



Concept Symposium 2016

Governing the Front-End of Major Projects

The economic case for Crossrail



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Crossrail is the UK's largest infrastructure project, although it will be overtaken by High Speed 2 if that goes ahead as planned. This east west tunnel through central London connects two existing commuter lines allowing trains to serve the centre, instead of stopping at terminals on the edge of central London. From the early 70's it was consistently the top ranked rail project in London wide studies, but other smaller/cheaper projects were built first notably the Jubilee Line, the Jubilee Line Extension and the Docklands Light Railway.

I led economic appraisal of Crossrail in 1994, 1997 and then from 2001 to 2008 I was chief economist for Cross London Rail Links (CLRL). The first two were standard transport appraisals comparing the value of the transport user benefits (time savings, comfort, reliability, operating costs) against the capital costs of delivering the scheme, the operating and maintenance costs of running it and the revenues earned from users.

In 2002 we started the development of a new approach to appraisal. That approach was based on what are now known as Wider Economic Benefits (WEBs) which capture the links between employment density and productivity. The role of Crossrail in reducing travel costs still formed a major part of the overall case, but the role of WEBs was made explicit. Crossrail enabled additional growth in central London by adding transport capacity to locations that were otherwise capacity constrained. Further economic gains came from Crossrail linking the Isle of Dogs, City and West End.

The Wider Economic Benefits of Crossrail played particularly well to HM Treasury who suddenly saw real financial returns (additional tax revenues) from investing in transport infrastructure. Crossrail already had a good Benefit:Cost ratio (BCR), but that was not enough to persuade government to invest. WEBs both doubled the economic case and showed additional tax revenues to government. The project opens in 2018/19.

The economics of Crossrail

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Talk Structure

Introduction – what is Crossrail?

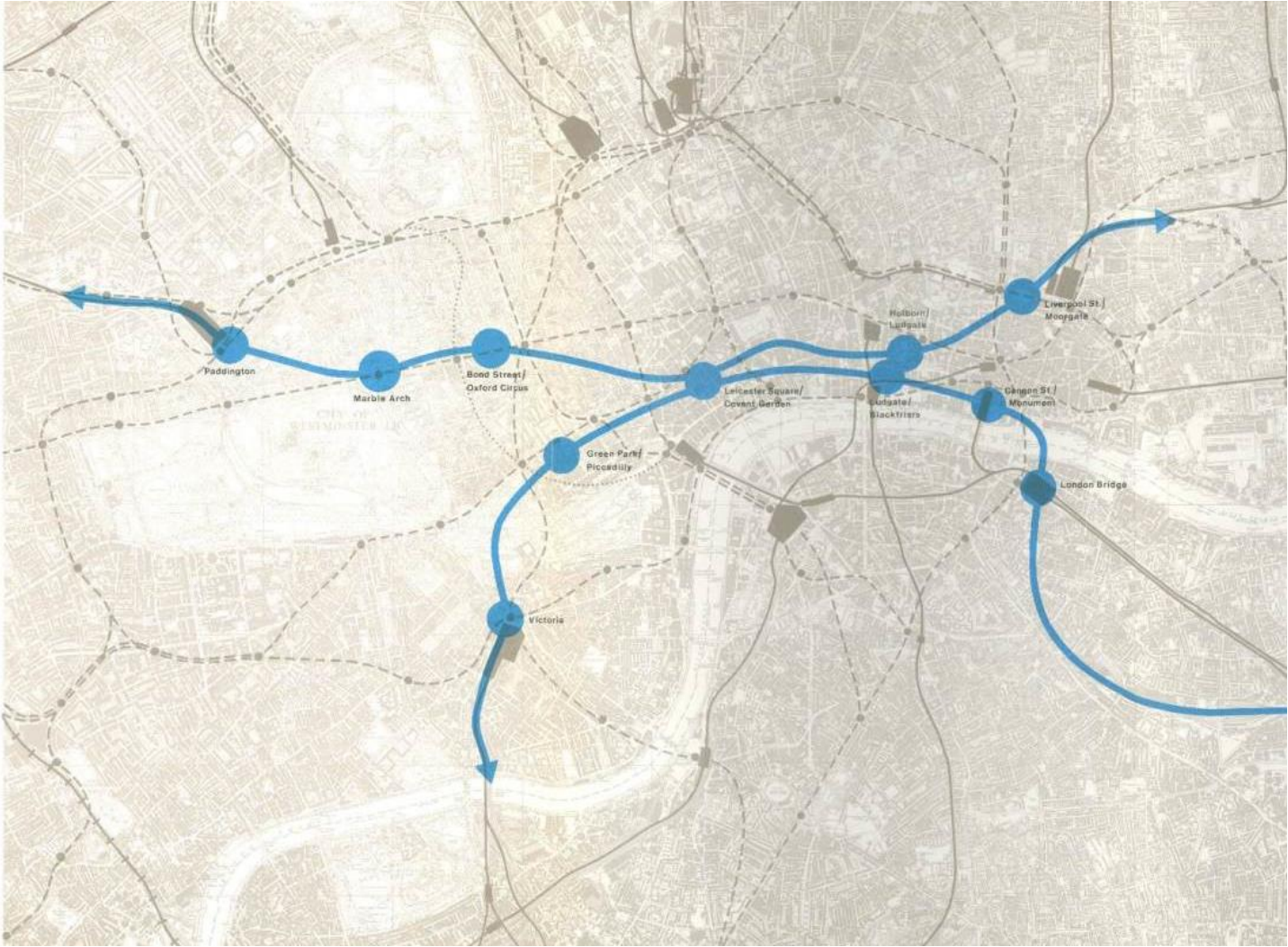
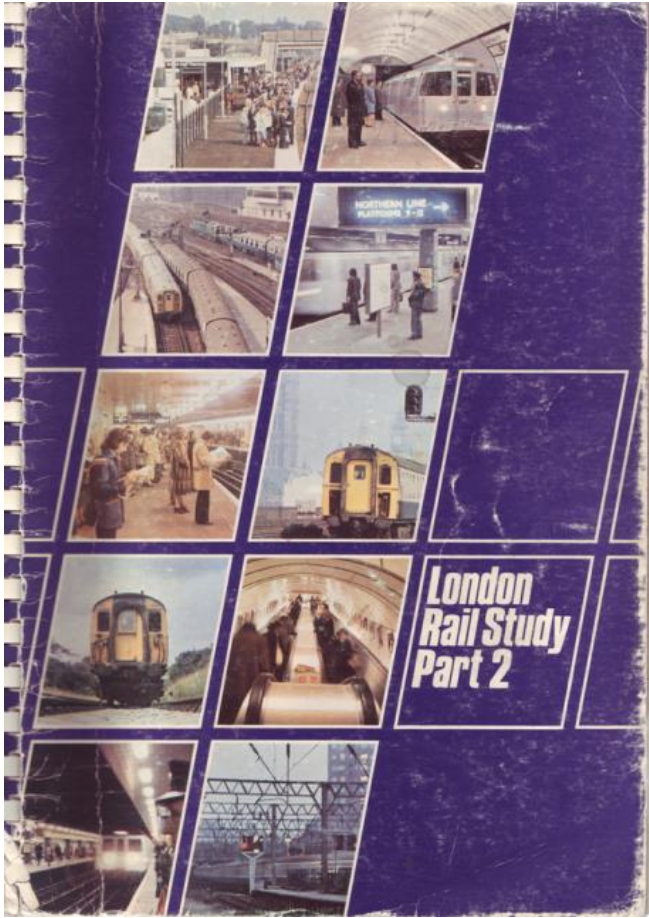
Transport Economic Appraisal

Wider Economic Benefits

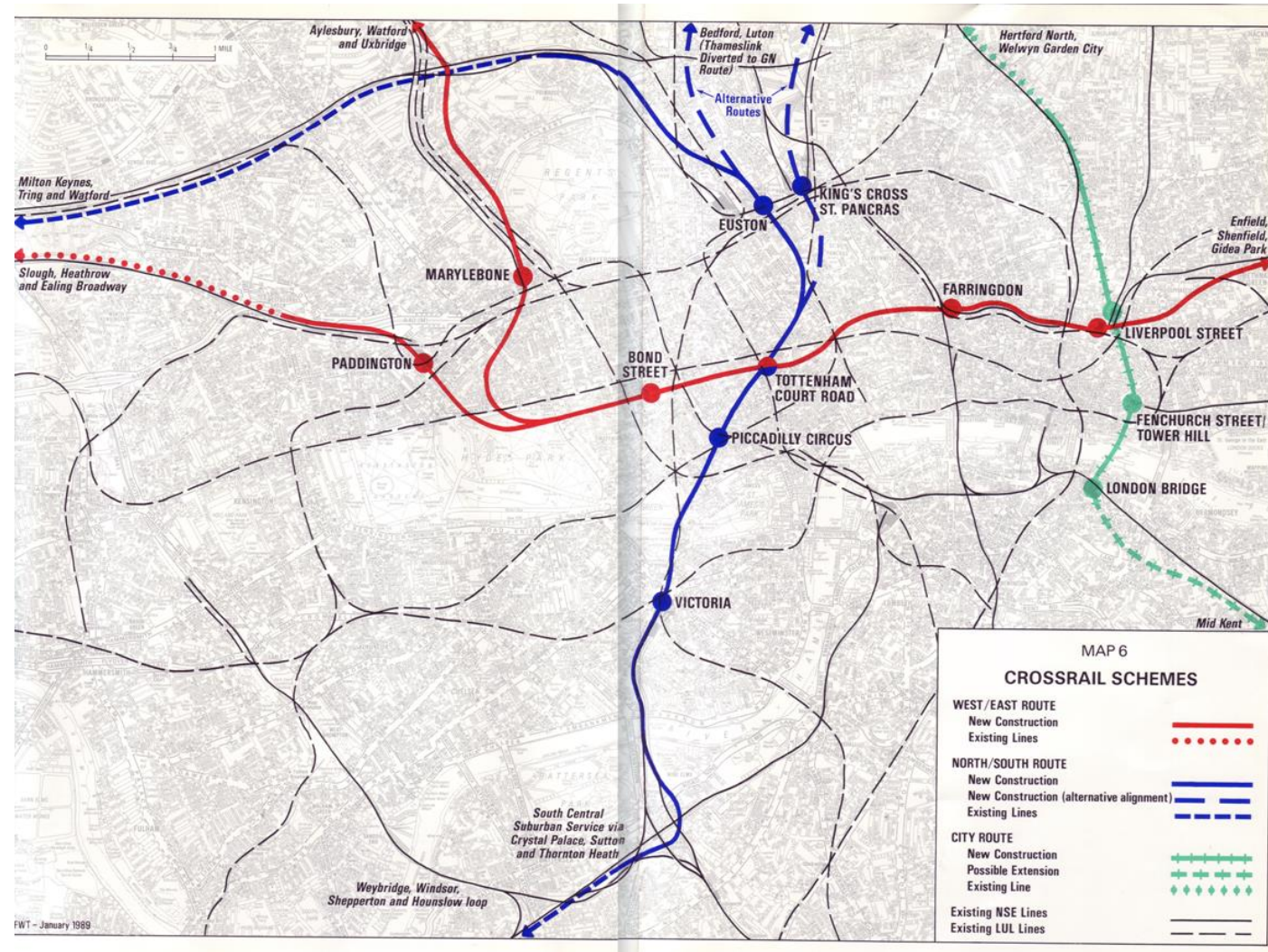
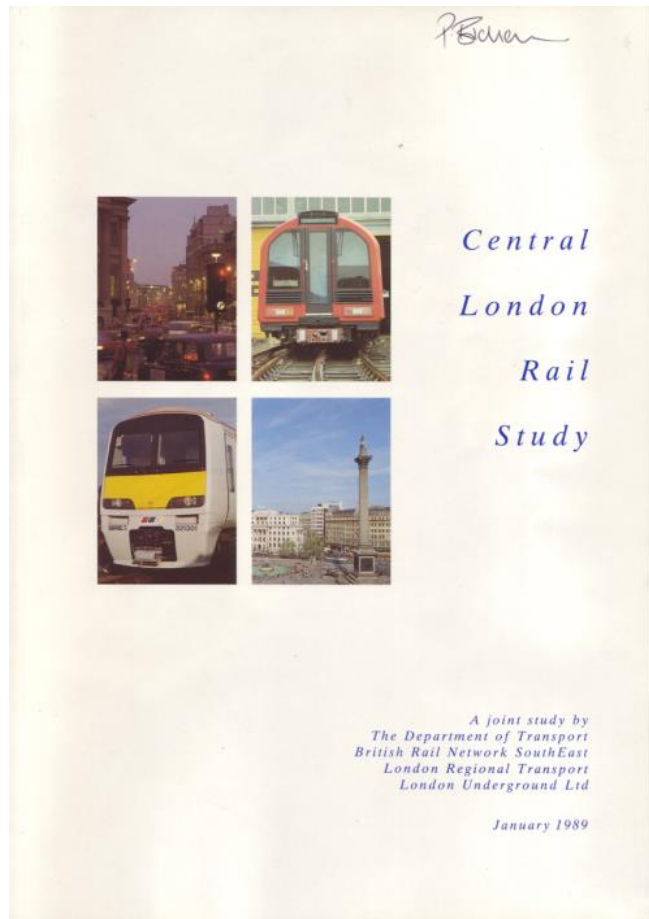
Delivering those benefits

Conclusions

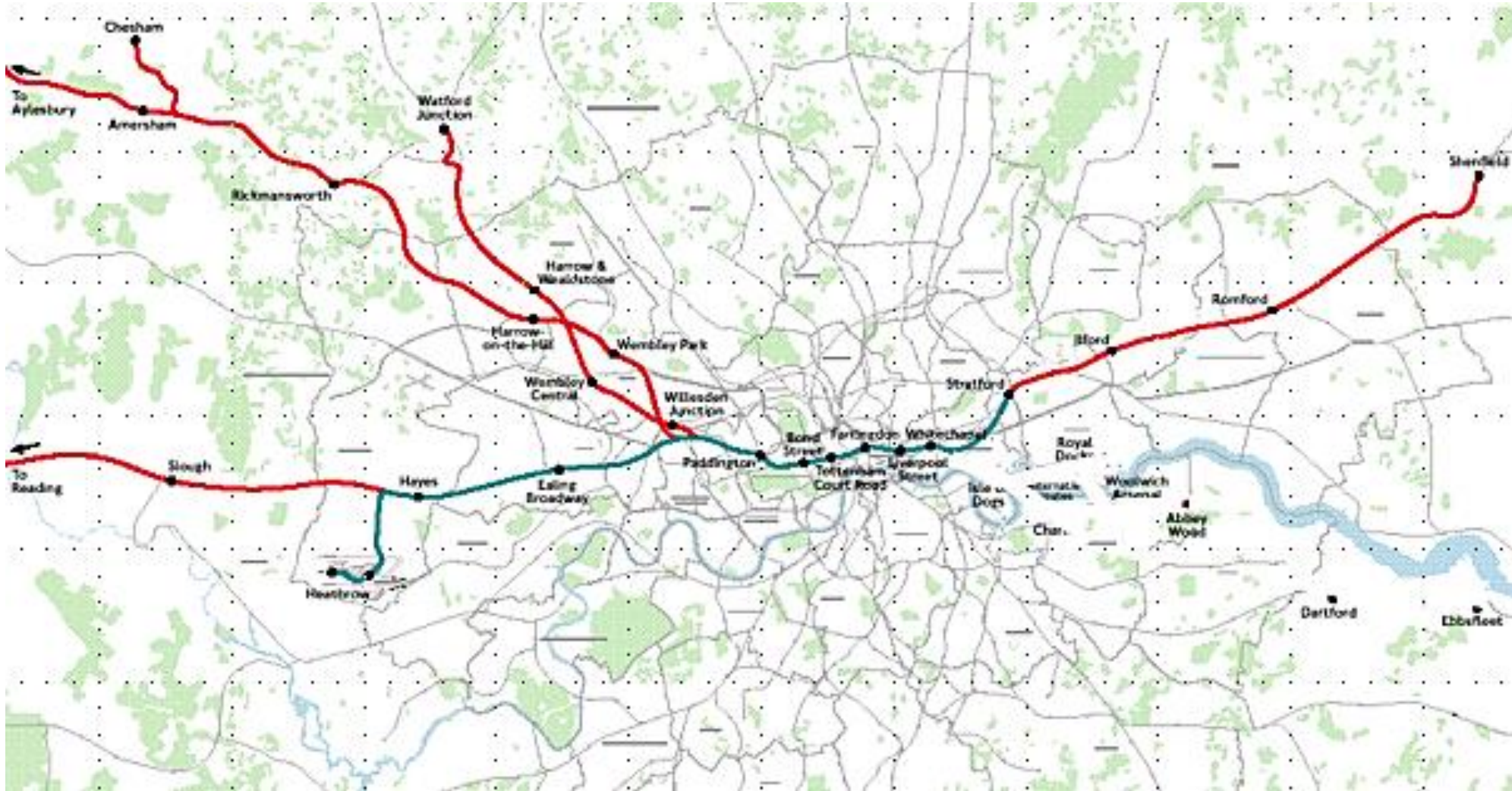
London Rail Study 1974



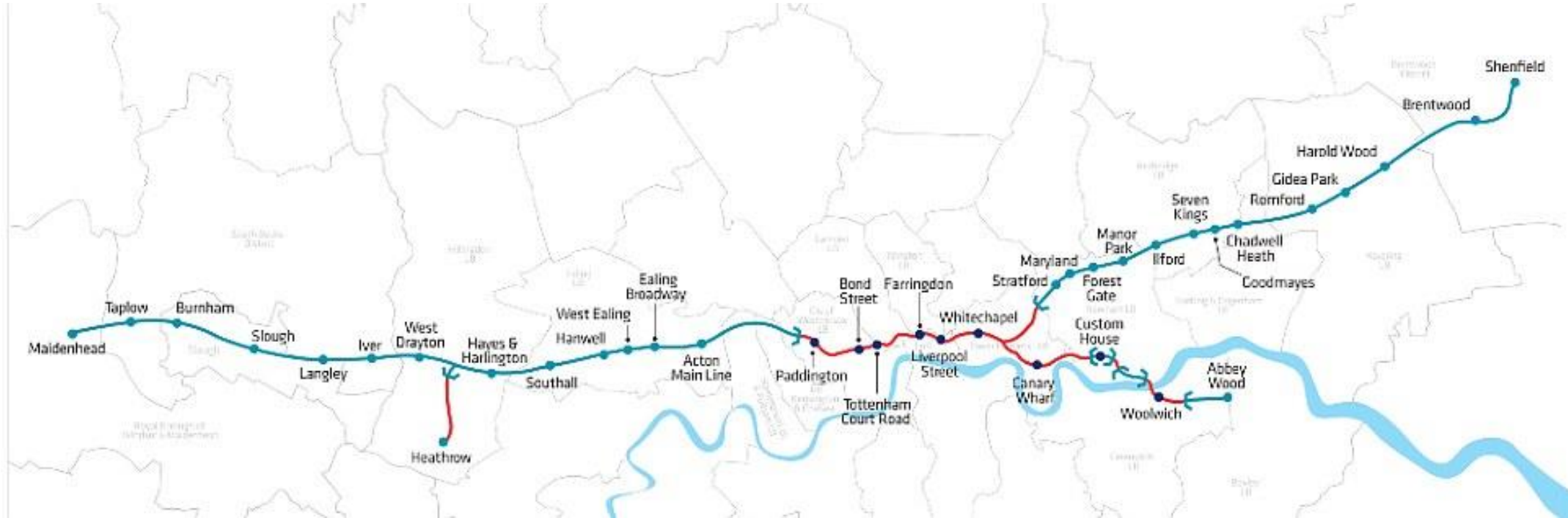
Central London Rail Study - 1989



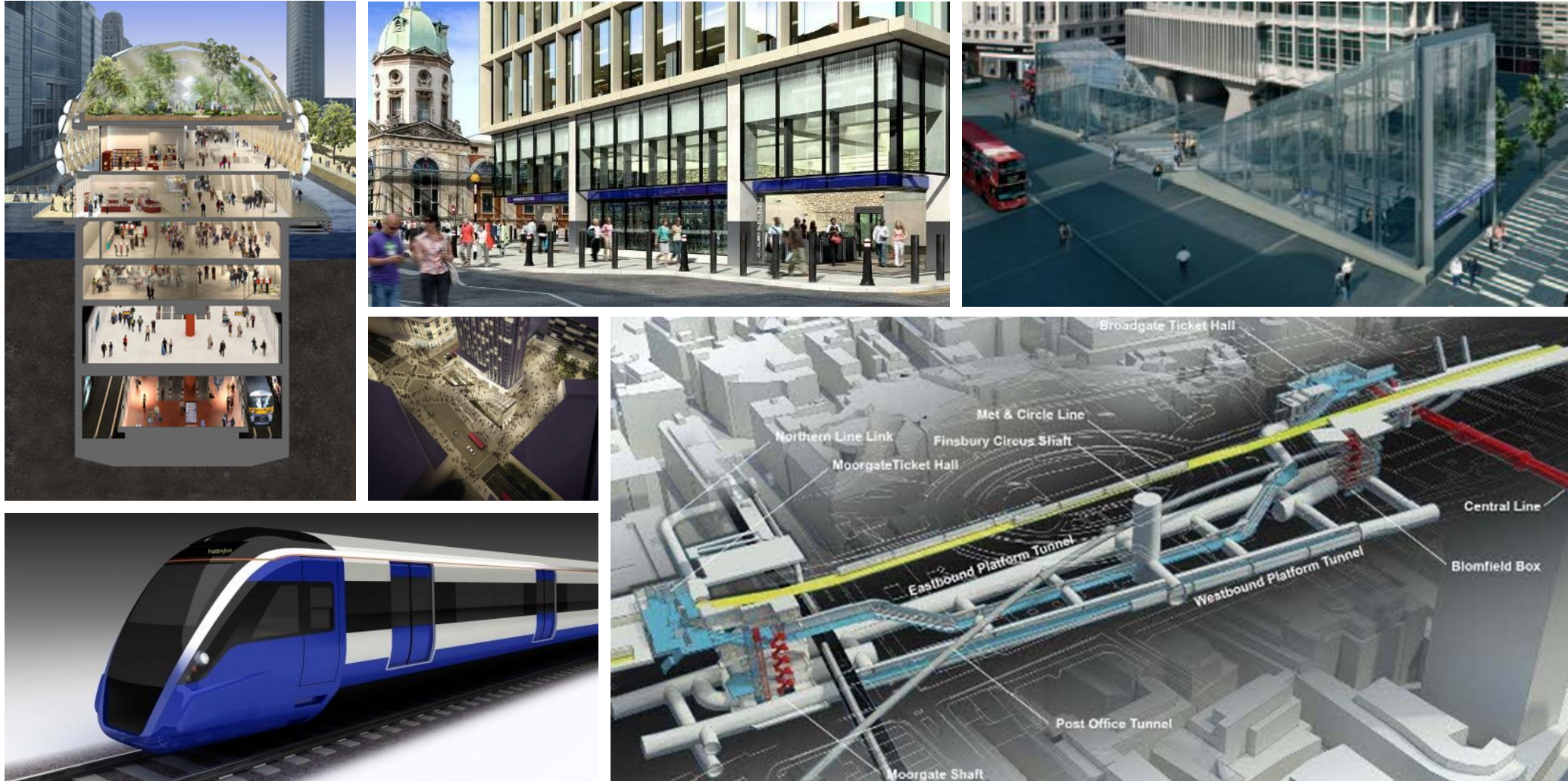
Crossrail 2002



Crossrail 2007



Crossrail



Why was Crossrail not built earlier?

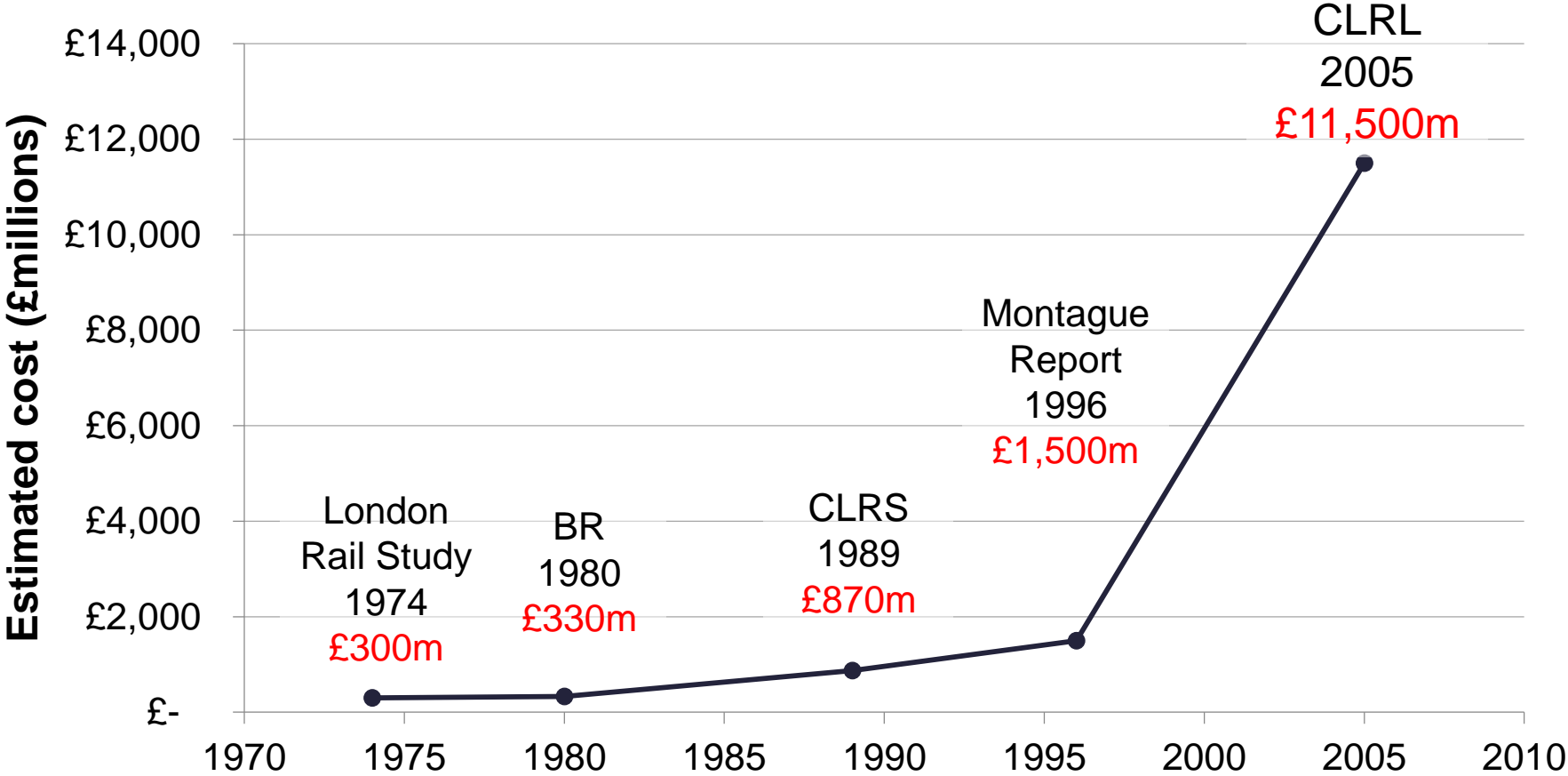
From 1970's onwards Crossrail was consistently the highest ranked transport project, the best Value for Money.

BUT it was never selected for funding.

HM Treasury view

Major projects have higher risks

Crossrail Costs



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What is transport for?

- **Moving things** – faster, cheaper & more reliable movement of people, goods & services
- **Accessing things** – faster, cheaper & more reliable access to people, goods & services
- DfT value transport changes by the reduction in the time and cost of transport
- Transport is good, faster transport is better

Transport Economics

- Benefits accrue to transport users – measured in time & cost savings + some externalities (safety, environment, equity ..)
- Fixed population and land use– transport schemes are incremental, no link between transport & development
- Perfect competition, and all that entails
- Is that an appropriate basis for understanding and appraising major infrastructure projects?

Is Transport a Perfect Market?

Perfect information **X**

No barriers to entry **X**

No quality differential between products **X**

Pricing at marginal costs **X**

No significant external costs and benefits **X**

Crossrail Economic Appraisal (all £bn PV)

Scheme Costs

	Base
Capital	10.6
Maintenance	1.6
Operating	1.7
Total	13.9

User Benefits

Benefit	Value
Time Savings	8.0
Congestion Relief	5.4
Highway	2.4
other	0.2
Total	16.0

Gross and net revenues

Gross	13.6
Less transfers	-7.4
Net revenues	6.1

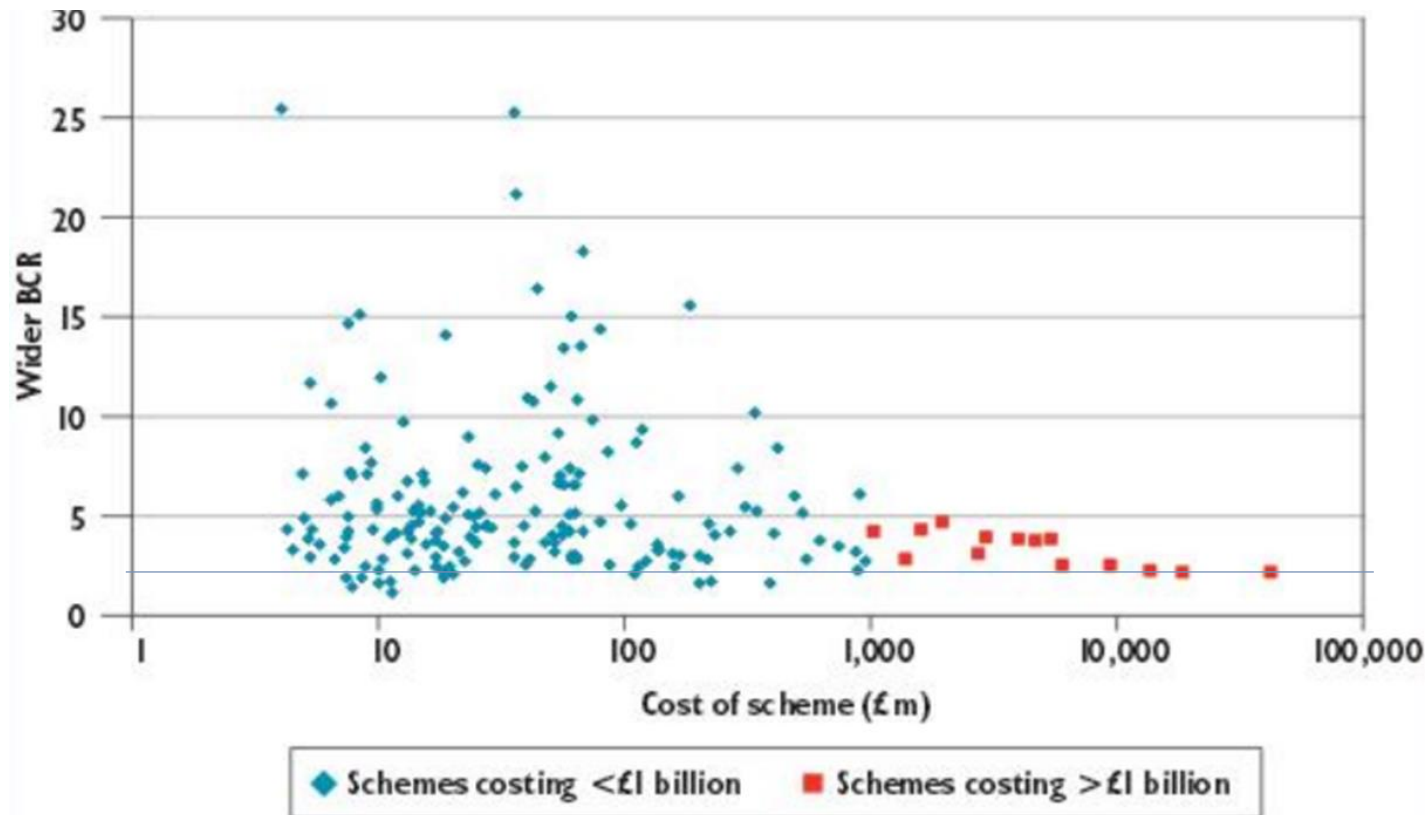
Economic Appraisal

Total costs	13.9
Less net rail revenues	-6.1
Plus indirect tax reductions	1.2
Net Cost to Government	9.0
Total Benefits	16.0
BCR	1.8

Indirect
Tax
Losses

Fuel Duty

Value for Money



Usually a high BCR is sufficient

- High value for money if BCR greater than 2
- Very high BCR if greater than 4

Year	% of spend by VfM Category			
	Poor	Medium	High	Very High
2013	0	6	80	14
2012	0	0	42	58
2011	0	0	63	37

What about economic development?

- No link from transport to development – land use is fixed in project appraisals
- All transport is “incremental”
- Allowing transport to change development makes the modelling very difficult
- And we’ve been doing it this way for over 50 years – it must be right!

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Why does this happen?



Shanghai



New York

Benefits of Agglomeration

1

Deeper labour market – more employees to choose from

2

Deeper product market - greater competition/specialisation

3

Knowledge spillovers – ideas & innovation spread faster within a cluster

▪

Quantifying and Valuing WEBs



Agglomeration



Labour Force
Participation
(LFP)



Imperfect
Competition
(IC)



Move To More
Productive
Jobs

Three on left all approved by UK DfT and included in IA guidance as sensitivity tests – the most important one not approved by either!

Agglomeration



- Cities exist because the productivity benefits from high densities outweigh the additional transport and other costs.
- Businesses locate in the city centre and pay the highest rents and wages because the productivity advantages are even larger.
- Centripetal force of agglomeration vs centrifugal force of higher rents in city centres.

DfT allows increases in “effective density” where transport drives change in density but land use is unchanged

LFP and IC



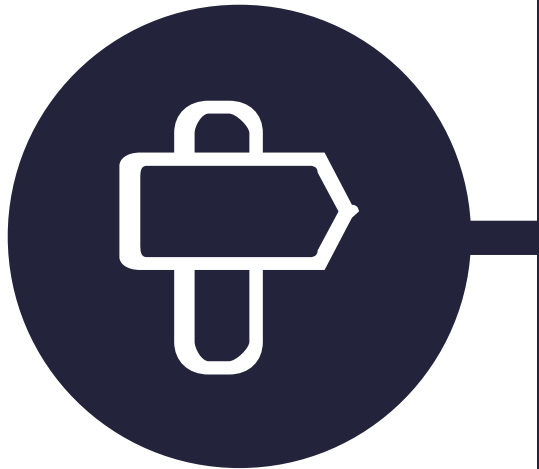
- **LFP** – better journeys for commuters => small increase in LFP with benefits to labour market and reductions in welfare payments. UK guidance adds 10% to value of commuter TS



- **IC** – under IC firms restrict output to make higher profits. If transport investment reduces costs & increases output => net economic gain. UK guidance adds 10% to value of IWT TS

Both simple 10% additions to transport user benefits

Move To More Productive Jobs



- Big productivity differential in CBD – 25-50% more than rest of city
- If employment growth constrained because of lack of transport capacity/accessibility then potentially v large gain
- UK DfT says only allowed if LUTI model says so – in fact LUTI models v weak at capacity constraints
- Have to prove that transport is the key constraint, not planning or demand from employers or labour supply
- XR

WEBs conclusions

- These are big project and big city issues
- Play particularly well to Treasury and city authorities – change transport investments into investments in economic growth
- Treasury captures 30-40% of all GDP growth through existing tax mechanisms – real financial returns to government
- Entirely additional to everything that is captured in traditional transport appraisal
- In the case for XR WEBs doubled the BCR

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Delivering the benefits

- More complex than you might think
- Transport changes often have unexpected impacts
- Transport itself is not a sensible objective

Safety and risk

How can we reduce accidents on the roads?



Better highway engineering?



Safer cars?



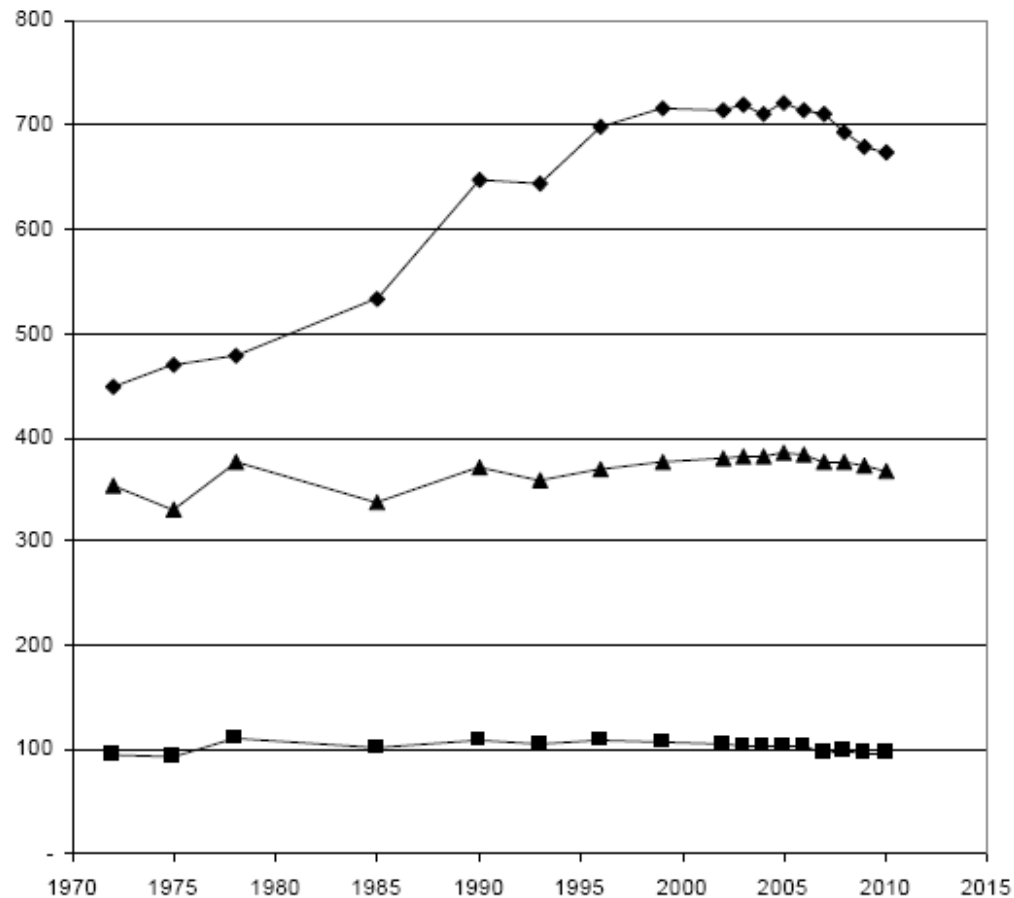
More control over speed?



Or a large metal spike on the steering wheel?

Speed and time savings

Travel in the UK 1970 -2011



Distance per person per year
(miles/10)

Time per person per year
(hours)

Trips per person per year
(trips/10)

Policy Alignment

Transport on its own generally not sufficient.

If we want development and density then the **planning policies need to align with the transport.**

Transport infrastructure most successful at adding to growth when overcoming a **capacity constraint.**

Ideally:

- **High rental values** showing strong market **demand**
- **Strong interest from developers** to invest
- **Planning policies that support growth**
- **Overcrowding** on rail (and congestion on road)

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Conclusions

- Transport an **enabler** of growth, not a creator.
- Most effective when there are clear **capacity constraints** on growth.
- High **density** city centre development boosts **productivity** – real economic returns.
- The traditional approach although well-established misses some of the most important benefits of railways – shaping land use.
- A fixed **land use** assumption is a very poor one.

Thank you

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