2030 : A TRANSPORT ODYSSEY

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ABSTRACT

In the year 2000, the UK Government – through the publication of a 10-year transport plan – recognised the need for a better transport network with less congested roads and modern, affordable and reliable public transport. Following decades of under-investment, the result in the UK, and many other countries worldwide, is overcrowding, congestion, delays, pollution and a lack of choice of how to travel.

Clearly transport strategies worldwide need to evolve in order to keep pace with an increasing desire for mobility and to protect our quality of life. To meet this demand, we have identified a number of key issues of primary. These include:

- Changes in travel mode and behaviour
- Traffic Growth
- Infrastructure
- Climate Change
- Land Use Planning
- Safety
- Sustainability and quality of life

Based on these key issues, the essay introduces an innovative model based upon the perceived urban make up of the United Kingdom in 2030 with urban and suburban agglomerations. The model visualises a framework of interchanges where efficient, mixed land use development occurs around them. The interchanges provide multi-modal choices and provide access to high-tech information resources. These interchanges are connected by intelligent linkages which comprise of automated highways, rapid multiple user transit and, sustainable and weather resistant infrastructure.

The mixed land use surrounding the interchanges is designed to encourage linked trips for example by providing necessary amenities close to the workplace and school, thus reducing the need to travel.

A fictional family is introduced in order to place Vision 2030 into some context. The reader is taken through a typical day scenario of the four family members and witnesses further the actualities of the 2030 transport system and looks in more detail at the intelligent and sustainable linkages between nodes.

The essay concludes with a synopsis of the objectives achieved in relation to reducing the need to travel whilst safeguarding quality of life. It moves on to suggest how Vision 2030 can be implemented in countries in transition or the developing world. The generic nature of the model endeavours to allow easy applicability in its entirety or just facilitating

elements of it. It is hoped that through the planning experiences of the developed world, and an annual international Vision 2030 congress, developing countries can learn from mistakes and plan for a better transport future.

1. THE WAY IT IS NOW

In the year 2000, the UK Government – through the publication of a 10-year transport plan (DETR, 2000) – recognised the need for a better transport network with less congested roads and modern, affordable and reliable public transport. Following decades of under-investment, the result in the UK, and many other countries worldwide, is overcrowding, congestion, delays, pollution and a lack of choice of how to travel.

Increased economic activity and growing incomes in preceding decades have combined to generate higher demands for personal travel and the transport of goods and services.

Growth in total traffic in the UK, for instance, is forecast to increase by 22% between 2000 and 2010. Resulting congestion in urban areas is forecast to grow by 15% across the UK network as a whole and by 28% on the inter-urban trunk road network. The car continues to be the preferred mode of transport, with 61% of all journeys in 2002 made this way. Walking (27%), cycling (2%), buses (6%) and trains (2%) account for the remaining modes used. As a result of past under-investment, local roads are in their worst condition for 30 years, with detrimental consequences for traffic flow and safety.

In terms of public transport, inadequate facilities have given rise to bus patronage declining by two-thirds in the UK since the 1950s. Outside London, only 15% of those working in metropolitan areas, and 7% in other towns, commute by public transport. With around 75% of those working in central London travelling to work by public transport, large parts of the Underground are currently overcrowded in peak times. On London commuter rail services, four out of the ten operators exceeded overcrowding standards. In rural areas, low population densities increase the cost per head of providing public transport, which has limited its provision. Currently, only 36% of households in UK rural areas are within a ten-minute walk of a regular bus service. Around 60% of the poorest 20% of households and those over 70 have no car. Women and those under 20 are also more reliant on public transport. As a result, large proportions of the population at present suffer poor access to work and services and, are at risk of social exclusion.

Forecasts of rail passenger demand show a 34% increase between 2000 and 2010. Providing additional capacity and improved services is forecast to increase this to 50%. Passenger satisfaction with rail journeys in 2000 ranged from 67% to 91%. Only 41% of users felt rail services offered value for money. In terms of safety, major investment in new safety systems is required to rebuild confidence in the safety of railways.

Emissions of carbon dioxide (CO_2) – the most significant greenhouse gas causing climate change – from the transport sector represented a quarter of the UK's total emissions in 2000. While emissions of the most noxious air pollutants arising from road traffic are predicted to decrease by 2010 due to improvements in vehicle technology and fuel quality, this trend is then projected to reverse beyond 2010 as improvements are offset by traffic growth.

2. THE WAY IT WILL BE THEN – 2030

Clearly transport strategies worldwide need to evolve in order to keep pace with an increasing desire for mobility and to protect our quality of life. To meet this demand, we have identified a number of key issues of primary consideration as shown in Figure 1. These include:

- *Changes in travel modes and behaviour*: If the increasing desire for mobility is to be met, then there needs to be a shift towards more sustainable modes of transport that can deal with the change in behaviour;

- *Traffic growth*: With very high levels of projected traffic growth, future transport networks must be designed to sustain such trends;
- *Infrastructure:* The infrastructure of tomorrow needs to be cost effective, durable, easy to maintain and 'intelligent', so as to control traffic and increase capacity;
- *Climate change*: The latest climate change scenarios for the UK (UKCIP02) indicate that during the 21st Century the climate will become warmer and wetter with sea level rise greater in the South East. Adaptations to transport infrastructure are necessary to withstand forecast climatic extremes.
- *Land use planning*: Future land use planning should seek to minimise the need to travel; mixed land use is an example of such planning.
- *Safety*: Safety with progress is paramount. Before a transport system can be implemented, a full safety audit should be undertaken to minimise risks to the public. This is achieved by realising what the risks, or perceived risks, are and deducing ways of either eliminating these or reducing them. This should be achieved by testing and trialling any new scheme.
- *Sustainability and quality of life*: All developments for the future should provide a better quality of life, while minimising impacts on the environment and local communities.

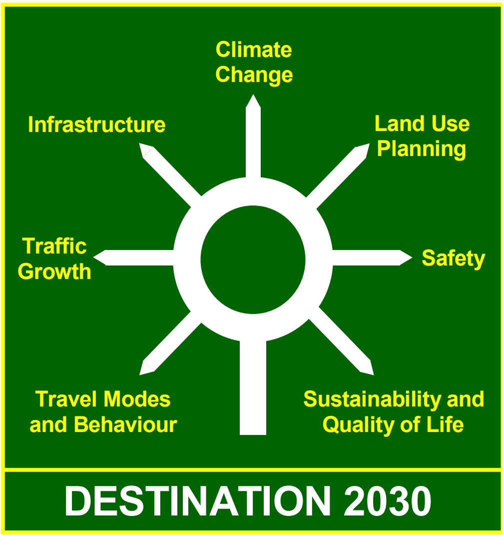

Figure 1: Key issues for the future

Based on these key themes, Figure 2 presents an innovative vision of a transport system in 2030. Vision 2030 would be a progression from infrastructure improvements currently taking place in many countries around the world. In the UK, for instance, the Government embarked on a ten-year plan, which by the year 2010 is proposed to deliver:

- A modern, high quality public transport, both locally and nationally;
- More light rail and bus services that are fully accessible and integrated with other types of transport;
- High quality park and ride schemes to prevent people driving into congested town centres;
- Improved transport links to regeneration areas and better land use planning;
- A modern train fleet, with reliable and more frequent services, and faster trains;
- A well-maintained road network with real-time driver information and reduced congestion;
- Fully integrated public transport information, booking and ticketing systems;
- Safer and more secure transport accessible to all;
- A transport system that makes less impact on the environment.

Vision 2030

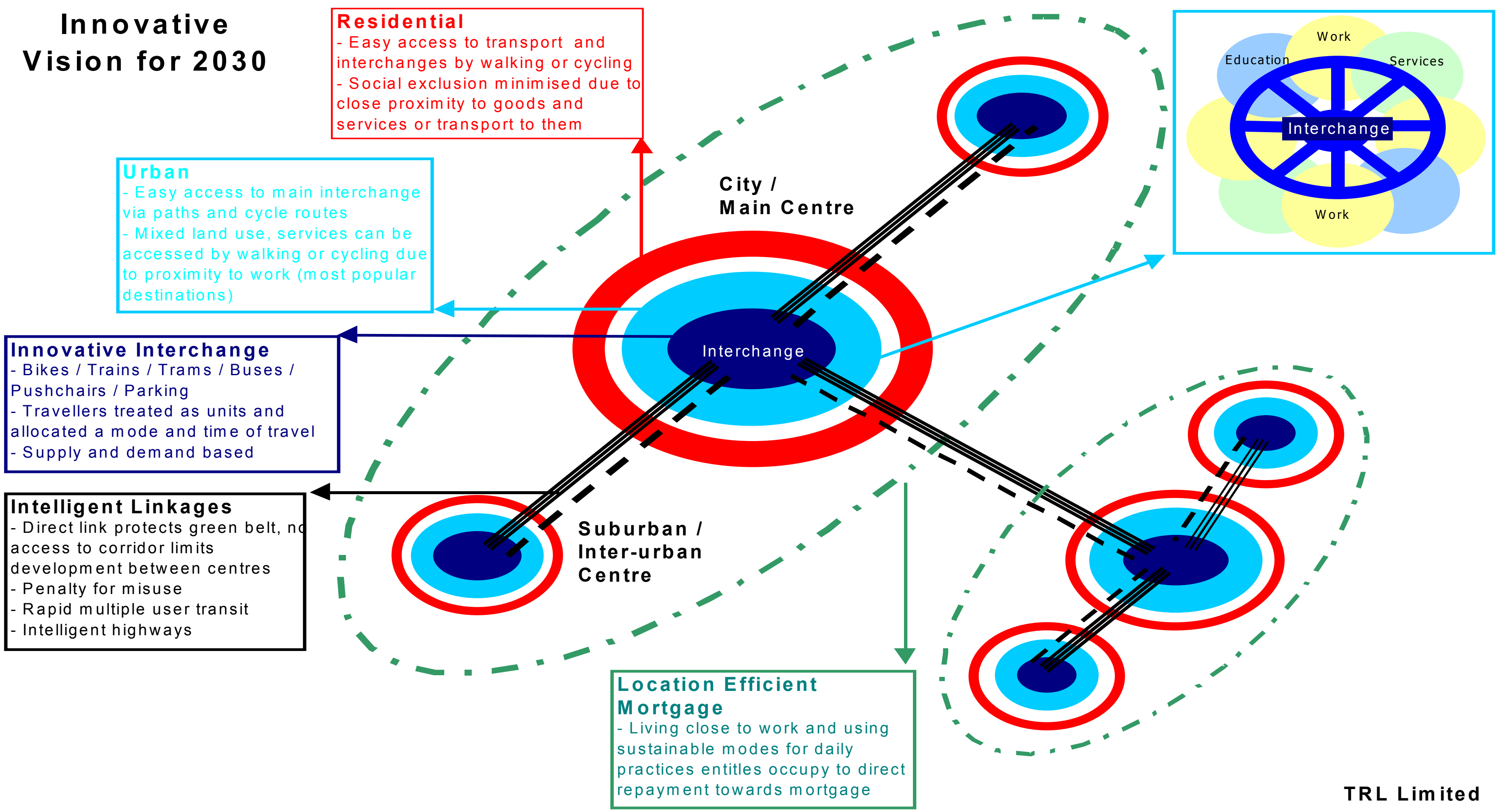

Figure 2: A Generic Transport Model for 2030

With these improvements as its basis, Vision 2030 in Figure 2 portrays urban and inter-urban agglomerations connected by rapid transit intelligent linkages. Each node holds a main interchange around which urban design has been implemented. This allows for mixed land use and linked trips, as will be described later. The nucleus around each interchange can vary from a city, to a small town, to a business park. Vision 2030 endeavours to reduce the need to be mobile by placing daily necessities within easy access of home. Where travel is required the intelligent linkages provide fast and sustainable access for all.

Planning in Vision 2030 embraces urban density as being more cost effective than urban sprawl. By 2015 urban density will have been encouraged instead of the earlier trend of urban centres versus green suburbs whereby the inner city in between became an area of degeneration. A 2002 study by TRL Limited on behalf of the Highways Agency UK concerning commuter travel behaviour with the corridors of the trunk road network found such a pattern. When looking at London it was concluded that those living outside London and those living in Inner London had reasonable and fast access to the transport network, whilst those living in Outer London were forced to rely upon their cars and experience the consequent diurnal congestion. Vision 2030 helps guard against degeneration through the provision of the direct linkages with no access to the principle links between the main interchanges allowing also for the protection of green areas in between. This works in conjunction with efficient development (and mortgages which will be discussed later), located to maximise accessibility.

The key to the Vision 2030 is the idea of these linked interchanges. An interchange is a multi modal transport node. Spontaneous users arrive and are allocated slots at a given time depending on the mode and the demand. The system will integrate these users with the regular commuters that have a preferred travel method. It can be viewed as a flexible all-purpose network providing an interface of roads, cycle and bus lanes, tram and railway lines, and pedestrian and roller-blading paths. Some of the major interchanges also include airfields. As well as efficient access to all modes of transport, there are services such as shops, restaurants, entertainment areas, cyber cafes, and walk in health clinics, conference/meeting rooms. Organised multi-storey car parks and a rotating car alighting wheel provide options for car users without causing too much congestion at the interchange. Design of the interchange has been based upon state-of-the-art guidelines on crowd control that does not discriminate against holidaymakers, cyclists and pushchairs.

The development and construction of all facets of Vision 2030 are carried out in a highly sustainable manner. All stakeholders are assessed at procurement stages using sustainability indicators that rank company performance in terms of a range of key issues, such as rates of recycling, respect for staff, appreciation of and adaptability to issues relating to climate change, etc.

Easy and convenient access of the interchanges to residential areas encourages use of safe and efficient public transport. Maintaining a healthy lifestyle and government environmental initiatives are the key drivers for the increasing popularity of interchanges. Variable road markings controlled from the interchange are an example of its flexibility to be either reactive or proactive with forecast transport demand.

In accordance with the beliefs of TRL Limited (Gillingham, R. et al., 2000) the facilitation of the 2030 model is dependent upon six key objectives for transport systems:

- To increase public awareness and support
- To manage demand in order to reduce congestion
- To increase the use of public transport
- To increase cycling and walking
- To increase the efficiency of the freight distribution industry
- To combine the above aims within land use planning

The 2030 model works upon the assumption that the greater the urban density the greater propensity there is for shared trips. The stance is taken that the use of the car can never be eradicated and that the car is still a valid form of transport. Instead of the current argument that public transport should take precedence above car use, 2030 sees no dominant mode of transport but several of equal priority.

Out of town shopping developments have been avoided and instead the viability of town centres has been developed. The late 20th Century out of town retail developments in the developed world have been catered for by serving them with cheap, multiple user transport to keep them viable but to encourage urban density through infill and development of brown-field sites. In short, land use has been maximised efficiently.

“Public transport stops should be no more than a short walk from home and as close as the parking lot to the office” (UITP,2001). The UITP (Union Internationale des Transport Publics) also states that pedestrianisation in place of congested streets can enliven cities and increase local trade as is portrayed by the urban make-up design in Vision 2030. With strict parking policies in place the two principles work in conjunction with one another. 2030 thinking suggests that land use planning should seek to minimise the need to travel, for example by mixed land use planning. The 2001 Planning Policy Guidance Note 13 (PPG13, 2001. UK) specifically highlighted the mixing of land uses advocating that "mixed use development can provide very significant benefits, in terms of promoting vitality and diversity and in promoting walking as a primary mode of travel".

The *need* for mobility has been managed through the adaptation of the model. Preferential location, in terms of work and accommodation which, in the past caused polarisation of other regions, is no longer an issue that requires acknowledgement. Good transport provision has been found to add value to a developing area, with a mutual benefit to business, workers and the quality of the area as a whole. A good transport network is now key to an area's viability, it provides access to existing resources whilst creating a framework within which future development can occur. The Transport Visions Network UK at the turn of the 21st Century highlighted the need for an equitable distribution of access to a range of key destinations that support a community's quality of life.

As the model demonstrates in a 2030 agglomeration, facilities for the necessities for everyday life are located close to those places where people spend most of their time - home and work. The need to be mobile has been lessened and the amounts of travel reduced (Figure 3). Through having reasonable access to goods and services quality of life has been guarded. The model also supports this through its adoption of a location efficient mortgage whereby by work and home are encouraged to be within close proximity (Victoria Transport Policy Institute).

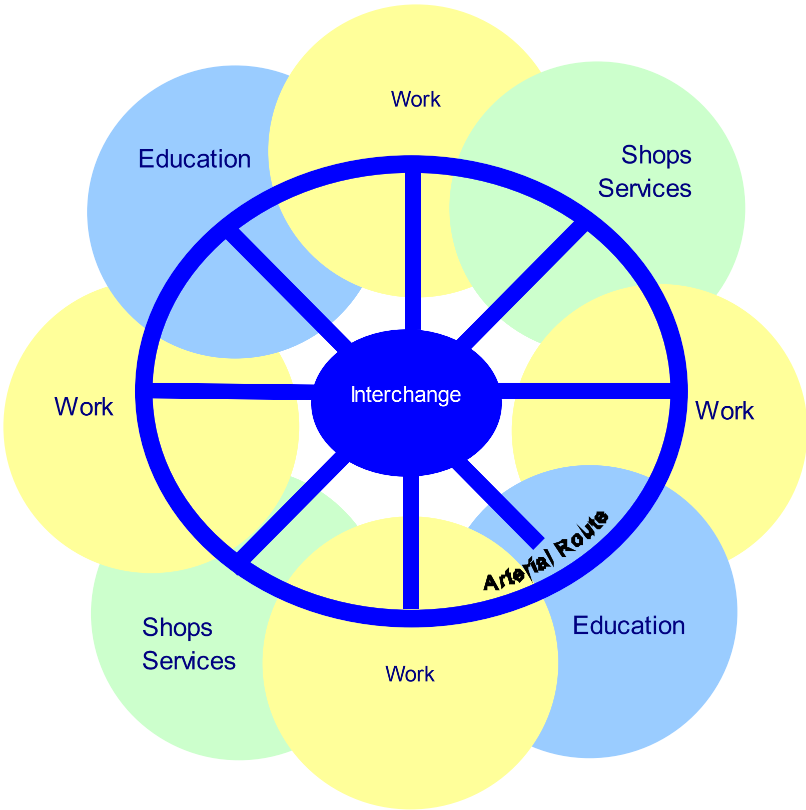

Figure 3: Urban Sectors within Vision 2030

Figure 3 demonstrates the 2030 concept of going back to the original reasons that agglomerations occur, a mix of land uses. Overlaps between sectors are apparent to allow for mixes to occur, for example having a post office as part of a work building. An urban layout such as this allows for linked trips such as dropping the children at school, work and shopping and thus reduces the need for mobility whilst enhancing quality of life through less hectic lifestyles. The different sectors are linked by a traffic free arterial path that allows easy access to the various spheres required by life via walking or cycling allowing many benefits such as noise reduction, better health, reduced pollution, and easy access to amenities.

Social exclusion has also been addressed in Vision 2030. By then, car ownership will not be a necessity and easy access to transport will meet the need for mobility. This is in accordance with the UK Government's Vision for 2010 which endeavoured to strive towards a transport system that provided " modern, high quality public transport, both locally and nationally", Whereby people would have more choice about how they travelled, and would use public transport (DETR, 2000:13).

To better demonstrate the 2030 Vision, let us take you through a typical day for a family living in 2030. This journey will demonstrate how a family would make their trips to and from work and school, in a local and national setting. Also, it will give an indication of the types of infrastructure that are in place in 2030 and how it will control the daily commute.

3. A DAY IN THE LIFE OF THE BROWN FAMILY – 2030

The introduction of 'Traffic Vision 2030' has been successful in eradicating the stress associated with to going work. Gone are the traffic jams, unexpected delays, and missed trains typical of commuting in the early 2000s.

Consider a day in the life of the Brown family for example. The Browns live in the South East of England, where they take advantage of the location efficient mortgage scheme, due to their proximity to their workplace. There are two children; a 17-year-old sixth form pupil George, and a 9-year-old primary school pupil Emma. Mr and Mrs Brown both work in the same city, but today Mrs Brown has a meeting in the north of England so she elects to take the car. The children attend different schools in the same city as their parents work, but choose to commute separately (see Figure 4).

The family is woken each morning by their Travel Intelligent Monitor, or TIM. This system receives local and national travel and weather information and helps the household plan their journey more effectively. For instance, George may be woken earlier than normal as TIM has received real-time travel information from a central control centre stating that there are delays on the train line that he usually takes. As George uses his bicycle on legs of his commute, he also receives daily weather updates to help him plan his journey times and clothing requirements.

Mrs Brown drives to the main city interchange and drops off her husband and daughter. At the interchange, Mr Brown and Emma assess their onward travel options. On this given morning they travel by bus to the Business Park where Mr Brown's office is situated conveniently close to his daughter's school. This park is served by a nearby satellite sub-urban interchange. Bus lanes are always made available on this route using Variable Road Markings.

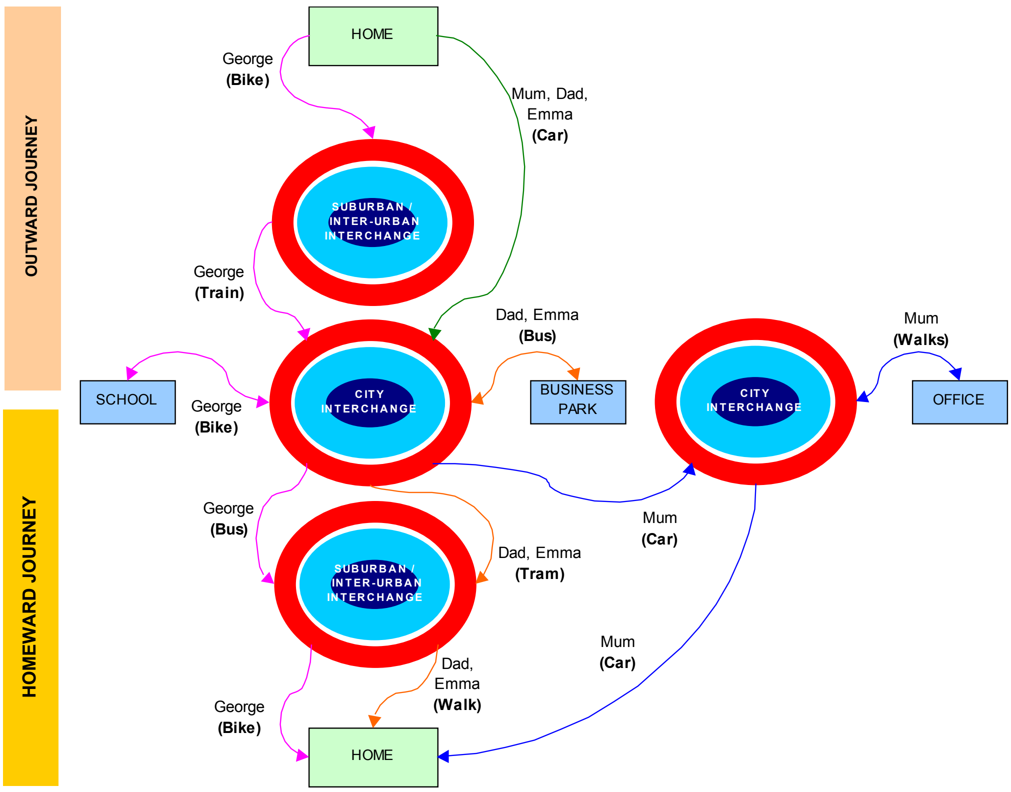

Figure 4: The Browns' Journey

Mr Brown and Emma have a short walk from the sub-urban interchange along the main arterial pedestrian and cycle path.

After dropping Emma at school, Mr Brown continues the traffic free walk to work meeting colleagues along the way. Upon arrival at the work domain, Mr Brown sits at his workstation and contemplates the work he has been e-mailed from HQ and the video-conference he will have later.

He rarely chooses to work from home as he enjoys the interaction with other colleagues and always finds it difficult to concentrate at home. As Mr Brown works on the increasingly popular flexible working hour scheme, he is always in good time to meet Emma at the end of each day.

Taking the train
George, on the other hand, using the abundance of designated paths, elects to cycle from home to the local suburban interchange, where today he catches a train to the city interchange.

George doesn't have a problem with the archaic ticket verification procedures of yesteryear, due to a debit facility built into his TIM. He passes through the security screening area, which is able to detect any contraband items such as weapons or explosives, giving passengers extra peace of mind.

Finding the correct platform is made simple in 2030 using a mobile TIM that is linked into the local Smart Travel Network (STN). The STN is a centralised system that monitors all forms of travel in the local area and makes adjustments to timetables accordingly. It can also make adjustments to bus routes depending on demand or the available capacity of the network. The local STNs also communicate with each other, and so long distance journeys can be planned more efficiently. Although the platform is above ground there is a Jubilee Shelter, which is a design of platform shelter taken from the early designs of the Jubilee Line on the London Underground. This shelter protects the customers from the elements, and only opens when the train has docked. When the train arrives, George is able to put his bike into the dedicated cycle carriage. From the city interchange his school is then a short journey along an elevated city centre cycle path, many sections of which are enclosed to allow relatively high and safe travel speeds

On the road
On the road, Mrs Brown uses the Automated Highway (AH) 4 on which she has booked a slot in the Road Train. This involves making her way to the waiting area, passing through automatic barriers that pick up the EVI (Electronic Vehicle Identification) chip that is embedded into the licence plate. This notifies the STN that Mrs Brown has arrived, and it begins to calculate how to integrate her car into the Road Train. Meanwhile, she waits in the holding area until it is her turn. The Road Train lane was introduced in 2020. It had first been envisioned in the 1990s, and was first successfully demonstrated in San Diego in 1997.The system 'links' cars together using radar to create a 'train' effect. As the cars are intelligently linked together, they can travel at high speeds with small headways. However, it took a long time to implement as the costs of the system were initially high and there were concerns about whether a viable consumer market existed. The AH comprises of four lanes in each direction, with the Road Train lane adjacent to the main carriageway, separated by a barrier.

Figure 5: A demonstration of the Road Train, California, USA

Mrs Brown's in-car information system chimes to let her know that her slot on the Road Train is approaching. This is her cue to enter the acceleration slip and engage automatic control. Further upstream, the space between two cars (as the Road Train is limited to cars and small vans) will be gradually increased to make room for her car. As the gap approaches, her car starts to accelerate along the slip until it's travelling at the speed of the Road Train and is adjacent to the gap, at which point it seamlessly joins the flow. As control is now out of her hands, Mrs Brown can relax and make preparations for her day ahead, safe in the knowledge that an alarm on the in-car system will notify her of any trouble. Due to increased safety implications as a result of small headways, Road Train lanes are constantly monitored at high levels.

At the turn of the 21st century, air pollution as a result of nitrogen oxide (NOx) in automotive emissions was reaching unacceptable levels. To address this problem, and in conjunction with vehicular improvements and reduced traffic levels, large proportions of the highway infrastructure in 2030 are now capable of air purification.

Based on work relating to paving blocks originally pioneered by Mitsubishi Materials Cooperation (Murata et al, 1997), all cement-based construction elements are impregnated with a catalyst - titanium dioxide - which in sunlight, helps convert nitrogen oxides into nitric acid. This in turn is then neutralized by the element, which due to its cement content is highly alkaline. Around 80-90% of the NOx gases that come into contact with these elements is consumed. Construction elements in close proximity to highways using this technology include bridge superstructures, concrete pavements, retaining walls, safety barriers, etc.

At the required exit, a chime sounds gently to alert Mrs Brown. If not acknowledged, the chime gradually becomes more insistent to the point of an alarm (some people are heavy sleepers). At the exit points, there are deceleration slips. At a certain point, the driver is required to steer the vehicle out of the Road Train. If the driver does not do this, then the automatic control remains on, the car remains in the Road Train and the authorities are alerted.

End of the day

At the end of each day Mr Brown meets his daughter outside school. Today, as in the morning, they elect to return to the main city interchange by bus. At the interchange, they take full advantage of the amenities available to them, with Emma visiting the doctor for an inoculation. To return home, they catch a tram to their local interchange and then walk from there.

George, on the other hand decides to take a cycle friendly bus between the city and local interchanges. His TIM registers this fact, and makes the appropriate adjustments to his account.

Car journey home

Finishing the meeting earlier than expected, Mrs Brown cancels her slot on the Road Train and decides to take her chances with the traffic. As she approaches the AH4, it is clear that the traffic is bad. The Ramp Metering is active, which means that traffic levels are high. Ramp Metering is a system where there are traffic lights on the slip road. Detectors built into the main carriageway detect when there is a gap in the traffic upstream of the merge area, and the system then allows traffic onto the AH.

Figure 6: Ramp Metering on the M27, Southampton, UK

Once on the AH4, the signals located on the gantries display speed limits. There are regular gantries, spaced every 500m, along the whole of the AH. These are able to display signals, speed limits and messages. The speed limits are set automatically depending on how heavy the traffic is. The system also detects when a queue has formed, and protects the back of it with speed limits set upstream. This system of Variable Speed Limits was first piloted in the UK on the M25 between Junctions 10 to 15 in 1995.

Figure 7: Variable Speed Limits on the M25, London, UK

As long as people obey them, the speed limits help to smooth the flow of traffic. Since the introduction of Electronic Vehicle Identification (EVI), enforcement of these speed limits has become a lot easier for the Police. EVI is a system where a microchip is embedded into the licence plate of the vehicle. This chip holds all relevant information about the vehicle and the owner. If someone breaks the speed limit, detectors pick this up and then ‘reads’ the EVI chip. An email is then sent to the offender alerting them of their impending fine. The message signs on the gantries display approximate journey times to the next Junction, thus allowing drivers to be able to plan their journeys more accurately. This also helps to alleviate aggressive driving, as motorists are more confident about getting to their destination on time.

With her journey unreserved, Mrs. Brown encountered the ultimate faux pas for the year 2030 – stuck in road works! Thankfully, however, interruptions related to highway construction and maintenance in the year 2030 are now minimal. This is as a result of the nature of modern-day highway construction. The majority of new pavement construction is undertaken using rigid prefabricated highway sections, built under strict factory control where quality control is paramount. Construction and maintenance is undertaken rapidly in situ by fitting these sections into place, not unlike laminate flooring. Prior to placing, subgrade preparation or maintenance is also carried out rapidly using in situ stabilising techniques. With high tolerance levels achieved during prefabrication, sections are designed to dovetail together to provide the required load transfer. For the same reason, joints and transition zones are of a high quality, requiring minimal maintenance with time; a major problem encountered with concrete paving technologies of old. When maintenance is required, pavement sections can be easily removed and a replacement section added. Deteriorating sections are either patch repaired, or rubbilised to form the aggregate for newly constructed sections. In 2030, the use of 100% recycled materials where possible, is mandatory in all construction.

Constructed at key regional satellite locations to minimise transportation needs, sections are constructed with a range of cross-sections, enabling engineers to meet the predicted traffic levels of different roads, and different lanes within a given road. Inside and outside lane sections additionally feature provisions for crash barriers and lighting, making complete road construction quicker and more efficient.

Wearing courses on modern day pavements are also applied rapidly using innovative techniques originally trialled in the Netherlands in the early 2000’s. Similar to the rigid foundation layers, wearing courses are prefabricated under strict factory control. Manufactured with bitumen-coated aggregate bound to a geo-textile base, the wearing courses are supplied in large rolls not unlike carpet. Techniques for laying this material are also similar to carpet, with bonding to the concrete foundation achieved by microwave-induced heat treatment and subsequent rolling. Rolls are supplied in a range of surface textures – often complete with road markings – to provide variable levels of skidding resistance and noise mitigating characteristics. In this way, specific wearing course rolls can be selected to suit given applications. While highly durable, wearing courses in the year 2030 are highly sustainable, and can be easily lifted and maintained off site. Maintenance typically involves the removal and replacement of the aggregate/binder constituent of the roll. In this way, wearing course rolls are fully recyclable in addition to being easy and quick to install.

Independently of the 'carpet' wearing course technique the rather more impressive 'Road Machine' was developed in 2015. The inventor and promoter also invented the ballistic soil nail machine for 'firing' 5m steel nails into slopes to improve their stability and spent most of his career encouraging the use of geotextiles and geomembranes in increasingly innovative ways. His idea proved completely successful when the prototype Goliath

Rolopaver performed beyond expectations on its first trial and subsequent jobs (see Figure 8). The Mark II prototype 'fired' the lighting columns into the soil more quickly than the original auguring technique. Of course the 1000 tonne Goliath is dwarfed by the current machines, which lay six, seven or eight lane carriageways in one pass.

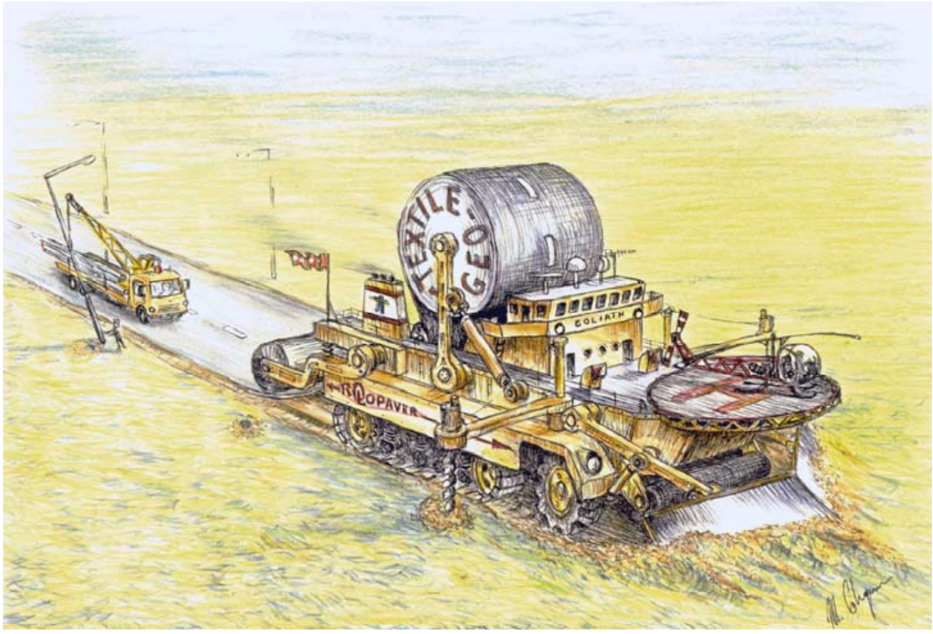

Figure 8: The Goliath Rolopaver

High quality infrastructure construction is assured in 2030 through Performance-Related Specifications, which contain mathematical models that predict performance, deterioration and life cycle costs. As this approach allows for accurate contractor payment adjustments, optimum quality levels are ensured.

In relation to Mrs Brown’s delay, at heavily congested sections of road the Hard Shoulder has been opened up as an extra lane. The white line that separates the Hard Shoulder from the main carriageway is actually a Variable Lane Marking. Normally the line is solid, but when the Hard Shoulder is opened up it’s changed to a broken line. The message signs on the gantries display that the Hard Shoulder can be used.

At places where Hard Shoulder running is problematic (such as at closely spaced junctions), a Plus Lane is introduced. Normally the main carriageway has three lanes. However, when there is heavy congestion and the traffic is travelling slowly anyway, the Variable Road Markings can be changed to alter the layout of the carriageway. Four lanes are now displayed with Lane 1 the same width as before to allow for the HGVs, Lane 2 is slightly narrower and Lanes 3 and 4 are just over a car’s width. A speed limit is imposed because of the safety implications due to narrower lanes. During free flowing traffic, the carriageway is reverted back to the three-lane configuration so that the speed limits can be removed. The Dutch piloted this system in the late 1990s.

A system called Exit Queue Management is also implemented in 2030 to avoid dangers associated with traffic tailing from congested junctions back into the main highway. The Hard Shoulder is opened up prior to the Junction for the traffic to queue into, thus leaving the main carriageway clear. Again, the message signs inform the drivers that the system is in operation.

With the help of these features, Mrs Brown leaves the AH4 and begins the final part of her journey home. The whole journey has been a lot quicker and more relaxed than it would have been in the past.

At the beginning of the 21st Century, global transportation infrastructures are experiencing unsustainable levels of demand. Matching the demand for increased mobility whilst enhancing quality of life will require proactive strategy and planning co-ordinated from national, regional and local administrations.

4. CONCLUSION

Arguably, any vision for the future should be based upon existing research, statistical trends, innovative ideas and experience.

'Vision 2030', as presented in this paper provides a generic and innovative theoretical framework of central interchanges surrounded by mixed land use development. The model aims to maximise mobility without compromising quality of life. The model encourages linked trips through the provision of amenities within easy reach of home, work and a transport network that is durable and intelligent.

Vision 2030 stresses the need for future transportation visions to embrace issues surrounding climate change and the environment, sustainability, infrastructure, land use planning, design, maintenance, travel behaviour, innovative technology and safety. Whilst it is not possible to forecast changing government policies, economies or market forces, the current trend is for improvement and forward thinking.

Although some of the concepts used in this essay are futuristic, the model itself is not meant for exclusive application to developed countries. It is our opinion that the generic nature of Vision 2030 can be facilitated in part or entirely within developing countries. The model has the ability to allow countries in transition to adopt relevant concepts that are applicable to them, such as locating amenities adjacent to transport nodes or promoting sustainable infrastructure. Time will allow them to develop their model based upon domestic priorities and economic and physical constraints. An annual international Vision 2030 congress would facilitate the continual dissemination of ideas and experience.

Are you ready for the odyssey?

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