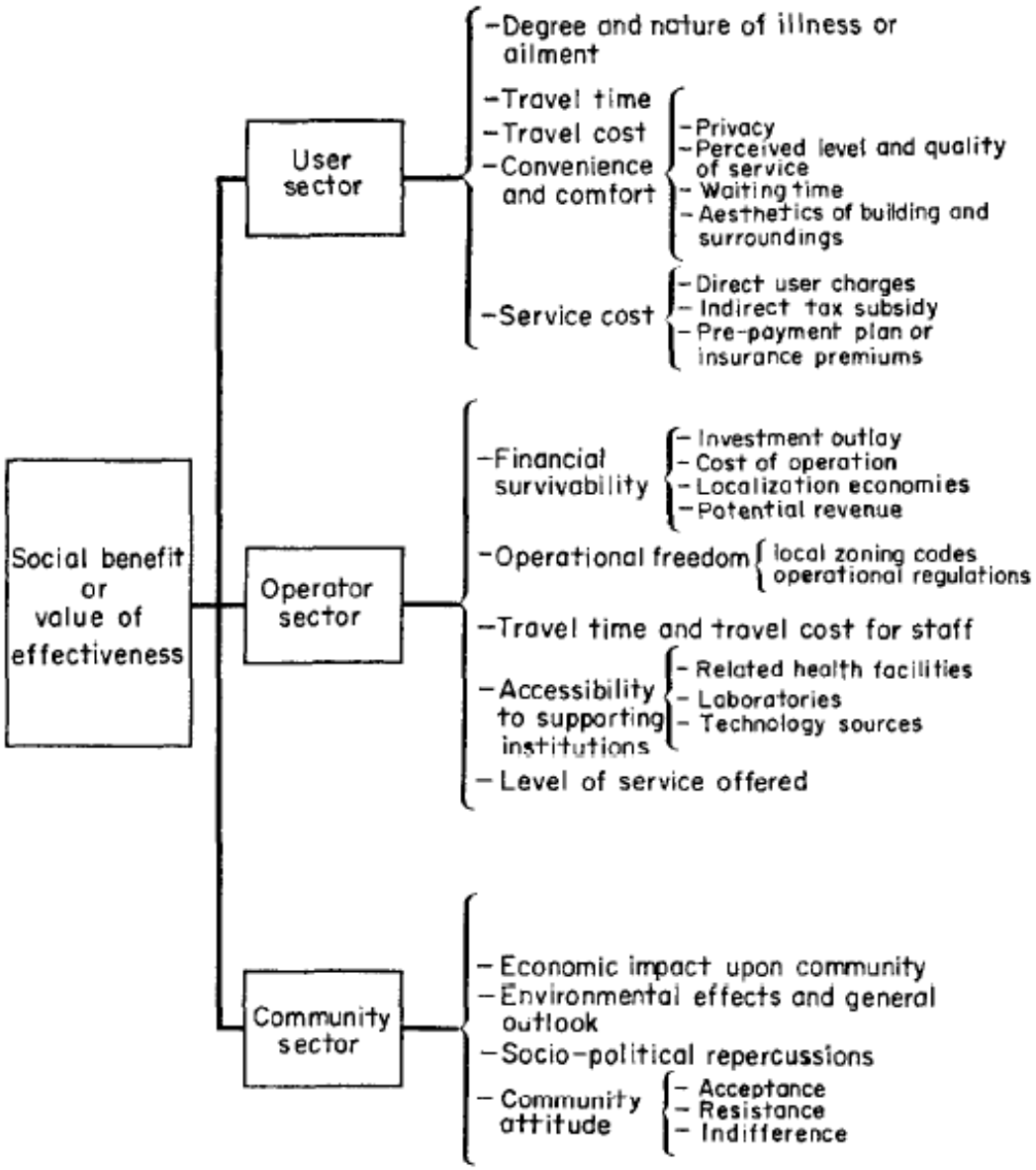

Figure 3.1: Criteria for health care facility planning proposed by Calvo and Marks (1973).

More recently, Moradian and colleagues (2017) have carried out a comprehensive review of the literature in the attempt to identify the most common criteria used for hospital site selection. The results of the review are summarised in Table 3.3.

Groups	Subgroup	Criteria	References
Cost concerns	Basic costs	Land	Behzadi(2013), Chiu(2013), Soltani(2011), Vahidnia(2009), Candy(2009), Wu(2007)
		Construction	Candy(2009), Chiu(2013)
	Infrastructure availability	Accessibility to main streets/roads, intersections and squares	Hu(2014), Behzadi(2013), Alavi(2013), Abdullahi(2013), Chiu(2013), Wissem(2011), Soltani(2011), Vahidnia(2009), Varnokovida(2006), Zhou(2012), Candy(2009), Chiu(2013), Sharmine (2013)
		Proximity to social service (like metro) and Green space	Behzadi (2013), Zhou (2012)
		Proximity to Infrastructure (electricity, natural gas, Drinking water, Sanitation and sewer system)	Hu (2014), Kim (2013), Wissem (2011), Zhou (2012), Chiu(2013), Zilla(1995)
		Accessibility to public transportation	Abdullahi(2013), Wissem(2011)
	Land/ Space	Land specifications (availability, Use, Capability, Texture of the ground, Vacant, Ownership, altitude, Visual aspects)	Behzadi(2013), Abdullahi(2013), Alavi(2013), Candy(2009), Varnokovida(2006), Zhou(2012)
		Enough areas/ site dimensions (Construction, Green and parking)	Hu (2014), Abdullahi(2013), Soltani(2011), Candy(2009)
	Traffic	Traffic volume/flow	Kim(2013), Candy(2009)
Demand concerns	Target Community	Socio Economic status of the population	Behzady(2013) Kim(2013), Candy(2009)
		Population number/ density (Maximize)/ Distance to population (Minimize)	Hu(2014), Behzadi(2013), Abdullahi(2013), Kim(2013), Wissem(2011), Soltani(2011), Vahidnia(2009), Wu(2007), Varnokovida(2006), Zhou(2012), Chiu(2013), Zilla(1995)
		Population age distribution	Kim(2013), Wu(2007)
		Community Health Status	Kim(2013)
		Travel time (minimal)	Hu(2014), Behzadi(2013), Kim(2013), Vahidnia(2009), Vahidnia(2009), Varnokovida(2006)
	Health service utilization	Total number of needed beds	Abdullahi(2013), Kim(2013), Wissem(2011)
		Patients transfer rate	
		Number of patients rejected by hospitals	
		Number of visits to doctors	Kim(2013)
		Health care spending per household	
	Existing Hospital	Distance to existing hospital and Faculty of Medicine	Abdullahi(2013), Kim(2013), Wissem(2011), Soltani(2011), Vahidnia(2009), Candy(2009), Wu(2007), Varnokovida(2006), Sharmine (2013), Zhou(2012), Zilla(1995)
		Rank of competing hospitals	
Disaster Risk concerns	Natural Hazards	Distance to High Risk Area (ground movement event)	Candy(2009)
		Distance to Faults (Seismic activity)	Alavi(2013)
	ManmadeHazards	Distance to Industrial centers	Alavi(2013), Sharmine (2013)
Environmental concerns	Climate And Air quality	Air pollution (Minimal density) Distance to industrial area (Maximize)	Brhzadi(2013), Abdullahi(2013), Wissem(2011), Vahidnia(2009)
	Noise Pollution	Distance to industrial, workshop, installation and railways (Minimize)	Abdullahi(2013), Candy(2009), Sharmine (2013)
	Biodiversity		Candy(2009)
	Water pollution	Distance to sewerage system, Public toilet	Abdullahi(2013), Zhou(2012), Sharmine (2013), Candy(2009)
		Distance to rivers , canals and water bodies	

Table 3.3: Research studies on selection criteria for hospital sites. Source: Moradian et al. (2017).

Education sector: selection criteria for School locations

McDonald (2010) has conducted in-depth interviews with several school facility planners in Maryland and northern Virginia (United States) to assess their perspectives on the school planning process and where school should be located. These interviews have led to the identification of some of the most important factors which planners consider during the evaluation of any potential school facility location:

- water and sewer access;
- road capacity;
- possibility to provide adequate and safe pedestrian access to school;
- connection to neighborhoods;
- pupil transport costs;
- traffic generated as result of the new development.

Murphy (2007) argues that more data needs to be collected to obtain a better understanding of the balance between the increased educational attainment resulting from educational choice and the cost of providing public transport needs to be developed, to ensure equality for all in the long term.

Retail sector: locational decisions for Retail premises

Location is often regarded as one of the most important factors for the success of a retail store since it can lead to strong competitive advantage (Zentes et al., 2007, 143). Whist traditionally, in the retailing sector, location choices had been mainly made intuitively as a result of competitors' strategies and government policies (Ciari et al., 2008), in recent years, more comprehensive and systematic location decision-making processes have been introduced (Clarke *et al*., 1997; Hernandez *et al*., 1998, Hernandez and Biasotto, 2001). The literature identifies a number of factors, involving various trade-offs, which can affect retailers' location decisions (see Table 3.4).

Using a Delphi survey method, involving a number of practitioners and experts, MacCarthy and Atthirawong (2003) have arrived at the identification of 13 factors and a number of sub-factors which affect the international location decisions of many companies affected by issues of global operations (e.g. trade and logistics, international fund transfer and monetary policy, cultural practice). These factors and sub-factors are reported in Table 3.5 below.

Customers	Accessibility	Competition	Costs
numbers by demographics (e.g. population size, age profile, household size)	pedestrian flows	existing retail activity (direct/indirect competitors, anchor stores, cumulative attraction, compatibility)	purchase price
	pedestrian entry routes		building costs
income level	road network (conditions, speeds)		rent costs
disposable income per capita	parking (capacity, convenience, cost, potential)	existing retail specification (selling area, turnover estimates, trade areas, age of outlet, design, parking)	leasing terms
employment by occupation, industry, trends	car ownership level		site preparation
housing density	public transport (types, cost, ease, potential)		building restrictions
housing age/type	barriers such as railway tracks, rivers	competitive potential (outlet expansion, refurbishment, vacant sites, interception, repositioning, competitor policy)	development concessions
neighbourhood classification	visibility		rate payable
home-ownership levels	type of location zone		refurbishment needs
building/demolition plans	access for staff		maintenance costs
main employers	access for delivery	saturation index	security needs
spending patterns			staff availability
shopping patterns		proximity of key competitors, traders, brand leaders	labour rates
population growth, density and trends			delivery costs
lifestyle measures			insurance costs
cultural/ethnic grouping			promotional media/costs

Table 3.4: Decision factors for retail locations. Source: Ciari et al. (2008), adapted from Zentes et al. (2007), McGoldrick (2002) and Gilbert (2003).

Major factors	Sub-factors
Costs	Fixed costs; transportation costs; wage rates and trends in wages; energy costs; other manufacturing costs; land cost; construction/leasing costs and other factors (e.g. R&D costs, transaction and management costs etc.)
Labour characteristics	Quality of labour force; availability of labour force; unemployment rate; labour unions; attitudes towards work and labour turnover; motivation of workers and work force management
Infrastructure	Existence of modes of transportation (airports, railroads, roads and sea ports); quality and reliability of modes of transportation; quality and reliability of utilities (e.g. water supply, waste treatment, power supply, etc.) and telecommunication systems
Proximity to suppliers	Quality of suppliers; alternative suppliers; competition for suppliers; nature of supply process (reliability of the system) and speed and responsiveness of suppliers
Proximity to markets/customers	Proximity to demand; size of market that can be served/potential customer expenditure; responsiveness and delivery time to markets; population trends and nature and variance of demand
Proximity to parent company's facilities	Close to parent company
Proximity to competition	Location of competitors
Quality of life	Quality of environment; community attitudes towards business and industry; climate, schools, churches, hospitals, recreational opportunities (for staff and children); education system; crime rate and standard of living
Legal and regulatory framework	Compensation laws; insurance laws; environmental regulations; industrial relations laws; legal system; bureaucratic red tape; requirements for setting up local corporations; regulations concerning joint ventures and mergers and regulations on transfer of earnings out of country rate
Economic factors	Tax structure and tax incentives; financial incentives; custom duties; tariffs; inflation; strength of currency against US dollar; business climate; country's debt; interest rates/exchange controls and GDP/GNP growth, income per capita
Government and political factors	Record of government stability; government structure; consistency of government policy; and attitude of government to inward investment
Social and cultural factors	Different norms and customs; culture; language and customer characteristics
Characteristics of a specific location	Availability of space for future expansion; attitude of local community to a location; physical conditions (e.g. weather, close to other businesses, parking, appearance, accessibility by customers etc.); proximity to raw materials/resources; quality of raw materials/resources and location of suppliers

Table 3.5: Factors affecting the location decisions of international companies. Source: MacCarthy and Atthirawong (2003).

Tourism sector: locational criteria for hotels and other hospitality facilities

In the literature on the tourism sector, there are several studies investigating the determinants of hotel locations. Selecting a hotel location is indeed an important decision as a good site is directly related to larger accommodation demand (Lockyer, 2005), higher customer satisfaction (Sim *et al*., 2006), higher revenue per available room (Sainaghi, 2011), and lower failure rate (Baum and Mezias, 1992). Moreover, such decisions involve a long-term commitment and are very difficult to rectify due to the high cost of relocation and reconfiguration (Yang *et al*., 2014; Kundakcı, 2015).

As illustrated in Table 3.6, researchers have identified different criteria for hotel location selection. In a feasibility study of hotel establishment, Gray and Liguori (1998) defined the most important criteria as: local economic environment, legislation, height limit of buildings, car park facilities, presence of public areas and facilities, traffic convenience and accessibility, geographical factors, natural resources and land size. In an analysis of the hotel industry in Taipei, Pan (2002) identified the following hotel location selection factors: site sustainability, traffic convenience, fine visual perception, public facilities, application of certain regulations, and flexible space.

Yang and colleagues (2012), in their study of the hotel industry, distinguished the potential factors contributing to the hotel location choice in two broad categories: location attributes, such as accessibility, agglomeration level, and urban development of the location area, and individual hotel characteristics, including hotel's scale, star rating, ownership and service diversity. In their multi-criteria model for tourist hotel location selection, Guneri and colleagues (2015) employed seven criteria: land size; distance to recreational activities and leisure facilities; proximity to the natural beauties; variety of transportation modes; operating costs; legislation; local people's behaviour. In the multi-criteria model developed by Kundakcı (2015), 15 criteria are grouped into 3 main dimensions (*i.e*. geographical conditions, transportation facilities and operation management) were used. Finally, through an approach combining literature review and comments from experts and hotel managers, Chou and colleagues (2008) arrived at the identification of 21 different criteria belonging to four key dimensions.

References	Purpose	Criteria for Hotel Location Selection
Gray and Liguori (1998)	Feasibility study of hotel establishment	• local economic environment • legislation • height limit of buildings • presence of car park facilities • presence of public areas and facilities • traffic convenience and accessibility • geographical factors • natural resources • land size
Pan (2002)	Analysis of the hotel industry in Taipei, Taiwan	• site sustainability • traffic convenience • fine visual perception • presence of public facilities and other services • application of certain regulations • flexible space
Guneri et al. (2015)	Fuzzy multi-criteria analysis for tourist hotel location selection in Mugla, Turkey	• size of the evaluating area • distance to recreational activities and leisure facilities • proximity to the natural beauties • variety of transportation modes

		• operating costs (e.g. land cost, human resource, quality of manpower, the average salaries in the area); • legislation (supportive to hotel and tourism or not); • local people's behaviour (pro or against tourism and tourists)
Yang et al. (2012)	Analysis of the hotel industry in Beijing, China	• LOCATION ATTRIBUTES - accessibility to city centres, touristic/historical places, train stations/airports - agglomeration effects - presence of suppliers of public goods and services - level of urban development in the surrounding areas • HOTEL CHARACTERISTICS - hotel size - hotel star rating - hotel ownership - types of services offered by the hotel
Kundakcı (2015)	Multi-criteria analysis (based on the Analytic Hierarchy Process) method) for tourist hotel location selection in Denizli, Turkey	• GEOGRAPHICAL CONDITIONS - proximity to public facilities - distance to existing competitors - natural resources characteristic (e.g. presence of thermal water) - availability of resources (water, electricity, - natural gas, heating) • TRANSPORTATION FACILITIES - distance/accessibility to bus/train terminals - distance/accessibility to airport - distance/accessibility to the city centre - distance/accessibility to suppliers/service providers - distance/accessibility to touristic/historical places • OPERATION MANAGEMENT - sufficient human resources/workforce - qualification of labors - land cost - cost for constructing building a new Hotel - regulation restrictions (e.g. building height)
Chou et al. (2008)	Fuzzy multi-criteria analysis for tourist hotel location selection in Taiwan	• GEOGRAPHICAL CONDITIONS - proximity to public facilities - distance to existing competitors - public security - natural resources characteristic (e.g. presence of thermal water) • TRAFFIC CONDITIONS - distance/accessibility to airport and freeways - distance/accessibility to the city centre - parking area - distance/accessibility to touristic/historical places - convenience of airport or freeway communication - extensiveness of traffic routes - convenience of traffic to tourism scenic spots • HOTEL CHARACTERISTICS - indoor leisure facilities - diversity of restaurants in the hotel - land cost - amalgamation with local culture - outside leisure facilities area - convenience of obtaining nearby land • OPERATION MANAGEMENT - sufficient human resources/workforce - qualification of labors - land cost - regulation restrictions (e.g. building height)

Table 3.6: Research studies on decision criteria for hotel locations. Source: authors.

Other studies investigating the optimal location of hospitality facilities concern, amongst other, restaurants, parks and tourist resorts (see Table 3.7). For example, the multi-criteria model developed by Tzeng and colleagues (2002) to rank alternative restaurant locations in Taipei, includes 11 criteria grouped into five main dimensions, namely transportation, commercial area, economic, competition and environment. The multi-criteria framework developed by Chen and colleagues (2018) to select the best location for a teahouse also includes 11 criteria derived through a review of the relevant literature.

The approach adopted by Lin and Juan (2010) to identify the most relevant criteria for determining the location of international resort parks consisted instead in a Delphi technique involving a number of experts with various backgrounds. This approach allowed the two authors to determine 26 key criteria, which were clustered into six overarching dimensions.

A study of Currie and Falconer (2014) carried out in Scotland emphasises the benefits and necessity of collaboration between the transport and tourism sectors in order to increase the attractiveness, accessibility and in turn sustainability of tourist destinations.

References	Purpose	Criteria for Hotel Location Selection
Tzeng et al. (2002)	Multi-criteria analysis for restaurant location selection in Taipei, Taiwan	• TRANSPORTATION - transportation cost - convenience to mass transportation system - size of parking space • COMMERCIAL AREA - size of the commercial area where the restaurant is located - pedestrian volume • ECONOMIC - rent cost - extent of public facilities • COMPETITION - number of competitors - intensity of competition • ENVIRONMENT - convenience of garbage disposal - sewage capacity
Chen et al. (2018)	Multi-criteria model for solving a teahouse location problem in Vilnius, Lithuania.	• rent cost • property area • distance to scenery • public transportation • pedestrian flow • parking capacity • number of competitors • number of crimes in the surrounding area • distance from public facilities • outdoor advertisement • distance from garbage containers
Lin and Juan (2010)	Delphi model for determining the location of international resort parks in Taiwan	• FACTOR ENDOWMENTS - labor resources - natural resources - infrastructure - capital • DEMAND CONDITIONS - marketing division - marketing scope - local resident attitudes • FIRM STRATEGY STRUCTURE AND RIVALRY - business strategies - business structures - visions

		- policymaker attitudes - entrepreneurial predilection • RELATED AND SUPPORTING INDUSTRIES - local natural resources - local human resources - medical centre and police station for emergencies • GOVERNMENT - zoning limitations - political environment - legal requirements - stable and explicit government policy - county industry policy • CHANCE • technological innovative • utilizing two languages • market demand for major change • disasters • the popularity of television and movies • conflict

Table 3.7: Research studies investigating the determinants of the locations of other hospitality facilities. Source: authors.

3.3 Trends in healthcare service delivery in England

Following on from the previous section reviewing academic evidence, here we examine real-life decision-making in relation to how services are delivered within the healthcare sector in England.

3.3.1 Trends in the post-war period

In the 1960s major policy statements and design guidelines for England and Wales (MoH, 1962 and 1966), providing the rationale for the development of a generation of hospital building, envisaged the District General Hospital (DGH) as the basic unit in which most major facilities and services would be provided. DGHs of between 600 and 800 beds were envisaged to serve sub-regions of between 100,000 and 150,000 people, based on the argument that it was better for medical specialties to be co-located in large buildings and competition between hospitals was inappropriate (Spurgeon et al., 2010).

However, research suggested location and access criteria were only briefly considered in these documents. A study commissioned by the UK Department of the Environment & Department of Transport (Rigby 1978) highlighted that, in decision-making processes regarding the distribution of hospital facilities, land availability often represented the main decision criterion, with the selection of sites already owned by the Health Authority or sites at out-of-town locations being preferred. Rigby argued that whilst logical in terms of capital costs, such solutions did not pay any attention to access considerations. In the post-war years, a study carried out by Cowan (1965) found that the decision locations regarding hospitals in London had been taken based on social attitudes, administrative convenience and economic expediency, rather than on the medical needs of the community. Only subsequently the concept of ‘Community Hospital’, allowing the provision of more localized care in

smaller units for certain types of patients, was developed (DHSS, 1974), and more careful considerations about accessibility were introduced (Rigby, 1978).

3.3.2 Overview of recent trends

Many drivers of change have been affecting hospital service configuration in the past few decades. According to McKee and colleagues (2002) these factors can be categorised in three broad classes:

- Demand-side factors: demographic changes (e.g. population growth; migration; increased longevity; ageing populations), changing patterns of disease (e.g. growing importance of chronic disease and long-term conditions; emergence of new risk factors such as obesity; rising emergency admissions), and higher public and patient expectations reflecting the transformation in standards of service in industries such as banking and retailing (Ham et al., 2012).
- Supply-side factors: innovation and technology enabling better, more efficient and less invasive treatments, and offering the opportunity of delivery health care services remotely (Castle-Clarke, 2018) or in small neighbourhood facilities (Ketchum, 2018; KPMG, 2019); increasing specialisation, new medical education and training requirements (Spurgeon et al., 2010).
- Wider societal and policy factors: including economic recession, financial pressures, internationalisation of health care systems and changes in medical research and development (Grin and Broerse, 2017).

In the UK (as well as in nearly all the EU countries) the most important drivers of change seem to be represented by the constrained resources and rising demand (Spurgeon et al., 2010; Ham and Alderwick, 2015), which, in recent years, have been the ultimate catalyst for a renewed trend towards centralisation of hospital services. This trend promoted by NHS in the attempt to reduce average costs, through the achievement of economies of scale in the management of hospitals, and deliver higher-quality care, by offering fewer, but more well-staffed units (DH, 2004), has so far produced numerous local political conflicts and public protests (Spurgeon et al., 2010), despite the government's commitment to consult with consult with the public before embarking upon hospital reconfigurations (DH, 2007).

Mergers, downgrading or closing of hospitals have also been criticised by several studies. Bhattarai and colleagues (2016), for instance, contend that the majority of economic evaluations on centralisation of healthcare services which have been undertaken so far have limited methodological quality and often turn out to be incomplete. According to the authors wider aspects, such as the increased costs access for patients due to relocation decisions, must be examined more carefully so as to help decision-makers make informed decisions on centralisation. Imison (2015) claims that, whilst workforce, quality, cost and access are the four key declared objectives that are typically taken into account when reconfiguring healthcare services, costs and workforce seem to have far outweighed quality and access in driving service change. Along the same line, Mungall (2005) argues that the impacts of these centralisation trends upon patients, in terms of increased travel time

(and cost) to access health care, have not been well considered and, often, some of the costs saved by the health service are in fact merely transferred to the patients. Other studies highlight that, in some cases, the increased journey distance to hospital may lead to a reduction in healthcare utilization (Posnett, 1999) or even to increased risk of mortality in patients with life-threatening medical emergencies (Rousseau et al., 1994; Buchmueller et al., 2006; Nicholl et al., 2007).

TfL and the NHS had been working together to better understand best practice in transport planning for healthier lifestyles and published a guide to draw out good practice in integrating the planning of healthcare with transport provision, and encouraging a shift towards more sustainable and active transport modes (TfL, 2013). In another guide, TfL also recommends the use of some specific tools such PTALs (Public Transport Accessibility Levels) and CAPITAL (i.e. a strategic travel time model for both highway and public transport services in London), which can allow the NHS to carry out in-depth analysis at the strategic level before deciding the best location for healthcare provision in terms of the site's connectivity to the local area (TfL, 2014).

3.3.3 UK case studies

Case study I: community hospitals in the Forest of Dean

In 2015, as a result of a health and care services review carried out for the Forest of Dean areas, the NHS Gloucestershire Clinical Commissioning Group and Gloucestershire Care Services NHS Trust concluded that the Dilke Memorial Hospital and the Lydney and District Hospital (i.e. the two hospitals currently serving this area) were no longer fit for purpose. They thus proposed to replace the two hospitals with a single new community hospital. A 12-week public consultation was held in late 2017 to discuss this proposal and compare alternative options (Tables 3.8, 3.9 and 3.10).

Option	What does this mean?
1. Do the minimum - maintaining compliance	On-going maintenance of the two existing community hospitals.
2. Re-develop/ re-provide two community hospitals	Provision of two 'new' community hospitals, either upon the current land or elsewhere in the Forest of Dean.
3. A single community hospital for the Forest of Dean	Develop a new community hospital in the Forest of Dean as a replacement for the two community hospitals (either on one of the existing sites, or elsewhere in the Forest of Dean).
4. Close both of the two existing community hospitals and offer home and community-based services as alternatives	Create community-based teams with skills to care for people at home and in the community, including at times of crisis (complementing the Rapid Response teams). Where a hospital stay is unavoidable, refer people to other hospitals across Gloucestershire or beyond.

Table 3.8: Alternative models ('options') considered for the delivery of health and care services in the Forest of Dean area. Source: NHS Gloucestershire Clinical Commissioning Group and Gloucestershire Care Services NHS Trust (2017).

Objective	What do we mean?
Support the delivery of new models of care	Accommodation that would support joined up (integrated) primary (e.g. services provided by GPs and their teams) and community based services in the Forest of Dean.
Improve local access to services	Increased access to high quality primary and community based services in the Forest of Dean.
Ensure appropriate service capacity	The necessary capacity (services, staff and premises) to meet the current and future needs of people living in the Forest of Dean.
Provide a high quality physical environment	Community hospital services in the Forest of Dean provided in places which are fully compliant with statutory standards e.g. building regulations, environmental and health and safety standards and in keeping with the unique environment of the Forest of Dean.

Criteria	What do we mean?
Flexibility and adaptability	Facilities that can be easily adapted to meet the changing needs of the local population and changes in the way health care services can be provided.
Support new ways of working	Facilities which reflect best practice and provide high quality, safe and sustainable services that encourage partnership working between staff, organisations and services.
Achievability	Can be completed no later than 2021/2022.
Affordability	Affordable and sustainable within the money available.
Acceptability	Will be acceptable to the public and partners now and into the future.

Table 3.9: Objectives identified for the review of health and care care services in the Forest of Dean area. Source: NHS Gloucestershire Clinical Commissioning Group and Gloucestershire Care Services NHS Trust (2017).

	Objectives				Criteria					Overall
	New models of care	Improve local access to services	Appropriate service capacity	High quality environment	Flexibility and adaptability	New ways of working	Achievable	Affordable	Acceptable	
1. Do the minimum	✗	–	–	✗	–	✗	–	–	–	Reject
2. Redevelop/ re-provide two community hospitals	✓	✓	–	✓	–	✓	✗	✗	–	Reject
3. A single community hospital for the Forest of Dean	✓	–	✓	✓	✓	✓	✓	–	–	Preferred
4. Close both existing hospitals and offer home and community based services as an alternative	✗	–	✗	✗	–	–	–	✓	✗	Reject

Table 3.10: Multi-criteria assessment of the different options for service delivery. Source: NHS Gloucestershire Clinical Commissioning Group and Gloucestershire Care Services NHS Trust (2017).

In January 2018, the NHS Gloucestershire Clinical Commissioning Group and Gloucestershire Care Services NHS Trust unanimously approved the preferred option of a new community hospital in the Forest of Dean. Following this resolution, in July 2018, further public engagement was undertaken to consider local residents' opinion on the preferred location for the new hospital. The declared objective was to make the new hospital as accessible as possible whether travelling by car or by public transport. In October 2019, it was announced that the new £11 million hospital will be built on greenfield land in the north of Cinderford, in line with the recommendations of a citizen's jury. The Gloucestershire Care Services NHS Trust is aiming to open the new hospital in Cinderford in 2022. The decision has, however, generated many protests amongst local communities who fear a drastic reduction in the healthcare service provision. According to many local community members, one single hospital will not be able to cope with the healthcare service needs arising from the continue increase of population of the Forest of Dean. Local residents living south of Cinderford will also face a longer journey time to receive medical help. Therefore, public campaigns have been held to protect and force investments in the two current hospitals.

Case study II: proposal for relocating Liverpool Women's Hospital

Four possible options regarding the future of the Liverpool Women's Hospital (a hospital providing maternity, gynaecology, reproductive, genetic and neo-natal services) have been developed as part of a review of women's and neonatal services, which began in March 2016 and is being led by NHS Liverpool Clinical Commissioning Group:

1. Make major improvements to Liverpool Women's Hospital on the current Crown Street site;
2. Make smaller improvements to the current Crown Street site;
3. Relocate women's and neonatal services to a new hospital building on the same site as Alder Hey Children's Hospital;
4. Relocate women's and neonatal services to a new hospital building on the same site as the new Royal Liverpool Hospital.

The examination of these options carried out by an independent panel led to the identification of the relocation to the Royal Liverpool Hospital site (Option 4) as the preferred alternative. According to the NHS Liverpool Clinical Commissioning Group, this option offers the most benefits for patients and provides solutions to the challenges set out in the case for change, including improved safety and patient experience, reduced transfers of patients and less separation of mothers and babies (see Table 3.11 below). This option is also judged to support long term clinical and financial sustainability and best value for money.

The description of the options and the results of the appraisal were included in a draft pre-consultation business case document. There have been a number of protests and campaigns against the possible closure (this is still an ongoing process and no final decisions have been taken yet) of the Liverpool Women's Hospital, with some people also expressing concerns regarding traffic and pollution at the proposed relocation site.

Option	C1	C2	D1	D3-N
Description	Develop and enhance Crown Street site with adult ICU, blood bank, CT/MRI/IR and neonatal refurbishment.	Minimal enhancement to Crown Street site to minimise emergency transfers (blood bank, leased CT) and neonatal refurbishment.	Relocate services to a new build on AH site, with access to diagnostics and ICU	Relocate services to a new build on RLH site, with access to full range of adult services (including diagnostics, ICU and specialists).
Key clinical benefits	Diagnostics suite and NIC provision will improve performance against clinical standards, support service dependencies and improve patient experience and outcomes. Reduced need for clinical 'workarounds'	Small improvement in standard of care for adult services via access to CT. Investments in NIC will improve performance against clinical standards.	Co-location of obstetrics with neonatal surgery improves care for babies, with potential for public health improvements. Access to diagnostics suite and ICU improves performance against key clinical standards.	Colocation on an acute site supports service co-dependencies and improvement of performance against key clinical standards, improving patient experience and outcomes. Clinical and workforce sustainable.
Impact on transfers	Reduction in adult transfers to acute site and minor reduction in neonatal transfers to AH.	Minor reduction in adult diagnostic transfers and minor reduction in neonatal transfers to AH.	Significant reduction in adult diagnostic transfers and elimination of neonatal transfers.	Elimination of adult transfers and reduction in neonatal transfers to AH.
Key clinical risks	Does not address all concerns regarding clinical standards and service co-dependencies; continued need for some clinical workarounds. Sub-scale ICU.	Does not meet clinical case for change or concerns regarding clinical standards and service co-dependencies; continued need for clinical workarounds.	Does not meet clinical case for change for women and the requirement for service co-dependencies Sub-scale ICU.	Relative to Option D1, a key risk from this option is the neonatal service operating across two sites.
Strategic fit	Does not fit with HLP proposal to centralise services.	Does not fit with HLP proposal to centralise services.	Does not fit with HLP proposal to centralise services.	Fits with HLP proposal to centralise services

Table 3.11: Multi-criteria assessment of the different options for service delivery. Source: NHS Liverpool Clinical Commissioning Group (2017).

Case study III: the plan to move Moorfields Eye Hospital to King's Cross

The Moorfields Eye Hospital has expressed interest in relocating from its current site in City Road to a redeveloped two-acre site at St Pancras hospital (see Oriel 2019). The new campus would integrate its clinical space with the UCL Institute of Ophthalmology, currently in Bath Street, near the existing hospital. A public consultation on the relocation proposal was held between May and September 2019, which will inform a decision in January 2020 on whether the proposed move is in the interests of population health, meets NHS long-term plans to improve health and care, and represents an effective use of public money. Tables 3.12 and 3.13 highlight the criteria or 'critical success factors' considered when different options for the Moorfields relocation project were being analysed. Note, in particular category 3, focusing on accessibility.

Critical success factor - categories	Critical success factor	Description
Strategic fit and business needs	1. Strategic fit	• Contributes to delivery of: - Priorities of the NHS Long Term Plan, including moving to new service models in which patients receive care in the most optimal setting - Integrated care priorities of the STP and NHS England specialised commissioning - The Government's industrial strategy: Building a Britain fit for the future - UCL 2034 Strategy and Brain Sciences Faculty Doctoral Strategy • Enables the Oriel partners to maximise integration and innovation in the delivery of research, education and clinical care • Improves the strength and effectiveness of existing clinical and academic networks • Improves accessibility and connectivity of the Oriel partners' hub to the partners' other sites
	2. Creating the best possible patient experience	• Improves clinical outcomes by integrating research with service delivery • Contributes to a reduction in health inequalities • Contributes to improving patient reported outcomes and experience measures through an improved environment • Enables a smooth clinical pathway from primary care referral to diagnosis/treatment to supported self-care • Facilitates transformation of clinical and research pathways through implementation of integrated care models and better use of technology
	3. Accessibility	• Positive impact on: - Accessibility and safety for visitors and staff by and from public transport - Emergency access - Population-weighted average travel times for acute and specialist patients • Reduces patient and staff journey times in the building due to improved adjacencies • Full compliance with Equality Act 2010
	4. Inventing and innovating together to be at the leading edge	• Brings Moorfields and the IoO into the heart of UCL, improving collaboration and enabling resources to be shared with colleagues in other UCL departments and the Central London Knowledge Quarter • Enhances delivery of life changing research evidenced through increased rate of conversion of new therapies from trials to clinical care • Provides space for collaboration between health professionals, researchers and patients in an 'open innovation hub', allowing us to transform existing (and create new) strategic partnerships with industry and other higher education institutes
	5. Educating people to be the very best	• Enables the Oriel partners to equip staff and students with the knowledge and skills to be successful and to fulfil their ambitions • Enables world leading education, learning and development to take place in appropriate modern facilities • Provides opportunities for cross-departmental learning at UCL and within the Central London Knowledge Quarter

Critical success factor - categories	Critical success factor	Description
		• Enables growth in education through greater capacity
	6. Improving the experience for staff and students	• Contributes to attracting and retaining the best clinical and research expertise for our patients • Contributes to improving staff and student welfare – and improving satisfaction measures through an improved environment and greater opportunities for learning and collaboration
Potential value for money	7. Future flexibility	• Provides a development opportunity of 40–45,000m² space with efficient floorplate • Ability to expand and contract space efficiently to suit changing demand • Increases flexibility of facilities through modular design and construction standardisation
	8. Economy and efficiency	• Improved adjacencies and integrated care models increases flow of patients within clinical areas and enables better use of resources • Enables greater use of technology to improve efficiency of services • Enables collocation of activities to achieve economies of scale and scope • Lower running costs from efficient and environmentally sustainable premises • Increases opportunities for potential alternative income sources for Oriel partners
Potential affordability	9. Affordability	• Capital available to achieve prescribed capacity and quality • One-off costs (excluding capital and receipts) to implement changes • Revenue expenditure requirement affordable within income
Potential achievability	10. Deliverability	• Can be delivered and made operational while maintaining current services by 2025/26 • Acceptable to stakeholders

Table 3.12: Factors considered in the appraisal of alternative options for relocation of Moorfields Eye Hospital. Source: Oriel (2019, pp.7-8).

↓Option vs CSF→	1. Strategic fit	2. Creating the best possible patient experience	3. Accessibility	4. Inventing and innovating together to be at the leading edge	5. Educating people to be the very best	6. Improving the experience for staff and students	7. Future flexibility	8. Economy and efficiency	9. Affordability	10. Deliverability	Overall assessment
0. BAU	Not aligned with strategic objectives	Unlikely to deliver improvements	Good accessibility by public transport	Not aligned with Oriel partners' research strategy (no integration)	Unlikely to deliver Oriel partners' education strategy	Unlikely to deliver improvements	No future flexibility	Limited scope for improvement owing to the estate	Substantial refurbishment but no land acquisition costs	Deliverable whilst maintaining current services	**Carried forward as 'business as usual'**
1. Develop land between MEH and IoO	Not aligned with strategic objectives (no integration)	Unlikely to deliver improvements	Good accessibility by public transport	Not aligned with Oriel partners' research strategy (no integration)	Could deliver Oriel partners' education strategy	Unlikely to deliver improvements	Some future flexibility	Limited scope for improvement owing to the estate	Decant but no land acquisition costs	Deliverable with disruption to patients	**Discounted**
2. Develop east of existing site	Partially aligned with strategic objectives	Could deliver some improvements	Good accessibility by public transport	Aligned with Oriel partners' research strategy	Could deliver Oriel partners' education strategy	Could deliver some improvements	Some future flexibility	Limited scope for improvement owing to the estate	Decant but no land acquisition costs	Deliverable with disruption to patients	**Carried forward as best option on current site**
3. Develop south of existing site	Partially aligned with strategic objectives (no integration)	Could deliver some improvements	Good accessibility by public transport	Not aligned with Oriel partners' research strategy (no integration)	Could deliver Oriel partners' education strategy	Could deliver some improvements	Some future flexibility	Limited scope for improvement owing to the estate	Decant but no land acquisition costs	Deliverable with disruption to patients	**Discounted**
4. Part new build, part refurb	Partially aligned with strategic objectives (no integration)	Could deliver some improvements	Good accessibility by public transport	Not aligned with Oriel partners' research strategy (no integration)	Could deliver Oriel partners' education strategy	Could deliver some improvements	Some future flexibility	Limited scope for improvement owing to the estate	Decant but no land acquisition costs	Deliverable with disruption to patients	**Discounted**
5. St Pancras	Aligned with strategic objectives	Could deliver improvements	Good accessibility by public transport	Fully aligned with Oriel partners' research strategy	Could deliver Oriel partners' education strategy	Could deliver improvements	Future flexibility possible	Target improvements likely	≤£20m per acre	Deliverable whilst maintaining current services	**Carried forward as 'preferred'**
6. A	Partially aligned with strategic objectives	Could deliver improvements if new build	Good accessibility by public transport	Aligned with Oriel partners' research strategy	Could deliver Oriel partners' education strategy	Could deliver improvements if new build	Future flexibility possible if new build	Target improvements likely if new build	£150m per acre	Deliverable whilst maintaining current services	**Discounted**
7. B	Not aligned with strategic objectives	Could deliver improvements if new build	Medium accessibility by public transport	Not aligned with Oriel partners' research strategy	Could deliver Oriel partners' education strategy	Could deliver improvements if new build	Limited future flexibility	Unlikely to achieve improvements owing to heritage on the estate	Likely to be >£50m	Deliverable whilst maintaining current services	**Discounted**
8. C	Partially aligned with strategic objectives	Could deliver improvements if new build	Good accessibility by public transport	Aligned with Oriel partners' research strategy	Could deliver Oriel partners' education strategy	Could deliver improvements if new build	Future flexibility possible if new build	Target improvements likely if new build	£60m per acre	Deliverable whilst maintaining current services	**Discounted**
9. D (various)	Not aligned with strategic objectives	Could deliver improvements if new build	Not assessed – increased travel time; specific location required	Not aligned with Oriel partners' research strategy	Could deliver Oriel partners' education strategy	Could deliver improvements if new build	Future flexibility possible if new build	Target improvements likely if new build	Up to £50m per acre	Deliverable whilst maintaining current services	**Discounted**
10. E (various)	Not aligned with strategic objectives	Could deliver improvements if new build	Not assessed – increased travel time; specific location required	Not aligned with Oriel partners' research strategy	Could deliver Oriel partners' education strategy	Could deliver improvements if new build	Future flexibility possible if new build	Target improvements likely if new build	Up to £50m per acre	Deliverable whilst maintaining current services	**Discounted**
11. F (various)	Not aligned with strategic objectives	Could deliver improvements if new build	Not assessed – increased travel time; specific location required	Not aligned with Oriel partners' research strategy	Could deliver Oriel partners' education strategy	Could deliver improvements if new build	Future flexibility possible if new build	Target improvements likely if new build	c. £10–20m per acre	Deliverable whilst maintaining current services	**Discounted**
12. G (various)	Not aligned with strategic objectives	Could deliver improvements if new build	Not assessed – increased travel time; specific location required	Not aligned with Oriel partners' research strategy	Could deliver Oriel partners' education strategy	Could deliver improvements if new build	Future flexibility possible if new build	Target improvements likely if new build	c. £20–50m per acre	Deliverable whilst maintaining current services	**Discounted**

Table 3.13: Multi-criteria assessment of the different options considered by the Moorfields Eye Hospital. Source: Oriel (2019, p.12).

3.4 Cross-sector coordination

3.4.1 Types of coordination and potential mechanisms

Key societal issues such as climate change, poverty and inequality, unemployment, and the lack of economic opportunities, education and infrastructure transcend the boundaries of established policy fields, administrative levels and ministerial areas. According to both scholars and practitioners, these global development challenges, which are marked by value conflicts, complexity, uncertainty and ambiguity, can hardly be successfully tackled by standardised approaches and unilateral initiatives, and could only be solved by working across the organisational boundaries (Douglas and Wildavsky, 1983; Koppenjan and Klijn, 2004; Rittel and Webber, 1973). Such problems would thus require new modes of producing, mobilising and implementing knowledge through dialogue, collaboration, coordination and integrations between different sectors and parties in society (Huxham and Macdonald, 1992; Alter and Hage, 1993; Hudson et al., 1999; Ney, 2009).

A number of definitions of coordination (as well as of cooperation and collaboration) exist in the literature (see also Halpern, Sarti and Rodriguez, 2021).[2] In simple and general terms coordination can be defined as the joining up of different sectors, groups and actors in the attempt to produce a more comprehensive and coherent perspective on the problems and issues at hand (Braun, 2008; Hämäläinen et al., 2016), whilst ensuring consistency between the various objectives and priorities of the involved parties (Peters, 1998; Meijers and Stead, 2004). The potential benefits of this approach should however be balanced against the costs and time spent informing and persuading actors to cooperate, preparing contracts, and designing and maintaining effective communication channels between the different parties (Malone, 1987; Sager and Ravlum, 2004).

Some authors tend to distinguish between different forms of coordination. Vitola and Senfelde (2015), for instance, emphasise the difference between administrative (or functional) and policy (or strategic) coordination. The former is concerned with ensuring smooth cooperation within and between organisations, whereas policy coordination involves the development of consistent policies and the formulation of strategies to implement them. Administrative coordination is generally seen a crucial precondition for policy coordination. Lægreid and colleagues (2014) considers also the temporal dimension of coordination and differentiate between temporary and permanent arrangements. In addition, political coordination (Bouckaert et al. 2010) is important In countries where horizontal and vertical coordination is ensured at the level of political parties.

A further typical distinction is made between horizontal (or cross-sectoral) and vertical (or intra-sectoral) coordination. Horizontal coordination focuses on managing actors and policies across different sectors. Vertical coordination, on the other hand, aims at managing the

[2] SUMP-PLUS D3.1/3.2, section 2 includes a list of major references and definitions.

strategic links between people operating at different levels within a company or a government department as well as between hierarchically organized sets of sectorial policies (Hogl and Nordbeck, 2012). It is also possible to discerns between four basic coordination mechanisms: hierarchies, based on formal rules and involving defined levels of leadership; networks, where actors engage in coordination by mutual influence on the basis of trust; negotiation, leading to consensus or compromise through bargaining; and competition, where coordination between actors is achieved through mutual adjustments induced by incentives to strive for common objectives (Hogl and Nordbeck, 2012; Sarvasova, 2013).

Considering these concepts in relation to the specific type of coordination discussed in this chapter – locations and models of service provision – we could perhaps distinguish between coordination at three different levels:

- Policy coordination: coordination at the level of strategic policy-making, i.e. the formulation of strategic policy documents in different sectors and how these relate to strategic policies in other sectors
- Planning coordination: coordination in relation to the detailed, temporal and spatial dimensions of policy implementation, e.g. through coordination at a more detailed level of spatial planning and how different facilities or infrastructures are related to each other, or
- Operational coordination: coordination in relation to more frequent, low-level decisions taken by professionals in each sector, including how professionals in different sectors communicate with each other

Whether temporary or permanent arrangements, or horizontal/network-type versus hierarchical/bureaucratic-type coordination, are most effective will likely depend on the nature of the sector and which of these three levels of coordination is concerned. In other words, it is a question to be proved empirically, but relevant to consider when coordination mechanisms are being designed.

Finally, a brief review of the relevant literature reveals that different tools and instruments are employed in the attempt to ensure coordination between different organisations and sectors. These include integrated strategic documents and coordinated policy frameworks, ad hoc institutions and organisational platforms, workshops, and ICT tools (Table 3.14).

Dimensions of cross-sector coordination	Distinctions made in the literature
Purpose	• Administrative (or functional) coordination • Policy (or strategic) coordination • Political coordination
Time	• Permanent coordination arrangements • Temporary coordination arrangements
Forms	• Horizontal (or cross-sectoral) coordination • Vertical (or intra-sectoral) coordination
Mechanisms	• Hierarchies • Networks (social) • Market (competition)

Tools and Instruments	• Strategic documents and coordinated policy frameworks • Ad hoc institutions and organisational platforms • Hearings and workshops • ICT tools • Performance monitoring and appraisal

Table 3.14: Types, tools and instruments for cross-sector coordination.[3]

According the analysis undertaken by Eriksson (2017), for example, strategic documents and collaboration platforms represent the main cross-sectoral collaboration instruments adopted by the Swedish cities of Stockholm and Gothenburg in their transport planning and policy making process, carried out with the view to developing a more energy-efficient transport system. In Stockholm, in particular, the future transport, land use and economic development strategies for the city and its urban region are outlined in the Regional Development Plan, whose preparation involves a cross-sectoral, cross-level process lasting about two years. The participating actors include the 26 political municipalities of Stockholm, the County Administrative Board, the public transport company, the energy companies and other private and public organizations as well as individuals (Eriksson, 2017). In Gothenburg, by comparison, transport policy-making is led by the Gothenburg Region Association of Local Authorities (GRALA), consisting of the 13 municipalities that cover the urban transport landscape. Specific decisions on transport infrastructure are taken by the regional council based on the advice of the Sustainable Development Drafting Committee (SDDC), whose membership comprises municipal representatives and members of different sectoral committees (Eriksson, 2017). Both GRALA and SDDC act as collaboration platforms for different parties on a number of issues, above all sustainable development concerns (Eriksson, 2017).

In Latvia, the objective of improving cross-sectoral policy coordination has been pursued through the creation of a coordinated hierarchical system of policies. Policy documents have been ranked according to their planning horizon (with short-term policy documents which are subordinated to medium-term policy documents and the latter which, in turn, should comply with long-term polices) and the level of planning administration in which they operate (with local policy documents which are subordinated to regional ones and regional documents which should be in line with national policies). To promote consistency and synergy between the different policy documents, some national, long-term strategic policy guidelines have also been produced and a special central policy coordination unit has been established (Vitola and Senfelde, 2015).

A recent study examining the practices and processes adopted in six European countries, (Denmark, Finland, Italy, the Netherlands, Romania and the UK) to promote the integration of health-enhancing physical activity policies into other sectors (e.g. education and culture, transport and communication), highlights that, in these countries, the main cross-sector

[3] We are grateful for comments from Sciences Po.

cooperation instruments which have been employed include the establishment of steering committees, working groups and scientific advisory groups for policymaking, and the organisation of hearings with various stakeholder groups and workshops for policy development and information dissemination (Hämäläinen et al., 2016).

Finally, in a workshop held in Washington DC in 2016 to explore opportunities for cross-sectoral collaboration between health care and transportation, several panellists presented some practical examples to emphasise the importance of geographic information systems, websites and other ICT tools for promoting data sharing across sectors, identifying potentially vulnerable population groups and deprived areas, and fostering community participation, simulating discussions and inspiring changes through group-based discovery (NASEM, 2016). In a report written to support greater cross-sectoral coordination and a more flexible use of resources across sectors to improve the wellbeing and health of local communities, the Health Development Agency describe possible strategies to achieve such objectives and provide some examples of good practice (HDA, 2004).

3.4.2 Case study: UK Transport Assessments as a coordination mechanism

Section 3.3 reviewed evidence on 'upstream' decision-making in relation to how and where healthcare services should be delivered in England, i.e. when major decisions regarding relocation of facilities such as hospitals are being considered and debated. Here we discuss a specific process that is part of UK national policy for spatial planning, namely 'Transport Assessment'. This process is triggered further 'downstream', when organisations have made locational decisions and are seeking so-called 'planning consent' from a local government to develop (i.e. build) on a particular land parcel. In this case, planning professionals in local government need to approve the proposed development, based on the appropriateness of the proposed land use.[4]

The Transport Assessment process requires the applicants wishing to develop, to analyse the possible impacts of the proposed developments on the transport system, and predict and mitigate future problems for the local transport network. For instance, London's city-wide 'masterplan', the London Plan (GLA, 2016), states that "Development proposals should ensure that impacts on transport capacity and the transport network, at both a corridor and local level, are fully assessed" (Policy 6.3). This process illustrates the potential for achieving cross-sector Links coordination through spatial planning.

The guidance on transport assessment published by the UK Department for Transport and Department for Communities and Local Government (DfT and CLG, 2007) identifies three situations:

[4] Similar planning instruments exist also in other European countries, but we are not aware of any synthesis or reviews of these on a cross-country basis; and thus it is beyond the scope to discuss multiple countries, here.

- Transport Assessment: major development proposals, having significant transport implications, requires a comprehensive and systematic analysis of the transport issues and the identification of the measures which have to be taken to cope with the anticipated transport impacts.
- Transport Statement: when the proposed development is expected to generate relatively low number of trips or traffic flows, leading to minor transport impacts, only a simplified analysis (in the form of a Transport Statement report) is necessary.
- No assessment: in situations where the transport issues relating to a development proposal are limited, no formal assessment is required.

The guidance provides suggested thresholds below which a formal assessment may not be needed, and above which the preparation of a Transport Statement or a Transport Assessment would instead be appropriate (see Tables 3.15 and 3.16).

Thresholds based on size or scale of land use						
	Land use	**Use/description of development**	**Size**	**No assessment**	**TS**	**TA/TP**
1	Food retail (A1)	Retail sale of food goods to the public – food superstores, supermarkets, convenience food stores.	GFA	<250 sq. m	>250 <800 sq. m	>800 sq. m
2	Non-food retail (A1)	Retail sale of non-food goods to the public; but includes sandwich bars – sandwiches or other cold food purchased and consumed off the premises, internet cafés.	GFA	<800 sq. m	>800 <1500 sq. m	>1500 sq. m
3	A2 Financial and professional services	Financial services – banks, building societies and bureaux de change, professional services (other than health or medical services) – estate agents and employment agencies, other services – betting shops, principally where services are provided to visiting members of the public.	GFA	<1000 sq. m	>1000 <2500 sq. m	>2500 sq. m
4	A3 Restaurants and cafés	Restaurants and cafés – use for the sale of food for consumption on the premises, excludes internet cafés (now A1).	GFA	<300 sq. m	>300 <2500 sq. m	>2500 sq. m
5	A4 Drinking establishments	Use as a public house, wine-bar or other drinking establishment.	GFA	<300 sq. m	>300 <600 sq. m	>600 sq. m
6	A5 Hot food takeaway	Use for the sale of hot food for consumption on or off the premises.	GFA	<250 sq. m	>250 <500 sq. m	>500 sq. m
7	B1 Business	(a) Offices other than in use within Class A2 (financial and professional services) (b) research and development – laboratories, studios (c) light industry	GFA	<1500 sq. m	>1500 <2500sq. m	>2,500 sq. m

Table 3.15: Thresholds for transport assessment based on the size and scale of land use, from UK government guidance (continued on next page).

Thresholds based on size or scale of land use (continued)						
	Land use	**Use/description of development**	**Size**	**No assessment**	**TS**	**TA/TP**
8	B2 General industrial	General industry (other than classified as in B1),The former 'special industrial' use classes, B3 – B7, are now all encompassed in the B2 use class.	GFA	<2500 sq. m	>2500 <4000 sq. m	>4000 sq. m
9	B8 Storage or distribution	Storage or distribution centres – wholesale warehouses, distribution centres and repositories.	GFA	<3000 sq. m	>3000 <5000 sq. m	>5000 sq. m
10	C1 Hotels	Hotels, boarding houses and guest houses, development falls within this class if 'no significant element of care is provided'.	Bedroom	<75 bedrooms	>75 <100 bedrooms	>100 bedrooms
11	C2 Residential institutions - hospitals, nursing homes	Used for the provision of residential accommodation and care to people in need of care.	Beds	<30 beds	>30 <50 beds	>50 beds
12	C2 Residential institutions – residential education	Boarding schools and training centres.	Student	<50 students	>50 <150 students	>150 students
13	C2 Residential institutions – institutional hostels	Homeless shelters, accommodation for people with learning difficulties and people on probation.	Resident	<250 residents	>250 <400 residents	>400 residents
14	C3 Dwelling houses	Dwellings for individuals, families or not more than six people living together as a single household. Not more than six people living together includes – students or young people sharing a dwelling and small group homes for disabled or handicapped people living together in the community.	Dwelling unit	<50 units	>50 <80 units	>80 units
15	D1 Non-residential Institutions	Medical and health services – clinics and health centres, crêches, day nurseries, day centres and consulting rooms (not attached to the consultant's or doctor's house), museums, public libraries, art galleries, exhibition halls, non-residential education and training centres, places of worship, religious instruction and church halls.	GFA	<500 sq. m	>500 <1000 sq. m	>1000 sq. m
16	D2 Assembly and leisure	Cinemas, dance and concert halls, sports halls, swimming baths, skating rinks, gymnasiums, bingo halls and casinos. other indoor and outdoor sports and leisure uses not involving motorised vehicles or firearms.	GFA	<500 sq. m	>500<1500 sq. m	>1500 sq. m
17	Others	For example: stadium, retail warehouse clubs, amusement arcades, launderettes, petrol filling stations, taxi businesses, car/vehicle hire businesses and the selling and displaying of motor vehicles, nightclubs, theatres, hostels, builders' yards, garden centres, POs, travel and ticket agencies, hairdressers, funeral directors, hire shops, dry cleaners.	TBD	Discuss with appropriate highway authority	Discuss with appropriate highway authority	Discuss with appropriate highway authority

Table 3.15 (continued): Thresholds for transport assessment based on the size and scale of land use, from UK government guidance. Source: DfT and CLG (2007).

Thresholds based on other considerations				
	Other considerations	**TS**	**TA**	**TA/TP**
1	Any development that is not in conformity with the adopted development plan.			✔
2	Any development generating 30 or more two-way vehicle movements in any hour.		✔	
3	Any development generating 100 or more two-way vehicle movements per day.		✔	
4	Any development proposing 100 or more parking spaces.		✔	
5	Any development that is likely to increase accidents or conflicts among motorised users and non-motorised users, particularly vulnerable road users such as children, disabled and elderly people.			✔
6	Any development generating significant freight or HGV movements per day, or significant abnormal loads per year.		✔	
7	Any development proposed in a location where the local transport infrastructure is inadequate. – for example, substandard roads, poor pedestrian/cyclist facilities and inadequate public transport provisions.		✔	
8	Any development proposed in a location within or adjacent to an Air Quality Management Area (AQMA).		✔	

Table 3.16: Thresholds for transport assessment based other considerations. Source: DfT and CLG (2007).

The guidance recommends that a Transport Assessment should take into account the following objectives:

- to reduce the need to travel, especially by car;
- to tackle the environmental impact of travel by improving sustainable transport choices;
- to promote accessibility by all modes of travel, in particular public transport, cycling and walking;
- to ensure as much as possible that the proposed mitigation measures avoid unnecessary physical improvements to highways.

A Transport Assessment should be prepared with regard to the relevant planning policy framework for the development proposal. It should include, amongst other things: a detailed description of both the existing land uses and the proposed use of the site; an assessment of the available capacity on the existing public transport infrastructure; an examination of level of accessibility for those walking and cycling; an analysis of the available vehicular capacity on the road network in the vicinity of the site; traffic data; and safety considerations and accident analysis. The first step in quantifying the impact of a proposed development on the transport system is to provide an estimate of the person trips (for all modes) that are likely to be generated by the development. Specific trip rate database tools can be employed to forecast trip generation rate for the proposed development.

Based on our experience and knowledge of transport planning in the UK context, we think it is fair to say that the Transport Assessment process has, in practice, not proven effective in getting clients seeking planning permission (in different sectors, e.g. a hospital) to systematically consider and reflect on the impact of their facility or development on the transport system. Nevertheless, Transport Assessments serve as an example of what future potential mechanisms and incentives for cross-sector coordination could look like.

3.4.3 Barriers and incentives to cross-sector coordination

While individual professionals may recognise the wider societal and economic benefits of considering the impacts that decisions made in their sector may have on the transport system, there are many barriers to cross-sector coordination. Professionals in different sectors are judged by achieving specific targets unique to their own sector, with funding and authority allocated accordingly, rather than incentivised to maximise public value across different types of public (or private) services. In other words, there is a lack of appropriate incentive structures for cross-sector coordination.

Hull (2008) investigated barriers and incentives to cross-sector coordination through in-depth interviews with land use, environmental health, public health, transport planning and corporate policy professionals within English local authorities. The study found that "because of the different administrative boundaries [spatial scale over which planning is undertaken] and timeframes [for policy decisions and plan preparation], the strategy and the spending decisions of a range of service sectors (transport, health, environment, planning, education, social services, regeneration, etc.) are disconnected" (p.101). The 'service sector coordination' taking place in these local authorities in the mid-2000s was "very much dependent on inter-sectoral and inter-personal skills of the individual practitioners involved" (p.99), and thus coordination remained at the ad-hoc, informal level; rather than facilitated by institutional structures that systematically incentivised such coordination. Further barriers, and potential incentive structures, highlighted by Hull (2008) are summarised in Table 3.17.

Barriers to coordination	Potential incentives for coordination
▪ Absence of management mechanisms for policy integration, at the senior level of policy-making ▪ Differing organisational cultures across departments, including language specific to different professions ▪ Need to adapt policy measures to fit the focus of external funders (e.g. national government) prevented formulation of integrated cross-sectoral policy strategies ▪ Lack of data on how sectors impact each other ▪ Insufficient staff time	▪ Policy integration among senior management professionals and overarching, integrated local policy strategies ▪ Environmental impact assessments, evaluating the sustainability of plans and proposals from different sectors ▪ *Legislative* requirements from national government, e.g. delivering sustainable development through the land use planning process

Table 3.17: Barriers to and potential incentive structures for cross-sector coordination. Source: authors' summary of Hull (2008).

Hull (2008) only considered cross-section coordination across public sector professionals. This deliverable also considers private sectors such as tourism and retail, and in relation to these, it must be acknowledged that barriers to coordination across public and private sectors may

be even more challenging. Notably, the underlying orientation of private sector entities towards maximisation of public value differs, including the extent to which wider social and economic benefits are considered within decision-making about a company's own business model. Indeed, the primary decision criteria is likely to be the generation of profit.

We also identify additional potential incentive structures for coordination, based on our knowledge of the field:

- Secondments and joint projects
- Early cross-sector collaboration when major investments or changes in policy are planned
- Greater consistency in business cases and appraisal methodologies, at least across the public sector
- More high-level government policy determined at a cross-sector level, with clear guidance on each sector's joint responsibilities for delivery
- Shared targets across sectors (e.g. carbon emission reductions)
- 'Whole place' community budgets, covering several public sector operations (Public Accounts Committee 2013).

Finally, it can be concluded that apart from key studies such as Hull (2008), there appears to be a lack of research evidence and/or case studies to support the design of incentive structures relevant to 1) coordination across transport and other sectors; and 2) locational and service delivery decision-making, beyond the integration of policy targets and strategies.

The challenges of achieving cross-sector coordination are magnified by the varying forms of service delivery in different sectors (e.g. varying mix of public and private sector players and different degrees of fragmentation or consolidation) and in different countries.

3.5 New technologies and emerging service delivery patterns: implications for transport

As discussed in section 2.2 and illustrated in Figure 2.1, city policy making and planning is becoming more comprehensive and holistic in nature, with a growing emphasis on the 'Integrated City', both in relation to transport modes and across sectors, heavily facilitated by advances in a broad range of technologies. Different sectors have been taking on board various types of new technologies and have been adapting their service delivery models in ways that impact on travel patterns, particularly given advances in digital infrastructures and capabilities, and in relation to mobility electrification.

Table 3.18 provides some examples of technological developments in four sectors that are likely to affect transport outcomes, either directly (e.g. through providing new transport modes) or indirectly, by shaping underlying travel patterns (e.g. through video medical consultations replacing face-to-face meetings).

Sectors	Major Technological Trends
Health Care Sector	• Possible decentralisation of health care service delivery (e.g. new technologies may allow specific services to be delivered in micro-hospitals and small neighbourhood facilities) (Ketchum, 2018; KPMG, 2019) • Possibility of delivering some health care services remotely (e.g. virtual clinics, video consultations, electronic patient records providing for more digital interactions and fewer face-to-face appointments (Castle-Clarke, 2018; Deloitte, 2018; McKinsey & Company, 2020) • Less impact on the surface transport system due to the introduction of drone-delivered medical supplies (Time, 2019) • Less environmental impacts due to the introduction of low-emission ambulances (Edie newsroom, 2019)
Retail	• Continued growth in ecommerce and rising demand for (rapid) home delivery (Glynn, 2020) • Location of new major warehousing facilities further from core markets, due to high land prices in metropolitan areas (Dablanc and Browne 2020) • Increasing use of electric bikes for last-mile deliveries (Davis, 2018) • Potential role for air-borne drone deliveries
Education	• Growth of distance learning and online courses (Raja and Nagasubramani, 2018).
Tourism	• Sharing Economy (*e.g*. AirBnB competing with hotels) • Food delivery apps • Travel itinerary app

Table 3.18: Technological trends affecting future service delivery patterns.

3.6 Discussion and conclusions

This Chapter began by citing previous research on the UK context, which has indicated that there is very little evidence of cross-sector coordination or 'Links' across transport, health and education, when it comes to locational decisions and decisions about how services are delivered (NERA 2004; Jones and Paskins, 2008; Jones 2012). The literature review presented here – across health, education, retail and tourism sectors in many different countries – finds some evidence of transport being considered as part of decision-making criteria for locational decisions in different cases and sectors, but this appears to be limited to ad-hoc instances, rather than providing evidence of systematic coordination across transport and other sectors or formal governance and coordination mechanisms.

In particular, the following conclusions can be drawn:

5. **There are many academic modelling tools that take into consideration transport-related criteria within locational decision-making across all sectors, but it is unclear to what extent these are used in real-life decision-making**

   Within academic research, there are many different types of (mathematically-based) optimisation models that can be used to inform locational decisions – identifying the most favourable sites for facilities and services based on multiple criteria. In relation to hospitals and schools, transport costs, travel times, transport accessibility (active travel and/or public transport) are frequently included as criteria; however, the cost and specifications of available land parcels and population distribution in relation to service coverage are equally prominent criteria. In the retail and tourism industry, transport costs, accessibility and infrastructure are also considered – but rather, from the point of view of maximising customer convenience. Although it is unclear to what extent these academic models reflect real-life decision-making, it is clear that there are existing modelling tools incorporating transport as a criterion for locational decision-making in diverse sectors, that could be further developed to be appropriate for supporting real-life decisions.

6. **Within the UK's healthcare sector, there are instances of transport accessibility being taken into account in locational decision-making, yet this appears to be limited to ad-hoc assessments and does not constitute systemic cross-sector coordination. Other criteria are given much greater weight within decision-making regarding hospital relocations.**

   It would be incorrect to say that transport is never taken into account in locational decision-making within the UK healthcare sector, as the accessibility of facilities is considered in several case studies (from the perspective of service users, rather than impacts on the transport network). However, this appears to be an ad-hoc consideration included and given differential weight on a case-by-case basis, rather than cross-sector coordination following a systematic, national approach to the so-called 'business cases' (the collaboration between Transport for London and the NHS is an exception). Decisions regarding where and how to deliver services, i.e. at the time of hospital relocation, are based on evaluations focused on economic costs, rather than wider social costs and benefits. Evidence suggests that constrained public sector resources and the associated drive to centralise hospital services to achieve economies of scale – in addition to the clinical quality of care – are the dominant criteria. Citizen objections to the centralisation and closure of healthcare facilities appear to be common, and there may be lessons to learn from local knowledge regarding access and service quality, to inform decision support tools (following Jones 2012).

7. **When designing coordination mechanisms, aspects to take into consideration are: the levels of strategic policy-making, spatial and investment planning, and continuous operational decision-making; the appropriateness of temporary vs permanent and hierarchical vs network arrangements; and the specific practical mechanisms through which coordination can be achieved. While the many barriers to coordination 'across silos' is recognised, much less is known about the types of incentive structures that could facilitate it.**

Much of the existing literature on cross-sector coordination focuses on the strategic level of policy-making, e.g. how policy formulation involves different sector representatives and how policy documents relate to each other. However, the type of Links coordination considered in this deliverable differs from the setting of strategic objectives and targets; rather, it focuses on how different sectors make *locational* decisions and how this is driven by decisions about *service delivery* – a complex phenomenon incorporating demographics, technology, land use, and financial planning in the public sector. Thus, in relation to Links, it may be important to consider forms of coordination that relate to spatial planning and operational decision-making by professionals in different sectors. The UK's Transport Assessment process operating through the land use planning system has not served as a systemic or effective coordination mechanism, in practice. Beyond established coordination mechanisms like strategic policy frameworks, ad-hoc organisational platforms and events and ICT tools, there appears to be a need for a new generation of decision-support tools that can facilitate Links coordination, in line with appropriate structures for incentivising professionals to coordinate, within each sector.

8. **Recent developments in ICT and vehicle technologies are reshaping the way that services are delivered in different sectors, and thus the consequent impacts of those sectors on transport systems and the substantive issues that require coordination**

   This is an emerging area of research that will be explored within the SUMP-PLUS project, in partnership with the partner cities, drawing in particular on recent experiences brought about by COVID restrictions that have accelerated moves to digitally-based service provision.

4 Conceptual Framework for Cross-sector Analysis

Recognition of the potential transport benefits of developing comprehensive cross-sector Links requires much broader thinking within the transport profession than is currently the case, alongside an awareness among professionals in other sectors of the influence that they exert on transport systems. It involves not just working with other sectors to promote sustainable mobility outcomes, but also to influence the business models in their respective sectors, in ways that can reduce the need to travel. This needs new ways of thinking, in several respects:

- Recognising that travel is a derived demand – a means to an end, or a 'space-shifting mechanism' that enables people to take part in successive primary activities at different locations
- Further recognising that there are different ways in which some of these primary activities can be realised, including on-line or in-home
- Taking more account of the temporal (i.e. timing) dimension of travel, alongside the spatial dimension
- Exploring various forms of interdependencies, between people and their activities; for example, a shift in focus from conceptualising travel as a series of discrete trips, to looking at household patterns of daily travel behaviour

Some key conceptual cornerstones relating to interdependencies and cross-sector links are introduced in section 4.1 in this chapter, including:

- Travel as derived from consumption and production activities
- Focusing on accessibility, not mobility
- The importance of the temporal dimension
- Non-transport barriers preventing sustainable travel choices
- Interdependencies in daily life, at the household level
- Aggregate, multi-sector ramifications of policy decisions taken by one sector
- Longer-term factors: the influence of socio-technical clusters and business practices

Section 4.2 brings these various concepts together and sets out a framework for cross-sector analysis. Section 4.3 draws some general conclusions.

4.1 Conceptual cornerstones

4.1.1 Travel as derived from consumption and production activities

As noted in Chapter 1, while it is generally acknowledged in theory that travel is a 'derived demand', it is rarely conceptualised or analysed in that way, in practice. In reality, for most people daily life is organised around taking part in a series of activities; some of these are

physiological requirements (e.g. sleeping and eating), others relate to individuals' roles in society (e.g. pupil, employee, parent); and a third group is generated by personal interests (e.g. sport, reading). Many of these activities require the provision of facilities, most of which are only available at specific locations (e.g. teaching facilities, recreational areas, retail facilities). Most people's days consist of scheduling a succession of different activities, with travel providing the 'space-shifting' mechanism that enables people to move sequentially, from one facility to another.

This suggests the need to analyse travel much more comprehensively, in the context of the scheduling of daily household behaviour (e.g. Jones et al, 1983). But, even at the level of the individual activity/travel decision, there is scope to take a much broader view than is currently the case in travel behaviour analysis and modelling, by viewing most travel as part of activities that consume various goods and services.

The **bold text in** Figure 4.1 shows how travel behaviour is currently treated in modelling and analysis. Travellers and their mobility needs are classified into groups, according to their income, gender, etc. and this forms the basis for establishing empirically derived trip rates by purpose (e.g. work, education, shopping, leisure); factors such as car availability, destination characteristics and modal alternatives largely determine the subsequent destination and mode choices that are observed.

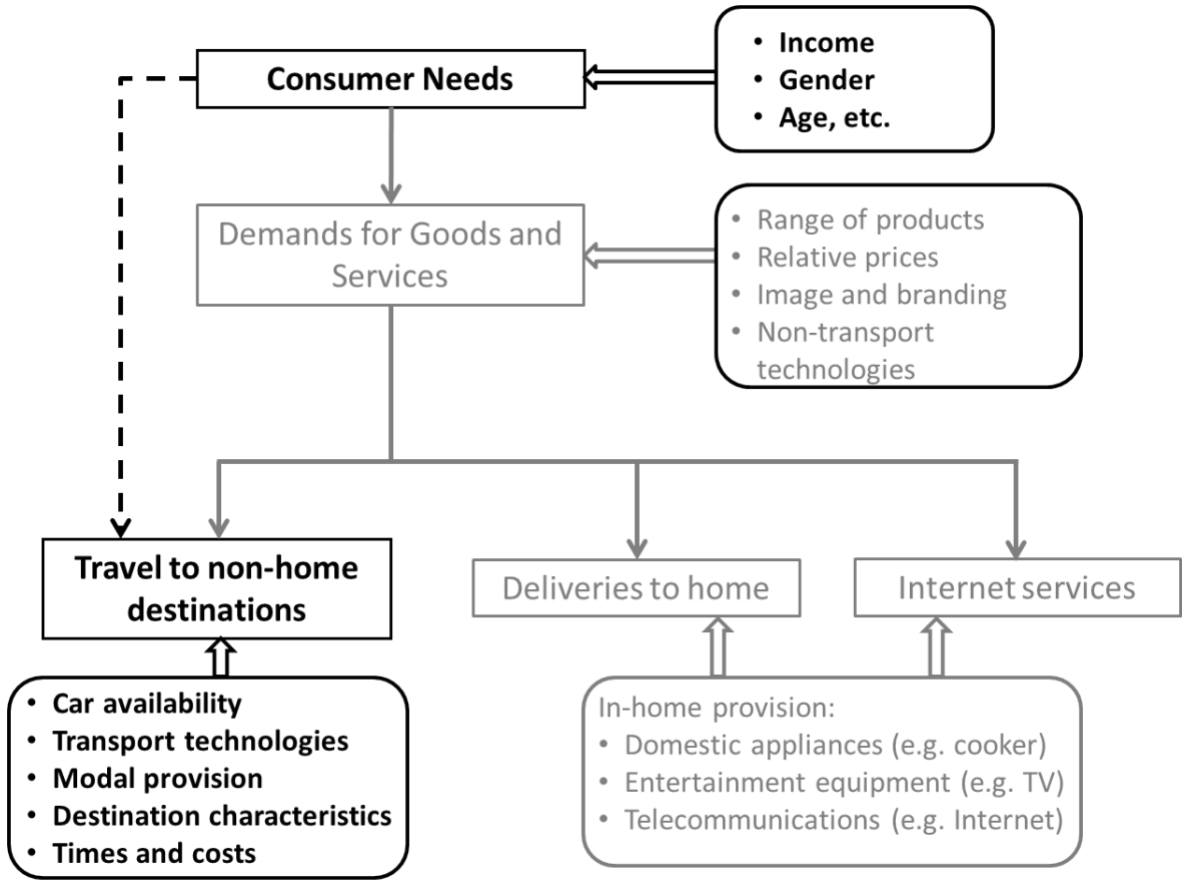

Figure 4.1: Representation of the drivers of travel demand, in theory and in practice. Source: adapted from Jones (2014).

The fuller picture of what happens in practice is apparent when we add the **grey boxes** shown in Figure 4.1. Now we see that most travel is driven by the demands for primary goods and services, across many sectors. These demands are, in turn, related to the different types of consumers and their needs, and by the range of products and services on offer (including pricing, image, etc.). The full figure shows that there are three ways of acquiring these goods and services. In addition to personal travel from home to a specialist outlet, these include (i) deliveries to the home and (ii) digital (or 'virtual') accessibility through internet services – neither of which features in current analyses of travel demand, although they are central to efforts to 'avoid' travel.

In some cases, these forms of delivery are partly interchangeable; for example, education could be delivered: at schools, in home via a personal tutor or online. But, in other cases, less so (e.g. food can only be physically consumed, in or outside the home). The nature and availability of these different forms of delivery depend on the business models of the different companies and sectors involved.

4.1.2 A focus on accessibility rather than mobility

As Figure 4.1 shows, by adopting an activity framing, the primary focus switches from simply providing personal mobility, to ensuring good access to goods and services, through both physical and virtual accessibility.

Physical accessibility can be viewed at three levels:

- **Micro:** infrastructure access. For example, the ease of boarding a vehicle, entering a building or crossing a street.
- **Meso:** network access. For example, the ease of use of local transport (e.g. street) networks, and network connectivity
- **Macro:** 'strategic' accessibility. For example, the ease of access to range of goods and services across an entire area (from urban -> international)

This can be seen as a 'nested' concept, as shown for a home to work trip by rail in Figure 4.2 below; all except local journeys will involve all three levels of physical accessibility. Virtual or digital accessibility is spatially agnostic, at a meso and macro level, but at a micro level there are issues as to whether a consumer can access suitable digital equipment, has local access to the internet and the desired service is online.

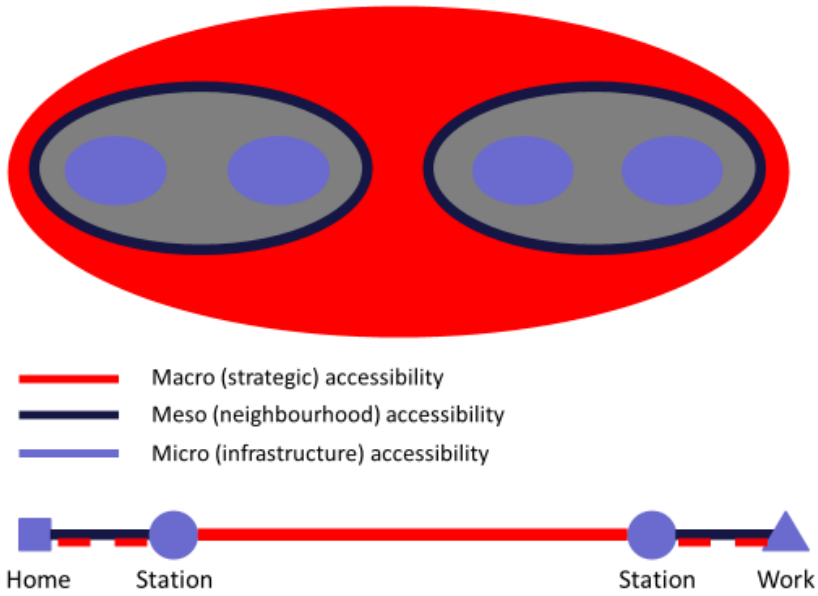

Figure 4.2: Physical accessibility as a 'nested' concept. Source: illustration by Peter Jones.

4.1.3 The importance of the temporal dimension

Internet-based digital services are generally available online 24 hours a day, but when replying on access to physical facilities, these may only be available for limited hours of the day (e.g. shop opening hours from 08.00 to 18.00). In some cases, hours of engagement may be fixed, for example, when attending a lecture or watching a theatrical performance; or a service may only be available at certain times of the day (e.g. a half-hourly bus service).

In practice, people take part in several activities during the day, each of which may have its own constraining temporal profile. In effect, this have to be overlain, to identify the actual access (spatial and temporal) that a person has to a set of goods and services. Figure 4.3 provides a simple example, of an elderly person attending a hospital appointment, from a study in South Yorkshire. There were several temporal constraints that this person needed to take into account:

- The hospital out-patients department is open between 09am and 6pm.
- The elderly person receives help from a home carer, so has to be home between 3pm and 6pm
- Free travel on the buses is only available from 9.30am

This combination of factors leaves a 'window' of between 09.30am and 3pm to be away from home. However, when travel time is added as a further constraint (e.g. one hour in each direction by bus, allowing for waiting and travelling time), then the person is only able to accept a hospital appointment starting from 10.30am onwards and being completed by 2pm.

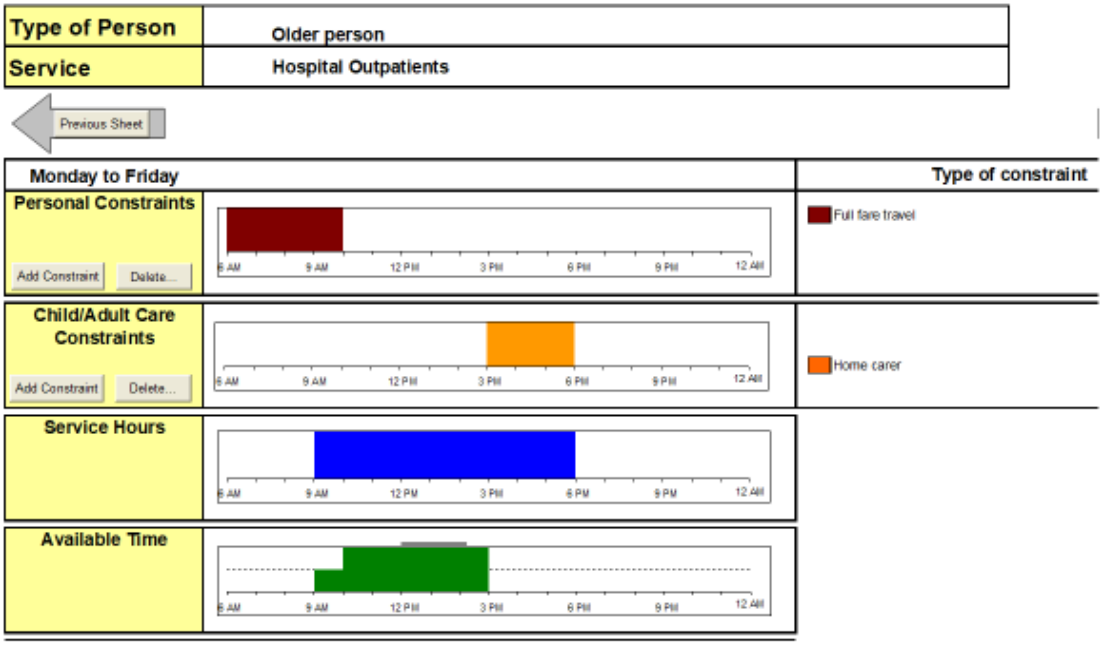

Figure 4.3: Temporal constraints facing one elderly person, on a given day. Source: Jones and Paskins (2008a).

4.1.4 Non-transport barriers preventing sustainable travel choices

Constraints on travel behaviour and consumer choice are not only spatial and temporal in nature. For example, the costs of goods and services, in relation to the financial resources available to an individual or household are a major constraining factor, but are not considered further in this report. The emphasis here is on other factors that are under the control of businesses and organisations in different sectors that can constrain consumer choices and travel behaviour.

Attempts to encourage people to use cars less and travel more by sustainable modes are often unsuccessful due to wider factors and barriers, including those under the control of non-transport sectors of the economy. For example, if a parent needs to drive to work, due to the location of the workplace, then it is often more convenient (and safer) for them to drop their child at school on route, rather than encouraging them to walk or cycle on their own.

Figure 4.4 shows a set of barriers that might prevent a parent allowing their child to travel to school by public transport, rather than being driven; this exercise is set out in the form of a decision tree, in which all questions require an affirmative answer for public transport to be used in preference to the child being chauffeured by car.

The main barriers identified here include:

- Lack of suitable bus/rail service provision, or a lack of awareness by parents and children that such services exist.

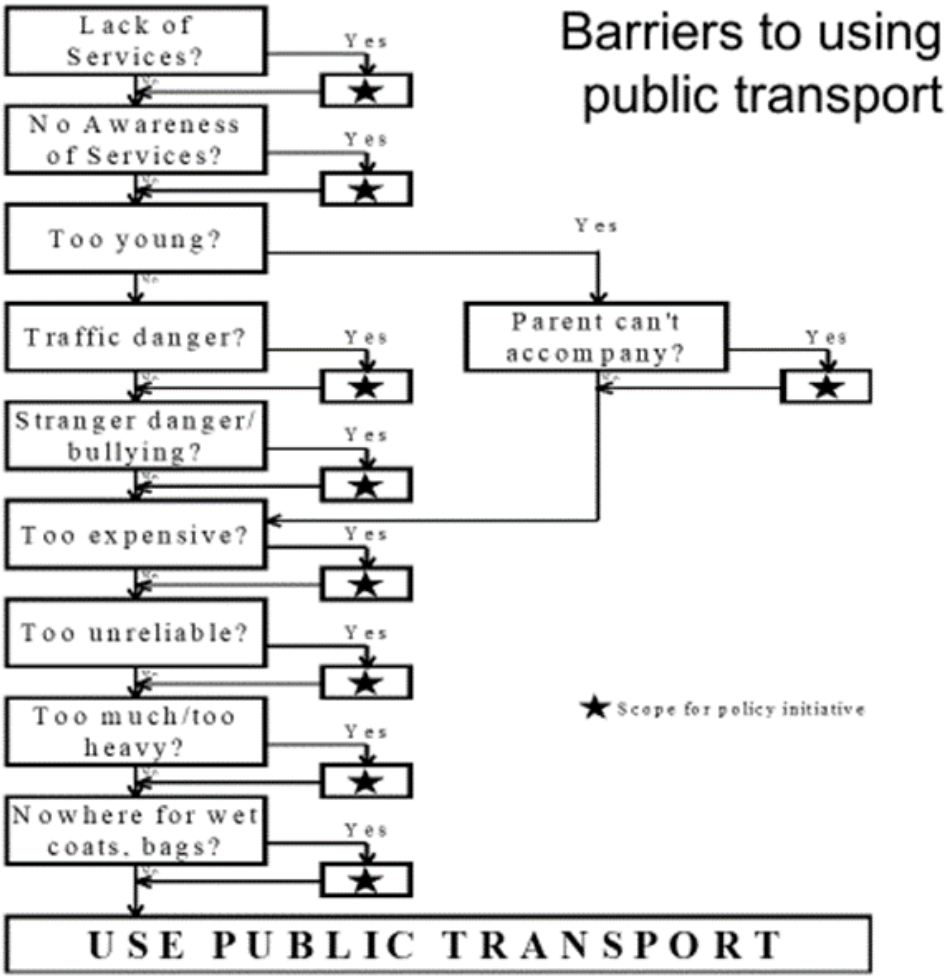

Figure 4.4: Barriers to children's use of public transport to travel to school. Source: Jones and Bradshaw (2000).

- Children may be too young to travel unaccompanied, or parents might be worried about traffic danger or of the prospect of their child being bullied on their way to/from school.
- Bus services might be too expensive
- Buses may be perceived to be too unreliable
- Children may have too much equipment to carry themselves, due to its size of weight (e.g. school sports kit, or a large musical instrument); and
- There may be nowhere safe to leave coats, bags, etc., once the child arrives at school.

Potential solutions to overcome these various barriers require action by several organisations, including the bus company, the local transport and highway authority and also, crucially, by the school. The latter could make parents and children more aware of the public transport options available, and also provide secure lockers where children could store coats, school kit, etc. both during the day and overnight.

However, such changes need careful consideration, as they may have unintended consequences. For example, what might be thought by the public transport operator as an

improvement in service may not always be perceived as such. For example, the switch from a bus route with fixed stops to a drop-at-the-end-of-your-road service was seen as offering an enhanced service, but for parents of younger children this was regarded as less attractive: there were no longer marked bus stops where they could tell their children to wait and congregate with others, and it was more difficult to know if they had missed the bus as there were no longer small groups waiting together.

4.1.5 Interdependencies in daily life, at the household level

Trips are not made in isolation, but are interdependent, both with other trips made by the same person (e.g. an outbound trip from home is subsequently matched at some point by a return trip to home), and with those of other people, both within and outside the household (e.g. when accompanying a young child on foot, or chauffeuring someone as a car driver). As illustrated in the earlier sections of this chapter, the timing and location of these trips can, in turn, be heavily influenced by the service delivery patterns operated by different sectors (e.g. when and where services are provided) and the resulting constraints that these impose on family life.

Figure 4.5 illustrates some the practical problems facing a single parent with three children (two pre-school) on one weekday, due to various interdependencies, taken from a village study in South Yorkshire (Jones, 2011).

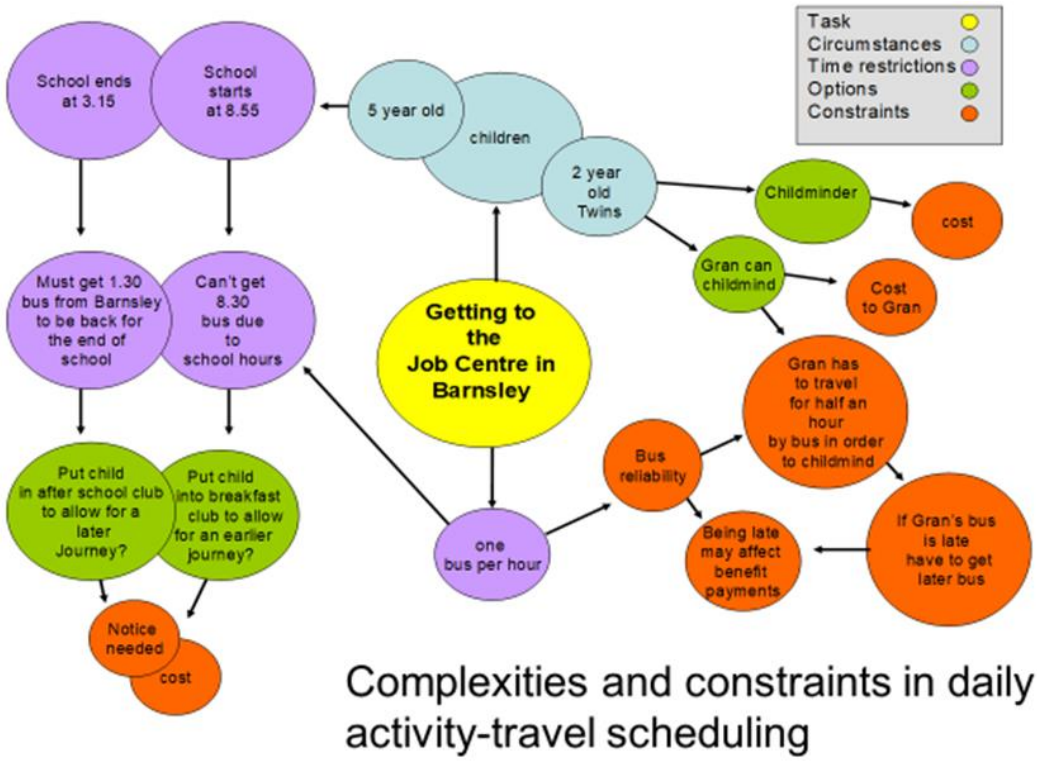

Figure 4.5: Complex interdependencies faced by a single parent in relation to everyday travel. Source: Jones (2011).

On this particular day, she has to accommodate the varying and uncoordinated requirements of three organisations: national government social services, local authority educational services and the local bus company. Organising her day can become a major logistical exercise, over which she has little control and with many uncertainties.

Note, in particular, that:

- The core activity that day for this single mother is to take the bus to/from her village to the district town of Barnsley, in order to visit the job centre for a 10.30 appointment; at that time this appointment was mandated by central government on a fortnightly basis, in order to continue to receive government financial support.
- She has to drop her eldest child at school between 08.45 and 08.55 and has to be back to collect her by 3.15pm. This meant that the earliest bus she could catch is at 09.30 (an hourly service), which takes 45 minutes – so she reaches the job centre just in time for her appointment (she is not given a choice of times).
- To give her more flexibility on bus times, her child could extend her hours at school by attending the breakfast club and an after-school club, but these are charged for on a whole-term basis, and she cannot afford that.
- In the past, she has taken her two-year old twins with her on the bus, but they do not settle well and on one occasion the bus driver would not let her on the bus with her buggy, as the allocated space was already occupied by a wheelchair user. On another occasion the bus was cancelled; in both cases this meant that she had to wait for the next bus and was nearly an hour late for her appointment. She was warned that, if this happened again, she would lose her government financial support.
- To avoid the first of these problems, her mother travels by bus from another village to look after the twins while her daughter goes to Barnsley (adding to family costs) – again, with the risk that her bus might be cancelled or delayed. It would be simpler for the single parent to employ a local babysitter, but she cannot afford that.

Note that, a switch to digital social services ‘signing in’ or a zoom interview, as is now increasingly common due to COVID restrictions, would have transformed the daily life of this parent and significantly reduced her travel demand.

This type of situation, where families in the surveyed villages were obliged to meet organisational and institutional requirements that were not under their control, was not uncommon. Several other families in the area had children aged 16 to 18, who were given an Education Maintenance Allowance payment, in order to encourage their children to stay on at school beyond the minimum statutory age and so benefit from further education.

Again, they relied on an hourly bus service that was often delayed by traffic, and occasionally cancelled. Here too there was a requirement to arrive within a tight time window and be signed in by a teacher; late arrivals caused by the poor bus service led to payments being denied. Parents were reluctant to send children on the earlier bus, as this would leave their teenage children hanging around on the streets (the college only opened 15 minutes before the class started). Neither the education authority nor the bus company accepted that they had any liability or responsibility, while it was the families who had no control over this situation that suffered the consequences.

4.1.6 Multi-sector ramifications of policy decisions taken in one sector

Figures 4.6 and 4.7 illustrate the wider consequences of business re-locational decisions taken by one sector (usually on the basis of offering a financial or operational benefit to that organisation) on a range of other sectors that can suffer negative consequences – without having any influence on that decision. Such consequences do not impact only on travel, but on a range of sectors.

The first example (Figure 4.6) relates to the closure of a local village school, with the justification that it will improve educational opportunities by giving these students access to a larger, more modern school with better technical facilities and a wider range of educational opportunities; and a supplementary benefit of saving money for the educational authority.

But this decision has a wider range of negative consequences, most of which are not taken into account – or even recognised - by the local education authority in their decision-making processes.

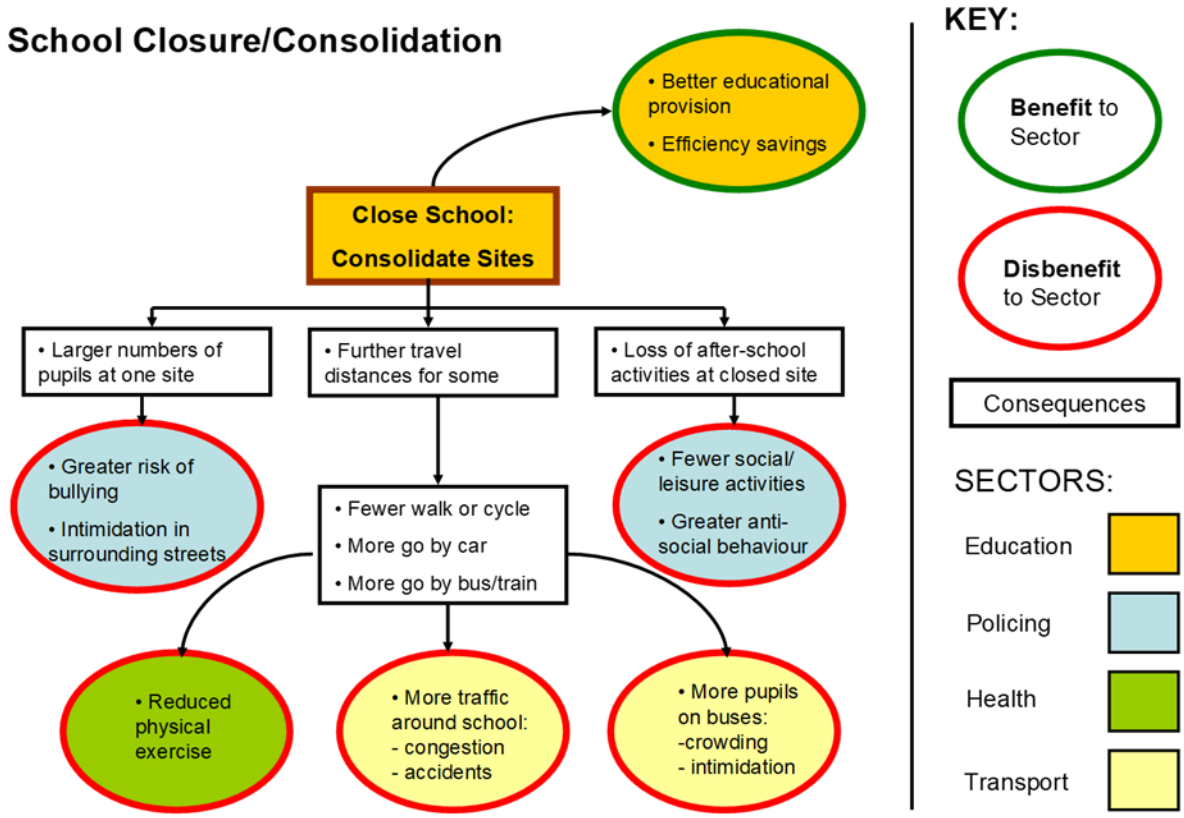

Figure 4.6: Multi-sector ramifications of a school closure proposal. Source: Jones (2012).

In particular:

- The consolidation of pupils at fewer sites leads to a larger concentration of students at and around remaining schools, which can lead to increased bullying and to the intimidation of people in surrounding streets as pupils leave school at the same time and converge on local shops (with increases in petty theft) and bus stops.
- Pupils from the closed school will now have to travel longer distances to reach their new school, probably making it infeasible to continue walking or cycling to school. This leads either to an increase in car travel, as parents now chauffeur their children to school (adding time and money costs for the parents and in aggregate contributing to extra congestion, air pollution and traffic accidents around the new school); or an increase in bus/train travel (requiring extra costly peak services, or causing overcrowding and intimidation) – and at the same time, leading to reductions in children's daily physical exercise, with negative health consequences.
- The local village school also provided out-of-hours leisure and social activities (evening classes, weekend sports, etc); this facility is now lost to the village, and pupils instead take part in informal activities outside school hours, leading to them 'hanging around' on the streets and resulting in increasing anti-social behaviour.

Thus, a proposal with some clear educational advantages has negative consequences for transport policies (increased traffic congestion or overcrowding on public transport), for the health sector (reduced physical exercise, increased accident risk and worse air quality) and for social capital and local policing services.

The second example (Figure 4.7 below) comes from the health sector, and illustrates some of the wider ramifications of a proposal to construct a purpose-built health centre on the edge of a small, town in Scotland, where currently the various medical services (doctor, dentist, pharmacy, optician, etc) were spread out in separate buildings across the town centre.

This change was proposed in order to provide higher quality health care in a new purpose-built facility, where all health services could be accessed in one place and health professionals could better plan and coordinate their patient care plans.

However, this proposal, while having obvious health service delivery benefits, did have some wider, serious negative consequences:

- The new site is much easier to access by car, with adequate, free parking (unlike in the town centre); so this encourages car use by both patients and staff and so adds to local traffic congestion, accident risk, air pollution and CO2 emissions
- Conversely, the new peripheral site makes it more difficult to access health care services on foot or by cycle, so this results in reduced physical exercise among patients.
- It is also now more difficult to access the site by bus as, for most patients, a change of bus is now required in the town centre; this increases patient travel costs, so reducing the number of bus users (and hence the potential viability of the bus service), and increasing the number of 'no shows' at medical appointments. Increased travel difficulties can also discourage some people from booking healthcare appointments in the early stages of an illness with potentially serious health consequences.
- Finally, a town centre survey of shoppers found that a majority of them were attending some form of health-related appointment while visiting the town. Local businesses were

very concerned that, once the health facilities were located out of town, that they would lose much of this trade, risking the viability of many local businesses.

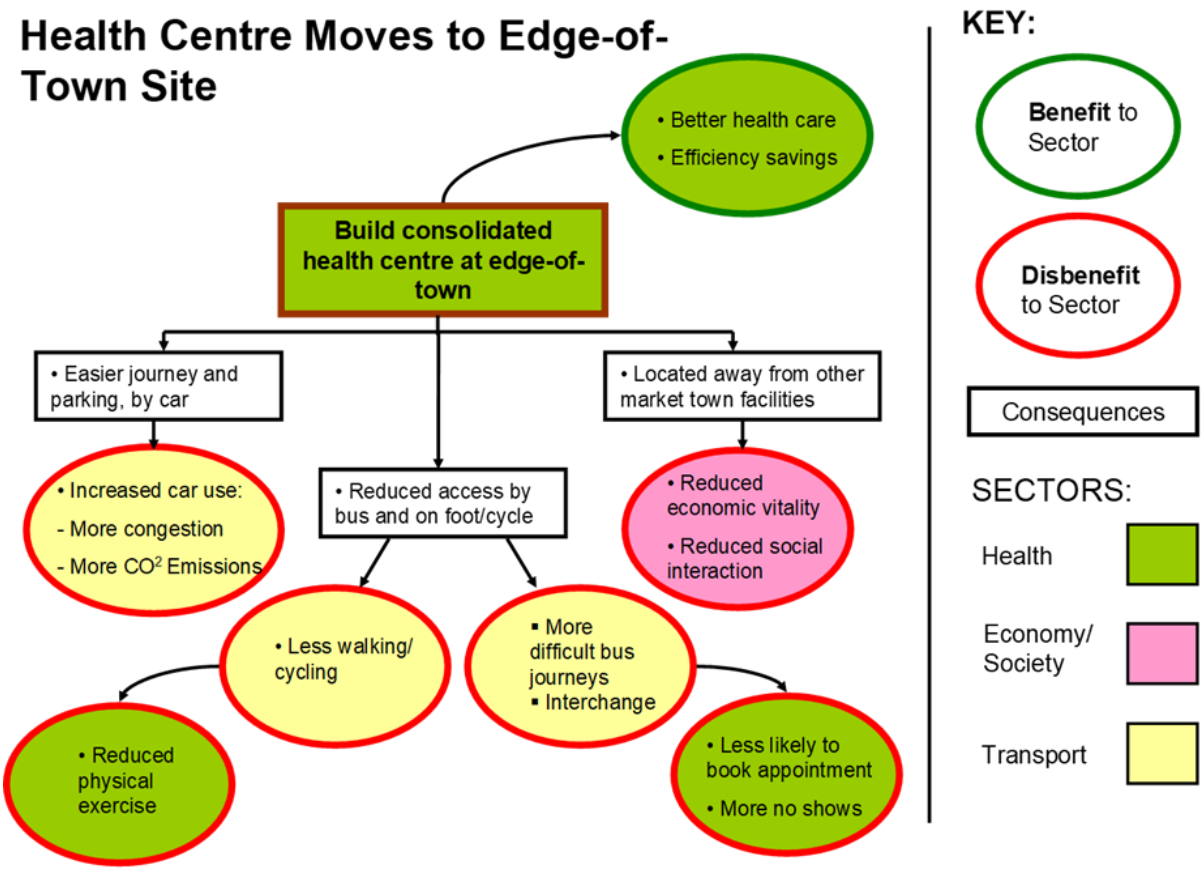

Figure 4.7: Multi-sector ramifications of a proposed consolidation of local healthcare services. Source: Jones and Paskins (2008b).

Finally, we consider cross-sector links associated with the tourism sector. Tourists not only visit major tourist attractions, but in the process often take part in sets of complementary activities, to a far greater extent than is the case for retail, education or health.[5]

Figure 4.8 shows some of the main links from the tourism sector to other sectors. Most visitors spend money and time consuming food, and may buy comparison goods and take advantage of other entertainment opportunities; those staying overnight additionally require accommodation. If they are unfortunate, they may also need to access local healthcare, car repair garages, etc.

[5] Although see Figure 4.7 for a more limited manifestation of a similar phenomenon.

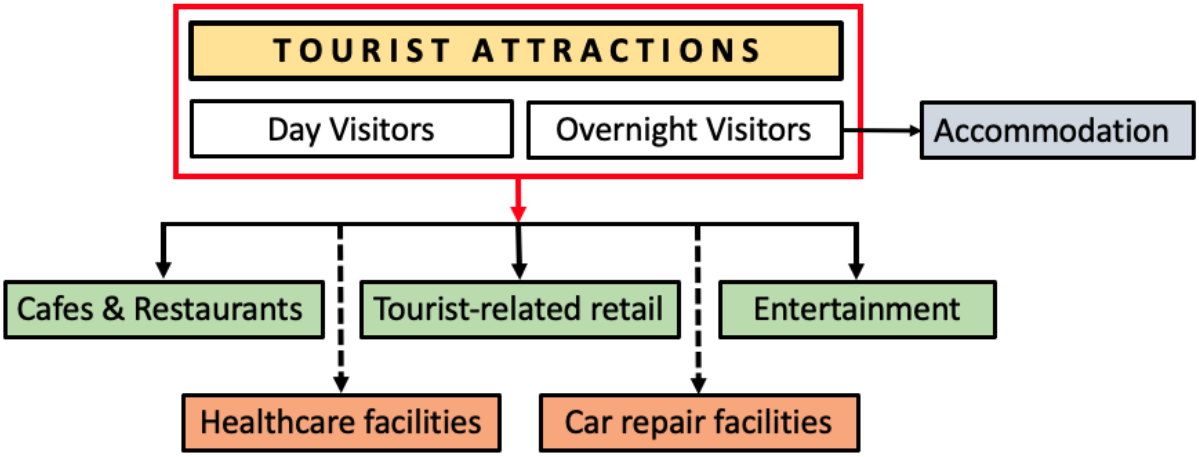

Figure 4.8: Potential tourist visitor demands on other, non-transport sectors. Source: illustration by Peter Jones.

4.1.7 Longer-term factors: the influence of socio-technical clusters and business practice

Most consumer and travel behaviour decisions are embedded in much wider, longer-term socio-technical contexts, which include sets of social/business practices and supporting technologies (Shove et al., 2012; Geels, 2002). Take convenience food shopping as an example, see Figure 4.9.

The Figure below outlines three different prevailing patterns of consumer shopping behaviour, associated with different travel patterns, that have evolved over the last 50 years, from:

1. shopping daily locally, on foot; then to…
2. shopping weekly or less frequently by car at major supermarkets; then to…
3. obtaining food through home deliveries, thereby eliminating the shopping trip and avoiding personal retail travel altogether.

Local daily food shopping on foot had been the predominant pattern over hundreds of years. Local shops would specialise in different types of fresh food and meats (e.g. greengrocers, butchers, bakers), that would have been obtained mainly from local farms and processed on site. Most purchases would have been made on a daily basis, as is still predominantly the case in large parts of France for the purchase of fresh bread from boulangeries.

During the late 1970s/early 1980s, there was a gradual shift towards supermarket-based shopping, carried out predominantly by car, on a weekly or fortnightly basis. Now it became possible to meet all food shopping needs ‘under one roof’, and these foods were increasingly sourced on a global basis.

Over the last decade – and, recently accelerated by the global coronavirus pandemic – there has been a major shift to home delivery of food shopping, replacing household shopping trips by car (or using public transport or on foot) with van deliveries to homes.

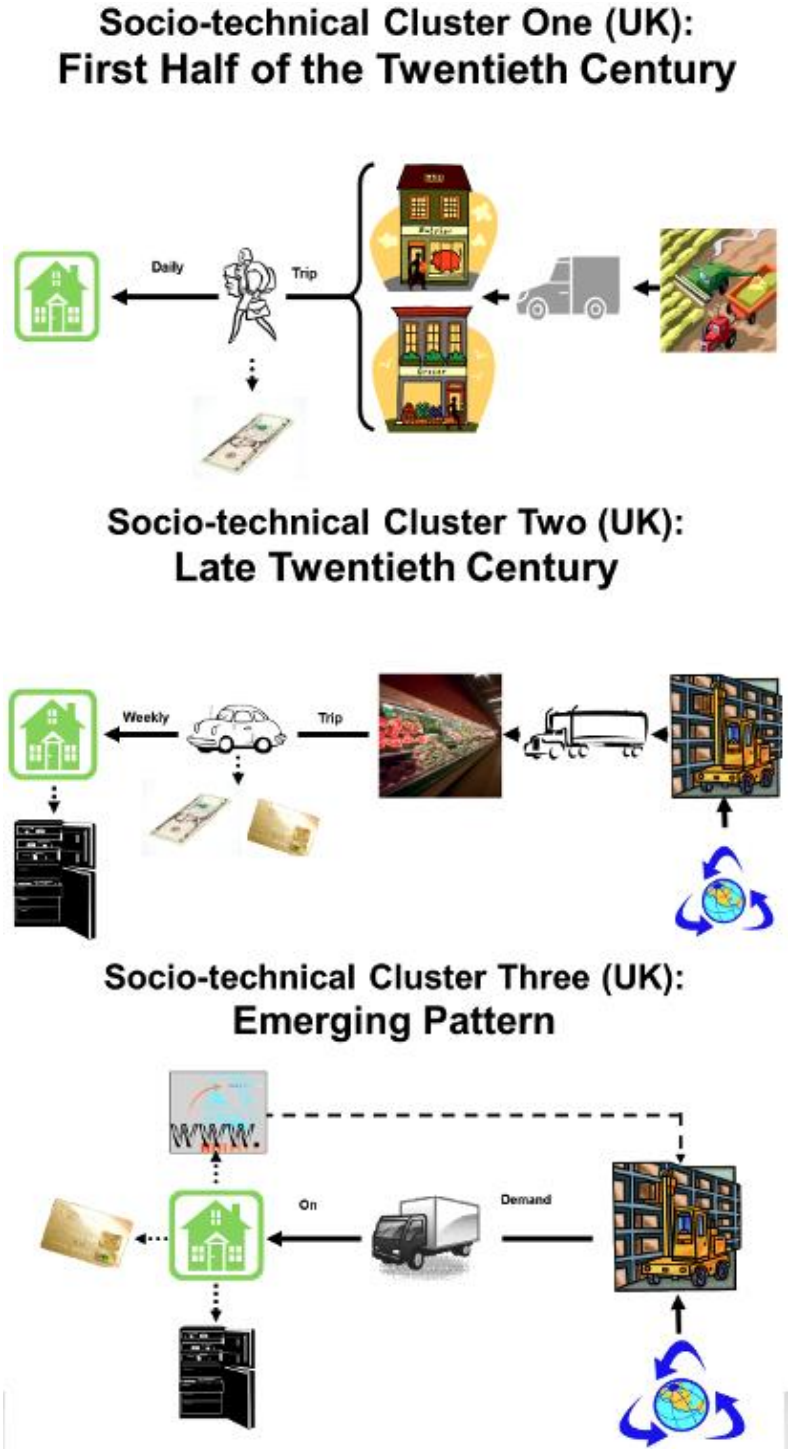

Figure 4.9: Three socio-technical clusters for convenience shopping, that evolved over time in the UK. Source: Jones (2012).

Traditionally, these different consumer patterns might simply be seen in transport terms as a change in predominant travel mode, as characterised above, but apart from the widespread

growth of car ownership making pattern 2 possible, these changes were entirely dependent on technological developments completely outside the transport sector. These non-transport technological developments are summarised in Figure 4.10.

Comparison of Three S-T Clusters

	Building construction	Shop type/ location	Grocery logistics	Home food storage	Grocery ordering	*Grocery delivery pattern*
STC One	Brick and wood	Small, many, within built up area	Mainly locally sourced	Limited – cool room or marble slab	In person, paying cash	***Daily collection on foot***
STC Two	Steel frame and cladding	Large, few, often out of town	Globally sourced	Fridge freezer	In person, using cash or card	***Weekly collection by car***
STC Three	Not used	Not used	Globally sourced	Fridge freezer	By internet, using card	***Deliveries direct to home***

Figure 4.10: Comparison of three socio-technical clusters for convenience shopping. Source: Jones (2012).

Note, in particular, the effects of technological advances in:

(i) **New types of building construction methods:** traditionally, food outlets were constructed from brick/stone and timber and were generally quite small in size, in part due limits on the size of the roof spans - and to the limited size of the customer catchment areas; they served local communities where the shops could be accessed on foot. The development of new building construction methods, using steel frames and metal cladding, enabled the economical construction of very large retail sheds offering much greater consumer choice; this coincided with large increases in customer catchment areas due the growing use of private cars for shopping trips.

(ii) **Changes in food storage facilities**. People used to shop daily for perishable items (e.g. bread and milk), that could not be kept for long periods of time at home. The invention of the refrigerator and freezer changed all this:

- From a consumer perspective, people could now store foods at home for weeks or months at a time, and so were now able to do much larger amounts of food shopping, on a weekly or even monthly basis.
- From a producer perspective, perishable goods could now be sourced from countries all over the world, removing seasonal shortages, bought in bulk and stored for longer periods of time.

Taking points (i) and (ii) together, this made it financially attractive to build very large supermarkets, easily accessed by car.

The third stage of development – the move to large-scale home delivery – was also depended on a further non-transport innovation: **the rise of the internet**. This has enabled:

- Remote ordering of food products on-line, in an efficient manner not using a manual ordering system, and
- The efficient electronic payment for goods and services, using debit or credit cards.

Note that **all** these elements needed to be in place – bringing together a range of independently developed technological advances in different sectors - for these observed changes in consumer and travel behaviour (i.e. trip frequency, destination and mode) to become possible.

4.2 Conceptual framework for cross-sector analysis

Figure 4.11 below summarises and brings together the various conceptual cornerstones discussed in section 4.1. It focuses on certain household consumption patterns and the person and freight trips that these can generate, with only implicit consideration of production-generated trips (e.g. commuting and business trips and freight movements). The figure starts with the representation of several sectors of the economy, that provide goods and services to households (with the support of household members as employers and employees), which are consumed in various ways through activity participation (section 4.2.1) – from consuming food, to watching television or learning online. The red arrows indicate links between these sectors (section 4.2.6) and the existence of various barriers to effective cross-sector collaboration (discussed in Chapter 3 - shown as double brown lines).

Having produced a wide range of goods and services, the issue arises of how households can access these various goods and services. Five types of access are identified in the figure (sections 4.2.2 and 4.2.3), including personal travel to a physical facility, the conveyance of the service or good to the home (involving a personal or freight trip), and provision within the home, either physically (e.g. food preparation relying on a cooker and refrigerator), or digitally via the internet (e.g. on-demand streaming of a film). Again, there may be various space (shown in red) and time (shown in blue) constraints and other barriers that make it difficult for a household to secure some forms of access (section 4.2.4 – shown as double brown lines), both originating within the transport sector and outside.

Collectively, the various forms of household access to goods and services enables a daily pattern of consumption and activity participation, that results in various types of interactions both between activities and among household members and other people and organisations (section 4.2.5). Finally, all this activity takes place within a sector-led set of current socio-technical clusters (section 4.7). As these change over time, they can give rise to major modifications, or sometimes discontinuities, in consumption and activity patterns, many of which are presently unanticipated.

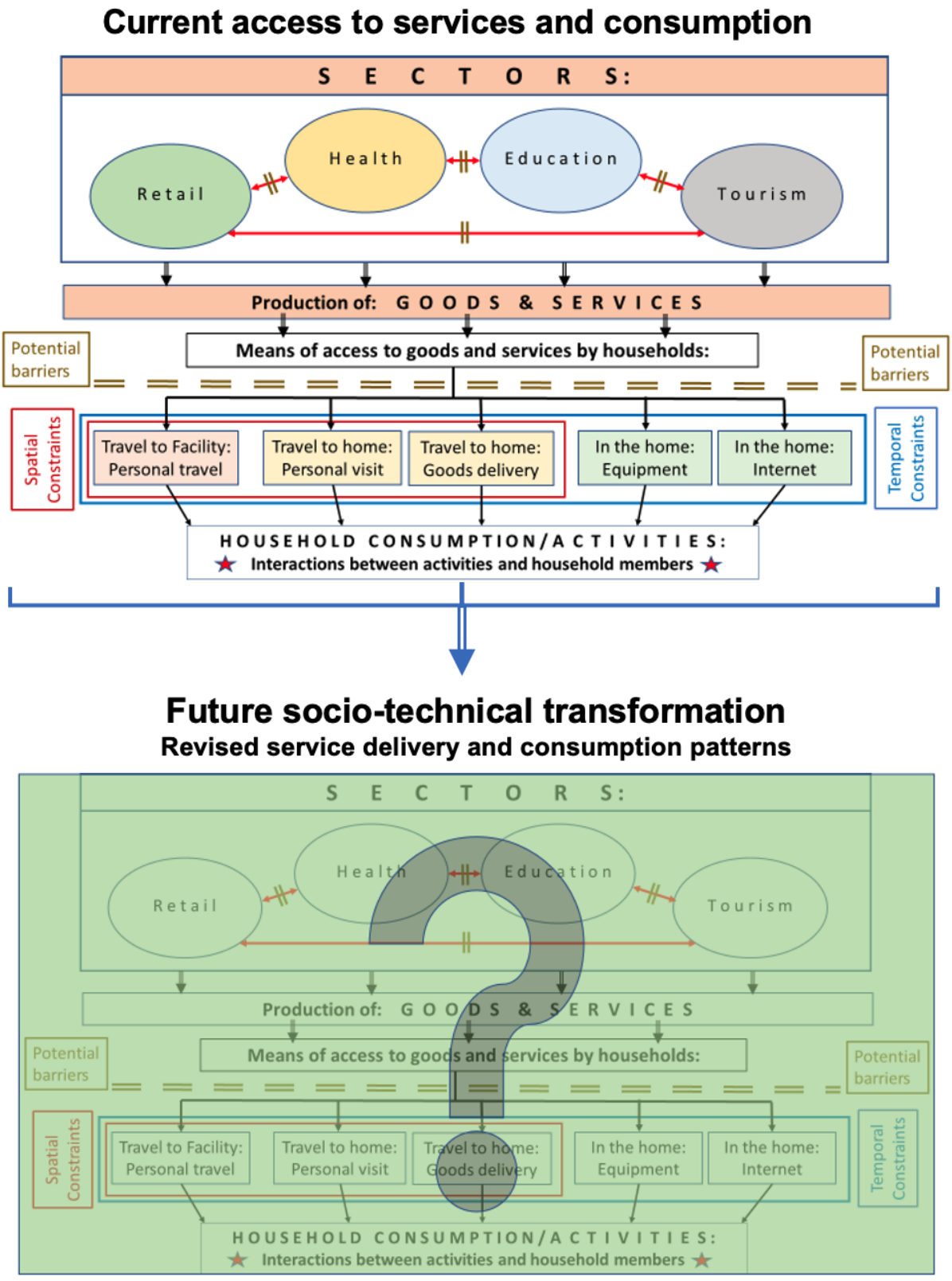

Figure 4.11: SUMP-PLUS conceptual framework for cross-sector analysis, in relation to both current and future services and consumption.

Table 4.1 provides a simple, four-component (1-4) framework for service delivery strategies from a supplier perspective, identifying the primary options and the dimensions along which cross sector planning could be explored – with certain forms of delivery being more applicable to some sectors than others.

Forms of service delivery	Types of service delivery	Consequences	Travel consequences
1. Physical facilities – fixed	Local vs. centralised sites Small vs. large, or specialist, facilities	Affects size of catchment areas to access services	Affects trip lengths and the range of modal options
2. Physical facilities – mobile	Providing some services at neighbourhood level (e.g. banking)	Services available locally, but with very limited operating times	Enables most people to access the facility on foot
3. Delivering services to people's homes	Personal services	Home care, hairdressing, etc. provided at home by professionals	No household trip, but personal trip to the home by service provider
	Goods deliveries	Food, medicines, etc.	No household trip, but freight delivery to home
4. Provision within the home	Physical equipment	Availability of household cooker, washing machine, etc.	No household trip required to obtain hot food, clean clothes, etc.
	Digital infrastructure	Computer, internet connection	No household trip

Table 4.1: Potential forms of service delivery in different sectors. Source: authors.

The four categories of service provision are discussed each in turn, in the sections below.

4.2.2 Fixed physical facilities: number and location

As was discussed in Chapter 3, there are many factors that businesses need to take into account when deciding on the types and locations of facilities that are offered to customers:

- Size of physical facility against the range of goods/services provided. This is a key trade-off, as larger facilities can offer a wider range of goods and services (e.g. retail and education), and more specialist facilities (e.g. health), but at the expense of offering fewer locations and hence, on average, requiring longer trips for customers and potentially, for staff.
- Location of facilities. Out-of-town locations enable land to be purchased more cheaply and green field sites incur no/few rehabilitation costs and can be designed from scratch. This may also mean easier access for customers and staff arriving by car, but at the expense of those who need or wish to use sustainable transport modes.

Together, these business decisions affect catchment area sizes, the number of facilities provided, site locational characteristics - and hence trip lengths and the range of viable transport modes available for consumers. These decisions can therefore counter local authority policies promoting sustainable mobility.

4.2.3 Mobile physical facilities

In cases of more specialist or infrequently demanded products, then some types of services are amenable to a form of mobile provision. The frequency of such provision can range from weekly or more often, down to annual.

In rural areas, it is not uncommon to find mobile fresh vegetable, meat and fresh fish suppliers, hot foods (e.g. burgers or fish and chips), banking services and mobile libraries. Some mobile medical services may also be provided.

Clusters of goods and services may also be provided on a temporary basis, with suppliers moving from one site to another. For example, in more urban areas it is increasingly common in the UK to find weekly farmers' markets, or weekly auctions. And there are traditions of a town receiving a visiting circus or a funfair, on an annual basis.

This enables customers to access goods and services locally (and hence largely on foot or by cycle), rather than having to travel potentially long distances, although not on a daily basis.

4.2.4 Providing goods and services to people's homes

Delivery of goods to people's homes has a long tradition, deriving on the one hand from local shops providing a home delivery service (mainly for fresh foods, but also newspapers) and, on

the other, from the development of national postal services and the rise of mail order catalogues, selling a wide range of consumer goods from clothing to cutlery and books.

Home delivery has received a major boost through the development of internet-based shopping (see sections 4.1 and 4.8), and through the rise of companies such as Amazon, which has encouraged a move to internationally-sourced retail products and new types of delivery services (e.g. Deliveroo and Uber Eats specialising in providing home delivery of prepared meals). Such developments have been spurred on by the COVID pandemic; due in part to national lockdowns, home deliveries have increased very rapidly, in both quantity and breadth of provision. However, competition to provide very fast delivery times and the offering of a personal selection of delivery slots (e.g. for grocery shopping) is resulting in less efficient distribution patterns than with traditional postal delivery services, and hence a surfeit of vans and van-km on the roads in some areas.

Bringing services into people's homes also has a long tradition, including visits by doctors and nurses, priests, cleaners and gardeners, as well as those offering hair cuts and home counselling. There is a wide variety of occasional service visits, from plumbers, electricians, builders, etc. Here COVID has had the opposite effect to goods delivery, with some services being postponed and other moving on-line (e.g. GP consultations).

From the household's perspective, this completely removes the need to travel, although at the expense to the transport networks of attracting delivery and professional service visits to people's home. The net effect of this practice on total vehicle km is likely to vary widely, according to local circumstances.

4.2.5 In-home provision: physical and digital

The types of goods and services that can be provided within the home depends on the facilities that are available to households and this, in turn, affects household travel patterns. There are numerous historical examples.

We noted in section 4.8 that the invention of refrigeration enabled fresh foods and frozen foods to be stored for long periods of time at home and had a major impact on food shopping patterns. The invention of the washing machine and the vacuum cleaner in the 1930s in the US led to major reductions in time spent (predominantly by women) on household chores and greatly increased the size of the female labour market, with consequences for employment and commuting patterns. In the 1960s, the rapid increase in television ownership led to a marked reduction in cinema attendances and, as a consequence, in evening public transport trips.

In recent times, such major shifts in living patterns, and consequential changes in travel patterns, have come predominantly from the provision of digital infrastructure: home computers, smartphones and internet connectivity. Again, spurred on by the COVID pandemic, there was been a large increase in home working and education, on-line access of entertainment exercise and services and on-line GP consultations.

In most cases, the effect of these developments is to completely remove the need for travel, both from and to the home. This might partly account for the downward trend in personal trip rates in England since the start of the century.

4.3 Conclusions

The travel modelling profession, which provides the paradigm through which much of the thinking about travel behaviour and transport policy is framed, adopts a very simplistic conceptualisation of travel demand that is unsuited to exploring the linkages between transport and other sectors of the economy.

By directly relating travel behaviour to the personal characteristics of the travellers it, in effect, treats travel as a direct rather than a derived demand; this means that it is completely insensitive to the effects of changed business and service delivery models on travel behaviour. It is not fit-for-purpose in a COVID-influenced world, where the reliance on household travel from home to produce and consume goods and services has significantly reduced. The necessary access is being achieved in a growing variety of ways.

Instead, this deliverable starts with the key economic sectors that produce the goods and services that households need or wish to consume, and the range of service delivery patterns on offer. These interact with household mobility and digital capabilities, to produce the observed patterns of activities and consumption and the means of access to the chosen goods and services. It recognises that there are various barriers to adopting certain patterns of mobility and accessibility, not only arising from the limitations of transport supply, but also constraints directly resulting from practices in non-transport sectors.

This chapter goes further, exploring various forms of interactions and interdependencies within a spatial-temporal context, among the sets of activities undertaken by individuals over the course of a day, those with household members and people outside the household, and with the goods and service suppliers themselves. It also identifies the major impacts that new service delivery models can unwittingly have on other sectors of the economy, many of which are likely to be negative, and the kinds of barriers that can arise when attempting to coordinate across sector.

Finally, this chapter looks to the longer-term, showing how the service delivery and consumption patterns that we currently observe – with their associated travel patterns – have developed in the context of a set of socio-technical systems, closely bound up with the use of available technologies and associated social and business practices. As technologies advance and business models adapt, there are often major impacts on travel behaviour.

Having a set of relevant concepts and an overarching framework for exploring relationships between service providers and household producers and consumers should enable SUMP-PLUS to engage more effectively with other sectors, and to help in generating innovate business solutions that maximise cross-sector benefits while minimising negative externalities.

5 Applicability of the concepts to different sectors

5.1 Introduction

Table 5.1 summarises the various ways in which transport is associated with other societal/economic sectors, and is explained in greater detail below. The first thing to note is that this deliverable focuses on the SUMP-PLUS LINKS concept, which is captured by the part of the Table highlighted **in yellow** (Type C impacts)**.** The dimensions included in the upper part of the table (Type A and B impacts) relate to SUMP-PLUS PARTNERSHIPS activities, which are included in the project's Co-Created City Laboratories (WP2).

Direction of impact	Type of impact	Examples of impacts
Transport → Sector =>SUMP-PLUS PARTNERSHIPS	A: Vehicle-related impacts	▪ Traffic accidents ▪ Air quality ▪ Noise levels ▪ CO_2 emissions ▪ Congestion & Delays
	B: Mobility- and access-related impacts	▪ Provision for walking, cycling and public transport ▪ Access to sector facilities
Sector → Transport =>SUMP-PLUS LINKS	C: Impacts of decision-making regarding facility locations and service/business delivery models (freight and passenger)	▪ Number of trips to sector facilities ▪ Trip lengths to sector facilities ▪ Scope to walk, cycle or use public transport

Table 5.1: Three types of association (A, B, C) between transport and other sectors.

Firstly, it illustrates ways in which decisions taken in the transport sector impact on people's lives and on other sectors of the economy, at two levels:

A. **Vehicle-related impacts**, which include the operation of the transport system itself and the wider (largely environmental) impacts of transport infrastructure and operation. Currently, these are largely negative (e.g. significant numbers of traffic accidents, poor air quality, high levels of CO_2 emissions), but efforts are being made to reduce or eliminate these impacts.

B. **Mobility- and access-related impacts**, which describe how the provision of transport services influences daily travel behaviour (both passenger and freight) and levels of physical access to a wide range of locations that provide goods and services, and facilitate social and leisure activities.

These first two types of impacts are primarily driven by developments on the transport sector, but their efficacy can be enhanced through the support of other sectors; for example, through encouraging the use of sustainable modes of travel, or installing supporting measures (e.g. electric charging points, or showers and lockers for cyclists).

Type C impacts work primarily *in reverse*, and focus on the **impacts of decision-making regarding facility locations and service/business delivery models** ('where', 'when' and 'how' services are delivered). These decisions are taken in non-transport sectors, but can have major impacts on travel choices and decision making – often in ways that are not taken into account in that sector's decision making.

We explore the potential scope for comprehensive cross-sector collaboration at the 'Link' (Type C) level in the four sectors introduced in chapters 3 and 4 of this report, namely: health, education, retail and tourism. The nature and extent of this collaboration can be affected by a number of factors, such as:

- Degree of consolidation of the sector (i.e. few vs many players)
- Public sector co-ordinated services vs private sector competitive consumption of goods/services
- Scope for on-line provision
- The intrinsic significance of location

In sectors where most of the provision/market is served by relatively few organisations, then each has greater control over the range of assets (type, size, location, etc.) required to deliver the goods/services and a greater influence over its supply chains. Here, for example, we can contrast the retail and tourist sectors. Most grocery purchases are supplied by a small number of major retailers, whereas the tourist sector is served by a very broad range of suppliers, often tied to specific locations (e.g. historic settlements or natural beauty spots).

Where services are delivered by the public sector (e.g. education and health), these tend to cover the whole spectrum of provision (e.g. all ages and all types of need), and the whole country – again giving considerable flexibility over the ways in which these are delivered. While this can also be true of parts of the private sector (e.g. groceries), other parts target particular markets (e.g. leisure facilities).

As noted in Chapter 4, the COVID pandemic and associated lockdowns have brought into sharp relief the ability of on-line service providers to flourish at the expense of those that rely on consumers travelling to fixed sites. A switch to the former has led to a commensurate drop in person trips, although in some cases off-set by increased home deliveries of goods and services. Over the last decade, the biggest shifts from fixed site provision to on-line provision have been in the areas of banking (e.g. internet banking) and entertainment (e.g. using web-based streaming services instead of purchasing CDs and DVDs).

Decisions taken in some sectors, notably tourism, are constrained by the inherent significance of certain locations, namely tourist attractions such as naturally scenic spots and heritage locations (e.g. Pompeii). There is very little scope for any change in the location of major attractions. Although the provision of digital visitor experiences will probably continue to grow, it is unlikely that this will replace physical visits to any significant extent. However, promotion of more localised travel, as well as city-wide spatial strategies for co-locating or clustering tourist facilities or clustering other tourist facilities holds some potential for reducing the amount of total trips and/or shortening trips.

Bringing these various elements together, we can identify a tentative spectrum of the degree of scope for full cross-sector Links coordination in making business service delivery model decisions that take full account of mobility ramifications, from health at the top (with the greatest scope), to tourism at the bottom, with least scope, as shown in Table 5.2 below. Recognising, however, that sectors are organised in different ways between countries (e.g. relative roles of the public and private sectors, degrees of consolidation or fragmentation, and the degree of regulation).

Each sector is considered in greater detail below.

SECTOR	TYPE OF PROVISION				
	Patterns of service provision	**Location of physical facilities**	**Online service provision**	**Deliveries to homes**	**Provision in the home**
Health	***	***	**	*	*
Education	**	**	*	-	*
Retail	***	**	-	***	-
Tourism	*	*	*	-	-

Table 5.2: Scope for flexible service provision, by sector.

5.2 The healthcare sector

The healthcare sector has the closest historical association with the transport sector. This began with growing attention to the impact of transport provision and policies on various aspects of public health. Well back into the first half of the twentieth century, there was an awareness of the **negative** health impacts of transport (impact type A in Table 5.1), initially in terms of deaths and injuries, and more recently the physical and mental health impacts of poor

air quality and high noise levels. Also, some evidence of the effects of long and multi-modal journeys on rates of reported sickness.

In the last two decades, there has been a growing emphasis on **positive** associations between transport and health (impact type B in Table 5.1), in the form of documented health benefits from active travel (walking and cycling) and better access to sports facilities.

Both these types of associations have been strengthened through the development of active engagement between transport and public health professionals (see section 3.5). But, the final impact type (C) shown in Table 5.1 has been largely neglected until now and operates in the reverse direction: the recognition that decisions taken in the health sector over how to deliver services has a major impact on levels of person and freight movements on transport networks. This is where active Links between the two sectors need to be established, and is not addressed in existing SUMP guidance (e.g. Davis et al, 2019).

Table 5.3 below illustrates how the Links concept addresses the 'Avoid' component of the 'Avoid-Shift-Improve' transport policy typology in the health sector. We see that successful measures to reduce the need to travel in order to access healthcare are derived directly from health sector strategies requiring full cross-sector links. These include measures to:

- Reduce the volume of personal travel from home, by: substituting physical meetings with on-line consultations; providing services within the home; making prescription deliveries to homes, to replace visits to pharmacies; and provide at-home visits.
- Shorten health-related trips through the localisation of some types of health facilities.

Accessibility and mobility framework		**Transport benefit**	**Interventions (examples included)**	**Impacts**		
			Type	**Customers/ patients/ visitors**	**Staff**	**Logistics**
LINKS	**'AVOID'** travel	1. Reduced volume of travel	Internet communication	NHS Direct Remote consultations		
			In-home service provision	Dialysis machines		Home delivery
			Home deliveries	Prescriptions		Home delivery
			Health-related visits to homes	District nurses		
		2. Shorter health-related trips	Localisation of health facilities	District health centres		Local deliveries

Table 5.3: Accessibility and Mobility framework – potential cross-sector links from the healthcare sector to transport (NHS stands for the UK National Health Service). Source: Greater Manchester SUMP-PLUS Co-Created Laboratory Plan.

5.3 The education sector

Historically, the education sector has also been negatively impacted by the activities of the transport sector, in similar ways to the health sector, as shown in Table 5.1: many parents are deterred from letting their children use active travel modes for the school trip, due to routes that are seen as being unsafe; and public transport services may not always be available. Long journey times to school may also have negative impacts on concentration at school and learning abilities.

In the UK and other European countries, most education services are provided by the public sector, either at national or local government level. In principle, this gives the education sector a similar degree of flexibility as in the health sector, to adopt policy measures that 'Avoid' the need for travel. However, in practice the options may be far more limited compared to the healthcare sector (see Table 5.4), due to the fact that face-to-face interaction is recognised as centrally important to primary and secondary education, including university and college students – this has become a major topic of public debate during the COVID-19 crisis.

Accessibility and mobility framework		Transport Benefit	Type of Intervention	Examples
LINKS	**'AVOID'** Travel	1. Reduced volume of personal travel	Education-related visits to pupils' homes	Personal tutors
			Internet communication	Remote teaching
		2. Shorter education-related Trips	Localisation of education facilities	Smaller sized schools
		3. Less congested or crowded trips	Re-timing of school activities	Later start to the school day

Table 5.4: Potential cross-sector Links from the education sector to transport.

Although the COVID pandemic has, at certain times, forced many countries to stop face-to-face teaching and move to on-line education, the general consensus seems to be that the latter is not as effective or equitable as classroom-based teaching, particularly at primary and secondary school levels - although there is already an on-line delivery tradition for some university-level courses, such as through the UK 'Open University'.

This, therefore, removes most options to replace physical educational trips with on-line learning, although there might be scope to consider the localisation of educational facilities, enabling shorter trips from home. This would clearly help to meet a number of transport-related impact types A and B objectives, from encouraging walking and cycling, to reducing exposure to high levels of air and noise pollution, reducing CO_2 emissions, local traffic congestion, etc. In the UK, the trend has been in the opposite direction, with parents having been given the freedom to apply to send their child to any state school, not just the nearest one, thereby

increasing average trip lengths; and private schools attracting pupils from very wide catchment areas.

The educational benefits of a localisation policy are less clear than in the case of transport, although children who engage in active travel seem to be more alert at school, and smaller catchment areas are likely to result in more social contacts outside school that may promote mental health. To achieve localisation, the loss of teaching of specialist subjects in smaller schools might be offset by a limited amount of on-line learning with occasional face-to-face tutorial classes.

If the education sector commits to carbon-neutrality, then it would be incentivised to consider the full carbon implications of their education delivery model, including school transport. Figure 4.6 shows that localisation could also have other cross-sector benefits, in terms of providing enhanced social and recreational facilities for the local community and reducing pressures on the health service.

5.4 The retail sector

In the case of the retail sector, a distinction between 'convenience' shopping and 'comparison' shopping must be drawn. The former provides for everyday needs and the latter for occasional, one-off purchases (e.g. clothing, electrical goods, furniture); given the differences in trip frequencies, it is the former which dominates in terms of shopping trips. Table 5.5 summarises the main ways in which retail business models might impact on travel levels.

Accessibility and mobility framework		Transport Benefit	Type of Intervention	Examples
LINKS	**'AVOID'** Travel	1. Reduced volume of personal travel	Home deliveries	Fresh food; furniture
			Internet communication	Select and order products
		2. Shorter retail-related Trips	Localisation of retail facilities	Neighbourhood convenience stores
		3. Less congested or crowded trips	Relaxation of opening hours	24-hour store opening hours

Table 5.5: Potential cross-sector Links from the retail sector to transport.

Figures 4.9 and 4.10 demonstrated the changes in shopping patterns that have occurred over decades in relation to food shopping. In the UK, the major food retailers invested heavily in major out-of-town stores in the last decades of the twentieth century (largely reliant on car access), but over the last two decades they have invested substantially in smaller retail outlets

on neighbourhood high streets and at major transport interchanges, primarily accessible on foot or by cycle, or whilst using public transport.

The recent substantial growth in internet-based convenience shopping, accelerated by the lockdowns and self-isolation resulting from the spread of the coronavirus, has resulted in divergent retail strategies, with contrasting implications for the location of outlets and patterns of delivery to customers' homes.

Model one involves order 'picking' being based in distribution warehouses. This supports trunk haul efficiency (i.e. HGV movements from suppliers to a small number of warehouses), but at the expense of longer distances to customers' homes; it also 'competes' for business with physical stores in the areas where deliveries occur and, over time, may undermine them. Model two sees order 'picking' carried out at local stores. This has the effect of supporting the physical stores and results in local distribution patterns, which in higher density areas might be carried out by cycle; customers can also 'click and collect' from their local store. From a cross-sector perspective, model two has the greater benefits in terms of reducing freight vehicle-km, enabling shorter work trips for staff, and in supporting the on-going viability of local physical stores.

In the case of convenience shopping, there has been a long tradition of home delivery for larger items that are too bulky to transport on foot, by public transport or in a car (e.g. furniture). For smaller items, the traditional shopping pattern was to compare and buy in-store, and this (outside pandemic restrictions) was the most popular means of buying clothing and footwear. But, for other types of semi-bulky commodity, retailers have reduced in-store storage over time (to maximise floorspace for selling goods), first on a 'one to show and one to go' principle and, more recently, just 'one to show' and all goods being delivered directly from warehouses.

5.5 The tourism sector

This is an extremely diverse sector which, by definition, usually involves visits by people to areas away from home. It includes a wide range of tourist attractions, from historical buildings and natural attractions, to whole towns and cities. In contrast to the other sectors, the range of organisations involved is much more diverse (from public authorities to charities and the private sector), with a wide range of independent actors. In terms of travel, there may be two distinct components: the (longer distance) journey to/from the attraction and local travel in the vicinity of the attraction, particularly when people stay overnight.

Compared with the other three sectors, there appears to be very limited scope to introduce tourism policies that avoid the need to travel (see Table 5.6). Generally, tourist attractions rely on physical presence, so reducing the numbers of trips equates directly with reduced demand (not an attractive business model, in most cases); and growth usually equates with increasing catchment areas and hence longer average trip lengths.

During the pandemic there have been increasing attempts to make, for example, museum collections and rare manuscripts fully accessible online, or to film documentaries about major

tourist attractions, as a substitute for visiting the area or establishment in person. This helps to greatly widen access, but it is not clear whether, in time, this stimulates demand for travel, rather than substitute for it, on a large scale.

Accessibility and mobility framework		Transport Benefit	Type of Intervention	Examples
LINKS	**'AVOID'** Travel	1. Reduced volume of personal travel	Internet communication	Online tours of museums and tourist sites
		2. Shorter tourism-related trips	Encouragement to visit more local tourist facilities	Advertising campaigns; 'sustainable tourism' concept
			Co-location/clustering of tourism-related facilities	Spatial planning and proactive tourism management
		3. Less congested or crowded trips	Encouraging temporal dispersion of visitors throughout the year	Tourism concepts and/or visitor incentives encouraging travel in off-peak season

Table 5.6: Potential cross-sector Links from the tourism sector to transport.

The other possibility is to reduce tourist trips lengths, i.e. the distances that visitors travel. Firstly, this can be achieved by raising awareness of tourist attractions within the local area, region or nation. During the COVID pandemic, restrictions on international travel have stimulated 'staycations' and visits to more local tourist facilities. In seeking to develop 'sustainable tourism' concepts and branding, some destinations have begun promoting local or 'slow' travel,[6] emphasising walking/hiking and cycling to enjoy local landscapes, food, and heritage – rather than visitors using hotels as a base and traveling long distances using cars. Curated tourism focusing on relaxation, mindfulness and unique experiences have grown increasingly popular.

Secondly, a strategy of co-locating or spatially clustering tourism-related facilities can be pursued to shorten the need for cross-city trips. Although the locations of tourist attractions are hard to affect, municipalities can influence the locations of accommodation and tourist-oriented

[6] Mirroring the 'slow food' movement, the 'slow travel' concept focuses on slowing down the pace of tourist experiences and enjoying local areas, e.g. by favouring trains over planes and walking, cycling and buses over driving; taking the time to enjoy local landscapes and culture.

shopping (retail) and hospitality (restaurants, nightlife, etc.) through land use planning. This type of strategy has been pursued Barcelona, for example, where the city government is pursuing a policy of 'proactive tourism management' to deal with the huge growth in visitor numbers and consequent overcrowding. A large number of policy strategies have fed into the formulation of the Barcelona *Strategic Tourism Plan 2020* (updating the previous plan for 2010-2015), including: 'District Tourism Plans' for more even territorial distribution of tourist activity, a Territorial strategy of tourism management, and new 'imaginaries and contents for the improvement of mobility and tourist sustainability' generated through participatory workshops with citizens.[7] In brief, the city government of Barcelona has created both a detailed spatial strategy for the distribution (particularly, dispersal) of tourist-related facilities across the city, as well as mapped tourist flows using social media data and sought to facilitate seamless and sustainable mobility between tourist nodes – all laid out in the *Tourism Mobility Strategy* (2017).[8]

Thirdly, addressing the temporal dimension, there are some potential Links measures to lessen congestion generated from tourist trips. For example, in response to increasing dissatisfaction by local residents of tourist overcrowding in Amsterdam, the Dutch government is promoting a national strategy of "spreading tourism more", including a marketing campaign to persuade visitors to travel to the Netherlands in the off-peak season.[9]

5.6 The next step: spatial coordination across sectors

This deliverable has looked at the potential benefits and mechanisms for ensuring a closer coordination between transport and other individual economic sectors, with the aim of contributing to the reduction of transport emissions and other negative externalities generated by car traffic. In doing so, we have made frequent reference to the importance of cross-sector coordination for achieving the climate targets of the EU Green Deal.

In this section, we focus on the wider spatial context. The next step that we wish to highlight – but which lies beyond the scope of this deliverable – is to consider spatial coordination of facility locations across sectors. This is depicted in Figure 5.1 below.

[7] See all documents at Barcelona city government website: https://ajuntament.barcelona.cat/turisme/en/planificacio_estrategica.

[8] This strategy was used to feed into both the Strategic Plan for Tourism, but also Barcelona's Urban Mobility Plan (PMU 2013-2018), thus demonstrating how tourist mobility is considered alongside resident mobility within transport policy-making.

[9] See the Government of the Netherlands website: https://www.government.nl/topics/tourism-and-recreation/strengthening-the-tourism-industry.

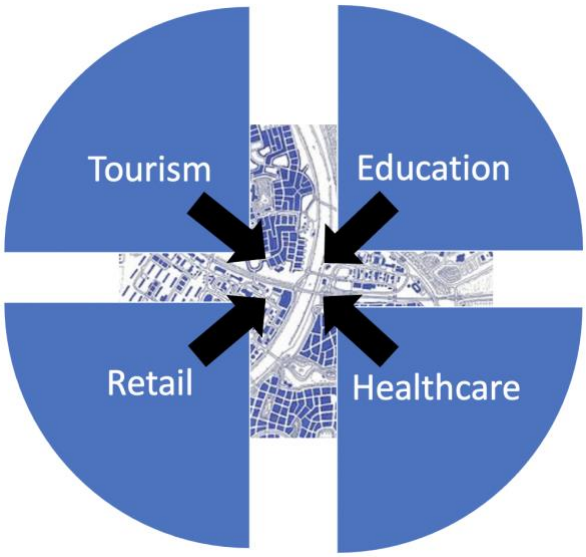

Figure 5.1: Cross-sector coordination to achieve spatial proximity of different services.

Spatial coordination can generate wider benefits for citizens' everyday life, and the broader local economy:

1. **Multiplied benefits from the proximity of services for everyday travel.** Households often visit many different locations to access public or consumption services, during a journey away from the home. For example, households may combine picking up a prescription from their doctor, with other activities like supermarket shopping or picking up their children from school. If there is spatial proximity of these facilities from different sectors – i.e. the destinations are located close to each other – then this encourages active travel and saves household members time (and potentially money, e.g. public transport fares) and makes everyday life easier to manage. From a strategic policy perspective, this means that the total lengths of household trips are reduced even more strongly, relative to easier access to a specific facility within just one sector (e.g. proximity of home to medical centre) and reduces car dependency.
2. **More efficient deliveries in logistics operations serving different sectors.** Similarly, logistics vehicles typically drop off goods to multiple different facilities, during one journey. The greater the spatial proximity of facilities across different sectors, the greater the potential to reduce the number of vehicle delivery drops (with 'last mile' on foot or by cargo bike) and lengths of delivery miles.
3. **Spatial proximity of facilities from different sectors builds 'critical mass' for well developed sustainable mobility to those areas of the city.** Sufficient density of facilities and services means more people will visit a particular area, which in turn provides the rationale for investment in high-quality public transport services to serve that area.
4. **Spatial proximity of facilities from different sectors makes those specific areas of the city more attractive in terms of economic activity and investment.** In economics, the effect generated by density of services and people is called an 'agglomeration benefit'. For example, such dense areas are more attractive as employment centres – e.g. encouraging investment in skilled jobs – and support a wider range of ancillary services,

from those serving offices to restaurants, etc. In other words, a virtuous cycle of increased attractiveness is created for those areas of the city.

Comparison of SUMP-PLUS Links and 15-minute city concepts

The **first point** described above has been captured in the notion of the **'15-minute city'**, developed by Carlos Moreno as part of Paris Mayor Anne Hidalgo's re-election campaign (Paris En Commun 2020). Similar ideas are now being promoted in many places, including the City of London, Dublin and Toronto. The vision for Paris as a 15-minute city is displayed below in Figure 5.2. The emphasis is on local accessibility, where a range of activities and services from work to outdoor recreation to healthcare[10] are available within a 15-minute journey from home, by foot or bicycle.

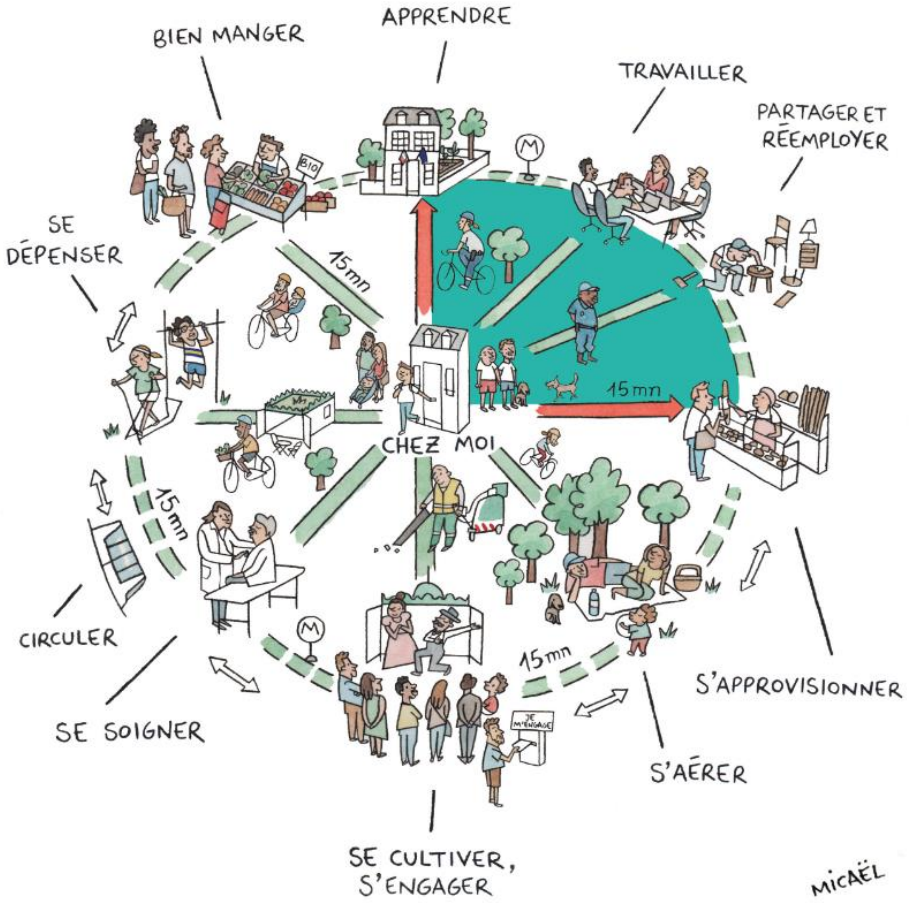

Figure 5.2: 15-minute city vision developed for Paris, 'Le Paris du quart d'heure'. Source: Paris En Commun (2020).

[10] The full range of activities shown in Figure 5.2, with French labels, are learning ('apprendre'), working ('travailler'), sharing and reusing ('partager et réemployer'), grocery shopping (s'approvisionner), spend time outdoors ('s'aérer'), cultivating and engaging oneself ('se cultiver, s'engager'), receiving care ('se soigner'), exercising ('se dépenser'), eating well ('bien manger') and move around ('circuler').

The idea of the 15-minute city is to provide an environment that is inherently attractive in terms of quality of life, and in the context of the COVID-19 pandemic, where there is a prevalence of working from home, shopping and accessing services primarily in one's local neighbourhood has increased. The commonality between the 15-minute city vision and the further development of the Links approach presented in this deliverable is the focus on *where* services and consumption opportunities are located, across *multiple* sectors.

The argument made in this deliverable, and the idea of Links (Type C) coordination, is that achieving such a 15-minute city vision is primarily dependent on land use and locational decisions; it is not possible just through transport policies that improve walking, cycling or public transport infrastructure. And that where facilities for learning, shopping, healthcare or recreation have been built in the first place is an outcome of decision-making processes in those sectors: to achieve spatial proximity, action is needed also within those sectors themselves, in coordination with transport and planning professionals.

The spatial realisation of the SUMP-PLUS Links approach can be considered a higher-level extension of the 15-minute city concept, as it incorporates additional aspects, such as:

- Multiple forms of access, including those that do not require leaving home, e.g. digital services and consumption
- Temporal dimensions of access, e.g. school starting hours; tourist seasonality
- Access to facilities with larger population catchment areas, e.g. hospitals, that go beyond the expectation of access within 15 minutes – and which are often scattered throughout the city

Even in older European cities, outer city areas are considerably less dense, and there are examples of scattered development in places with poor accessibility by sustainable modes. In many places, the starting point is quite different to the dense urban core of Paris. Thus above all, the most challenging aspect of achieving spatial proximity and high levels of accessibility is that it requires extensive – and as discussed in this deliverable, often challenging – coordination across professionals working in multiple sectors, with respect to *already existing cities and locations*.

6 Cross-sector coordination in the SUMP-PLUS cities

Establishing Links between transport and major trip-generating sectors requires appropriate governance structures to facilitate cross-sector coordination. This chapter reviews such governance arrangements in three of the SUMP-PLUS partner cities: Greater Manchester, Alba Iulia and Platanias (see Task 1.3.1). It focuses on existing and potential Links between transport and healthcare, education and tourism; as these are the sectors in which SUMP-PLUS cities have expressed interest.[11] This information is qualitative in nature, as there as yet appears to be no empirical evidence on the benefits of cross-sector coordination at the Link level, in terms of quantitatively measurable outcomes. This is unsurprising, as Links (Type C) coordination is a novel concept, unexplored in most cities. This chapter draws on analysis conducted within SUMP-PLUS WP1, WP2 and WP3, including primary data provided by the SUMP-PLUS city partners. The relevant documents and authors are referenced throughout. Under each section (6.1, 6.2 and 6.3), the first sub-section reviews the governance structures for each city's transport system and the other sector(s) of interest, providing an overview of key institutions and policy strategies. The second sub-section then analyses to what extent existing coordination between transport and the chosen sector includes attention to Type C impacts (see Table 5.1) and potential Links,[12] i.e. reducing the need to travel by avoiding household trips and shortening trips. The third sub-section section presents a SWOT analysis, including strengths and weaknesses of existing cross-sector coordination, and opportunities and threats with respect to future coordination.

6.1 Greater Manchester: links between healthcare and transport

Greater Manchester is the largest urban area in Northern England, a city-region of 2.5 million inhabitants and 10 metropolitan boroughs. Transport for Greater Manchester (hereafter TfGM) is the transport authority governing all modes of mobility within the city-region, and the organisation constituting the official city partner within the SUMP-PLUS project. The application of LINKS concepts in the Greater Manchester City Lab focuses on coordination between healthcare and transport sectors. This section draws on governance analysis conducted by Halpern and Sarti (2020a and 2020b), as well as additional analysis by the authors.

[11] Excluding retail as one sector considered in this deliverable.
[12] Thus excluding Type A and B impacts, included in Table 5.1.

6.1.1 Governance structures for transport and healthcare

Greater Manchester has a unique governance structure with respect to both transport and healthcare, within the UK context. As part of a political decentralisation agenda in the UK since 2010, powers have been devolved by UK central government to a newly formalised city-regional level of governance. In the Greater Manchester area, a new city-regional administration called the Greater Manchester Combined Authority (GMCA) has been established as a result of series of 'devolution deals' between central government and local government administrations in the area. This included the establishment of a new office of an elected city-regional Mayor. The Mayor of Greater Manchester – presently Andy Burnham – enjoys unprecedented powers for shaping the spatial, economic and infrastructural transformation of the area. In relation to both transport and healthcare services, GMCA and the Mayor have been granted greater local autonomy in relation to policy-making and funding/investment than any other metropolitan or regional authority in England. This devolution constitutes an important context for the current and potential extent to which coordination can occur between transport and healthcare sectors.

Transport governance in Greater Manchester

This section draws on Halpern and Sarti (2020a). The November 2014 Greater Manchester Devolution Agreement between GMCA and central government devolved powers over transport, planning and housing to GMCA, along with autonomy over £billions of public spending. The resulting decision-making structure for Greater Manchester's transport system is depicted in Figure 6.1 below. Responsibilities for policy delivery and decision-making powers are shared between the GMCA, the Mayor and the 10 local authorities ('councils') that make up the city-region. The Mayor and the GMCA set the strategic priorities for the transport system, whereas local authorities are in charge of implementing elements of the strategy set at a city-regional level, including responsibilities for planning and infrastructure within their boundaries.

TfGM is a transport authority that has a long history in managing the city-region's public transport system, and is since 2012 has been in charge of developing and delivering on a detailed policy and investment agenda across all modes, following on from the priorities of the Mayor and the GMCA. TfGM is not an authority with formal planning powers, like the local authorities in Greater Manchester possess, or an agency that operates public transport services – these are provided by the private sector, in the UK. Instead, TfGM has a strategic coordinating role, acting as the 'glue' in a highly fragmented transport system, by engaging with multiple public and private sector organisations to deliver on city-regional priorities.

In addition to the actors already mentioned, there is also the Greater Manchester Transport Committee, a city-regional forum that predates the GMCA and serves as a mechanism for coordinating decision-making across party-political leaders of all the local authorities in the area. This Committee appoints the Director General of TfGM and scrutinises the quality of transport services across the city-region.

The key strategic policy documents in relation to transport in the Greater Manchester area are the **Greater Manchester Transport Strategy 2040**, the city-region's SUMP that was launched in 2017 with TfGM as the primary 'institutional owner', and the **Greater Manchester Spatial Framework,** a strategic spatial plan for 'homes, jobs and the environment' for which the GMCA is leading development (currently in draft form).[13] GMCA and TfGM has pursued an integrated planning approach seeking to coordinate between transport and land use planning – particularly in relation to planned housing development, envisioned service provision and economic activity concentrated in different town centres, and public transport connectivity.

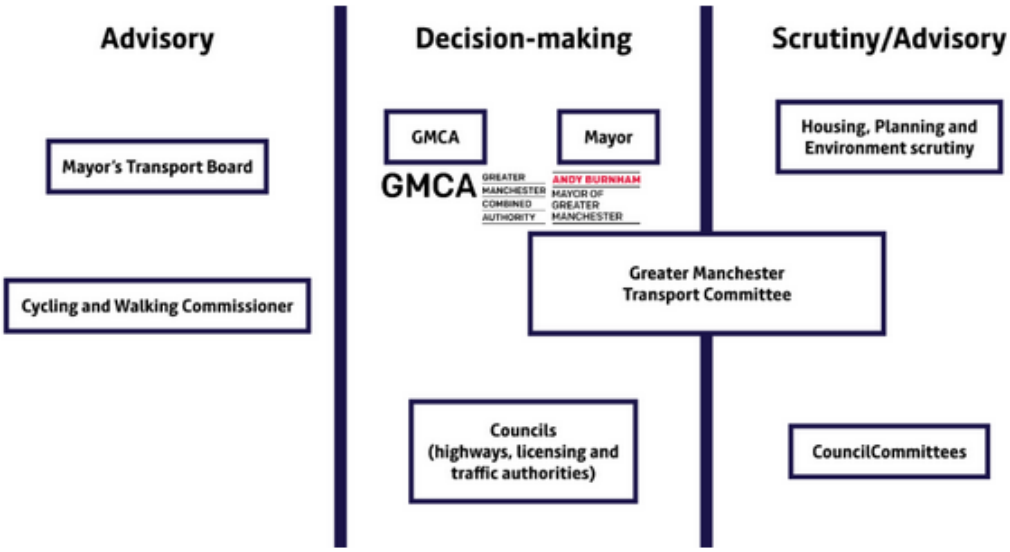

Figure 6.1: Overview of the decision-making structure for Greater Manchester's transport system, as of 2020. Source: Halpern and Sarti (2020a, p.33).

To conclude this section, analysis within the SUMP-PLUS project (Halpern and Sarti 2020a) has already revealed that governing actors in Greater Manchester have developed strong coordination capacity – particularly impressive within the UK context since this is evolving at city-regional scale – across transport, environmental, spatial and economic policy objectives, as evidence by the strategies discussed above. Many tools have also been made available at the national government level to support the development of cross-sectoral policies.

Healthcare governance in Greater Manchester

[13] A full draft of the Spatial Framework was published in January 2019 for consultation, and as of January 2021 has not yet been politically adopted as it is still under debate between the local authorities of the city-region.

This section draws on Halpern and Sarti (2020b). We can distinguish two aspects of healthcare governance in Greater Manchester: the NHS system that is standardised nationally, and the recently established governance structures unique to Greater Manchester.

The NHS system

In the UK, the whole population is covered by a universal, public healthcare system called the National Health Service (NHS). The NHS includes (Halpern and Sarti, 2020b):

- Primary care: family doctors or 'General Practitioners' (GPs), who treat patients or refer them on to secondary care services
- Secondary care: hospital clinics, including acute medicine and mental health
- Tertiary care: national or regional specialist centres

The planning, funding and monitoring of healthcare service delivery by the NHS is referred to as 'commissioning', with an overview provided in Figure 6.2. At the national level, the authority responsible for commissioning is **NHS England**, which operates somewhat independently from central government. At the local level, the NHS organisations responsible for commissioning are the **Clinical Commissioning Groups (CCGs),** of which there are 209 across England. The CCGs are membership organisations of all the General Practitioners in the local area, and they are directly accountable to NHS England.

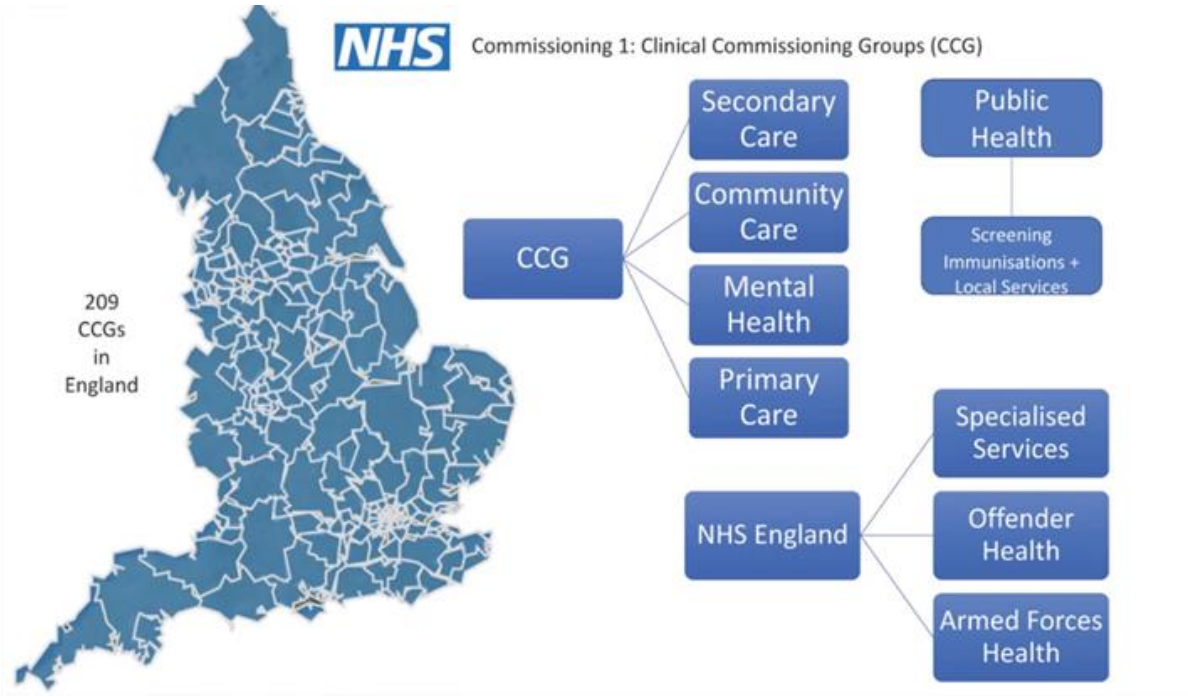

Figure 6.2: Overview of the commissioning structure of the NHS at national and local levels. Source: Halpern and Sarti (2020a, p.33).

Separate from commissioning is *provision* of healthcare services to patients, which is carried out by so-called **NHS 'Trusts'**. These are individual, public sector bodies with their own boards of directors, that provide services corresponding to the requirements of health authorities and GPs – i.e. responding to commissioning. Trusts may comprise one or several hospitals and other facilities, and include different types such as those focusing on hospital/acute care, ambulance services, community health, mental health, etc. **NHS Foundation Trusts** are a specific type of trust that enjoy a greater degree of autonomy, free to control their finances more independently from government and decide locally how to meet their obligations. Foundation Trusts are governed by a Council of Governors representing multiple local public sector organisations. Both types of trusts are accountable to NHS Improvement, a national institution that oversees their financial sustainability and general development.

The national policy framework that determines through what models healthcare services are delivered is the **NHS Long Term Plan**, for which NHS England and NHS Improvement develop an implementation framework that sets the parameters for local NHS institutions to plan their services. [14]

A key aspect of the NHS system is the pressure to deliver healthcare services more cost-efficiently, considering NHS budget deficits at the national scale and systemic challenges like an ageing population and persistent socio-spatial inequalities in health. NHS England thus established **Sustainability and Transformational Partnerships** countrywide from 2016, to achieve greater collaborative planning between NHS organisations and local authorities to transform healthcare delivery and reduce deficits over time – thus taking a more place-based, decentralised approach.

Greater Manchester's approach to healthcare governance

As part of its 'devolution deals' with central government, Greater Manchester secured city-regional powers and autonomy over health and social care services in February 2015. This established a direct relationship between NHS England as a national authority, and the **10 Greater Manchester district councils, the 12 Clinical Commissioning Groups, and the 15 NHS and Foundation Trusts in the area.** In association with the organisations listed above and the GMCA and the Mayor, the **Greater Manchester Health and Social Care Partnership** (GMHSCP) was established in 2015 to oversee the devolution process.[15] Most notably, the Greater Manchester area was transferred a £6 billion budget, with the Partnership having the autonomy to decide how this should be spent on health and social care services locally. This

[14] Information provided by local GM health professionals via the GM SUMP-PLUS City Lab Manager.
[15] The GMHSC is a non-statutory partnership between the 37 local health authorities. It includes 12 CCGs; 14 acute, community and MH Trusts, 1 ambulance Trust; 500 GP Practices; 450 General Dental Services; 700 community pharmacies; 300 community optometry services; At least 300,000 carers[15]; 10 local Authorities; 27 social housing providers; 14,500 voluntary and community organisations; GM Police; GM Fire & Rescue Service; and 2.8m residents.

made it possible to integrate health and social care with the city-region's wider longer-term visions, to a greater extent.[16]

Much of the emphasis of the health devolution process and GMHSCP has also been on **transforming the way that healthcare services are delivered locally**. GMHSCP has adopted the NHS **'integrated care systems'** model, which in essence is the 'next generation' approach following on from the Sustainability and Transformational Partnerships (see above).[17] 'Integrated' care refers, first and foremost, to integrated delivery of health and social care services, but more broadly, focuses on 'advanced' partnership between NHS and non-NHS institutions locally to advance different types of innovation in relation to service delivery. For example, this includes strategic commissioning to improve population health outcomes, and better use of technology and data.[18] In the case of Greater Manchester, GMHSCP works with NHS England to determine the service delivery model appropriate to the region; including coordination across all members of the GMHSCP board such as Trusts, local authorities and CCGs. There are three 'vanguards' for new integrated care models in Greater Manchester: Salford Together, Stockport Together and the Wigan Foundation Chain.

GMHSCP has also established **Local Care Organisations** (LCOs) for each of Greater Manchester's 10 districts, that brings together actors (primary care, social care, community health) to design and implement transformation of service delivery at an even more local scale. LCOs have explored different approaches that so far include the creation of multidisciplinary neighbourhood teams and community-centred models minimizing the use of hospitals. Manchester University NHS Foundation Trust is one of the largest acute (secondary care) trusts in the UK, operating nine hospitals and employing over 20,000 staff – including those of the two LCOs it collaborates with: Manchester Local Care Organisation and Trafford Local Care Organisation who provide community services. This is an example of the new type of healthcare partnership approaches that are evolving within Greater Manchester.

The structure of healthcare governance in the UK and Greater Manchester is summarised in Figure 6.3. In this case, 'Sustainability and Transformational Partnerships' can in essence be replaced by GMHSCP, which oversees the LCOs. Service delivery models for healthcare in Greater Manchester are decided on through national-local coordination. The national NHS institutions (NHS England and NHS Improvement) work with the GM Integrated Care System (GMHSCP, Trusts and Local Care Organisations) to specify how services are delivered. The financial resources for service delivery flow via the commissioning organisations, for a mixture of business-as-usual (BAU) delivery and non-BAU development of services.[19]

[16] Including target of achieving net-zero GHG emissions by 2028, housing delivery targets as part of the Greater Manchester Spatial Framework, TfGM's 2040 Transport Strategy, etc.
[17] See NHS England website: https://www.england.nhs.uk/integratedcare/stps/
[18] See NHS England website: https://www.england.nhs.uk/integratedcare/integrated-care-systems/
[19] Information provided by local GM health professionals via the GM SUMP-PLUS City Lab Manager.

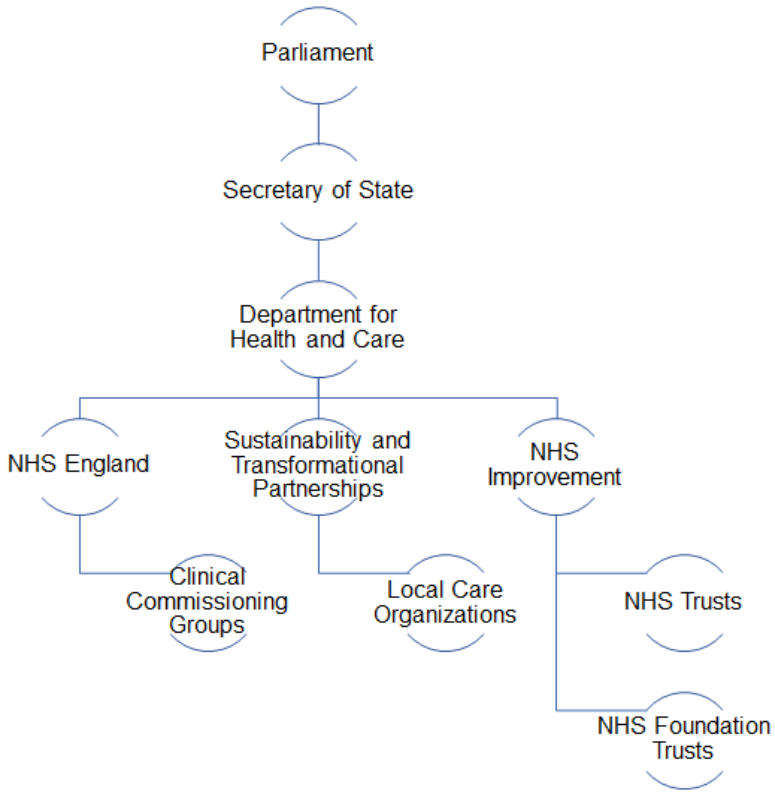

Figure 6.3: Hierarchical organisation of healthcare governance in the UK. Source: Halpern and Sarti (2020b, p.14).

The most important strategies in relation to healthcare in Greater Manchester are firstly, the GMHSCP's 5-year strategic plan **'Taking Charge of our Health and Social Care in Greater Manchester'**, a brief document setting out the Partnerships strategic priorities, that are elaborated in a series of regularly updated sub-strategies for Estates, Digital, Workforce, Commissioning care, Primary care, etc. The second key strategy is the **Greater Manchester Population Health Plan 2017-2021**, developed jointly by GMCA and GMHSCP. This plan focuses on a cross-sectoral, systemic analysis of the determinants of population health, including addressing structural inequalities and maximisation of the social value benefit of health and social care commissioning (discussed further below). The report **Transforming the Health of our Population in Greater Manchester: Progress and Next steps** (GMHSCP and GMCA, 2019) provides a progress update in relation to both of these strategies and discusses the future of advancing population health.

To conclude this section, analysis by Halpern and Sarti (2020b) has shown that the GMHSCP and its constituent members have embarked on a uniquely ambitious agenda for transforming local healthcare services[20] using newly devolved powers. This responds to NHS-wide priorities of reducing budget deficits, improving cost-efficiency of service delivery and digitalising care,

[20] Including an emphasis on integrating social care, which is beyond the scope of the SUMP-PLUS project.

but has also taken a distinct place-based approach that emphasises community networks and the neighbourhood scale in delivering care. However, as also noted by Halpern and Sarti, the *de facto* powers of GMHSCP to deliver on this ambitious agenda are unclear. The funding that has been devolved remains relatively limited. Crucially, although some power to decide on commissioning of healthcare services has been devolved, it is unclear to what extent GMHSCP members can innovate with to delivery of primary and secondary care services in practice, as it is still accountable to NHS England and its relevant national standards. Many agendas and models employed by GMHSCP to date are still formulated at the national level of NHS decision-making.

6.1.2 Extent and coverage of current cross-sector coordination

Having examined governance structures for both transport and healthcare sectors in Greater Manchester, this section analyses the extent and coverage of current coordination between them. The policy analysis conducted by Halpern and Sarti (2020b) reveals that most emphasis has been on enhancing transport policy delivery and the impacts of the transport system on public health (i.e. A and B type impacts in Table 5.1):

- Within local transport policy documents, awareness of the cross-sector impacts of transport on public health dates back to the early 2000s in Greater Manchester, with a focus on 1) promoting 'healthy modes of transport', 2) better transport services to existing healthcare facilities, with a focus on social inclusion and rural areas, 3) systemic cross-sectoral issues like air quality and road safety.
- Within the 2017-2021 Population Health Plan produced by GMHSCP, transport is discussed as 'wider determinant' of population health.[21]
- Current city-regional planning processes, particularly in relation to spatial planning and environmental quality (e.g. Greater Manchester Spatial Framework), involve both representatives of transport and healthcare sectors and thus coordination occurs to some extent through strategic policy-making. It is not clear that this extends to Impact C-type interventions relating to the delivery or accessibility of healthcare services. Furthermore, there do not appear to be existing strategic coordination mechanisms, e.g. organisational or data-sharing arrangements, between TfGM (and other transport governance actors) and the GMHSCP and its constituent members in the healthcare sector.

In other words, public authorities in Greater Manchester have historically developed sophisticated capacities for cross-sector coordination in relation to Types A and B impacts (Table 5.1), considering the range of ways in which the transport system affects public health.

[21] Although notably, the GMHSCP Population Health Plan does not refer to TfGM's 2040 Transport Strategy as part of its agenda of policy integration, despite mentioning GM spatial planning frameworks (Halpern and Sarti, 2020b).

However, Links coordination and type C impacts that are the focus of this deliverable, i.e. how the delivery of healthcare services may affect transport systems, appear yet to be explored and addressed locally.

6.1.3 SWOT analysis for healthcare sector Links

This section presents SWOT analysis for cross-sector coordination in Greater Manchester (Table 6.1) with respect to **Type C coordination**: considering the impact of the health sector on the transport system, including the spatial distribution of different types of facilities, and through what models services are delivered. This builds on Table 5.1 regarding potential Type C Links opportunities for the healthcare sector. In addition to evidence provided by Halpern and Sarti (2020b), Table 6.1 contains a few additional suggestions based on policy analysis by the authors. As part of co-creation in SUMP-PLUS WP2, Transport for Greater Manchester (TfGM) have already begun to identify many different local Opportunities for future health-transport coordination and Links measures – these are not covered in detail here.

STRENGTHS of current trends in establishing Links	**WEAKNESSES of current trends in establishing Links**
NHS and GMHSCP is in the midst of a 'transformational agenda' (Halpern and Sarti, 2020b) → creates an openness for innovation in service delivery – there are many new institutions and processes under development in relation to healthcare services. COVID-19 has rapidly accelerated digitalisation of primary care and outpatient services (Halpern and Sarti, 2020b) → providing a 'window of opportunity' for accelerating home-based service delivery	Unclear how the NHS transformational agenda materialises locally; what powers GMHSCP actually has for taking its own approach to commissioning. 2008 and 2019 GM economic reviews showed that transport policy implementation had not sufficiently addressed socio-spatial inequalities and that there are strong differences in accessibility levels (Halpern and Sarti, 2020b). The national NHS zero-carbon agenda is only just emerging and will take time to filter down locally. Some NHS Trusts within GM are still lagging on mitigation with carbon reduction.[22] In general, the Greater Manchester health sector remains fragmented with a large

[22] Information provided by local GM health professionals via the GM SUMP-PLUS City Lab Manager.

	number of actors involved in any adjustment of service delivery.[23]
OPPORTUNITIES for facilitating coordination in the future	**THREATS to facilitating coordination in the future**
GMHSCP is pursuing a 'Social Value' approach to system reform of healthcare services, which seeks to establish and quantify the impact that healthcare spending is having on local communities across the board (GMCA, 2019, p.35). With GM chosen as a NHS England Social Value Accelerator site, an economic impact assessment of healthcare spending is underway. This may provide an opportunity to advance transport-health Links, as the approach taken focuses on the impact of healthcare on other sectors. The Manchester University Foundation Trust is applying the 'Social Value' approach (MFT, 2018). The Mayor is championing a Greater Manchester Model of Unified Public Service Delivery that seeks to break down funding and policy silos between different public service sectors (GMCA, 2019). Carbon management and net-zero emission pathways are emerging as incentive structures, including the NHS national Net Zero Carbon Plan and Greater Manchester's ambition to become carbon-neutral by 2038. Transport and carbon also feature in individual trust strategies, e.g. the Manchester University NHS Foundation Trust's sustainability plan (MFT, 2018). Local Care Organisations, e.g. for Manchester City, are championing a community-based approach to healthcare delivery, focused on 'healthy neighbourhoods agenda', working more closely with the transport sector and giving residents the opportunity to access care where they live.[24] Coordination between GMCA, TfGM and GMHSCP as part of the Local Industrial Strategy process, in	Even if coordination between health and transport is considered a priority at the city-regional level, national ministries are organised in silos. This means that there are few nationally-coordinated joint policy frameworks or funding sources for joint work across sectors (Jones, 2012). Greater Manchester is still highly dependent on national funding in relation to both health and transport, which means that the specific priorities of national funding programmes dictate opportunities for actual policy implementation (Halpern and Sarti, 2020b). Successful development of Links will require coordination at the District level, i.e. between the diverse local authorities that make up Greater Manchester

[23] Information provided by the GM SUMP-PLUS City Lab Manager.
[24] See Healthier Manchester website: https://healthiermanchester.org/how-health-and-care-services-will-change/local-care-organisation/

relation to digitalisation and healthcare innovation (Halpern and Sarti, 2020b), provide opportunities for private sector involvement in service delivery innovation.	

Table 6.1: SWOT analysis of Links between transport and healthcare in Greater Manchester.

6.2 Alba Iulia: links between transport, education and tourism

Alba Iulia is located in the Transylvania region of Romania, with a population of approximately 63,000.[25] The city is the administrative and economic centre of the wider region of Alba County. Alba Iulia Municipality is the official city partner organisation within the SUMP-PLUS project. The application of LINKS concepts in the Alba Iulia City Lab focuses on coordination between transport and education and tourism sectors. Notably, Alba Iulia is an increasingly popular tourist destination within Romania for both international and domestic visitors, due to its Citadel fortress and other cultural and historic attractions. A distinguishing feature of governance in Alba Iulia, of relevance to cross-sector coordination as discussed below, is the Municipality's Smart City agenda and 'Stage 4' policy measures (Figure 2.1) that seek to increase the efficiency of public service delivery and private sector growth through digitalisation and data infrastructures – of strong relevance to cross-sector coordination, as discussed below.

This section draws on governance analysis conducted by Halpern and Sarti (2020c) within SUMP-PLUS WP3, as well as additional analysis of local policy documents by the authors.

6.2.1 Governance structures for transport, education and tourism

Transport governance in Alba Iulia

Alba Iulia Municipality has authority over the city's road transport network and public spaces, whereas public transport services are operated by **STP Alba Iulia**, a 100% privately-owned company.[26] It is contracted by **AIDA-TL** (Association for Alba Iulia Intercommunity Development for Public Transportation), to run public transport services for the conurbation. AIDA-TL comprises Alba Iulia Municipality and seven rural communes. AIDA-TL plays a very important role, with transport policies in Alba Iulia thus primarily having been formulated at the city-regional level since 2005 (Halpern and Sarti, 2020c), with this integration across the functional urban area demonstrating one strength of current governance arrangements in Alba Iuila, in line with the principles of SUMP planning.

[25] The last Romanian census (2011) reports the population as 63,536.

[26] The city's bike-sharing system is also privately-operated, provided through a partnership between the Municipality, a company called Green Revolution and Raiffeisen Bank (Halpern and Sarti 2020c).

The most important transport-related policy documents in Alba Iulia are the Municipality's **SUMP** (adopted in 2015), the **SIDU 2014-2023** (Integrated Urban Development Strategy)[27] and the **General Urban Development Plan (GUDP)**, with the latter being the main operational planning tool and the legal basis for the implementation of programmes, including technical specifications and land use zoning (Seeman and Crisan 2014). Several documents published in relation to **investment from the World Bank** also detail a large number of planned and/or implemented in relation to infrastructure, education and tourism (World Bank Group 2014); even if the influence of the EU remains dominant.

Alba Iulia Municipality does not have a sub-unit/department dedicated to mobility/transport, however – only units responsible for a broad range of public infrastructure and utilities (roads and streets, public spaces, streetlighting, gas and water), urban planning (the 'Urbanism' department) and a **Programs Division** that bids for, manages and monitors externally-funded projects (e.g. EU and World Bank-funded initiatives). This division plays a central role in managing transport and mobility, since the majority of mobility initiatives are implemented through a project-based approach, funded through the **Regional Operational Programme** (ROP). This means that the formulation and implementation of transport policies in Alba Iulia is dependent on coordination between several municipal departments and the Programs Division,[28] which coordinates the programming and management of EU-funded initiatives (ROP) with the **Regional Development Agency** (the formal recipient and coordinator of funds). Authority over transport policy is thus quite fragmented in Alba Iulia, with a lot of coordination necessary at both the local and city-regional level. While coordination capacity and mechanisms have strengthened significantly in recent years, this process remains challenging (Halpern and Sarti 2020c).

Finally, regulation. The **Police Inspectorate for Traffic and Roads** is responsible for enforcing most traffic regulations, including speeding; whereas the **Municipal Police** is responsible for enforcing regulations in relation to parking bays, etc. As is discussed below, the role of the police is relevant to parking issues encountered in the education and tourism sectors.

The governance of education in Alba Iulia

Like in most EU countries, in Romania, primary and secondary education are provided as public services, controlled and funded by the public sector. The most important institutions within the education sector are the School Directorate at the county level (under the National Ministry of Education), which determines education policy and divisions of Alba Iulia municipality that are responsible for local educational infrastructure (Halpern and Sarti 2020c).

[27] Strategia Integrată de Dezvoltare Urbană (SIDU) in Romanian. The 2024-2020 plan was adopted in 2015, it was updated and extended to 2014-2023 in 2017.

[28] This division operates somewhat independently and differently from other Municipal departments, being under the direct authority of the Mayor, with the City Manager overseeing a large number of consultants acting as project managers on behalf of the municipality (Halpern and Sarti 2020c).

Decisions regarding new educational facilities or extension of existing facilities are taken at the municipal level. Most of the schools in Alba Iulia span both primary and secondary education (grades 1-8). Parents can freely choose which among the local schools their child should attend, however, there is also a points system through which a residential address closer to a specific school or kindergarten offers some priority access.[29]

The governance of tourism in Alba Iulia

Tourism is central to Alba Iulia's development strategy as a city, with strategic connections to economic growth, culture and heritage management (Alba Iulia SIDU). The medieval Carolina Citadel, located at the centre of Alba Iulia, attracts a large flow of more than 500,000 visitors every year, from both domestic and international tourism (Halpern and Sarti 2020c). In addition to a fortress structure creating a small neighbourhood of the city surrounded by medieval walls, the Citadel hosts a number of religious, cultural and university institutions within it. Other prominent tourist attractions include St Michael's Cathedral, several nationally important museums, and a site of Roman ruins. Tourist accommodation is dispersed widely across the city.

Enabled by World Bank investment (World Bank Group 2014) and the Municipality's strong capacity for absorbing (securing and spending) EU regional development funds (Halpern and Sarti 2020c, p.14), Alba Iulia has created a tourism concept and city branding strategy, completed a major structural restoration programme for the Citadel, and begun expanding green spaces and leisure routes for walking and cycling (World Bank Group 2014).

The most important institutions in relation to the tourism sector in Alba Iulia include the **Alba County Council Tourist Office,** the **Alba Iulia National Centre for Touristic Information and Promotion,** the Association of tourism operators (HORESALBA), the Professional Association of Tourism Guides in Transylvania, and the Alba Iulia Chamber of Commerce and Industry**.**[30]

6.2.2 Extent and coverage of existing cross-sector coordination

Having examined governance structures for Alba Iulia's transport system, education sector and tourism sector, this section discusses the extent and coverage of current coordination between these sectors. Here, we refer to Table 5.1 in particular, and the distinction between three different types of possible associations between transport and education sectors. Type C is the specific emphasis of this deliverable, with a focus on reductions in trips/avoiding the need to travel and reductions in trip lengths. In the case of the education sector, in particular:

[29] We are grateful for information provided by EIP, as experts on the Romanian context.
[30] Drawing on stakeholder mapping within SUMP-PLUS WP4, led by EIP.

integrated planning of education services, land uses (e.g. school locations) and transport, and potential benefits of re-timing school start and finish times.[31]

Coordination issues identified: education sector

The primary coordination issue identified by Alba Iulia Municipality so far is the attempts of the Municipality to reduce car use for home-to-school transport. Increasing numbers of schoolchildren are being driven to school by parents. Limited coordination on this issue between transport and education sectors has already been established, with the Municipality increasing "coordination with schools' inspectorate and managers in order to reduce traffic congestion in the morning (9am) and increasing safety" (Halpern and Sarti 2020c, p.30). A pilot project to re-time school starting times was unsuccessful. The primary policy measure so far has been the introduction of minibus services for schoolchildren from nearby villages, coordinated and funded by the national Ministry of Education, without municipal involvement.[32] A related issue has been the lack of parking supply and unsafe parking practices around schools, which has been an issue of controversy among parents (ibid.). Coordination between schools, the Municipality and the local police has not been sufficient to fully address this issue.

We can thus note that the dialogue established between the transport and education sectors in Alba Iulia, to date, has been trying to address the impact of the education sector (travel to school) on the transport system (congestion and safety). *However*, this has **focused on a type A perspective (Table 5.1), not extending to Type C Links (reductions in trip lengths).** The existing response has been to address parking and provide alternative transport services to private car use, but not extending to clarification of the *root cause* of why an increasing number of parents may be driving to school, which may be related to: uneven spatial distribution of schools in relation to the demographic structure/residential location of families, or travel distances that are too long for walking or cycling to the (desired) school.

It is encouraging that a degree of coordination between transport and education sectors has already been established. The focus of the SUMP-PLUS project, as per this deliverable, will be to analyse and recommend solutions from a Type C perspective that analyses decision-making related to school locations, timing of the school day and planning of education services.

Coordination issues identified: tourism sector

Major investments into the tourism industry in Alba Iulia has resulted in the doubling of tourist capacity since 2009 (Halpern and Sarti 2020c, p.12). The primary coordination issue identified by Alba Iulia Municipality so far is the lack of parking availability for tourist vehicles (buses, coaches, private cars), particularly around the Citadel. There is currently no joint planning

[31] As noted in Section 5.3, the scope for significantly reducing the need to travel for education may be limited, e.g. through a significant shift from face-to-face teaching towards e-teaching – specifically in relation to primary and secondary education.
[32] Information provided by the Alba Iulia SUMP-PLUS City Lab Manager.

between tourist sites/attractions and the municipality in relation to parking management. Pedestrian accessibility to the Citadel is partly problematic, due to the walled structure with limited entry points. Although there is established coordination between the municipality and tourist industry stakeholders – as a result of tourism development efforts – the fact that mobility management has not been arranged alongside such extensive growth in tourist facilities and visitor numbers suggests a lack of coordination, to some extent (Halpern and Sarti, 2020c). A response to this issue could be coordination regarding the location and supply of parking spaces; however, it is also worth considering whether there are other root causes to the need for visitors to use motorised vehicles, in a city that should be very walkable from the perspective of its scale and distances.

A more systemic issue has been briefly noted by Halpern and Sarti (2020c) based on discussion with Alba Iulia stakeholders: the dispersion of tourist accommodation across the city, "creating additional tourism-related traffic in the absence of specific services" (p.31), i.e. lack of city-wide tourist access to mobility services such as the city's I'Velo bike-sharing system. The Alba Iulia Sustainable Urban Logistics Plan (SULP) provides some further indication regarding the impacts of the growth in tourism-related activity:

> "Recent years have seen an increase in traffic flow on Transilvanei Boulevard [one of the main streets of the city] due to both tourism and the emergence of new businesses operating in the area (shops, restaurants, cafés, street vending, etc… we identified approximately 100 trade and related activities over a distance of about 1km… Traffic is extremely heavy throughout the year, as Transilvanei Boulevard is the route that connects the upper town (Cetate district) to the city centre (downtown), through the Alba Carolina fortress" (Seeman and Crisan, 2014, p.10).

This quote illustrates how the tourism sector not only brings substantial numbers of visitors to Alba Iulia to visit attractions like the Citadel, but this then generates a wider set of demands for tourist-oriented retail, accommodation and hospitality, which combined have a major impact on the transport network, at the strategic level of planning. Indeed, as discussed by the World Bank Group (2014, p.17) for Alba Iulia, the tourism sector includes not just attractions and accommodation, but also 'quality services' referring to retail and infrastructure, as well as connectivity (transport services) and information (in this age, primarily digital channels for providing services).

Thus here, a Type C perspective on coordination is very appropriate. The SUMP-PLUS project can add value in fostering coordination with the tourism sector to consider the spatial distribution of tourist activities and potential measures to reduce the trip lengths/distance needed to travel for visitors, e.g. through concentrating facilities in multiple, connected areas of the city (see the next section).

6.2.4 SWOT analysis for education and tourism sector Links

This section presents SWOT analysis for cross-sector coordination in Alba Iulia with respect to **Type C coordination**: considering the impact of each sector on the transport system, including the spatial distribution of different types of facilities, and through what models services are delivered. This builds on Tables 5.4 and 5.6 regarding potential Links opportunities in education and tourism sectors.

Table 6.2 identifies strengths, weaknesses, opportunities and threats that apply to **both** the education and tourism sectors, in their coordination with transport. The following Tables then analyses **each** sector in further detail, with Table 6.3 focusing education and Table 6.4 focusing on the tourism sector.

SWOT for both education and tourism sectors

STRENGTHS of current trends in establishing Links	**WEAKNESSES of current trends in establishing Links**
EU Regional Operational Programmes and the World Bank have promoted a series of planning studies that require prioritisation of projects across public service sectors (transport, education, health) and sectors aimed at developing private sector growth (incl. tourism); and analysis of spatial and synergistic relationships between the location of different projects across the investment portfolio. SUMP-PLUS Links activities can further build capacity within the Municipality in this respect, which will demonstrate to funders that there is an advanced level of spatial integration and institutional coordination that maximises the cost-efficiency of spending. Alba Iulia has developed a Smart City-focused project portfolio and partnership model as an approach to cross-sector coordination; with a formal Smart City Strategy currently under preparation. SIDU strategy gives prominence to accessibility planning and the optimisation of transport networks and services, drawing on sensors and real-time traffic data (Halpern and Sarti 2020c).	Lack of a mobility department within the Municipality, and the fact that most organisational capacities/resources are concentrated within the Programs Division, may mean that coordination may be challenging unless there is an externally-funded project designed specifically to address the particular coordination issue, that the Programs Division can lead on.
OPPORTUNITIES for facilitating coordination in the future	**THREATS to facilitating coordination in the future**

Further development of the Smart City agenda and focus on ICT within SUMP-PLUS provide opportunities for cross-sector coordination through interconnected digital infrastructures and data-sharing, moving towards a 'Stage 4: Integrated City' model. Validation of smart city solutions and harnessing the new types of data generated from the perspective of Type C coordination: reducing the need to travel and shortening trip distances.	Continuation of a strongly project-based approach to policy implementation within the Municipality creates a risk that institutional coordination across sectors remains ad-hoc and dependent on temporary arrangements, rather than properly institutionalised.

Table 6.2: SWOT analysis of Links relevant to both education and tourism sectors in Alba Iulia, in relation to their coordination with transport.

SWOT for the education sector

STRENGTHS of current trends in establishing Links	**WEAKNESSES of current trends in establishing Links**
Some degree of institutional coordination between School Inspectorate and School Management functions, and the Municipality, has been established.	Socio-political barriers from parents to measures seeking to reduce driving to school. Coordination between education sector, local police and the municipality has some room for improvement.
OPPORTUNITIES for facilitating coordination in the future	**THREATS to facilitating coordination in the future**
New kindergartens and schools (plus extension of existing facilities) have recently been constructed using ROP funds (World Bank Group 2014). Future investment projects of this type provide an opportunity to consider locational decision-making within the education sector, and transport accessibility as a criterion within this process. Project specification documents mention investments in e-education and educational ICT infrastructure (World Bank Group 2014), which could allow exploration of how education could be delivered within homes – as an option to provide resilience (e.g.	Unsuccessful coordination not only increases pressure on the transport network, but also risks worsening the life quality of children and young people in Alba Iulia, in terms of opportunities for active travel and enjoyment of public spaces (existing issue identified by Gehl Architects, 2016). Insufficient communication and engagement of school children's parents (and teachers and other stakeholders) in the coordination process creates risks for the success of any initiatives.

during pandemics) or temporarily ease pressure on the transport system. Alba Iulia's City Barometer data collection mechanism could be used to understand citizen satisfaction regarding current education services, from an accessibility perspective, and the barriers to travelling to school by active modes and public transport. Spatial analysis tools developed within SUMP-PLUS by Space Syntax can be used to analyse home-to-school travel flows, the spatial distribution of education facilities in relation to demographics, as well as meso-scale accessibility to schools (e.g. pedestrian infrastructure). An ambitious approach would be to conduct this analysis at the city-regional level, to understand home-to-school trips across the entire functional urban area. Opportunities to build on existing projects for the regeneration of city neighbourhoods[33] to rethink how public services are delivered and providing localised access in line with a 15-minute city concept, e.g. testing integration of small-size neighbourhood schools.	Parents' opposition considered a high political risk by the local administration and politicians.

Table 6.3: SWOT analysis of Links between transport and education in Alba Iulia.

SWOT for the tourism sector

STRENGTHS of current trends in establishing Links	WEAKNESSES of current trends in establishing Links
Alba Iulia Municipality has developed clear policy strategies for tourism and existing coordination	Mobility management issues surrounding the Citadel, and congestion along Transilvanei Boulevard, demonstrates the need to continuously monitor data on tourist flows

[33] Previous projects include a pilot of 'Community-Led Local Development' for a marginalized community in Lumea Nouă district, with a regeneration approach integrating social services, health, education (World Bank Group 2014); transformation of city neighbourhoods with a focus on child-friendliness in an EU-funded project partnering with Alba Iulia primary schools, and "engaging the Owners Association of local apartments… to contribute ideas on how they would like to transform their neighbourhoods to become more child-friendly "(METAMORPHOSIS 2019, p.15).

mechanisms with the tourism industry, in general, as this is a key economic development sector.	through a proactive and coordinated cross-sector approach: seeking to steer the development of tourism so that it works for the city, and prevent problems arising before they grow more challenging to address.
OPPORTUNITIES for facilitating coordination in the future	**THREATS to facilitating coordination in the future**
Alba Iulia has planned Smart City 'tools' in relation to tourism, including 3D scanning of the city, virtual guides of the city and museums, and using the proposed City Analytics platform to monitor tourist flows, drawing on traffic sensors and real-time traffic monitoring via video (Halpern and Sarti 2020c). These could all be used to strengthen data collection on tourist movements within the city, and potentially be used to substitute trips. Creating a spatial vision for tourism, and potentially co-locating attractions, accommodation and facilities in distinct neighbourhoods – addressing the issue of accommodation being scattered across the city. As noted by the World Bank Group (2014), "local authorities are not in the hotel business (this is an area that is almost exclusively covered by the private sector), but they can identify creative ways to encourage the development of the sector – e.g. concession of land/buildings or the development of business associations" (p.17).	Without investment in capacity-building for coordination across Municipal departments and between the Municipality and other stakeholders (incl. those at the regional level), it may be challenging to bring together land use planning, transport planning, traffic enforcement and tourism promotion functions.

Table 6.4: SWOT analysis of Links between transport and tourism in Alba Iulia.

6.3 Platanias: links between transport and tourism sectors

Platanias is a tourist destination on the Mediterranean coast, located close to the city of Chania, on the Greek island of Crete. The Municipality of Platanias was established in 2011 following a merger of four other municipalities with Platanias town itself, resulting in a much larger administrative unit stretching further south/inland, and with a combined population of approximately 21,000 inhabitants (Halpern and Sarti, 2020d). The Municipality of Platanias, supported by the Technical University of Crete, are the organisations constituting the official city partners of the SUMP-PLUS project. The application of the Links concept in the Platanias City Lab focuses on coordination between transport and tourism sectors. A special feature of

Platanias is that, as a very small municipality with a population and traffic flows multiplying manyfold during the 5-month tourist season, there is a great degree of annual fluctuation in relation to pressures on the transport system.

Sections 6.3.1 and 6.3.2 draws on governance analysis conducted by Halpern and Sarti (2020d), adding some ideas from the authors from a Links perspective within section 6.3.3.

6.3.1 Governance structures for transport and tourism

Transport governance in Platanias

Even though the **Municipality of Platanias** has actively sought to promote sustainability mobility in recent years, it has limited powers and resources to do so, as it operates at the lowest level of administrative units within the Greek political system (Halper and Sarti, 2020d). The major axis road running along the coast of Northern Crete, including through Platanias itself, is under the control of regional authorities. Institutional capacity and financial resources to formulate and implement transport policies – including sustainable mobility measures – mainly lies at the level of the **Region of Crete**, i.e. with the administration governing the entirety of Crete; including coordination with the national level of government and regional authorities such as the **Regional Unit of Chania**, Organisation for the Development of Crete, etc; which also control the flow of EU co-funding. EU projects and networks are critical to enabling Platanias to approach sustainable mobility approaches informed by municipal and local priorities, independent of regional and national administrations (ibid.).

Public transport (bus) services on Crete are privately operated by a company called **KTEL,** operating under the authority of the Chania regional unit, but over which the Municipality has no authority. The Municipality does have access to some tools for improving the quality of mobility infrastructure and public spaces, in a small-scale manner. This includes maintenance of the municipal road network and development of infrastructure catering to tourists, such as the development of pedestrian pathways, cultural and sport-oriented routes. Greek municipalities also control traffic regulation, municipal public parking and the licensing of vehicles.[34]

There is no dedicated transport/mobility department within the Municipality. However, a first **SUMP** is currently being developed as the first municipal policy strategy focused on transport specifically,[35] as part of the SUMP-PLUS project. The Municipality relies strongly on technical support provided by the Technical University of Crete for SUMP development. The Municipality has also developed a **Strategic Energy Action Plan (SEAP)** linked to its Covenant of Mayor's commitment to mitigate climate change.

[34] See Halpern and Sarti (2020d), Annex 3.

[35] The Municipality has previously developed some sustainable mobility policy proposals within the 2015-2019 Strategic Operational Plan and the 2017 Tourism Development Plan.

Tourism governance in Platanias

Municipalities in Greece have some control over tourism – at least more so than over spatial and transport planning. There is also municipal control over the licensing of local shops and small enterprises.[36] The Municipality of Platanias channels some of its resources towards the promotion of tourism, e.g. through different types of marketing and support for the private sector. Within the Municipality, there is a **Department of Tourism**, and there is also the **Committee of tourist development and promotion of Platanias.**

The Municipality has developed a **Tourism Development Plan** (2017/18) that focuses on the concept of promoting an alternative, sustainable approach to tourism; e.g. promoting Platanias as a natural, cultural and religious destination. Sustainable mobility is seen as central to this vision and 'brand', with planned policy measures focused on fleet renewal, reducing emissions, awareness-raising for the public and stakeholders, and promotion of walking and cycling. The focus is thus not only on mobility within built-up areas, but also developing naturalistic and cultural leisure routes across the hinterland.

However, in Platanias, **the private sector arguably plays a stronger role in governing tourism.** The political power of local touristic businesses is strong, and they are considered as critical stakeholders with policy-making due to their importance to the local economy (Halpern and Sarti, 2020d). Most actors within the tourism industry are organised at the regional level of Chania, and further their interests at this level, since this administration has greater authority than the Municipality. Tourism stakeholders include:

- membership Associations for hotels, hotel employees, restaurants, tourist accommodation, tourist agencies, and so on;
- mobility providers like KTEL, the Taxi Owners Association of Chania Prefecture and the Union of Car Rental Enterprises of Chania;
- other private companies offering tourist services (e.g. culture, sports).

6.3.2 Extent and coverage of current cross-sector coordination

This section discusses the findings of Halpern and Sarti (2020d) from the perspective of this deliverable's concern with Type C impacts (Table 5.1) and Links measures.

There are clear efforts by the Municipality of Platanias to coordinate between tourism and sustainable mobility policies, e.g. through the concept of 'sustainable' or 'alternative' tourism. Overall, the Municipality's policy vision frames sustainable mobility as a means to the end of developing the local tourism industry. Coordination is framed in terms of the **impact of transport on tourism**, e.g. mitigating negative externalities such as pollution and congestion to ensure the quality of visitor experiences (Type A impacts), or providing positive opportunities for active travel and sports (Type B impacts).

[36] See Halpern and Sarti (2020d), Annex 3.

The **impact of tourism on the transport system** is acknowledged in terms of the traffic congestion generated by the tourism sector during the peak season, and how this affects the quality of life for Platanias residents. While this issue is being considered as part of SUMP development by the Municipality, it appears to still be an issue of lower importance, considering the overall policy vision. There is an opportunity to develop this dimension within the SUMP-PLUS project, as presented in the next section.

Furthermore, although the Municipality is active in terms of tourism development, coordination with private sector organisations operating at the regional level of Chania or even Crete appears to suffer from insufficient communication channels. As reported by Halpern and Sarti (2020d, p.15):

> "In the recent period, the tourist industry and real estate developers have increased pressure on municipalities to accommodate the needs of visitors in terms of accessibility and liveability, by threatening to withdraw planned investments and/or to 18 retrieve these localities from organized tours."

The quote above refers to how larger tourism sector companies (operating at the national or international scale) have begun lobbying for enhanced sustainable mobility provision and environmental quality, as part of the wider shift towards sustainable and responsible tourism on Crete. There may be a lack of coordination mechanisms, in this respect, since the Municipality of Platanias shares these very objectives with the tourism industry.

6.3.3 SWOT analysis for tourism sector Links

Table 6.5 summarises the strengths and weaknesses of current coordination between transport and tourism sectors in establishing Links to develop Type C collaboration; as well as potential future opportunities and threats, for the municipality of Platanias.

STRENGTHS of current trends in establishing Links	**WEAKNESSES of current trends in establishing Links**
Municipality's 'sustainable tourism' vision provides an opportunity for developing coordination of tourism and sustainable mobility policies, i.e. an institutional platform through which Links measures can be planned.	Opposition from citizens and local business interests to visions for Platanias that focus on sustainable mobility or alternative tourism (Halpern and Sarti, 2020d). Coordination mechanisms at the municipal level, but also across the political system in Crete, are typically reliant on informal networks (Halpern and Sarti, 2020d), and thus the competition between alternative

	visions may not always be visible in the public domain. Authority and resources of the Municipality to develop Links measures is extremely dependent on EU-funded projects (Halpern and Sarti, 2020d); thus the sustainability of activities beyond the expiry of such funding is crucial to consider, incl. the capacity of the Municipality to sustain measures, and the private sector business models involved.
PPORTUNITIES for facilitating coordination in the future	**THREATS to facilitating coordination in the future**
The 'sustainable tourism' vision could be developed to include a vision for 'slow travel' and 'local travel' (e.g. agro-tourism), marketing local travel to attractions along both the coast and hinterland, with village accommodation and shorter trip distances via non-car modes; rather than visitors using Platanias hotels as a base and driving to other parts of Crete.	Without careful articulation of how Links measures can benefit the local economy and help promote tourism – rather than seeking to limit visitor experiences – there is a strong risk of successful opposition from the tourism industry. New mobility concepts must thus also be articulated as tourism concepts.

Table 6.5: SWOT analysis of Links between transport and tourism in Platanias.

7 Validating the Links framework

The purpose of this deliverable is to provide a framework for initiating further and deeper cross-sectoral initiatives in several of the SUMP-PLUS cities, and possibly some of the Follower Cities (Task 7.3.1). The concepts outlined here have been presented to city partners and have been incorporated into most cities' Co-created Laboratory Plans (presented in D2.1), with additional support from WP3 (governance aspects) and WP4 (establishment of City Integrators).

The co-creation process will also include more established, 'conventional' approaches to cross-sector coordination, in relation to Type A and Type B impacts of transport on other sectors. This work will fall under the heading of 'PARTNERSHIPS' activities in the City Labs. Co-creation within SUMP-PLUS City Labs will thus integrate LINKS and PARTNERSHIPS approaches – providing an indication of how different types of coordination can be merged, in practice.

The success of these cross-sector initiatives will be closely monitored (from both qualitative and quantitative perspectives) as part of WP5, with the main findings presented in D5.3 (results of city laboratory evaluation). These will then be incorporated into D1.7 (validation of the SUMP-PLUS conceptual/analytical framework), where the Links conceptual framework presented in this deliverable will be refined, for wider application. It is also intended to provide some form of SUMP guidance (as part of D6.1) focusing on Links, drawing on the updated conceptual framework and the practical experiences of city partners.

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