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SUSTAINABLE TRANSPORT SYSTEM WITHIN A DESIGNED NEIGHBOURHOOD

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Abstract

It is highly accepted that a number of European countries can provide suitable models of an “ideal neighbourhood” for a sustainable transport system. European public transport services, for example, are often a target of admiration by professionals from across the Atlantic (Salomon et.al. 1993); however European publications, unlike those from North America or Australia, rarely focus on the role of neighbourhood design in countering private car dependence. One of the reasons may be that the urban neighbourhood in many European countries is less problematic in terms of private car dependence and its interaction within the transport system. Nevertheless, this lack of attention could be the catalyst to promote the patterns of urban transport which European countries have already achieved.

The aim of this paper is to provide an overview of European travel patterns from the former works and to bring about the present experience up to date with evidence of travel patterns which contribute favourably towards sustainable issue. For sometime European mobility issue has been highlighted as approaching the trends of North American and Australian cities that is facing the difficulties to tame the ubiquitousness of cars and its infrastructures. However, in the era of sustainable city, European cities tend to be more resistant to the mobility trends and therefore the research has the opportunity to hypothesize the role of neighbourhood design in transferring travel towards sustainable patterns – learning from the European experience.

1. Introduction

The motives why people make transportation choices they do are complex. They are bounded in culture, socio-economic and geographic necessities, and individual psychological characteristic. Public transport is seen as a positive transportation choice because of the certainty of provision plus a mass transportation media whilst walking and cycling are because of the exercise involved and its non-polluting nature. However private car is a dominating mode of transport that most people would adhere to bear with once they could. The flexibility, comfort, safety, perceived low cost and freedom are the promises that people would have when they do choose the private car, albeit with little regard to the impact on community. In a medium up to high density living urban environment, the first three modes of travel mentioned are considerably sustainable modes of transportation (Newman & Kenworthy 1999; Rudlin & Falk 1999; Richards 2001). The means on how to encourage people to pursue sustainable mobility therefore becomes the main thrust towards the presence of sustainable urban environment.

Over the last two decades there has been increased concern in cities with the decline in air quality, increased congestion in both urban and suburban area, and negative impacts to the natural environment resulting from land development patterns overwhelmingly favourable to the private car. In order to address these concerns, the relatively more recent emphasis has been on encouraging the development and implementation of policies that exploit the possible relationship between urban form and travel behaviour (Badoe & Miller 2000). Yet, the relationships between transport investment and urban development are not well known (Banister 1995), as well as the strength of the links between economic growth and increases in road traffic is being questioned (IHT 1997). To a further extent this fact is realised by researchers that the relationship between the development of urban form and the use of private car versus public transport, cycling, walking, etc. and distances travelled is particularly difficult to disentangle, because so many different factors influence the relationship (Dieleman et.al. 2002). These enquiries which may arise are becoming
some of the force, again, towards a sustainable urban environment as the Institution of Civil Engineers attempt to manage to balance the growth in traffic with people (2002) and as research tries to gain insight into options for encouraging other than private car use in urban settings.

Compact, mixed use, and walk/cycle-friendly urban development, many contend, can significantly influence the modes people choose for travel (Cervero & Radisch 1996; Badoe & Miller 2000; Cervero 2002; Dieleman et al. 2002; Rodriguez & Joo 2004). These findings may be interpreted to indicate a need for commitment and adjustment in the development of integrated neighbourhood design with an emphasis on a public transport, cycling and walking friendly built environment. In such a case, it may be reflected in a set of integrated transport and urban development planning policies. Even though to bear merely on policy issue is not the only way of achieving it. However, as Rudlin & Falk (1999) stressed, it is the neighbourhood rather than the individual house or street that should form the building block for sustainable communities. Nonetheless, decreases to the stock of private car travellers and increases in the number of public transport users, walkers and cyclists imply changes to the nature of the built environment, in particular to the design of housing and work locations as well as changes to the way in which housing development take place.

Recently there seems to be an interesting paradox between Europe and the US which can also be seen in Australian and Canadian cities. After the Second World War, and even before, the US had been a model on some issues in terms of transport and land use planning in Europe; after a remarkable reversal, by the turn of the 21st century the land use and transport policies of many European cities had become the model for many US cities (Haas-Klau & Crampton, 2002). This trend therefore somehow derives the need to exhibit more of European experience to reveal the contemporary transport and land use planning in the direction of the future ‘sustainable’ cities.

The aim of this paper is to provide an overview of European travel patterns from the former works and to bring about the present experience up to date with evidence of travel patterns which contribute favourably towards sustainable issue. For sometime European mobility issue has been highlighted as approaching the trends of North American and Australian cities that is facing the difficulties to tame the ubiquitousness of cars and its infrastructures. However, in the era of sustainable city, European cities tend to be more resistant to the mobility trends and therefore the research has the opportunity to hypothesize the role of neighbourhood design in transferring travel towards sustainable patterns. Haas-Klau (1990) in addressing town planning as a new concept for controlling traffic revealed town planning in Germany, Britain and the United States developed at a different pace and with different emphasis. In Germany, the town planning tradition started merely as street planning, in Britain the main town planning attempts were to improving health conditions, whilst the United States were argued had the weakest town-planning legislation with the wide and long grid-iron street layout.

The paper begins with the anxiety of nowadays environmental problem issues as a consequence of the excessive private car dependency. In addressing the problem, promoting to pursue sustainable mobility through the development of sustainable built environment is among those efforts to preserve the present urban civilisation. Section 2 describes the whole idea of research plan to actualise the development of sustainable neighbourhood. The current state of the research progress is in formulating European travel patterns and to compare to some extent to the New World. In section 3 the past work of Orfeuil & Salomon (1993) about European travel patterns was selected to depict general travel patterns in European scale. In section 4 Great Britain latest travel patterns were explored as a case study and linked with the implication of urban design. Finally, the last section is a discussion about the ideal sustainable city and link to European travel patterns and contribution to the research state.

2. The Research of ‘Neighbourhood design role in transferring travel’

One of the central conclusions in the report on Transport and the environment by the Royal Commission on Environmental Pollution (1994) is that the present growth rate of road traffic, is environmentally unsustainable. Even the invention of a totally ‘green’ car would not solve – and might even exacerbate – the problems of traffic congestion (Cartledge 1996). Steps must be taken to make travel by private car a less attractive option.

As well as the ‘New Urbanism’ movement in the North America for redesigning American neighbourhoods to return to compact neighbourhoods, mixed land uses and pedestrian amenities (Cervero & Radisch 1996); UK Town and Planning Association, Urban Village Forum, UK
Government and European Union accept the need to increase development densities to make urban areas more sustainable (Rudlin & Falk 1999), so that they are less oriented towards car travel and more conducive to walking, cycling and transit riding. The built environment is thought to influence travel demand along three principle dimensions – 3D: density, diversity and design (Cervero & Kockelman 1997). Elsewhere Newman et al. (1995) cynically question of overcoming car dependence, physical planning and economic instruments are the means to solve the problem according them. The research proposed here aims to examine whether a neighbourhood design can contribute to the opportunity to make travel by private car a less attractive option.

The initial phase of the research is a critical review of literature of the neighbourhood design role in the interaction with transportation system within urban settings. It is highly accepted that a number of European countries play a big role as a model of ideal neighbourhood for sustainable transport system. European public transport services, for example, are often a target of admiration by professionals from across the Atlantic (Salomon et al. 1993); however there has rarely been research within Europe which addresses the extent to which often parts of the world concern such as North America and Far East Australasia emphasize the role of neighbourhood design as a central strategy in countering private car dependence. One of the reasons may be the urban neighbourhood that European countries already have, is not creating such a problem as those countries have, according private car dependence in interaction with transport system. Nevertheless, this lack of attention could be the catalyst to promote the patterns of urban transport which European countries have already achieved. This issue however has once been raised by Hass-Klau et al. (1999) in which they recognised the lack of travel behaviour research in European cities.

The research then proposes to examine options other than private car as the principal mode of transport. Drawing on observations in a number of European countries, the objective is the examination of demographic variables including gender, age and occupation associated with high public transport use, walking and cycling levels. It is assumed that a number of countries produce anonymous micro-datasets; these will allow research to identify the mode of transport people use by trip purpose or frequency. The research will involve the use of multi-variate statistics to identify public transport, walking and cycling ‘hotspots’ in Europe, North America and Far East Australasia and to compare the extent to which they share similar demographic and geographic as well as urban neighbourhood design characteristics. These particular regions were selected on the raison d'être of historical background of transport technology. The rise of mobility started with the widespread adoption of railway technology in the 19th century which then received a decisive momentum with the introduction of the car after World War I (Salomon et al. 1993). Since then those countries invested heavily in denser road networks offering accessibility. From the demand side, those countries are developed countries in which growing personal incomes and general welfare are their inherent character and inevitably elucidates their mobility. Therefore such regions will have a remarkable historical evolution of adapting the influx of car technology more than other regions which may be rich in urban culture but have short history of car technology adaptation.

The third phase of this research proposes to involve a multi-country examination of communities in which public transport, walking and cycling is particularly prevalent. Basically, the sample ‘hotspots’ obtained from the previous phase would be examined through the interactive assessment of communities by means of interviews and or questionnaires. It is desirable if a combination of non-private car mode of transportation in certain representative cities would be samples of this examination. However, if there were cities which represent a particular dependence on a non-private car mode of transport, the characteristics would be expected to exhibit those of an integrated public transport, walking and cycling friendly built environment.

The fourth phase of this research proposes to model a visualisation of simulation approaches in transferring travel from private auto to public transport, walking and cycling through a modelling tool, a micro-simulation program. MEPLAN is one of the models that has been used to simulate a land-use/transport interaction model. It is based on representation of markets in land (space) and transport, however in the London and South East region (LASER) Project this model was thought to be under-sensitive to land-use changes (Bates et al. 1999). Meanwhile micro-simulation models are becoming widely used in practice. They are most commonly used to simulate traffic conditions. Proprietary models include VISSIM, PARAMICS, DRACULA, and TRANSIMS. The proprietary packages listed above often include a travel generation package such as VISSEM. Planning consultants are increasingly using these models as the basis for Travel Assessment submitted with planning applications. Regarding this phase of the research, a case study of a certain car-dependence area will be selected to be replicated to highlight and to contrast the neighbourhood
design of a public transport, walking and cycling friendly built environment. It is expected from this model comparison that some aspects of a non private car dependence neighbourhood will reveal a model of a sustainable neighbourhood.

The applied part of the research, finally, would involve an effort to document the types of conditions as modelled in the previous phase of the research and as identified in the preliminary phases, which if replicated could lead to similar transportation conditions in areas where private car dependence is greater. In doing so, some scenarios of integrated transport and urban development planning policies will be sculpted to highlight the credentials of neighbourhood design in transferring travel of private car into other sustainable modes of transport. One of the expectations is to involve recommendations for changes the way in which housing development take place and its interaction with the road and transit system as well as the retail and working sector.

3. European travel patterns

Referring to the above research phases, the literature review is still the nature of this paper. In its observation progress, to reveal European travel patterns from the past works is in general sense providing overview of how transport professionals consider the matter at that time. To refer particularly on very few resources about European travel patterns is inevitable, because not many materials were found according it. However, the case study of Great Britain in the later section will reveal that the numbers found is still representing what have been observed from the former study.

European travel patterns are different from those of the North-Americans, Australian (New world) and the Japanese. The main differences may be explained by geography (density and distribution of settlements), culture, and the domestic economic context (pricing policies, infrastructure settlements and employment densities) which in turn mirror the different cultures (Bovy, Orfeuil & Zumkeller, 1993). Especially the lower population densities factor and the lower employment densities in the urban core factor, which notably characterised North American cities, were argued to discourage public transport use (Haas-Klau & Crampton, 2002).

Mobility levels in Europe vary widely across the countries; although in all countries the car plays the dominant role, there are nevertheless clear differences as to its contribution to personal mobility (Bovy, Orfeuil & Zumkeller, 1993). Much of the difference is a question of national and personal wealth. The wealthier countries show much higher car ownership rates, in particular with a car. At the same time, the affluent countries have the financial means to maintain and improve expensive public transport systems, notably (light) rail. However, the governmental policies in European countries aimed at making public transport and rail more attractive (as in France, Switzerland and Germany) or conversely, making the car less attractive (as in Denmark and The Netherlands) has already demonstrated an effectiveness towards future ‘sustainable’ city.

Personal travel behaviour has to be studied through surveys which provide a wide variety of indicators, either at personal or aggregate level. Considering mobility as a personal activity implies first a description of the (potential) traveller, including personal characteristics such as age, gender, professional status, license holding, as well as information on the size, income, residential location, and motorisation of his household. The mobility pattern of each person is then described through sequences of trips made during the survey period. A trip is defined as the (one way) physical movement of a person from one place to another for a given purpose. It generally involves parameters such as: the purpose, the origin, the times, the mode and the route. In the European context, there are no common standards for travel surveys therefore cross-national comparisons are difficult (Orfeuil & Salomon, 1993).

In the work of Orfeuil & Salomon (1993), aggregate mobility indicators describe a different facet of mobility and are used for a different purpose. The proportion of mobile persons in European countries is between 80% and 90% on a typical weekday urban, service oriented societies, and falls down to 60-70% on Sundays. Walking concerns 20-25% of tripmakers, as a result only two-thirds of the population uses at least once a day a motorized mode. Some 45 to 55% use a car at least once, as a passenger or a driver, 15 to 25% use public transport at least once and 2 to 7% uses a bike or a moped at least once. The mean number of trips per capita and day is now in the range 2.5 – 3.5 in most European Countries. The number of out-of-home activities per capita ranges from 1.5 to 2.5. Orfeuil & Salomon (1993) divided trip purposes into three groups of approximately equal importance: the mandatory mobility (including work, school and business related trips); the mobility related to the household’s management (shopping, escorting children,
In describing structural determinants of personal travel behaviour, Orfeuil & Salomon (1993) highlighted seven issues. (1) Gender, age, position in the life cycle: the use of soft modes and to a lower degree, of public transport is greater among women, and conversely car driving is greater for men. Women make less commuting (and business) trips but higher rates for personal business trips, especially shopping and escorting children. For distances figures, women travel 40% less than men. The effect of age on mobility; leaving aside work, business and school trips reduces the gap between children, adults and elderly people. Persons in the active part of life cycle, make more trips and distance between the ages of 30 and 40, and growing share of walking and public transport from the age of 40 onwards.

(2) Effect of car access on mobility patterns: the differences in mobility patterns with gender or age resulted mainly from differences in imperative social roles. If the distances travelled on necessary activities (roughly 1/3 of total mobility) are subtracted from the distances covered by each population category, it has been found practically no differences between men and women in the active part of the cycle. A comparison between economically active persons, pensioners and housewives in Switzerland gives similar picture: the differences in distance travelled diminish as necessary activities and car ownership are taken into account. The observations concerning Switzerland, however, conceal the impact of business travel.

(3) Level of education and income: higher mobility levels are correlated with higher level of education. Higher levels of education are positively correlated with income and, in Europe today, negatively correlated with age. High car ownership rates in every social group could however question the link between mobility and income. The reality is quite different: trip numbers increase only slightly with income, the distances travelled do increase sharply, as well as the share driving. Analysing the role of the car: in low income groups, car travel is a household activity, with a high occupancy rate while in high income groups, very low occupancy rate are observed.

(4) Residential location and geographical patterns of travel: the effects of residential location on mobility patterns may be studied at three levels: (1) the size of the urban area; (2) the location of the residence within the conurbation; and, (3) the land use patterns. These 3 levels differentiate people according to their access to urban amenities (jobs, shops, and leisure) as well as to their access to public transport network, with important effects on private mode ownership. A European analysis on these topics has to be very cautious, since geography suggests no clear evidence of common urban structures in the European area: comparing multi-centric urban regions such as the Randstadt or the Ruhr to a highly centralised one such Ile-de-France region may seem meaningless. The analysis of transport supply and mobility patterns exhibits however some common features.

(5) The size of urban area: long trip distances are observed in rural communities and the greatest conurbations, while shorter distances are observed in medium-size cities. For total distance travelled: middle-size cities offer maximum mobility to people (in terms of opportunities and trip numbers) at minimum cost (in terms of distance). Moreover, middle-size cities offer important opportunities to a strong role of the bicycle.

(6) The residential location within the conurbation: Location of the residence relative to the centre of the urban area generates huge differences in travel needs. In Germany 74% of the households in small communities (less than 20,000 people) have a car, a share that decreases to 55% for cities over 500,000 people (Hauztinger, 1989, cited from Orfeuil & Salomon, 1993). In France, cars per household decrease from 1.2 in rural areas to 0.82 in the Paris area (Hivert, 1991, cited from Orfeuil & Salomon, 1993).

(7) The spatial distribution of the activities: three current trends in European land use patterns which can affect mobility have been identified; (a) An increasing attractively of low density areas – rural places, small towns, outer suburbs – for housing, especially for high income households. (b) An increased concentration of 'high level' jobs in the biggest conurbations, those which are becoming Eurocities, served by major airports, high speed train service etc. (c) The suburbanization of jobs, stores or even leisure facilities.
Orfeuil & Salomon (1993) concluded that mobility patterns evolve towards spatial diffusion, more complexity, longer distances, higher shares for car and peak developments at the regional scale. According to them, meeting these demands with public transport becomes more difficult. The competition between modes is highly dependent on the geographical patterns of trips. They synthesized evolutions of mobility in European countries as: higher incomes provide higher access to car use; in turn, the car provides access to cheaper zones for housing and wider choices on labour market. However, they realised that the sum of rational individual decisions do not lead to a sustainable equilibrium, at the collective level. The attention is now diverting to the 'side affects' (reduced comfort for walking and biking due to environmental and safety hazards, decreasing market shares for public transport).

4. Present Great Britain travel patterns and implications for neighbourhood design

Great Britain has a unique feature compared to other European countries. It is an island. According to Cullinane (1993) the implications for transport are there has been no possibility of integration with the transport systems of other countries and rail plays a smaller part in transport sector because the island is small with dense population. The average distance between cities is 253 km; in France it is 576 km; in Germany, it is 402 km. Of all the European countries, Britain had the highest car ownership, but even so, car ownership levels in Europe remained low. The real issues of mass motorisation started to emerge during late 1950s and early 60s, about 30-40 years later than in the US (Haas-Kla & Crampton, 2002).

In Great Britain, up to the latest National Travel Survey (DfT, 2003); the number of trips per capita per day is 2.7 but the trips of 1 mile or more per capita per day is 2.1. Walking concerns 25% of tripmakers, 63% use a car or a van at least once as a passenger or a driver, 9.3% use public transport, and bicycle at the meagre portion of 1.4%. In so far, the present UK survey still mirrors the mobility indicators pointed by the work of Orfeuil & Salomon (1993) a decade ago. However, the share mode of public transport in the UK is not describing the common European trends where Orfeuil & Salomon (1993) identified between 15 to 25% use of public transport on a typical European personal trip.

Within 1 mile distance in Britain, walking concerns 78% of all trips and 20.3% private car whilst bicycle and public transport obtained 1.3% share each. Between one and two miles, concern for car arises at 57.6% as well as public transport which reaches 19.6% of trips per person per year. The significant change of modal share however obviously seen in between two to five miles where walking mode decreases to 5.2% share as the private car occupies share at the peak of some 77.9% of all trips. Public transport share occupies 13.7% of all trips. Above 5 miles, car dominates the mode people choose to travel and gradually lessen nearer above 100 miles.

People in Britain spent almost an hour a day to travel with an average trip time of 21.9 minutes. 16 minutes average spent on a walk trip, 20 minutes on bicycle and 21 minutes on car/van as a driver. In the scope of public transport, taxi/minicab average trip time is 18 minutes whilst bus service is in the range of 30 to 40 minutes and underground and surface rail occupy 50 to 80 minutes average trip time spent by surveyed passengers.

25% trips in Britain are mandatory trips, 44% are the household’s management and 31% are the discretionary mobility. Mandatory trips cause 32% of miles travel per person per year whereas household’s management trips create 27% of miles travel. Above all leisure trips engage 41% of miles travel per person per year. From this data the household’s management purpose trips explain an interesting number where it produces the most trips but occupies the smallest portion of miles travel. In mandatory trips, people commute in average of 8.5 miles for 26 minutes but admit to go as far as 20.9 miles for business trip and allow 40 minutes to be spent on this trip. In the household’s management purpose trips, the average trip length is in between 2 and 5 miles which take 13 to 17 minutes for each trip. Average trip length for leisure activities are varies where people spare 19 to 24 minutes to travel as far as a mile (as just walk) to 9.2 miles to visit friends; and make available 1.5 hours to travel more than 50 miles for holidays.
Table 1: Daily mobility of Great Britain according to mobility survey

<table>
<thead>
<tr>
<th>Type of period</th>
<th>Date of the survey</th>
<th>Trips/day (#)</th>
<th>Distance/day (km)</th>
<th>Travel time/day (mn)</th>
<th>Modal distribution % (trip/distance based)</th>
<th>Purpose % (trip based)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7D*</td>
<td>85/86*</td>
<td>2.8*</td>
<td>23*</td>
<td>55</td>
<td>37/9*</td>
<td>30*</td>
</tr>
<tr>
<td>7D</td>
<td>2003</td>
<td>2.7</td>
<td>30</td>
<td>59</td>
<td>27/6</td>
<td>40*</td>
</tr>
</tbody>
</table>

* cited from Orfeuil & Salomon (1993)

7D: all days
Soft: soft modes, i.e. walk, bike, moped
P.T.: any kind of public transport
Car: car driver + car passenger
Mand.: mandatory trips: work, school, professional trips
Serv.: service trips: shopping, escorting children
Discr.: discretionary trips: visits to friends, holidays, leisure

The survey about trips to/from school for children age 5 to 16 describes modal share of 46% walk, 1% cycle, 21% public transport and 30% car/van. The average distance is 2.4 miles per trip per child. Between 12 to 18% of cars during peak hours are escorting children to school according to the survey.

Relating to sustainable mode of transport at which the survey addressed, bicycle travel attracts 14 trips per person per year and fulfills 34 miles distanced travel per person per year. However, bicycle use in urban area reaches 8% of use in England and Wales; elsewhere 24.7% in The Netherlands, 20% in Denmark, 10% in Germany and 5% in France and Italy (Pucher, 1997). Bax (2004) formulated 6 major factors that influences bicycle use, they are: traffic policy in city, social factors (culture and lifestyle), economically related factors, spatial factor, weather and competition of other transportation modes.

Public transport in Great Britain by means of bus service functions quite well, as 87% of household live within 6 minutes or less from the bus stop use the service. In the area above 7 minutes walk from/to the bus stop, bus service is not that popular according to the survey, especially in the metropolitan area. However in the urban area with population below 25 thousand, bus service becomes slightly accepted in the range of 11 to 13% of household to make use of the service. In recent European research shows that 80% of EU citizens live in urban areas in which travel patterns are such that 50% of all trips are less than 5 km, and about 25% of trips are less than 2 km. According to Barton et.al. (1995) net densities of 100 persons per hectare is suggested to sustain a good bus services. It corresponds to 25 dwellings (average dwelling size of 4 bed space). A tram service needs 240 persons per hectare for a sensible operation.

Street planning had previously been part of urban planning. According to Haas-Klau & Crampton (2002), by the end of the 1950s the analysis of transport and traffic had become more technical. Two professions were geared to understanding these technical aspects: railway and construction (traffic) engineers; and there was the modellers as a third party which was interested in transport whose professional basis was economics or again traffic (construction) engineers. Urban planners had lost their technical dominance over transport, and this may have been one of the reasons why it took some time to understand the land use and socio-economic effects these substantial road constructions had on the urban environment (Haas-Klau & Crampton, 2002).

The contemporary issue that may interest urban planners is concerning housing development. There can be few people who are not aware of the 4.4 million extra households that have been projected by UK government by 2016 for England alone (DoE, 1995). The accommodation of this household growth has become the great planning issue. The prospect of house building covering England’s green and pleasant land has led to demo and the eco-campaigners, who were so effective in causing Government to reassess its road building policy, are now turning their attention to the house-building industry (Rudlin & Falk, 1999). The potential to accommodate household growth in existing settlements has received increasing attention over recent years. In the Netherlands the compact city policy issue has created conflict of interest between housing and mobility aims (Maat, 2002). However, to accept existing trends in England of dispersal and population drift to the south, will face the continuing and perhaps irreversible decline or urban areas, the loss of valued green belt and agricultural land, as well as a huge growth in car use.
Rudlin & Falk (1999) emphasize the need to rediscover the city which may help to meet housing need, to address urban decline, and to create more sustainable transport patterns; but it would mean forcing people to live where they clearly do not wish to. Nevertheless they realised that if urban areas are to be repopulated it must be through attraction rather than coercion. What matters there is the location of housing, its layout, its relationship to different uses, to transport system and to open space.

Newman & Kenworthy (1999) in promoting sustainable city concept illustrate how the auto city could change over time and be more sustainable. It brings: the process of re-urbanisation, traffic calming, state-of-the-art transit and bicycle planning, the New Urbanism design of streets for pedestrian, growth management, economic penalties on private transportation, and transit oriented development planning in new and old suburbs, particularly the development of urban village. These concepts are to a degree idealistic, but according Newman & Kenworthy (1999), they are well under way in a number of innovative cities. In Europe, two irreconcilable objectives been concerned by urban planners: to provide for the apparently relentless rise in mass car ownership and to conserve and enhance the quality of urban heritage. In the United States the same problem had been faced decades before, but it was easier to resolve: with a few conspicuous exceptions there was less accumulated architectural heritage (Hall & Haas-Klaau, 1988).

Link to the research of ‘neighbourhood design role in transferring travel’ in section 2, the fact that unique European urban character and urban planners thinking of sustainable city, the trends of travel behaviour patterns, the formulae of 3D from North America, and the concern of environmental degeneration, are offering a prolific research field to elaborate the complex relationship between technological development – in our case the different transport modes – and the development of housing and cities in the direction to accomplish the humane city of tomorrow.

5. Discussion

The future ‘Sustainable’ city is not one that banishes cars, but one with much less car dependence. This is achieved by creating much greater diversity in how people can live without needing car. It provides for increased opportunities to walk, cycle, or use public transport as well as use cars (Newman & Kenworthy, 1999). Europe has always been more traditional and urban planning remained basically conservative. During the 19th century, new urban plans were exceptions and implemented mostly in the capital cities. Some other major cities had extension plans but the city centre in many cases was hardly touched.

In Europe the decentralisation trend which had already started before the WWII continued, though it differed according to the country and the size of the city. In Britain after the war there were attempts to focus population dispersal into the New Town programme which started in 1946 with the New Town Act, but general decentralisation strengthened during 1960s and 70s (Haas-Klaau & Crampton, 2002). However, by 1982 only 2 millions people or 4% of the population lived in new towns (Rudlin & Falk, 1999). Notwithstanding, Hall and Hay (1980) concluded that the European cities did not follow the general tendency of deconcentration in the US model. European cities were still concentrated in the 1950s into core metropolitan areas and only in 1960s started to deconcentrate into metropolitan rings, moving increasingly into the suburbs of large and middle sized cities.

Looking at European travel patterns, the mobility trends evolve towards spatial diffusion, however the urban planners already realised the tendency and alternatives are available. The importance to pursue sustainable mobility therefore becomes the thrust to explore how built environment design may influence travel behaviour. In the research proposed, identifying European urban forms’ ‘hotspots’ which represent sustainable mobility will involve the application of GIS Arc View simulation program. The program allows many variables of census data to be visualised on screen in layers. Each variable will represent a certain demography characteristics and transport accessibility. The idea is to put together all the variables of transport system within the study area in layers and therefore it may be possible to reveal ‘hotspots’ of sustainable mobility practice.

It is important to bear in mind that there is no one correct model for urban areas. The key is not to find the right physical model but to discover or rediscover the natural process of city building which enables a city to naturally work towards and constantly reshape the physical model which best meets its needs (Rudlin & Falk, 1999). A model neighbourhood should therefore be human in scale but urban in nature and designed to promote interaction and to accommodate the diversity of
urban life. In West European Countries, many cities/towns are already or on the way towards such a neighbourhood. Therefore through this study it is expected that such a well developed patterns can be exploited and learned and documented to lead to the development of a sustainable urban/transport planning policy. As Nijkamp et.al. (1998) emphasized, without strict policy measure, for the next generation environmentally sustainable mobility will probably still been seen more of a challenge than a realistic objective, well as Banister (2002) confirmed that a ‘new look’ transport planning will at last emerge that balances the political, economic, social and environmental constraints under which public policy decisions are made.

References


Royal Commission of Environmental Pollution (1994) Transport and the environment London, HMSO


The Institution of Civil Engineers (2002) The 2002 Designing Streets for People Report London, The Institution of Civil Engineers

The Institution of Highways and Transportation (1997) Transport in The Urban Environment Essex, Mayhew McCrimmon Printers Ltd