Whole-journey planning - is walking is the neglected part?

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Abstract

This paper examines the case for investment in walking as a means of encouraging the use of public transport.

Without walking, buses, trams and trains would have no passengers. Without walking, journeys involving motorised travel could not be made. This paper takes a look at the requirements for “seamless” quality when journeys involve more than one mode, and illustrates this with examples from practice. It argues that the walking component is too often neglected, and that poor quality access on foot to public transport stops and stations is a key barrier mode shift away from the car. It warns of the dangers of reliance on “main mode” data on mode split, which draws attention away from the importance of walking as part of travel by public transport.

It is suggested that improved walking access to stops and stations could be more effective in increasing public transport use than investing in the public transport system itself. Such investment could include improved lighting and overlooking of paths to bus stops, provision of more direct and better quality paths, and better signing and information to make interchange more legible. The route to the stop is also often a neglected aspect of land use planning and building design, for example with building entrances facing car parks rather than streets with bus stops. Priority for public transport is not just about bus lanes, but about urban design that makes stops and station easily accessible on foot from the places where people want to go.

By reviewing examples of best practice guidelines and examples from projects undertaken by the author, the paper concludes that fragmented responsibilities are often the cause of poor quality pedestrian access between transport modes. In many parts of the UK, for example, responsibility for roads, land use planning and public transport are split between at least three agencies. International examples of good as well as poor practice are included.

Tim Pharoah bio

An independent consultant with over 40 years experience in public and private sector planning, and as an academic. He is a keen advocate of walking as the prime mode of travel, and the use of planning techniques to this end (spatial planning, infrastructure planning, and “smarter travel” programmes).

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What about the wiggly bits?

The theme of this paper is how to use walking improvements to achieve more public transport use, and less car use. It must first be emphasised that without walking, most public transport services would be cut off from their passengers. The whole journey involves the walk to the bus or tram stop or the railway station, the walk between different public transport vehicles, and then the walk from the final stop to the destination of the journey. These parts of the overall journey may be short, or not so short, but whatever their length, they are 100% essential. Because they are linked to longer stages of the journey by bus, tram or train, and involve negotiating local streets and paths, they can be called the “wiggly bits”, and appear as such when drawn on a plan.

The wiggly bits arise from journeys (or trips) that involve more than one stage. Not all surveys record all the separate stages of a journey, in which case the “main mode” is used, commonly the mode used for the longest stage of the journey. While “main mode” data are useful for monitoring mode shift and also broad comparisons over time and between different cities, they are less useful in planning for the improvement of whole journeys. Some journeys involve only one mode:

- Walk all the way
- Cycle all the way
- Car door to door

Walk, cycle and car (and taxi) trips can be single mode (door to door), but trips involving public transport are almost always multi-mode, and involve wiggly bits on foot at either end. Many car trips, especially to city centres, also involve a walk stage. The whole journey thus involves, for example:

- Walk to car > car > walk from car park to destination
- Walk to bus stop > bus > walk from bus top to destination
- Cycle to station > train > walk from station to destination

The wiggly bits are handled differently in different surveys, and so comparisons must be approached with care. Many surveys do not record walking trip stages at all (e.g. US Census of journeys to work; Transport for London travel survey) or do not count short stages on foot. Even when walk stages are included, the minimum distance for a stage or trip to be recorded varies enormously. For example, in the British National Travel Survey, the minimum distance recorded is 50 yards (46 metres), whereas in the Swiss Mikrozensus it is 25 metres. The Danish travel survey excludes stages of less than 300

metres. The Danish survey also brackets all walks between 300m and 1400m as 1km, thus making it impossible to determine the aggregate distance walked.

Walking within private property generally is not included, but this can make a huge difference to walkability in the case of large sites such as superstores and business parks. Similarly, walking within transport interchanges is often excluded (e.g. when changing trains).

How important is it to wiggle and walk?

The number of trip stages will always be greater than the total of single and "main mode" trips. For example, in Britain the number of "walk all the way" trips was 228 per person in 2009, while the number of walk stages was 302 (28% of all trip stages). Counting all walk stages rather than just walk-all-the-way trips shows that the true amount of walking is much higher than conventional mode split data suggest. In Britain the number is almost a third higher (32.3%).

Survey analysis often focuses on trip distance rather than number of trips, and this inevitably results in walking being presented as a less important mode (for example the Swiss Mikrozensus 2005 shows that walking accounts for only 7% of the total distance travelled). But the story for walking itself is highly dependent on trip stages as part of public transport journeys. The South East Queensland Travel Survey 2003-4, for example, found that for home-based trips, multi-mode trips accounted for 62% of all kilometres walked. Single mode walk trips accounted for 38%. It was concluded that public transport plays a very significant role in amount of walking for transport made in Brisbane, and dominates home-based walking for transport. (Matthew Burke, A. L. Brown (2007) "Active Transport in Brisbane: how much is happening and what are its characteristics?", Urban Research Program, Griffith University.)

The importance of walk stages is closely tied to the degree of public transport use, and thus varies considerably according to the size and type of city. For example, in London, the number of walk stages (416) is almost double the number of single mode walk trips (214 per person per year). In London, public transport is involved in 30% of all journeys. By contrast, in British cities of under 250,000 population, where public transport accounts for only 7% of all trips, the number of walk stages is only 20% greater than the number of single mode walk trips. (See Table 1)

This relationship, although obvious, tells us that if we can increase the amount of public transport use, we will at the same time increase the amount of walking. It is a short logical step to hypothesise that the opposite is true: that if we can encourage more walking, then we will at the same time encourage greater use of public transport. The aim therefore is to exploit the mutually supportive roles of walking and public transport to achieve more use of both: a positive "win-win" outcome.

In car-dependent areas, where the car accounts for the majority of trips, walk stages are unlikely to be very important. This is because car journeys are usually door to door, or specifically from one private property to another private property. Walking within a property from the car door to the front door is not usually regarded as a walk stage in data surveys, although clearly such walks can sometimes be lengthy.

Consideration of walk stages should not, however, be disregarded in car-dependent areas. To the contrary, the fostering of walk stages may be even more important if the aim is to reduce car dependency by shifting trips to public transport.

Table 1: Percentage of trip stages by mode and size of city - GB 2009

	Greater London	Metropolitan areas	Other cities over 250k	Cities 25-250k	Towns under 25k (approx)	Rural
Walk	38	28	28	26	25	19
Cycle	1	1	2	2	1	1
Bus	15	9	7	5	3	3
Rail	11	1	2	2	1	1
Car driver	20	36	37	40	43	50
Car passenger	12	21	21	23	23	23
Other	3	4	3	2	4	3
All	*100*	*100*	*100*	*100*	*100*	*100*

Source: National Travel Survey, special tabulation, 2009

Grid and hub layouts: achieving "wiggleability"

The ease with which public transport can be accessed on foot will depend in part on the layout of streets and paths. Settlements which grew up incrementally and without top-down planning intervention generally take either a linear form or circular form, in both cases based on main walking routes to the centre. Settlements which grew up based on public transport also display this characteristic, although in this case the linear aspect will be a bus or tram route, and the circular aspect will be the walking catchment of the stops.

Planned settlements vary considerably in terms of suitability for walking. Pre-car grid layouts can be good for public transport in that the system is highly legible, and no more than two bus/tram stages are needed between any two points (e.g. San Francisco). But for access on foot to the stops, grids can be inefficient, requiring a walk along two sides (the "adjacent" and "opposite" sides) of a right angled triangle, when the desire line is the hypotenuse. Smaller street blocks tend to favour walking, by increasing the choice of routes, and allowing flexibility in the choice of bus/tram stop locations. A few cities have very small grid blocks, a notable example being downtown Portland, Oregon (grid blocks just 60 metres square) and Manhattan (60 metre wide rectangles of varying lengths). The Eixample quarter in Barcelona also has square blocks, but almost double the size. San Francisco mostly consists of rectangular blocks about 80 by 125 metres in the older districts, and with skinnier blocks about 70 by 180 metres in the later western suburbs. The longer blocks cut down on the amount of street space for a given number of dwellings, but they can feel tedious to walk.

Settlements planned with priority to car travel are rarely convenient either for walking or for public transport. It will therefore be no surprise that in such settlements walking to public transport is poorly provided. There are, as always, exceptions, some being the attempts in recent decades at "Transit Oriented Development". TOD is really no more than an attempt to roll back spatial development practice to the pre-car model, but with cars allowed in. It is a concept that is often threatened by that compromise. For example,

while development at stations is recognised as a way of promoting public transport use, parking at stations is often regarded as more valuable to the railway company than development within the walking catchment. Parking at stations can greatly reduce the experience of arrival and departure on foot. In discussing this problem at Walnut Creek station on the Bay Area Rapid Transit system, a senior transport official in San Francisco said wryly, “In the USA we tend to regard transit as something we drive to”. In Joondalup, a recent settlement north of Perth, Western Australia, the nearest residential development is more than 700 metres away from the station, while the convenient locations are commandeered by commercial uses and associated acres of parking.

The ideal arrangement to provide direct and convenient access to stops and stations on foot is the “hub and spoke” pattern of streets and paths, with the station or stop as the hub, and the streets and the routes for pedestrians converging on it like spokes of a wheel. This ideal arrangement for foot access, however, is generally impractical in its pure form, since it leads to odd-shaped development blocks (like slices of cake), which cannot be built or used efficiently. Here, then, is a classic example of how design always involves a compromise between competing but equally important objectives.

While the ideal of hub and spoke cannot usually be achieved, there are many suitable arrangements that can be found, with only minor disadvantages to walking. Examples of suitable arrangements can be found in most urban areas that were developed in the era of public transport, before private motorised transport became prevalent. Included would be the 19th and early to mid 20th century suburbs of cities in Europe and the English speaking world. The best examples are where development occurred around surface public transport (bus and tram). Railway stations also were often at the focus of development routes, though railway lines themselves often created severe barriers to direct pedestrian movement.

What can go wrong?

There are several problems that can arise, some more serious than others.

1. Failure of urban structure (extremely difficult to rectify)
2. Pedestrian route design failures
3. Neglect by planning and highway authorities
4. Attitudes of business to public transport

These failures can be elaborated with some examples.

Example 1 - Milton Keynes (UK)
A failure of urban structure

Milton Keynes is a new town planned in the 1960s, based on a vision of the future with mass car ownership. It was expected that public transport would continue to be important, but the designers failed to realise that if good provision is made for the car, then good provision for buses is virtually impossible. It was also not realised that if more people are going by car, less people will be using buses.

In order to cater for ease of car use, Milton Keynes was developed with a “super-grid” of high speed roads, with roundabouts at the intersections. This grid is too large to allow easy access on foot to bus stops. The grid squares are roughly one kilometre square. Whether buses stop on the grid roads, or penetrate the grid squares, many people are more than 300 metres from their nearest bus stop. Buses find it hard to compete in cities

with high car ownership, no congestion and easy parking, so long walks to the stops are unworkable.

There are two further problems in Milton Keynes which compound the situation. First, the internal development roads are generally unsuited to bus operation, with meandering distributor roads and culs de sac. So even though some bus routes penetrate the grid squares, they are too slow to be attractive. Second, the bus stops and the footpaths leading to them are often not overlooked, and can feel extremely threatening, especially after dark and at quiet times. Added to this is the fact that since most travel is by car, public transport use is fairly low, which means frequencies are low, which in turn means that bus users often find themselves waiting alone for considerable periods at stops that are not overlooked except by people in cars.

This is a structural problem in Milton Keynes which cannot easily be solved. Newer residential areas, however, are starting to break free of the straightjacket of the one kilometre grid. This should allow them to be more easily served by bus, providing the details are handled well.

Example 2 - Howden, Yorkshire
A simple route design failure

The small town of Howden in East Riding of Yorkshire is an attractive historic place. Like most rural areas in the UK, bus services are sparse, but there is an hourly service to nearby towns and villages. The northern part of the town would be within 400 metres walk of this bus stop, except that the direct route is cut off by a fence placed across the end of a cul de sac. This adds 190 to 275 metres to the walk to the bus stop, depending on the alternative chosen. As a result only a small proportion of residents of the northern part of town are within a 5 minute walk of the bus stop. The alternative routes, moreover, have narrow footways by a busy road, or a street with no footways at all. Not only does this fence cut the walk to the bus stop, it also cuts the desire line to the town centre and main facilities. No-one has ever sought to provide good access on foot in this area:

- The developers of the cul de sac
- The planners who approved it without a condition to provide pedestrian access
- The highway or transport planner who failed to insist on access
- The bus operator who thinks no further than the bus stop
- The residents who apparently are content to walk further, or not to use the bus

Fortunately, further new development is planned to the north, and the promoters are warm to advice that the direct route should not only to be opened up, but also physically improved, to benefit existing as well as new residents.

Example 3 - Stevenage, UK
Attitudes of business to public transport
Marginalisation of public transport

This example is of a failure at a destination, in this case a supermarket in Stevenage, UK. Lack of concern for public transport and how to encourage its use is unfortunately fairly standard amongst local authorities. It most places, bus use accounts for much less than 10% of journeys made by residents, and so there are not many votes to be had by promoting or defending bus companies or users. One of the consequences is that when businesses or property investors say they do not want buses near their properties, few local authorities are prepared to argue with them. Even if they understood the merits of

bringing buses close to front doors to encourage the use of both, they will rarely risk upsetting investors in case they take their money elsewhere.

So it is that supermarkets, retail parks, business parks, leisure parks, college campuses, and so on are often built and laid out in a way that makes them difficult to serve by bus, and/or marginalises the presence of buses. Many investors regard the bus as being associated with poor people, and therefore do not want them within sight of their front doors.

The example chosen here (although any number could have been picked), is Sainsbury's store in Stevenage. There is a bus service that enters the Sainsbury's site, but it is not brought to the store entrance, where it could be seen and also accessed easily by shoppers. Instead it is tucked round the back, out of sight. To add insult to injury, the waiting area for the bus (there is no proper stand or shelter) is shared with the store's refuse bins. On a hot summers day there are many more flies than bus passengers, and the smell is unbearable. Car parking, however, takes pride of place immediately in front of the store entrance and is clean and well maintained. There is provision for empty trolleys in the car park, but not at the bus stop area. With provision like this, bus passengers are relegated to second class citizens.

Example 4 - Den Haag Rijnstraat area
Positive planning integrated with transport operators
Overcoming layout deficiencies with new development

A major redevelopment of the Turfmarkt area allowed the creation of a new pedestrian-friendly access route between Centraal station and the city centre. This route is now better linked across the busy Rijnstraat with "straight ahead" linked pedestrian crossings. The scheme reflected the Dutch "ABC" policy of focusing high density development on the most accessible location, with Den Haag Centraal station being an "A" rated location.

Example 5 - Groningen
Positive pedestrian (and cycle) route planning
New direct link to railway station

Walking to Groningen station from the city centre was formerly fairly indirect, and used heavily trafficked bridges. A new direct link for pedestrians (and cyclists) was created by building a new bridge across the canal, alongside a new museum (Groninger museum). Not only has this reduced walking distances but also the walking experience has been much improved.

Example 6 - Grantham, UK
Neglect by planning and highway authorities
A failure to plan routes with new development

Walking to Grantham station and the town centre from the west side of the railway is a tortuous affair. The main route in from the west passes through a narrow bridge under the main east coast mainline, and there is no footway on the southern side. This requires people from a large catchment area to cross the road before passing under the railway, only to have to cross again at a busy junction in order to reach the station. In all, seven carriageways must be crossed at light controlled crossings to reach the station. The masterplan for an adjacent regeneration area proposed the creation of a more direct and convenient pedestrian route, utilising an under-used railway arch and leading to a

connection with a recently built housing area. This new route would have involved just two carriageways to be crossed to reach the station. While this work was being prepared for the local authority, the same authority gave permission on part of the regeneration site for a new office development that cut across the proposed pedestrian spine route, thus scuppering the opportunity for better pedestrian access to the west of the town.

Example 7 - Redhill (UK)
Failure to assert pedestrian route priority
Access to a rail station and bus interchange

As part of a town centre action area plan, it was proposed to remove a large roundabout and dual carriageway which currently separates the bus and rail stations, and presents a barrier between the rail station and the town centre. The aim was to provide a signalised junction and to use the space saved to create a new public square to serve as an attractive arrival point for the town. Unfortunately this may not now go ahead because of worries about peak hour road capacity, withdrawal of the action area plan, abandonment of a major housing development that could have helped pay for the scheme, and the scrapping of the regional plan and associated funding by the new UK Government.

Example 8 - Sheffield (UK)
Success in asserting pedestrian route priority
Station access improvements

Arrival by train in Sheffield left passengers with having to negotiate taxis and parking, and a large dual carriageway to get towards the city centre, followed by an unattractive and illegible route through semi derelict commercial areas to reach the main shopping areas and the bus station. Now, though, vehicles have been removed from the station forecourt, and an attractive public space has been created, leading to a new tree-lined pedestrian route to the city centre. Walking to the station is now a much more feasible and attractive option.

Example 9 - cinema in East London
Attitudes of business to public transport
Major roads and parking prevent foot access

A multi-screen cinema was built just off the A13 Trunk road in east London. There are buses serving the cinema, in theory. However, one bus service stops across the far side of the car park from the cinema entrance. The bus stop itself has no shelter, and not even a proper path leading to it. Another bus stop is on the A13 main road itself, but this requires negotiating a pedestrian tunnel under the road in order to reach the cinema. It is a long and extremely unpleasant walk. Of course, the cinema was planned for car access, not bus access. But it is located in a relatively poor part of London with one of the lowest rates of car ownership. In addition, many potential customers for the cinema are below the legal age for driving.

A sample random journey from Brooks Avenue, East Ham to the cinema, using the Transport for London journey planner, gave the following result:

- By bus - 41 minutes with awkward walk routes plus 2 minute walk across car park (fare for return journey, £2.40 per person).
- By car with free parking - 9 minutes

Given this information, the predominance of car use to this location is unsurprising.

Fixing the problems

The examples above illustrate some of the difficulties that can arise in trying to plan and implement improvements.

Where there are severe defects in the urban structure, the layout of streets and the configuration of development blocks, the best that can be done is to improve the quality of paths and footways (surface, maintenance, lighting etc) and to ensure good information. It may also be possible to identify new, more direct paths that can be created, perhaps involving land purchase, or taking opportunities arising from new development.

In areas with a reasonably good urban structure, however, the emphasis should be on identifying the key routes that serve public transport stops, and auditing their quality. A programme of measures can then be drawn up to reduce deterrents to walking, such as difficult junctions to cross, or poor lighting.

In both circumstances, the effect should be to extend the catchment area of the stop or station. This will obviously be the case if a new more direct path is created, as in the Howden example above. But improving the quality of the walking experience, as in the Sheffield example, can also extend the catchment. This works, or should work, by changing the perception of a route, and by making the experience of walking along it more interesting or enjoyable. Changes in behaviour resulting from such improvements will be difficult to measure, and may only occur over time. But it should be an aim to encourage people to walk more, or further, in order to make better use of public transport, and this can be achieved by reducing “resistance” to walking. There are any number of ways in which this can be done, such as improving lighting, introducing greenery, installing artworks in difficult locations such as under bridges, and giving pedestrians more priority at busy road junctions.

A programme of improvements, designed to reduce resistance to walking should lead, in the long run, to people being prepared to walk further to reach and to use public transport services. This means that people who before would have considered themselves outside the catchment, now will consider themselves to be within the catchment. Catchment areas of stops and stations also increase in size if services are improved. Since walking is part of the public transport journey, it is logical to surmise that improving that part of the experience will have a similar effect.

In new areas, paths and routes must be identified and put into the mix of factors that will determine the overall layout. In the Howden example, the planned new housing layout was modified to provide more direct walking routes to the main town bus stop and facilities.

A note on the length of wiggly bits

The catchment areas for public transport are conventionally cited as being a 400 metre radius for bus stops and 800 metres for rail stations, although there seems to be scant research to support these figures. More important, however, is to consider not what existing passengers do, but what is required to attract new passengers. People who do

not have a choice of mode are more likely to “tolerate” longer walks and poorer services. People with a car sitting outside their home will not choose public transport unless the walk is easy and pleasant, and the level of service from the stop is good and reliable. In recognition of this, public transport in Zürich is planned to bring most people within 300 metres of a stop. The level of information required will also have a profound impact on mode choice and the distance people are prepared to walk.

The catchment extent, and thus the length of the “wiggly bit” routes to be planned, should thus be a matter for decision, not for adherence to a simplistic rule of thumb. The improvement of walking routes should in any case lead to a lengthening of the distances that people are prepared to walk. So the better the wiggly bits, the longer they will become! Planning should take this into account.

In preparing a programme of action, the 400 and 800 metre convention may be an adequate starting point, but it will be worth considering a number of factors first:

- The destinations reached by the public transport service (the nearest bus stop may not be the most useful bus stop)
- The quality of the service (e.g. does the service run after dark)
- The terrain (hills may result in shorter tolerated distance)
- Local climate

A method for planning the wiggly bits

Overall journey planning should aim to boost public transport use by reducing the friction produced by getting to and from stops and stations. The most effective and environmentally and personally rewarding means of access is either on foot or bicycle. Foot, especially, places no spatial burden on the land around stations, thus leaving the best opportunity for higher intensity development at the most accessible locations. Park and Ride by contrast means that the most accessible locations are taken up with parking for people who live at a distance from the station.

The walk component of public transport journeys occur at the beginning and end of the “line haul” stage, and also in between for journeys involving more than one line-haul stage (e.g. bus then train, or two separate trains). These intermediate wiggly bits will often take place within a public transport interchange and consequently will be firmly the responsibility of the public transport undertakings. The wiggly bits at either end, however, will more often involve the use of public streets and paths, thus involving different authorities and responsibilities.

The following is a suggested method for improving access on foot to stations and stops, as a means of improving the overall journey experience, and thus to encourage the use of public transport rather than private motorised transport.

1. Responsibility
   Establish an appropriate mechanism of competence and responsibility.
   This could be as part of a station access plan. It could involve a specific partnership agreement between a bus company and the highway/planning authority. Personalised travel planning initiatives can be a useful way of identifying walking issues, or carrying out route audits. Whatever mechanism is devised, it is necessary to have a single accountable body in charge.

2. Identify sources of funding
   Funding may be required specifically for the work, and sources will need to be identified. However, it is important to take advantage of “zero cost” opportunities, such as will arise when major highway or utility maintenance is being undertaken (allowing a redesign of the street at no extra cost), or when new streets or developments are being planned.

3. Priority
   Identify the public transport stops and stations for which access on foot is to be improved. It is unlikely that an entire network can be tackled, and so priorities must be decided, for example on the basis of improving the viability of a particular route, or tackling known trouble spots on the network, or taking advantage of planned major highway or utilities renewal.

4. Audit existing routes
   Identify station and stop catchments, and routes within them. Audit the quality of these routes, paying particular attention to weak links and barriers to movement on foot. Involving public transport operators will be useful, for example helping to fund user surveys and audits, and advising on mode of access. Baseline data can be established on levels of use of each stop, and the distance passengers have walked, thus establishing the extent of the catchment area.

5. New development coding
   Where new development is being planned, there is an opportunity to plan walking routes and bus or tram stops together in a coordinated way. There may also be opportunities for the new development to fund improvements beyond the area of the scheme itself (as in the Howden example). It is important that amongst the many planning considerations, the walk to public transport is given priority attention. A simple code of practice could assist decision makers in this.

6. Identify physical measures
   Once the mechanism and funding sources have been established, and opportunities audited, detailed plans need to be drawn up for specific physical interventions that can be made.

7. Identify information measures
   Information improvements may consist of more than just conventional signs. Increasingly people are using mobile and internet-based journey planning, involving GPS. In order for this to work effectively, GIS databases must accurately identify the quickest walking routes. Most current journey planners fall well short of the ideal for the planning of walk and cycle routes, with path networks being incomplete and inaccurate bus stop or other information. Personalised journey information is increasingly being used to promote alternatives to the car, and these initiatives will be cheaper and easier to run once accurate network databases are readily available. The journey planning software can also include realtime service information and updates, allowing genuine presentation of “whole journey” information.

8. Implementation
   A scheme of works and actions will need to be implemented. This will often need to include consultations with users and people who potentially may be affected,

and may require negotiation with landowners to achieve rights of way.

9. Monitoring
   A monitoring programme should be drawn up. “After” surveys will ideally be carried out and these could consist of, for example, levels of use of stops, perhaps targeting specific use patterns (such as after-dark use, or use by children from a particular school), pedestrian flows on catchment routes, interviews to gauge satisfaction with the route.

Conclusions

Examples of deliberate and specific action to boost public transport ridership by improving walks to and from public transport are few and far between. Data on the effectiveness of such actions are still harder to find. The two parts of a public transport journey are usually the responsibility of different bodies, and consequently the two are not planned together. Walking routes can be improved through planning and highway planning and maintenance regimes, but more effective actions could be achieved in partnership with public transport operators.

Before the car became widely available, deficiencies in the walk to the stop or station were tolerated without loss of passengers. Now that most people have a choice, it is necessary to address the whole journey experience, not just the level and quality of services themselves. The walk to and from the station or stop (the “wiggly” parts of the journey) should therefore no longer be neglected. The paper has suggested how improvements to the walking routes in public transport catchment areas could reduce resistance to walking, and hence encourage the choice of public transport for a greater proportion of trips. The steps necessary to carry out such a programme have also been suggested, both for making improvements in existing areas, and for ensuring good design in new developments. A number of examples have been identified to illustrate the variety of situations and improvements that can be made.

Finally, in the information age, it is important to recognise the powerful potential of real-time and location-specific information on walking routes as well as bus, tram and rail services, to help people choose alternatives to the car. The technology and availability is expanding rapidly and will have greatly improved by the time you read this!