

# Urban Transport: The Beating Heart of City Productivity



# Contents

---

1 Executive Summary	1
---------------------	---

---

2 Diagnosing Urban Ills	2
-------------------------	---

---

3 @ the Center of the Urban Transport Debate	3
--	---

---

4 Where to Start the Journey	5
------------------------------	---

---

5 Making Urban Transport Improvement A Reality	7
--	---

---

6 The Last Word	12
-----------------	----

---

# 1 Executive Summary

As social, economic and capacity pressures on urban transport and city planning schemes continue unabated, where do city leaders start on the journey towards cohesive, intelligence-led transport improvements? How do they deliver all things to all people—not just transport that gets city dwellers from a to b, but transport that is economically viable, meets current and future housing and commercial needs, and is socially inclusive. It must also reflect 21st century concerns about global warming and sustainability.

No one city is the same. Some planners are already well on the road to effective transport planning that integrates all aspects of urban living. Others are struggling with internal silos that prevent holistic thinking around transport improvement aligned with other social factors. Many know what is required but have yet to put in place the necessary infrastructure strategy that will support the free flow of urban transport, keeping the arteries of commerce and community healthy and capable of delivering the city's lifeblood—its people.

Capgemini has developed a maturity model that plots a path towards effective urban transport improvement. Where each city's transport strategy is on this model will

depend on a wide range of conditions and attitudes that are covered in this report. However, what remains consistent is the need for effective planning and implementation as integral parts of a modern urban transport infrastructure, subsequently backed up by an ongoing operational focus that ensures sustainability.

This document sets out to stimulate debate around this crucial component of every city's wider planning strategy. We define transport planning and the key elements that make up an 'improved' transport infrastructure. We consider the importance of the new technologies supported by visionary leadership that together will enable the seamless collection, sharing and exploitation of information across multiple city systems—the rise of information-led network operations will be the key to providing a real-time picture of the entire urban operation.

And finally, we suggest that there are three specific areas of focus that will make urban transport improvement a reality: strategic planning, governance and demand management.

## 2 Diagnosing Urban Ills

Like the transport systems that sustain the human body, urban transport is a complex myriad of flows which constitute the lifeblood of a city. As in the human body, these flows get disturbed, constricted and congested. But we have not yet found the means to make the city transport systems run as smoothly as those of the human body.

Transport is vital both to the economic success of a city and for making it a pleasant place to live. Efficient transport systems save people time, increasing productivity by improving connectivity between people and businesses. As with a healthy human body, the aim should be for a city's transport system to be consistent and reliable, in other words boringly predictable. But transport doesn't operate in isolation; it simply provides an enabling service to the whole urban system—as in the human body.

Although the analogy has its limits, there is an underlying message that could form an important aspiration. The human systems are ideally boringly predictable—working seamlessly together, responding to signals of constant dynamic change, and all without us being consciously aware of it—until something goes wrong.

There are a growing number of fresh new ideas that can help city administrations achieve 'boring predictability' in transport. At the core of many of these is the move towards a substantial improvement of the operational performance of urban transport. This can be achieved by applying new concepts such as: information-led, network-enabled operations that address city transport as a unified system, inter-dependent with other city systems. This, together with effective demand management can help today's cities achieve their economic, social and environmental goals.



### Did you know...

- Westminster City in London sees the equivalent of the entire population of the UK pass through its borders every two months – that's 65 million commuters and tourists.
- Up to 900,000 motor vehicles enter Milan every day and 320,000 passengers arrive at its Central Station
- By contrast, 33% of commuters travel in Copenhagen by bicycle (in Amsterdam the figure is 40%), and 85% of Copenhagen residents own a bicycle; 60% of whom ride it every day
- Rotterdam, Europe's busiest port, ships 1.04 million metric tons of goods every day
- Taipei City Government took 10 steps to tackle vehicle-generated air pollution, three of which involved LPG or bus emissions
- 81% of all traffic jams in Holland are in the Randstad road network, even though the Randstad covers only 20% of the country's surface area.
- The high speed train network in the Tokyo-Yokohama area carries 29,000,000 passengers every day.

# 3 @ the Centre of the Urban Transport Debate

## Defining the edge of the Urban Transport system

Defining the boundary of the multimodal system that we know as urban transport is important before we explore what can be done to improve how the system operates. But this raises the whole question of where the boundary actually is. Our view is that cities should be considered as multiple inter-dependent overlapping systems with different spatial boundaries. This is a far cry from the current governance model, but a more sound means by which improvements will be achieved. Transport is perhaps the least boundable of city systems.

Improvement is best addressed by considering the transport system not just as a unified whole but by also addressing specific modal opportunities. Too often insufficient time is spent dealing with the former (for perhaps understandable complexity, organisational, political, informational reasons) which results in sub-optimal outcomes for the latter.

What is improvement in urban transport? Less or more of it? Or something entirely different? When it comes to transport, we are a fickle breed; we use what is given to us to its maximum and complain when it gets overcrowded. So for most people improvement means “easier for me”. But with urbanisation levels at over 80% in developed countries, there are just too many of the “me” to satisfy.

Capgemini recognises five important considerations that are central to the transport debate.

### # 1: System complexity:

Urban areas normally depend on many modes of transport, from capacious rail systems enabling economic growth to niche ‘dial-a-ride’ systems reducing social exclusion. And don’t forget simply walking or cycling. But complex management and governance arrangements can often mean that passengers don’t experience an easy, seamless journey. To the uninitiated, a short local journey can require a considerable amount of research into exactly how it can be made, how much it will cost and how well (if at all) modal interchanges can be made. Disjointed management continues to cause problems during and after the journey: delays are always a nasty surprise and staff find themselves unable to answer the questions passengers expect them to be able to, leading to a slow but constant worsening of the public perception of public transport.

Away from direct passenger view, system complexity is a function of at least two factors. Firstly, the arrangements between central government, local authorities and

publicly-owned operators. Secondly, the contractual arrangements between the public and private sector service providers, which can define relationships and service standards for long periods of time.

Wherever the complexity lies, it indirectly influences the public attitude to public transport and thus their demand for it. The choices made at all levels do make an impact.

### # 2: Customer Demand:

The consumer paradigm has taught us to demand that things are delivered when it is convenient to us. The result of which is that retailers seek to promise one-hour delivery windows and pump more and more white vans onto our already crowded streets in the process. We strive for heightened security in our lives, and thus expect the transport systems to respond accordingly—be that managing threats, or mitigating consequences. Either way, it places severe strain (and costs) on the systems.

### # 3: Transport Regulation:

Governments and City administrations take a stance on transport in their endeavours to regulate and set policy for the best outcomes. There are always questions posed as to the motives and quality of the information that informs such decisions. Because many of these decisions affect city infrastructure for years beyond that of the reign of power of the politician or the span of control of the administrator, they deserve inspection. Alas these deliberations too frequently turn into serious delay and exacerbated transport issues—with all the consequential economic and societal implications.

#### # 4: Indirect Regulation:

It is not just transport policy and regulation that influences transport. Each element of urban systems, such as housing, environment, health, immigration and the economy is interwoven. So, for instance, decisions around the location of housing stock can have a marked effect on the ability of workers to live close to work. The implications of impending environmental regulations—mostly as yet unset or indeed not yet contemplated—have the potential for draconian impacts on transport habits. However the wheels of political power that are typically in place to govern such interdependencies are rarely sufficiently joined-up to address them in an efficient and informed manner. Delay, re-work, confusion, and societal impact abound.

#### # 5: Personal Agendas:

While some people actively seek to buy locally, recycle and walk instead of drive, the true fact is that most people don't. Transport schemes large and small often have little vocal support from the public, and suffer from a popular media narrative which focuses only on the unhappy vocal minority or wallet of the individual. Engaging the public to build support for potentially unpopular projects in the short term—but that are essential for society in the long term—is likely to be the hardest and most risky part of any urban improvement programme. We believe stakeholder management, in the widest sense, is essential at the embryonic stage of an initiative, long before glossy solutions are presented to the public. In addition to statutory consultation requirements for projects—read

solution—people need to already believe there is a problem that needs to be solved.

There are other developments afoot that offer a more positive light. The well-embedded information revolution delivers a stream of new technologies that frequently offer unintended solutions to transport problems. If we can learn to innovate in a smart and speedy way with these technologies then there are real opportunities to alleviate the transport challenge. What these technologies do is provide information on all parts of the transport system and put information at the heart of the transport system—a situation we must all strive to achieve. The most difficult part is knowing where to start.



## 4 Where to Start the Journey

**“If we apply the consumption of the developed world to that of the developing world, apart from causing our transport systems to grind to a halt, we will also have a profound impact on the environment and the dwindling hydrocarbon resource base. We neglect that at our children’s peril.”**

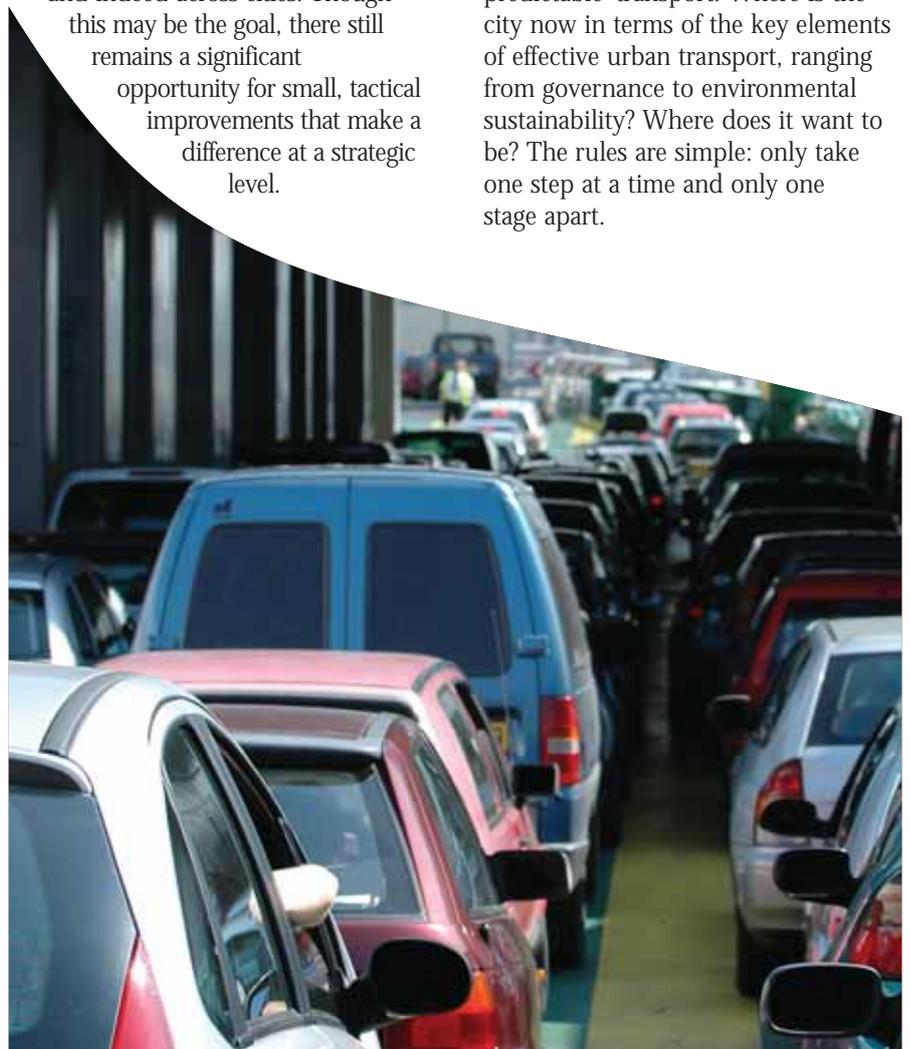
Graham Colclough  
Global Vice President Cities and  
Regions, Capgemini

No city is the same and thus no transport strategy will be either. Cultures, priorities, funding, growth and a host of other factors affect the decisions that need to be made in transport. A clear understanding of the maturity levels across each of these factors will help ensure constancy of internal plans.

We have highlighted the importance of transport to a city’s performance and the need to manage the process of planning across city administrations, and indeed across cities. Though this may be the goal, there still remains a significant opportunity for small, tactical improvements that make a difference at a strategic level.

Supply-side improvements tend to be followed by demand increases, which is why demand management is so vital. Without it, improvements risk bringing only temporary relief, soon to be followed by increased demand and another step closer to gridlock across the entire network rather than just its main arteries. So where should we start our journey?

The table below offers a starting point for each city beginning the journey towards delivering ‘boringly predictable’ transport. Where is the city now in terms of the key elements of effective urban transport, ranging from governance to environmental sustainability? Where does it want to be? The rules are simple: only take one step at a time and only one stage apart.





	Inward looking	Progressing	Performance driven	"Boringly predictable"
Governance	Transport is managed across multiple independent bodies	Transport is led, with some cross-body agreements	Agreements cover most inter-organisational relations. Some shared initiatives	Pan-city urban transport board integrates with surrounding systems
Strategic planning	Viewed as poorly bounded independent cogs	Connections between main cogs, with operational benefits	Most cogs connected, with both user and urban benefits	Urban area predictively modelled as inter-dependent system with capabilities
Demand management	Few or no demand measures in use	Proactive user info used to influence customer choices (soft demand management)	Blunt pricing to influence demand, soft measures to influence demand patterns.	Mix of hard and soft TDM to optimise use of all infrastructure and technology
User information	Infrequent and ad-hoc. Takes effort to find	Simple message systems in place to explain major issues	Location-specific messages; easy access to information	Real time, e-enabled, 2-way, multi-modal and event intelligence
Access and inclusion	Expensive; physical access barriers common	Travel affordable to low-income groups; no barriers on basic routes	Minimal social exclusion. No access barriers on major routes	Universal access to everywhere
Operational effectiveness	Working in silos, with little communication	Silos share health and safety knowledge	Operational processes implemented across silos	Continuous improvement and customer focus in operational DNA
Infrastructure management	Limited or no performance metrics; infrastructure deteriorating	Basic metrics used. Existing infrastructure maintained "like-for-like", with level performance	Metrics measure and prioritise in asset management to ensure safety and efficiency	Assets maintained, new ones introduced. Capacity matches changing demand
Environmental sustainability	Little or no awareness of environmental impact	Public declaration of intentions made and early wins implemented	Impact measured; published strategy for sustainability / environment	Meets needs of present without compromising needs of future

# 5 Making Urban Transport Improvement a Reality

## Urban Transport Warfare

There is a battle going on in cities: a battle for space. With the current approach it will be a battle with only losers. The air will be more polluted, the transport system will come to a standstill and cities will not be desirable places to live.

There is much to learn from those experienced in warfare: the Armed Forces.

Traditionally, the Armed Forces were divided into Air, Land and Sea, with each force gathering its own intelligence and only working together when necessary. Internal boundaries could only be crossed at a sufficiently high level in the chain of command. This meant that the distance between a soldier in the field and (say) his desired air-support (the so called sensor-to-shooter distance) was highly inefficient. The result? Late, inaccurate, bombing and potentially unnecessary loss of lives. The modern army has solved this problem by removing the internal organisational boundaries.

Information gathered by the different forces is shared to create a common operational picture. This is then shared with those involved to ensure that everyone is situationally aware. The communication between a soldier in the field and the pilot in the air is now almost direct (a short sensor-to-shooter distance) resulting in far more efficient warfare with higher accuracy and a lower risk of unnecessary loss of lives.

Imagine how that would work in a city: a short sensor-to-traveller distance would give all travellers a direct link to all relevant travel information in real-time and everywhere. This would enable them to make the best decision based on the most accurate information.

The power and information to make a decision should lie at the level where the one that takes the decision also feels/suffers the consequences: the soldier or traveller. When this is true for all travellers this will result in the most optimal use of the transport system. This is called taking the power to the edges.

The elements presented in the preceding table set out a path a city could follow to deliver improvements. We believe that, at the heart of it, there are three crucial areas of focus that will make transport improvement a reality: strategic planning; governance; and demand management. These are now explored in more detail. To be successful, each component is likely to require technological innovations and/or new ways of working to be embraced.

### Strategic planning

Cities are systems whose components interact in complex and seemingly unpredictable ways. Understanding how transport fits in (as a derived demand) and how a shift in one element of the system impacts another is essential before plans are developed and implemented.

Our 'system dynamics' diagram below looks complicated but in reality it is simply reflecting the complexity of the strategic planning required to achieve long-term improvements in urban transport. It illustrates how a change in one area, such as population density or journey homogeneity, will indirectly link to the customer experience of public transport. It shows three types of information: drivers, transport impacts, and wider urban outcomes. Some drivers can be changed quickly, but others will take generations. Either way, they cannot be neglected.

The principal links, those believed to have greatest influence, are shown. While the diagram will be tailored for a specific urban area—subject to local cultural preferences, city layout, operational capabilities, individual

wealth, and so on—we include it here to provide a generic example of how a local government or transport provider can begin to unravel the strategies needed.

More detail can be added, such as whether the links between each part of the diagram have a positive or negative impact. For example, by improving the customer experience, the impact will be positive for demand levels but negative for crowding and discomfort as more people are attracted to the service. If ignored or unnoticed by management, this will in turn have a negative impact on customer experience. It is also possible to discover those drivers which have the greatest influence, and hence require the greatest thinking.

### Governance

Creating governance processes that can seamlessly collect, share and exploit information with all other systems in a city will provide a real-time picture of the entire city operation. And through this we can understand, make decisions and predict the effects of a change in one system on another.

While the idea is simple (and in terms of the technology implementation, it is) there are challenges: awareness of objectives and ultimate benefits must be built; there has to be leadership will; and those leaders should have the ability to look beyond a personal goal. Visionary people and leaders are needed who are willing to think differently and be prepared to place their own organisation's goals second to the city's goals. They will be able to understand that the organisation's short-term objectives may not be met.

Instead, they will focus on the overriding benefits of the longer-term goal of a more functioning city.

In many urban areas, transport information is gathered for use by an individual organisation. For example, a bus company will collect information on the accuracy of its buses to determine the performance of the bus network. A taxi company may do the same for its fleet. It is too often forgotten that this information can be shared and used by, for example, a central traffic management centre to determine the travel time on certain sections of road. So a lot of effort is put into gathering information to answer what are, in general, the same questions: what is the performance of my bus system and where are the bottle necks?

Being 'network enabled' is all about being aware of this inefficient approach to information gathering

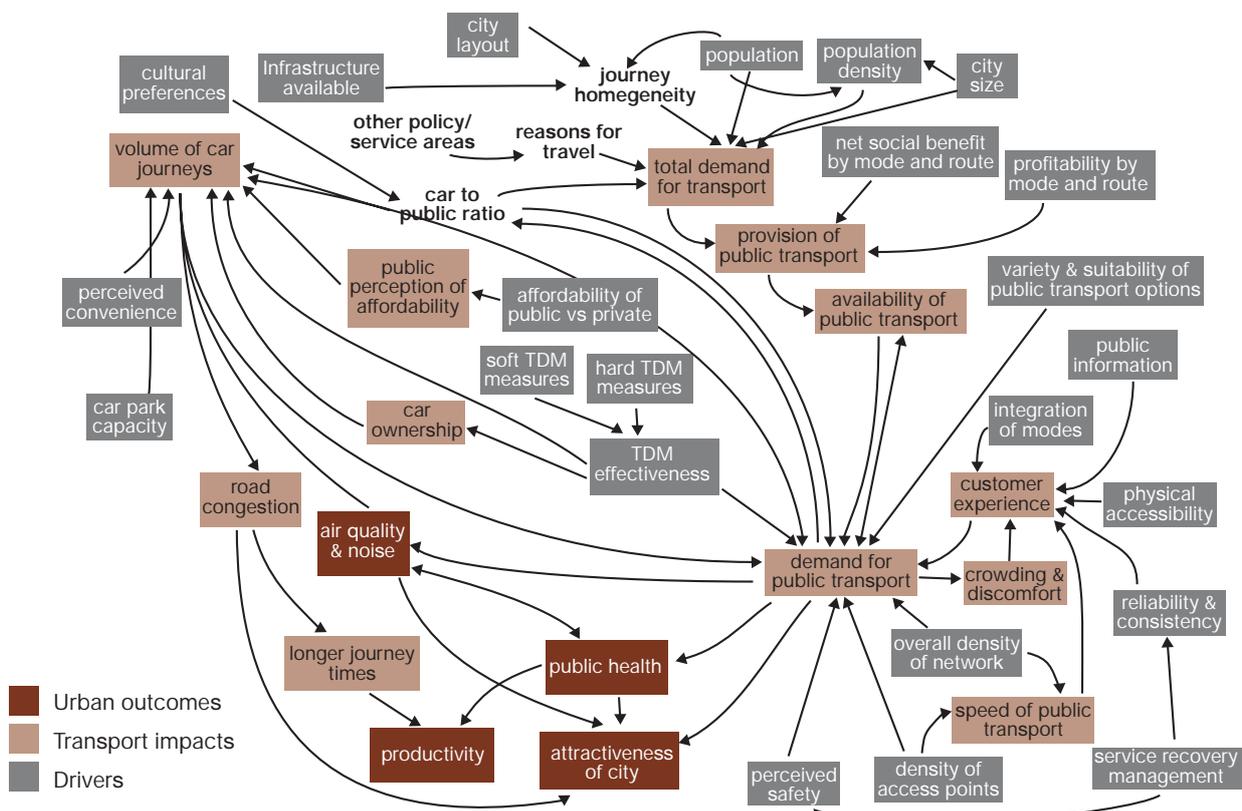
and being prepared to share information across system and organisational boundaries to create a 'common operational picture'. It starts with gathering real-time information and sharing it across system boundaries. From this common operational picture a far more complete set of real-time data can be sent to participants. This will make them more aware of what is going on in their environment (situational awareness) thus enabling them to make a better judgement of the situation and in turn an informed decision. When fully operational, participants are completely and accurately informed and can therefore take the right decisions that will yield the best use of the available infrastructure (the notion of self synchronisation).

Capgemini believes this has two main implications for cities:

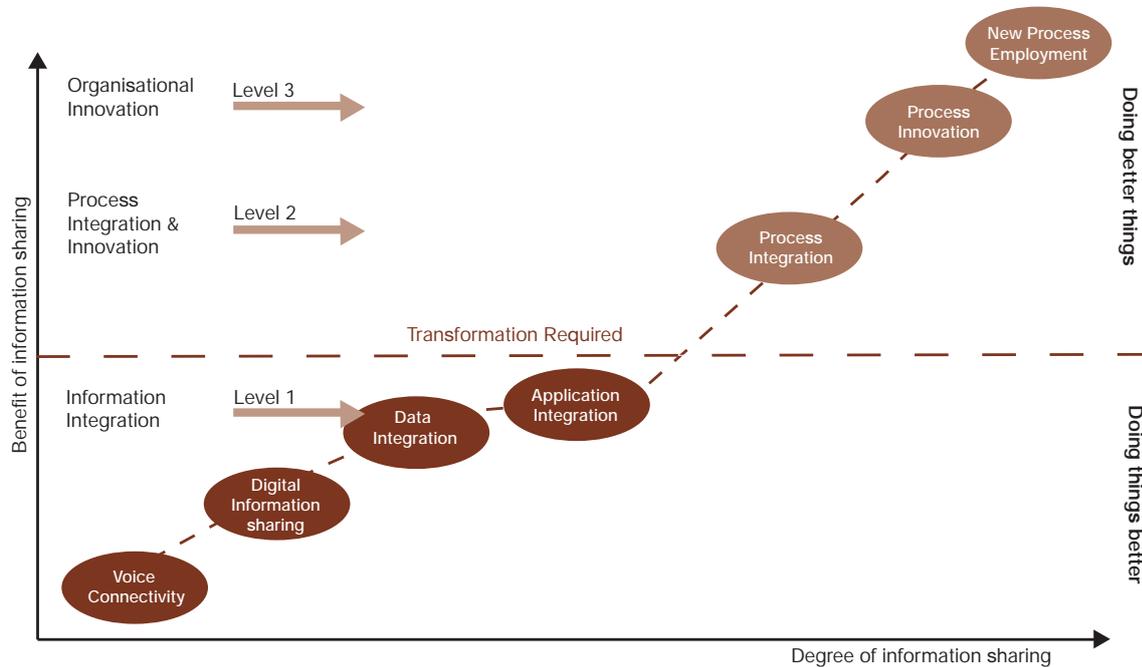
- There are benefits from crossing traditional organisational boundaries. In order to operate in a truly network-centred operational environment governance changes should almost always be considered.
- The power to make decisions should be moved to the edge of the system and placed in the hands of the end-user, the customer, passenger, or front-line employee. This will give system users the information they need to make the right decision, at the right time, to improve their journey.

An awareness of the interdependencies between systems, and of the need to move decision-making powers to the edges of the system is essential to make the step to a network-enabled approach. This stands at the core of providing 'symbiotic urban transport systems'.

Unravelling complexity: understanding how each element of a city's urban transport plan interacts on the overall strategic planning is crucial to improvement success.



Step change: from integrating information resources to process innovation, the journey to improved urban transport schemes requires a shift in thinking as well as practice.



In such an environment the willingness to share information across the organisational boundaries is great, making it possible to truly put information at the heart of the network and to build a common operational picture of the problem at hand.

In some cases first steps towards sharing information are relatively easily made. This is because modern technology makes it possible to share information across organisation boundaries. However, to really make the difference the governance change should also be implemented. It's the difference between *'doing things better'* and *'doing better things'*.

### Demand management

With 95% of the expected urban population increase over the next two decades taking place in the developing world, innovation is vital in order to manage resources and the impact of pollution on a local as well as global level.

Recent research in the Netherlands shows some astonishing results: only 1.2% of the transport infrastructure is used on average to transport people or goods over roads, rail and/or waterways. Yet the traffic jams get longer and more frequent; morning jams merge into afternoon jams. If demand for infrastructure was spread evenly across the day and across the different types of infrastructure there would be no problem (even in the long term). Instead, we use the same infrastructure at the same time, accepting the resulting congestion and demands for huge infrastructure investment schemes. This behaviour is just as true in the Netherlands as it is for many transport systems in cities across the world. This is represented by the simple diagram below.

So how can we avoid this downward spiral? It is unlikely that there will ever be one simple answer. Rather, a set of relatively simple, innovative ideas that will combine to ensure the available infrastructure is used in a smarter way. Successfully managing

demand starts by considering the following questions:

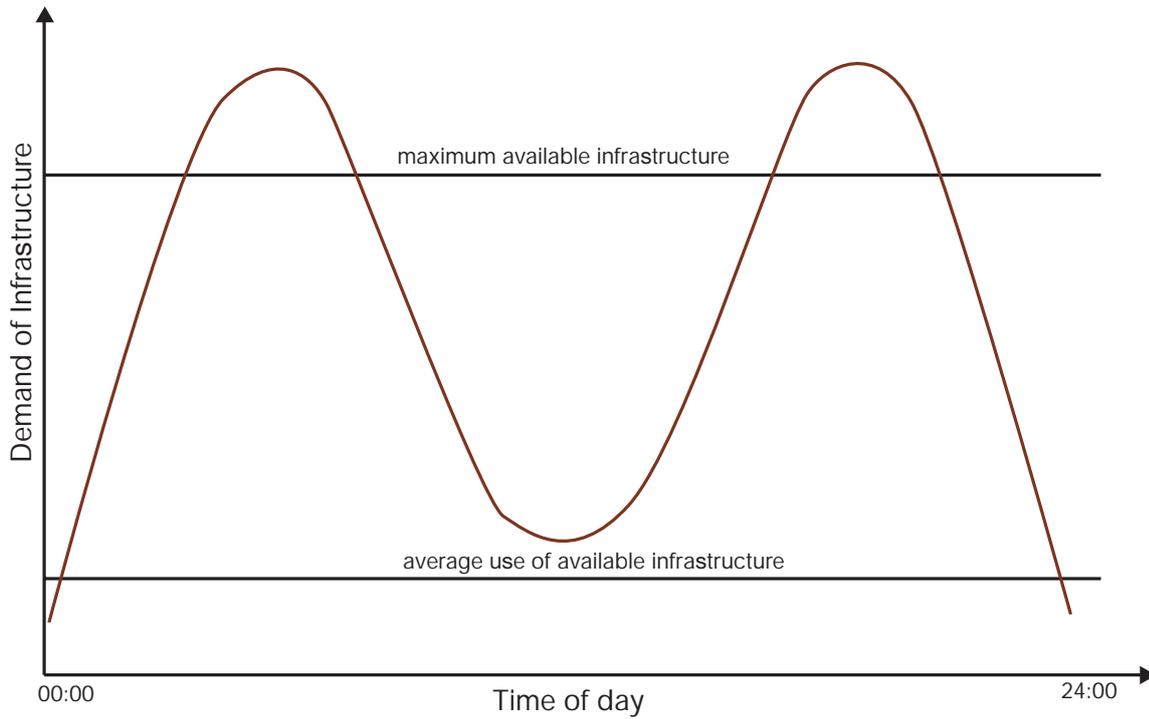
#### i. Who wants to travel when and by which mode?

This makes it possible to estimate the usage of all transport modes and therefore predict the time when a mode will become congested. This warns travellers of possible congestion before it occurs so that they can switch modes before they start to travel—a facility likely to be on the wish list of every city and citizen.

#### ii. What truck has space available on the next trip?

We transport a lot of empty space and this is exacerbated with the extra demand for speedy delivery that we expect when ordering online. This has resulted in increased numbers of smaller parcels through a growing fleet of (half empty) vans. The same holds true for the empty taxi driving through the city towards its next pickup.

Peak flow: overcoming the rush hour highs is a critical infrastructure challenge.



**iii. How to switch transport to rail or water instead of roads?**

Information is crucial here. Firstly to monitor the volume of goods on different modes. This will help to decide what is needed with respect to vessels or train carriages, and transfer points to facilitate the modal switch. Secondly this information will improve the distribution of the goods over the different modes.

**iv. Where are the traffic jams (and the alternative transport means to avoid them)?**

Knowing where traffic jams are helps vehicle drivers take alternative routes, or decide to take alternative means of transport.

**v. How to enable working at home /different locations?**

Another way of reducing the demand for infrastructure is by home working—the lack of which keeps traffic jams in place. A significant change in culture is required to accept the simple fact that working at home is often as productive (and often even more) as

working in the office. Organisational changes are needed to facilitate working at home. There are a growing number of pilots in place in most cities

**vi. How to persuade people to travel to work outside congested hours?**

Rewarding a change in driving patterns can also influence the demand for infrastructure by encouraging greater road use outside congestion periods. In the Netherlands, for example, successful pilots gave car travellers a financial reward when they travelled outside a given period. This had a positive effect on the behaviour of people. Instead of starting the day by joining yet another traffic jam, people chose to travel to work much earlier or they started the day by carrying out some work at home.

These kinds of measures—often quite simple—will influence the demand for infrastructure. They are typically more effective, and certainly cheaper, than creating new infrastructure.

**Different ways of managing demand:**

Transport for London uses two categories of demand management—soft techniques, which include advertising and persuasion, and hard techniques such as financial incentives.

Singapore has maintained a particular focus on hard demand management, requiring all road-users to purchase ownership licences for their vehicles and install satellite transmission devices on them to enable mile-by-mile congestion charging for each journey.

Lyon in France sits at the softer end of the demand management spectrum, with a strategy of encouraging long-term parking for residents and incentivising them to use public transport, including a public bicycle system.



## The Randstad Area—Overcoming Complexity

The Randstad area in the west of the Netherlands is the 5th largest city region in Europe, incorporating five large cities:

- Amsterdam (with two main ports: Schiphol airport and a harbour)
- The Hague (the political capital of the Netherlands)
- Rotterdam (with one of the largest harbours in the world)
- Utrecht
- Almere

The area houses 40% of the national population and is the economic heartland of the Netherlands. However, its competitive position is at stake because of the growing level of congestion on the roads. Capgemini is monitoring the situation carefully as the region's complexity continues to pose a threat both to the Randstad area and to the country's future prosperity, underlining the importance of getting urban transport planning right.

With four provinces, numerous local governments (including those of five of the Netherlands' largest cities), and several regional entities all involved at one level or another, improved cooperation is a necessity. And of course the central government also wants to have an influence as the Randstad area's development determines the competitive position of the Netherlands worldwide.

Herein lies the biggest challenge: how to ensure that the Randstad area remains competitive and stays in the top five of Europe's economic centres. The ownership of infrastructure, land etc is divided across several governmental layers: national, regional and local. In addition, intergovernmental entities occasionally exist on a regional or local level. To solve a given problem consensus between two or more of these parties is necessary. Without this consensus, stagnation occurs. For example, the debate about the extension of the A4 between Delft and Rotterdam has been raging for almost 45 years with no agreement for this vital piece of infrastructure – only 7 kilometres in length. This lack of consensus is mainly due to the different interests at stake.

Elsewhere, another example of fragmented responsibilities can be seen in the fact that on a national level three sub-departments of the Ministry of Transport are responsible for the traffic management on the national highways. Unsurprisingly – and unhelpfully – this means that there are no less than three traffic management centres in the Randstad area. What's more, a growing number of traffic management centres for the secondary roads are being built or considered by the responsible authorities. Fortunately, the importance of cooperation has been recognised and at the national level traffic management centres, at least, are working together closely. However they are a long way from being truly network enabled: sharing information across organisational boundaries taking into account all different types of roads and all types of transport available.

Governance change is an essential aspect of the solution to transform the Randstad area into a city-region of the future. This was emphasised by a review committee headed by former Prime Minister Wim Kok. However, successful resolution requires implementing governance processes to align a wide variety of organisations representing governmental, business, and citizen interests. The task for now appears too daunting and Kok's recommendations have been shelved by the Dutch Minister with the exception of a more modest "High Priority Program for the Randstad". This is not in line with the necessary changes Capgemini advocates and only time will tell how this works out for the Randstad area.

# 6 The Last Word

The human body has a very special healing system that requires no complex treatment, just one simple remedy: time. But whatever our level of health and fitness, as time passes that level is never constant.

The same is true for the urban area and its transport infrastructure. If assets and information systems are not improved and upgraded, they too will fail to provide the desired level of performance. They will deteriorate and the whole area will suffer.

So the choice is simple. A continual drive to deliver improvements is vital if our urban areas are to become healthier and fitter. This will require a focus in each of the eight elements described, including the crucial areas of strategic planning, governance and demand management, that provide a route map for the journey. To be successful, it is essential to:

- use new approaches to strategic planning and governance across

multi-modal city transport systems;

- improve the use technology to put information at the heart of the system and power to the edges; and
- understand and optimise the balance between supply and demand.

Capgemini recognises that before embarking on such action, each city must have an urban planning strategy that first defines where the city is on the transport improvement maturity model. What's right for one city isn't necessarily going to be right for another.

Our approach is to begin by assessing the current status and capability within the wider urban planning context. Only then can a route map for effective transport improvement be drawn up and steps taken, however small or large, to implementing the urban transport infrastructure that best meets your city's needs, not just today but well into the future.



## About Capgemini and the Collaborative Business Experience

Capgemini, one of the world's foremost providers of Consulting, Technology and Outsourcing services, has a unique way of working with its clients, called the Collaborative Business Experience.

Backed by over three decades of industry and service experience, the Collaborative Business Experience is designed to help our clients achieve better, faster, more sustainable results through seamless access to our network of world-leading technology partners and

collaboration-focused methods and tools. Through commitment to mutual success and the achievement of tangible value, we help businesses implement growth strategies, leverage technology, and thrive through the power of collaboration.

Capgemini employs approximately 75,000 people worldwide and reported 2006 global revenues of 7.7 billion euros.

More information about our services, offices and research is available at [www.capgemini.com](http://www.capgemini.com)



**Graham Colclough**

Global Vice President Cities and Regions  
+44 (0) 870 238 2425  
[graham.colclough@capgemini.com](mailto:graham.colclough@capgemini.com)

**John Reed**

Head of Transport Projects UK  
+44 (0) 870 238 8588  
[john.reed@capgemini.com](mailto:john.reed@capgemini.com)

**Ruud de Groot**

Head of Transport Projects NL  
+31 30 68 90677  
[ruud.de.groot@capgemini.com](mailto:ruud.de.groot@capgemini.com)