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**A framework for transport  
planning in Australia: With  
special reference to UK  
Eddington transport study**

By

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Board of Advice Working Paper ITLS-BoA-WP-10-01

**TITLE:****A framework for transport planning in Australia: With special reference to UK Eddington transport study****ABSTRACT:**

The Commonwealth (Infrastructure Australia (IA)) is putting growing pressure on the States to improve infrastructure planning and particularly planning for transport services. Given the Commonwealth of Australia's domination of discretionary finance for infrastructure investment, and the status of the UK Government's Eddington (National) Transport Study (2006) approach as the most recent and effective national planning exercise, it would not be surprising to see a push for an Australian National Transport Study along the lines of the UK Study. The UK Study ably met the needs of the UK Government, is laudable for describing the role of transport services in economic development, and advocates a big step towards economic rational allocation of resources and away from political allocation. This Paper suggests a different process for Australia while using the UK Study as a primary reference framework to place the recommended approach and tools in context. The paper continues the themes of another recent Paper (ITLS-WP-09-05)), Commentary on the Report to COAG by Infrastructure Australia. It does not comment on the place specifics of transport investment in Australia or in the UK Study, except by way of example. While this paper is about transport service, the underlying analysis and commentary applies to the other public infrastructure services such as water, energy and communications that are within IA's purview.

The paper is structured in four parts. The first looks at the purpose of planning studies and where they fit in the institutional arrangements for transport service provision. Using this institutional framework and in contrast to the UK Study approach, an on-going process of continuous improvement of decision-making for transport service provision is proposed for Australia based in part on World Bank experience. The second part looks at the impacts of transport service provision. The third looks at analytic tools appropriate to decisions regarding the allocation of resources for the provision of transport service with reference to the several Benefit/Cost, GDP and other measures recommended in the UK Study, and analyses the appropriateness of their application for Australia (and elsewhere). It suggests that the application of benefit cost analysis (BCA) in its various enhanced forms including wider external benefits, environmental and social impacts and value for money, as well as GDP impacts, misinterprets the nature of the decision-making processes involved and the purpose of investment appraisal. The fourth part briefly discusses several of the other seminal issues involved in service provision such as competition, markets, and revisits governance, finance and planning, again with reference to the UK Study (Volume 4). The final summary section sketches a strategy for implementation of the recommendations in Australia.

**KEY WORDS:**

*Public infrastructure services; transport planning; investment; land use; location; sector analysis; economic development; World Bank; governance; institutional arrangements; control; pricing; decision making processes; dynamics; adaptation.*

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## 1. Purpose of transport studies

In the best of all worlds, transport studies can provide the impetus for ongoing improvements in the decision-making processes within the institutional arrangements for provision of transport services as well as recommendations for specific investment projects. The key elements in this statement are “ongoing improvements” and “institutional arrangements”. The term “institutional arrangements” is used here in its broadest form from Institutional Economics, covering the full range of the decision making processes involved in service provision.

It seems that every decade or so in many countries it is seen as politically advantageous to have a comprehensive national review to set the stage for significant changes. The purpose of the large national study then is twofold. The *first* is to establish evidence-supported recommendations in regard to investments and improvements in the sector wide national institutional arrangements including decision making. And the *second* purpose is to communicate the outcome to all stakeholders and garner the power to implement the recommendations.

Infrastructure Australia (IA) has issued a number of guidelines and reports (see <http://www.infrastructureaustralia.gov.au/publications.aspx>) that begin to approach the transport planning issue. But with limited resources, a position in the Commonwealth Government bureaucracy that does not include power independent of the Ministry of Infrastructure, Transport, Regional Development and Local Government, and a Board dominated by representatives of the current public and private institutions that control infrastructure provision, it has little opportunity or incentive to change infrastructure service supply arrangements to increase their economic efficiency. Some of the issues were discussed in a previous working paper that commented on IA’s report to COAGi however this paper will deal only with transport.

Transport service is supplied at several scales to match demand for local to metropolitan/intra-regional, inter-regional, national and international gateway service, with a high degree of connectivity between each level from low to high scale. The dual purposes of making recommendations and garnering power for implementation attributed to national transport studies apply to improving provision at each scale, and the outcome from planning at each level feeds down and up to the adjacent scales as well as within the service under consideration.

At each level there is the need to communicate and implement recommendations. Leaving the mysteries of the garnering of power and who has or should have it aside, the communication challenge was met by the UK Study primarily with a report structure that used a variety of formats (tables, graphs and maps as well as prose) to both summarise and where appropriate fully explain points, such that as a reference document the report advances the state of the art considerably. It however still suffers from the inability to present the complex issues involved at each scale in a succinct manner that denies narrow interest stakeholders the chance to ignore evidence and logic in regard to broader issues that are contrary to their narrow interests.

For effective planning, a better communications bridge is needed between individual studies and stakeholders in the desirable ongoing improvement process. The so called A3 management process (see Lean Enterprise Institute<sup>PPii</sup>) is one example mechanism that emerged from the application and improvement of Deming’s production principles that has relevance and promise of advancing this important issue. In general it follows the seven part process of summarising: Background; Current Conditions; Goals/Targets; Analysis; Proposed Countermeasures; Plan; and Follow-up – all on an A3 sheet. Its adaptation to transport and other public infrastructure services studies at all scales appears possible and desirable.

As such, it appears suitable as a communications bridge for the elements in the World Bank’s Sector Study processes suggested in my previous Working Paper<sup>TTi</sup>. In summary the World Bank Sector Study approach is to establish a sector wide process of ongoing improvement that feeds into the establishment of economy wide policies and strategies, sector specific policies and strategies, determination of investment policies, and identification of specific project investments, and improvement in organisations responsible for the process at all levels.

With this example process in mind, the viewpoint used in the UK Study will be discussed, followed by the viewpoint proposed for Australia and used in this paper.

### ***1.1 UK study viewpoint***

It is hard to think of a prior national transport study in an OECD country in the last thirty years that has put the relationship of the transport services sector to the national economy and the decision-making behind the resources employed in that, so clearly at the centre of its concerns as the Eddington Study. And logically it did that using transport *services* as the reference point rather than discussing transport modes separately. The inputs from many disciplines including micro and macro economics, land use planning, sociology, environmentalism, and law are evident and bring a higher than normal level of comprehensiveness to the discussion. The central discussion is clearly founded on, and is a welcome return to, the broad concerns of political welfare economics. As far as is possible to discern, the nomenclature in the UK study uses the contemporary separate labels of:- “economics” to describe the monetized economy; “welfare economics” when non-monetized external impacts are included but with separate categories for “environmental” impacts and global warming; and again the exercise of political rights are discussed primarily as a concern separate to economic rights. Time was when the discussion of **all** economic action with regard to rights to valued resources was under the label of political welfare economics. But sharing the desire of the UK Study to contribute to contemporary discussion, contemporary labels will be used herein as far as is possible.

The UK Study evidence based recommendations for improvements in institutional arrangements came from an assessment of the economic role and appropriateness of: - organizational frameworks, strategy, policies, planning, and resource allocation to (investment in) projects in fixed facilities, operations and maintenance. However, as presented in the report, the Study gives more focus to national including international gateway scale challenges and is structured to meet the political framework of discussion in the UK (and elsewhere) of immediate changes rather than to provide a comprehensive theoretical framework for continuous ongoing improvements at all scales.

This brings into focus the important challenge for all entrusted with infrastructure studies to strike an appropriate balance in the framework of analysis between discretion and influence over decisions driven by the rationality of relevant expert disciplines, and discretion and influence over the same decisions driven by popular political discourse with its own sometimes different version of what is rational. The growing understanding of the economics of public infrastructure service supports a view that the balance should lean back towards the disciplined expert. Experience also suggests that the expert discipline need not be in conflict with the political while fulfilling its ultimate responsibility to improve the decision making conclusions announced by politicians. Transparency has thus a large role to play in raising the quality of decision-making by exposing the expert (and inexpert) analysis to all.

### ***1.2 Recommended Australian process***

To be clear, this paper focuses on the decision-making process that allocates resources to products that make up transport service as the objective of planning. The analysis in economic decision-making processes (DMPs) is to assist the selection of one option from amongst a small number of highly constrained feasible options. This primary focus on the decision-making *process* contrasts with the popular presentation of decision-making as an instantaneous selection by an all knowing and all powerful *decision maker*. It also contrasts with the seductive contemporary Google led quest for more and more information rather than gathering information that is relevant to the needs of the DMP which is simply to rank a small number of feasible options for the allocation of scarce resources (a.k.a investment).

The comment on over emphasis on information is not a trivial point as evidenced by the voluminous reports laden with statistics and outputs from simplistic predictive models of future demand that often thankfully go largely unread in government libraries. It goes to the heart of the nature of economic decision-making that uses information as but one input to choosing among a highly constrained set of options. In economist speak, the process takes place to choose from a highly bounded set of feasible alternatives.

As noted above in the discussion of the purpose of transport studies, the product *transport service* is demanded at several distinct scales. The UK Study statistics suggest<sup>iii</sup> that by length, around 65% of all trips (all modes) are less than around 15 kilometres and 90% less than 45 kilometres, so a discussion of DMP at three scales, local, intra-regional, and inter-regional (including national standards and international gateways), covers most scale related issues and points to the significance of the local network in meeting the demand for service and hence in the economy.

Of course there are boundary-related definitional problems in using physical scales including that the location of individual users will mean that their travel pattern will not be contained completely within the boundaries. It also can lead to statistical problems when assessing characteristics of travel demand and supply. But this is primarily a function of the need for transaction cost economic efficiency (another desirable constraining attribute) of institutional arrangements to aggregate demand and limit supply to a single (monopoly) service.

The concentration on the DMP brings to the analysis a requirement for at least a hypothesis describing the causal relationships between economic variables to give some substance to the relationships yielded by statistical analysis across the spectrum from micro to the macro level of economic analysis. With this approach comes a shift in the allocation of analytical resources from getting the *right answer* regarding a single *project* to getting the *right process* (or institutional arrangement) that delivers *right answers for all projects over time*. This is the concern of Institutional Economics and its primary focus on improving the DMP by analyzing transaction (process) costs and benefits of different DMPs<sup>iv</sup>.

As noted, the concentration on the DMP highlights the limited number of alternatives available to decision-makers when the process recognizes the constraints of existing features, such as topography, financial/economic feasibility and array of resources in existing transport facilities.

The paper also uses the important perspective of economics that transportation is a discussion of the provision of transport service in the form of *rights*<sup>v</sup> to resources contained in various transport products that are defined by exchange between entities.

In transport these products are: - the right of access to a network of right of ways (ROWs), the right to access appropriate facilities within the ROWs, the right to use a vehicle on the facilities, and the right to make a specific trip. Note the absence of transport mode as a given, places it in its rightful place in the analysis as a technological variable in the determination of the most economically efficient facility to provide transport service. The distinction between rights to resources and their physical consumption is central to economics, as is the act of exchange of rights to resources that defines the economic product.

The rights that result in access to the network of transport service also highlight the demand variable “location”, and that “change of location” is or should be a necessary and powerful variable in analysis of behavior resulting from service provision. For example, a transport policy founded on providing access to urban CBD destinations for all origins at all times and for the same price, is bound to eventually fail on most dimensions of feasibility. However a policy that includes say a temporal congestion charge at a cordon around a CBD will ultimately cause entities to consider relocating employment (and residences) in other satellite centres when the benefits of the CBD location are outweighed by transport service costs that include a congestion charge.

An important aspect of the framework is a mechanism for causally relating the three (local, intra-regional, inter-regional, (including national standards and international gateway services)) scales of demand and supply where economic exchange takes place. Economic exchange takes place between entities, and by observation the entity demanding service at each scale includes the entity demanding service at the adjacent lower scale. For example, an export oriented firm has an interest in the cost of local and regional transport service for workers and other inputs to production as well as international export transport service.

So the governance (DMP) framework for supply at each level would ideally represent the interest at each level, or in other words a bottom up exercise of rights. Of course other legitimate interests, for example politically driven national economic development considerations say for future users, need to

be represented (a top down approach). But the main insight is the need to connect representation from each level to ensure integration of the DMPs. In this way, for example, NIMBY (not in my backyard) local scale community sentiments regarding major transport facilities such as a port are considered in the proper context of regional and national demand by parties representing individuals with local concerns, particularly in community consultation processes.

The DMP for rights to resources (investment) in each product has several levels of prior constraints on options considered that are typically represented as policy, strategy, and planning. It could be argued that decisions about each of policy, planning and strategy are a form of high scale exchange especially in regard to budget allocations that they influence. But this economic decision-making process view of the ideal transport world tracks exchange between entities, so until and unless institutional arrangements suggest such exchange occurs, for logical consistency it is more accurate to accept such decisions as constraints.

This is not to say that decision processes about policy, planning and strategy should not be informed by economic analysis of their costs and benefits. All constraints on the selection of alternatives are informed by cost benefit analysis at some level even, for example, natural constraints on say the location of right-of-ways will usually rule out steep sidelong locations that carry too high a construction cost compared to the benefits of use in such locations.

### ***1.3 Economic context of transport service provision***

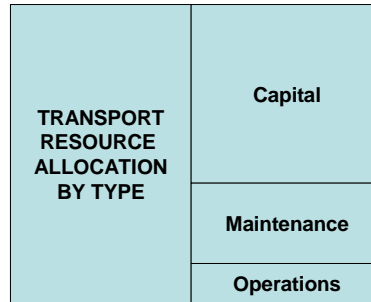
Transport service is a necessary product in an economy to meet the spatial (and temporal) mismatches between entities seeking to exchange resources. So transport and the economy is a discussion that must include location. Given that we are never starting from scratch in the provision of transport service, entities and their rights to resources are already located and some level of transport services provided to allow physical exchange. To grow the economy through allocation of more resources to increase the efficiency of the provision of transport services, we can either increase the net benefits of transport service to the entities by improving the efficiency of the existing service or shift the location of either or both of the entities. (Note that by talking in terms of net benefits to entities we conceptually include all valued features of the service including say reliability). Hence the need in any transport study to include location as a variable to make sense of such powerful interventions as congestion charging that can contribute to an entity shifting location. The UK Study observed the power of the locational variable (Vol. 1 -1.7) in regard to 19<sup>th</sup> century labour force movements resulting from industrialization and globalization, but failed to carry it through as a relevant consideration in the later discussion.

### ***1.4 Recommended framework of DMPs within transport sector***

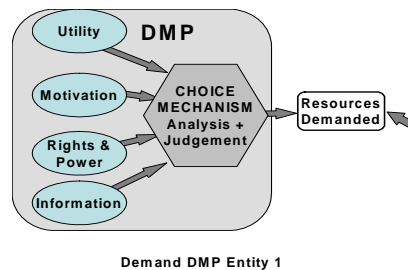
Using the DMP viewpoint and its primary concern with allocative efficiency to assess the UK study, the understanding of the relationship of transport to the economy can be framed as noted above around a set of decisions to be undertaken by various entities at different scales of resource allocation and at different times. The objective of the allocation is the provision over time of efficient generic transport service, not to any particular mode or point in time but by allocating resources to categories of products that make up the service. Typically, these allocations are (or should be) by supply entities operating in each product area (ROW, facilities, vehicles, trips (traffic flow)). The supply entity's objective is to either maintain or enhance their value to the provision of service by exchanges that include in varying degrees:

- Investment in improvement of operations,
- Investment in maintenance,
- Capital Investment;

at each of the local, intra-regional, inter-regional (including national) scales of service provision.



Allocations to the three primary scales of service and three subsidiary product categories in each are highly interconnected and use a variety of choice mechanisms within the decision-making process to choose amongst alternative allocations to increase the value of the service provided. The choice mechanisms use inputs that reflect the utility or value the entity (the individuals demanding service that it represents) places on resources, the rights to resources it possesses for use in the exchange (budget), and the information available about the costs and benefits of alternative options being considered.



Using the nominated three scales of service as criteria to size the three supply entities, the rights to resources held at each level consists primarily of the resources of those demanding service now, and those representing future demand. This highlights the importance of distinguishing between the scale of unit product demands of economic entities (that range from an individual to a whole nation), and the unit scale of efficient supply products (say a freeway) which are usually large compared to an individual. For example at maximum one way use of a single lane of road there is at least 1500 individuals in vehicles whose demand is being satisfied.

As noted above, the transport service product demands consist of: -

- the access right to the network ROWs,
- the right to access facilities,
- the right to use a vehicle on the facility, and
- the right to take a particular trip.

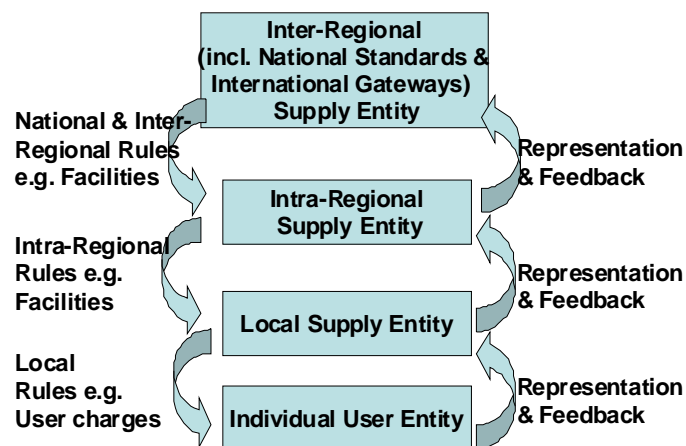


<b>TRANSPORT SERVICE PRODUCT</b>	<b>Right to access Network of ROWs</b>
	<b>Right to access FACILITIES</b>
	<b>Right to use licensed VEHICLE on facilities</b>
	<b>Right to take a single TRIP</b>

Resources exchanged for these rights come from those who value them and for transaction cost efficiency the more direct the exchange the better. Direct exchange between many similar entities both demanding and supplying similar products is a feature of efficient markets. However, in transport service we are usually talking about monopoly supply and hence the need for mechanisms other than multiple suppliers to achieve efficiency. But the desirability of direct connection between entities undertaking exchange remains. In other words large state or national scale centralized supply entities are unlikely to have the detailed local knowledge required for efficient supply for all (for example local) demands, hence the recommended local, intra-regional, and inter-regional (including national issues and international gateway services) levels of institutional arrangements.

To summarise, the conceptual outline of the recommended organizational structure for transport service provision in which studies to improve the DMP take place, would include:

- Three interconnected organizational levels of supply entities at local, intra-regional, and inter-regional (including national standards issues and international gateways), each with its own DMP for supplying service at the relevant level.
- Each entity would concern itself with transport service products including three types: the right to access a ROW network, right to access facilities to meet demand efficiently, and rights to take trips appropriate to its scale. The right to purchase a vehicle for use on the facilities is an exchange in a separate open market for vehicles that meet required standards for use. For example an intra- Regional Transport Supply Organization would concern itself with the network of services connecting urban centers in the region and, looking down scale, with its interfaces with Local Transport Service Supply Organizations, and upscale with inter-regional Transport Organizations.
- Where appropriate each level would establish constraints (rules) on the options considered by the next level down, and receive feedback from the lower level to inform the determination of those constraints. For example, physical dimensional and performance standards for road vehicles would desirably be national as is now being established in Australia.
- The entities would desirably be interconnected by representation in the governance (DMP control) structure of one level in the adjacent level with the initial allocation of power (discretion over the supply DMP) determined politically in a context of the above comments on the appropriate split between political considerations and property rights based expert considerations in the ongoing DMP.



This proposed structure would alter the current organizational governance arrangements to provide more local representation and hence more local knowledge and responsiveness than is currently the case in Australia. Local Government (and other levels of Government) has many responsibilities beyond the provision of local transport service. However on the topic of transport service demand, in many parts of Australia the local government boundaries bear little spatial relation to transport demand but, with ongoing consolidation of existing often small local government into more efficient larger units, representation in the governance structure at the local scale could well come from local government elected representatives. Similarly, state boundaries bear little relevance to regional transport demand but again local representation could come from among state government representatives from relevant state electorates in addition to local government representation, and again for national level organization governance. Such a schema for representation begins to expose the over representation of political rights in the current decision processes of service supply but that is an issue for other discussions.

The financial implications of the proposed framework are a different matter which is highly dependant on existing tax based arrangements for financing transport service. And with this approach comes the vexed question of DMP for allocating resources among Economic Sectors. Both these issues are briefly discussed below 4.3 and 3.6 , but first some comments on the UK Study's discussion of impacts of transport service on the economy.

## 2. Transport impacts

### 2.1 General

Volume 1 of the UK Study makes the case for the importance of the contribution of transport service to the economy by reporting on the many fields of research that seek to establish causal relationships between service and various measures of performance in the economy. While the specific fields chosen for discussion, GDP, Productivity, Agglomeration, Risk, Response to Structural Change, Quality of Life and External Trade all are impacted by transport service, quantitative expression of the causal relationship to transport service investment for use in resource allocation (project appraisal) remains unclear in practical terms as opposed to theoretic terms. If the purpose in the UK Study is to provide general evidence for the overall allocation of resources to the transport sector, then the case is made, but it remains a general argument with little specific application to the intersectoral allocation question, and none to the intrasectoral allocation issue.

As noted above, allocative discipline requires that we at least have a hypothesis regarding rationality of causal relationships between variables used to guide the DMP for resource allocation in transport. As the UK Study observes we have a paucity of evidence for most relationships at the highest national

scale of resource allocation. The Study observes (1.17) the debate regarding the direction of causality without coming down on whether transport investment should lead or lag economic development and its accompanying demand.

Most agree that for efficiency we should have as close a match in time between demand and supply, but this agreement is obfuscated by the prevalent misconceptions about the transport service product. As argued elsewhere<sup>vi</sup> when transport service is disaggregated into its constituent products of right of access to a network of right of ways and facilities therein, right to use vehicles (public and private) on the network, and finally right to take a particular trip, the timing of provision becomes more straight forward, as follows:

- The network of right of ways decision is one for action at the same time as all land use planning (zoning) and is reflected in the land cost.
- The facilities investment should as close as possible match existing demand.
- The mix of private and public vehicles would vary with demand and hence congestion.
- And finally location changes would occur as cost of consumption of all transport products in the current location exceeds costs for other locations.

The conclusion for future transport studies is to more accurately define the transport service constituent products rather than concentrate on the final trip product as is done currently.

Returning to the UK Study's section on categories of impact, as noted, if the point was to establish that transport has an impact on many economic measures then there is no dispute. But we do know more than presented about the nature of each measure and it is a strongly held view of the author that we have a responsibility to transparently present some rationale (causal relationship) for measures cited if they are to make a contribution to both the inter-sectoral and intra-sectoral resource allocation DMPs mentioned above.

I will now discuss each measure used in the UK for their potential contribution to DMPs.

## **2.2 GDP**

As a gross annual measure of economic output, GDP has served us well in making international and even regional comparisons, but it has several well known shortcomings as a measure of increase in sustainable wealth and beyond financial wealth as a measure of wellbeing. But confining the discussion to wealth, as GDP estimates annual output in an economy, there is a challenge in estimation of the output stream over time for use as a measure of the increase in wealth for alternative allocations of resources, particularly those whose benefit streams have multiyear lives. In other words it does not measure net increase in the value (utility) from economic action, only the total level of activity (output). Even if it did measure net increase, again it is challenging to estimate the annual measure that is causally related to the impact of alternative investments in transport over the investment's economic life. This problem is not something unique to transport as it permeates many macro-economic analytical models. Input/output analysis conceptually could assist in the estimation, but the practical application has been found to be so data intensive as to make the process too costly for the benefits gained.

Clearly transportation activity registers as one component of GDP, but it does not follow that increasing transport output alone increases wealth. It may be that reduced transport activity may increase wealth by lowering transport costs and hence lower GDP. Of course lower transport costs may prompt increase in other outputs to increase GDP.

In general a society will not undertake economic activity unless it leads to increase in wealth (including wellbeing and happiness) of that society. So it makes some sort of informational sense to say an increase in GDP including an increase in the transport component is a good thing and hence its relevance to decisions about national economic settings including both fiscal and monetary. But it offers little insight into the efficiency of particular allocations at both national and inter-regional level given the varying constraining features of particular areas and societies.

This discussion is continued in section 3 on investment appraisal methodology and criteria.

### **2.3 Productivity**

Improvement in productivity in all its measures of output per unit of input is useful for improving the efficiency of processes. It is also useful for comparing similar processes at all scales to identify areas such as transport for investigation as to the usefulness of additional resources.

However the various measures of productivity share the same shortcomings as GDP when applied as a measure of allocative efficiency by only measuring output albeit per unit of input. The usual productivity measures are for the efficiency of inputs labour and capital to give information on their application to a process in the economy for delivering a product (goods or service). In the case of transport service this is useful in identifying targets for improvement but then when it comes to the issue of allocative efficiency, the DMP has long ago moved to appraisal of the **net benefits** of alternatives when deciding the most effective allocation to do this.

### **2.4 Agglomeration of investment**

The role of transport service in delivering agglomeration benefits can be summarized in a quote from the UK Study Appendix Summary on Agglomeration:

*“Evidence is found that transport interventions can lead to further agglomeration economies, but the extent to which it does relies on a number of area-specific factors: employment density, industrial composition and GDP. This is reflected in the simulations which indicate that there are no specific types or locations of agglomeration where transport interventions deliver consistently higher agglomeration benefits. Whilst simulations centred on or around large urban areas, in particular London, deliver substantial returns, the costs associated with securing the time savings will also be higher.”*

So we are left with the necessity of supplying transport service products to obtain agglomeration benefits but no quantitative calculus from this area of research to guide us.

### **2.5 Response to structural change**

Structural change in an economy typically creates a need for physical spatial rearrangement and reallocation of resources to maximise the net benefits of the change including by minimizing transition costs from the old state to the new. Transport usually plays a significant role but is rarely alone in terms of changes in inputs to the new economy. Much confusion existed in appraisal methods until the interdependence of the various factor inputs in the new economy were observed and accounted for in analysis often at the intra-regional economy scale to determine the most efficient mix of inputs.

So as was signaled at least partially in the UK Study the lesson is to ensure transport allocations are not analyzed separately from other necessary inputs.

### **2.6 Quality of life**

The discussion in the UK Study of transport services contribution to quality of life has a political resonance to it which typifies the challenge faced by those entrusted with such studies. While it is important to communicate the importance of transport service in a society, the lesson from the UK Study's approach is that considerable attention and study resources should be applied to the methods and media used to communicate to the many audiences (stakeholders). Combining the lot even in as well presented study as the UK's means that much of this general message is not accessible to its intended audience and significant expert messages are consequently obscured.

### **2.7 External trade**

The UK Study did not devote a special section in this part of its report to external trade impacts, but throughout it emphasises its importance to the national economy. The UK national government (as with the Australian national government) reflects its constitutional mandate to concern itself with national issues including the efficiency of external trade.

Using national account figures for Australia, external trade typically accounts for one third of economic output. So while an important subject of a transport study it is clear that the balance of emphasis in national transport studies should be towards domestic economic action.

### **3. Allocation mechanisms (Appraisal)**

#### **3.1 Introduction**

The claim in the UK Study: (vol. 1 paragraph 2.60) “Internationally, the UK is at the forefront of thinking on appraisal and the measurement of transport’s impact on the economy, and its impacts on society and the environment” appears based on the inclusion in assessment of wider impacts on the economy including agglomeration or cluster efficiencies. This is fine as far as it goes but the interpretation of this claim used in the Study goes beyond identification of wider impacts which has some relevance to the **inter**sectoral resource allocation question, to its use in appraisal of alternative **intra**sectoral investment options. Leaving aside the intersectoral allocation question and focus, as the UK Study does on project or intrasectoral allocation, their claim is problematic. While much relevant interesting work exists and some is cited<sup>viii</sup> none of it appears to yet provide detailed evidence for use in resource allocation decision-making by defining differentials in impact for neither alternative different transport investment in the same location (low scale decisions) nor different investments in disparate locations (high scale decisions).

The Study does place Benefit Cost Analysis (BCA) as used in project appraisal as one element in a broader frame including social and environmental analysis. This parallels the relatively long standing Environmental Impact Assessment (EIA) but seems to argue that somehow the proposed expanded BCA and GDP and other impacts are different to EIA. The discussion of differentials for external benefits between different sectors such as manufacturing and services is interesting but again given the DMP viewpoint of this paper, more detailed work such as regional input/output analysis would be required before such information can improve transport investment appraisal at any of the four levels (including individual) of decision-making listed above (1.4).

To return to fundamentals, the objective of appraising alternative allocations of the rights to resources at any scale is to rank the alternatives to assist selection of the “best” in the political welfare economics sense of “most efficient”, or put in neoclassical economics terms, efficient including direct monetized impacts, environmental and social impacts. Without further diverting the discussion into the issue of the appropriate definition of “best” and “most efficient”, the significance of the objective statement is that decisions are made by appraising, a usually small number of highly constrained alternatives in order to rank them, not to estimate some specious absolute statement of net benefits to the whole economy. It is hard to see how the broader BCA techniques highlighted in the UK Study advance this beyond what is already accepted.

Emphasising this point returns us to the question of balance between expert analysis and political analysis for it is clear that broad assertions of favorable impacts is a lot more conducive to soft quantitative political analysis in support of a political objective rather than a disciplined quantitative expert analysis in support of growth in economic wealth in the broad political welfare sense. As noted above, in the best of worlds there is no distinction in the objectives of expert analysts and political representatives. In a democracy, one of the important roles of political representatives is to build power in support of a proposed decision selected using a decision mechanism that combines expert analysis and broader political analysis with an objective of growth in community wealth and wellbeing. It is noted that the latter objective is significantly different to the oft remarked objective of elected politicians to retain political power.

I now comment further on the specific measures proposed for investment appraisal in the UK Study.

### 3.2 *BCA*

In the practical world, resource allocation takes place at many scales, among many locations and among many sectors. The project investment appraisal techniques of benefit cost analysis are well established in micro economics as are their theoretical shortcomings which assume per unit equivalent impacts when comparing investments of different size and different duration of benefit and cost flows. This form of appraisal has served us well in rank ordering project investment options.

As reported in the Study, the UK is suggesting that traditional BCA can be improved by including macro (GDP, Agglomeration) measures. Further they suggest that these enhanced BCA measures are applicable, in varying combinations, to decision mechanisms ranging in the scale of resources involved from specific projects to sectoral allocation in inter-regional and national budgets. Such application of measures with distinctly different dimensions and origins in research with a variety of objectives is fraught with both theoretical and data gathering problems. The lay term “comparing apples and oranges” comes to mind when sector and project specific cost and benefit streams are augmented with measures of economic output.

I will now discuss each of the other measures proposed in the UK Study

### 3.3 *GDP per unit investment*

Again in traditional BCA it is assumed that each alternative investment (allocation of rights to resources) produces the same broader impacts beyond the immediate and easily measured monetary impacts such as fuel savings. And in comparing investments of differing scales (size and life), it is assumed that such impacts can be scaled to some equivalence. Taking the transport investment which is the whole focus of the UK Study and the appraisal imperative of including cost and benefit streams, what GDP elements are measured in GDP per Unit Investment? Clearly it should be the ***additional net output*** caused by the transport investment over the life of the investment. Conceptually this is fine, but in the real world with and without measures of net impacts is tricky to measure to say the least. And the convention of including only “final” goods and services in GDP leaves out what in the net present value measure of BCA would be the net benefits of exchange between entities of what are known in neo classical economics as intermediate goods and services.

Hence GDP per unit investment as a means of ranking investments (resource allocations) may suggest some statistical relevance but it fails the test of representing a causal relationship relevant to the objective of growth of economic wealth by ranking investment options.

As noted, it also has problems estimating GDP impacts over the life of the investment being considered, particularly when other investments resulting from the transport investment (savings) have differing life spans. I am not aware of research to establish project specific GDP information that provides such information.

### 3.4 *Wider BCA*

At the project appraisal level the traditional BCA approach was on relatively safe grounds as in general the benefit stream (direct and indirect) was the same for each alternative considered and the ranking was primarily on cost per unit of benefit basis (benefit cost ratio). But it is hard to see how including “missing” GDP effects, and extending this to all sizes and types of investments being considered, gives us new relevant net benefit information differentiated for each particular investment option being considered in the resource allocation decision process.

Again this wider BCA measure has the same suite of problems of GDP measurement as the above commentary on GDP per unit of investment. The inference in the Study is that it includes the missing (net) GDP that should be included as a benefit in BCA, but can we really measure such net GDP impacts at the project appraisal scale? The same measurement issues are confronted in input/output analysis. The data acquisition costs are such that it is only rarely attempted not-with-standing the legitimacy and relevance to appraisal of one of its outputs, the calculation of multiplier effects. This has not inhibited the use of multipliers of dubious origin in political justification of investments.

### 3.5 *Value for money (VfM)*

As noted above, the VfM measure is similar to Environmental Impact Assessment (EIA). It broadens the scope for justification of resource allocations by emphasising social and environmental impacts, but does nothing to solve the conundrum of converting indirect economic, social and environmental costs and benefits into cost and benefit streams measured in common, presumably monetised, units. This again shifts the emphasis in estimation from market established prices for costs and benefits to politically established estimates.

This is a legitimate approach that puts the focus on the need for research of such measures to assist our political representatives, and on politicians to represent the views of their whole constituency and not just special interest groups.

### 3.6 *Large scale allocation of resources*

There is a long standing contention in economic theory as to how to allocate resources between sectors and between regions. It forms a curious common ground between micro and macro economics where both use statistics comparing what has “worked” in similar circumstances in other regions and other countries.

Another feature of the real world of large scale allocations which is rarely evident in theoretical approaches is to constrain the options being analysed to what is judged by experts to be feasible in economically/socially/environmentally (including the topographical constraints that limit the location of transport infrastructure) terms.

The other missing feature in theory and practice is a clear definition and appreciation of the *product* for which resources are being allocated. Taking inter-regional allocations (not project) as an example, the product is logically not just transport services but includes allocation of resources to other attributes (factors) that make up a regional economy. For a simple example, take a rural agriculturally based economy and it is clear that if improved transport service is not complemented by say improved agricultural extension service, improved credit, storage and so on, then, net benefits will not be maximised. The relevant “product” is the sum of these inputs. The inclusion of GDP is not a substitute for accurate definition of the relevant product.

In sum the planning of service provision needs to take place at least at national, inter-regional intra-regional and project levels and the product at each level will be different as should the details of appraisal techniques used. Clearly each level is interconnected and governance structures that reflect such relationships should contain representatives from lower levels and feedback links that go up and down between the levels to ensure coordination and support for allocations.

## 4. **Other seminal issues**

### 4.1 *Markets and competition*

It is an unfortunate characteristic of the success of free market economies that the terms market and competition are in common usage applied interchangeably and for a wide variety of economic activities. We say there is a *market* for such and such a product when we mean a *demand* for it. We incorrectly equate the efficiency of competitive tendering amongst a small number of suppliers for a product that is closely specified with the efficiencies of a market with large numbers of suppliers and demanders of products that are close substitutes for each other.

Much of this confusion and misuse can be traced again to the definition of **product**. The transport service product is constrained to be defined so closely that there are few substitutes. When we stray into the folly of talking of one transport mode competing with another, and that this somehow represents an efficient product market, we are equating one trip product with another, say rail with road. But as has been discussed elsewhere<sup>vi</sup>, the products that result in a trip include rights of way

(ROW), facilities, vehicles and then a trip. There is no market for ROW, or facilities. Economic efficiency allows for only one set of each. It is a monopoly.

However there are existing efficient markets for many of the inputs to, for example, the provision of facilities including design construction and finance, which will now be discussed.

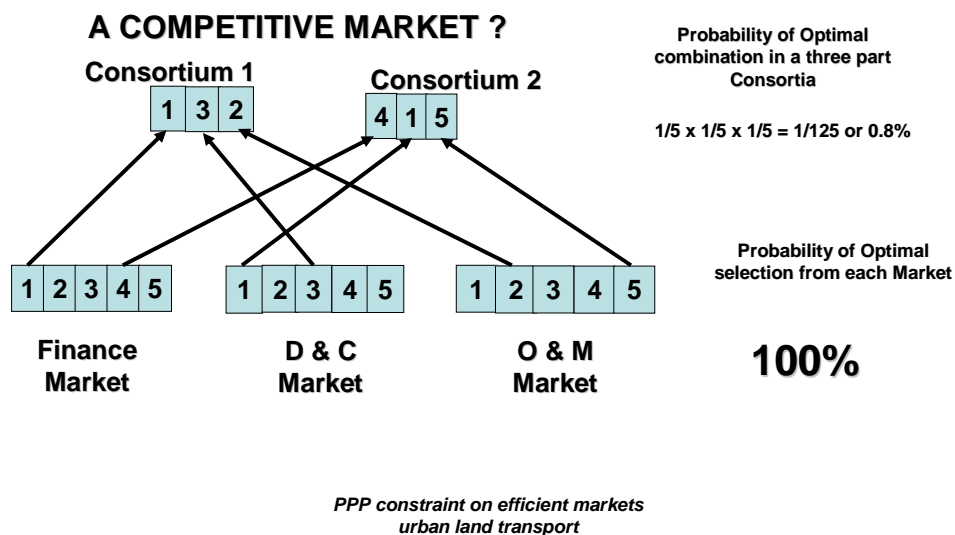
#### 4.2 Private sector engagement

Current practice as highlighted in the processes of establishing what is now commonly called Public Private Partnerships (PPPs) has its own set of problems centered on the undisciplined use of the nomenclature for: markets as discussed in 4.1, and the separation of goods and services into public and private products.

In neo classical economics, it was reasonable to categorise monopoly public infrastructure services as public goods the supply of which was delivered by the public sector. As our understanding of the efficiencies of real markets increased there was a shift by the public sector to a responsibility for, rather than the actual physical supply of the inputs which were supplied from efficient markets dominated by the private sector.

Then we took the valid concepts of privatisation of industries previously nationalised under the strictures of war, and applied them to public infrastructure to overcome constraints on public finance. But we forgot the market efficiency criteria and bundled together all the inputs that go into infrastructure supply including those product inputs such as ROWs that are truly non market monopoly products.

Even if we limit procurement, as we currently do, to the supply of the facilities product, this reduces the potential efficiency of existing markets for inputs by usually requiring participants in such competitive tendering processes to restrict their participation to just one grouping which collectively may not be the most efficient combination. This has been discussed previously<sup>viii</sup> and may be shown graphically as follows:



This brings the issue of finance of transport service to the fore.



### 4.3 *Finance*

The financing of transport service depends inter alia on the creditworthiness of those demanding the product service (typically some combination of existing users and government representing future users), the definition of the product including its physical scale and life, and the risks associated with the cost of each input product and the revenue stream to service the financing.

Using the transport product definitions of 1.4 of ROW, facilities, vehicles, and trips we get the following profile of the financing task for each product:

- The value (and required financing) of the right to access the network of ROWs is included in the value of the right to occupy a particular location (say a residential lot). The cost of the right to network access is bound (with cost of access to other services) into the value of the lot. And the extent of associated finance and service is the result of the value of inputs determined during planning of land use allocation and development, and again, is included in the sale price to the consumer. So this financing task is in general included efficiently in existing property markets.
- The value of the right to use the network of facilities in the ROWs is a function of the cost of such facilities and it is the financing of this product, the facilities, that is the usual focus of discussion about financing transport. Logically the responsibility of financing (creditworthiness and revenue to service) this product is some combination of those who currently value the right of access (intended users) and the government representing other interests such as defense and future users. Currently governments manage this financing task either out of general tax revenue or by franchising the private sector in some form of PPP to manage it for them. Either way is significantly remote from the logical arrangements with close connection between the lot owners and the cost of facilities.
- The financing of vehicles is in general a private sector issue dealt with efficiently by existing efficient markets.
- In theory the financing of a right to take a trip is, for uncongested networks excluding PPP tollways, covered by existing efficient private markets. In practice in PPPs it is in charging for the trip product where tolls are set which are expected to cover cost of both facility and trip products. Financing the rights to take a trip on congested facilities (logically priced to include congestion costs) is an issue well covered in the micro economics literature.

In conclusion the UK Study continues the current discussion framework around arranging finance for transport with little regard for either the differing nature of the products or the scale of the products involved, or whether or not efficient markets exist. For financing the most significant product, the *network* of facilities, efficient markets exist on the supply side (private capital markets) but institutional arrangements comprise either governments at different usually larger scales or PPPs at usually less than network scale (usually a PPP project consisting of a single link).

The establishment of an efficient transport planning *process* needs to include research and establishment of new institutional arrangements including governance structures at scales that reflect products that constitute transport service.

### 4.4 *Relation to planning system*

The UK Study incorporates (Volume 4.5 & Annex) discussions and proposals regarding relationship of transport planning to the broader planning system and the implementation process for projects that comprise the transport resource allocation program. It takes the sustainable development objective of the UK's Communities and Local Government Department which focuses on physical development, as a given.

In terms of applicability to Australia, it constructively suggests more involvement of experts operating through appointed Commissions using an inquisitorial approach to avoid design and implementation problems ahead of time as compared to the adversarial approach now used in quasi legal courts to solve problems after they have emerged on announcement of a project.

The UK Study also continues the advancement of community consultation as a means of obtaining what is presented as a representative community view. This also points to the continued deterioration of the responsibility of the elected political representatives to express the views of the whole community, not just those that turn up or submit their views at ad-hoc community hearings. It also points to mismatches between the areas of political jurisdictions and transport user catchments and the difficulty and tension this causes planners when seeking the views of the effected community.

The UK approach nods in the direction of integrating transport planning with the planning of the other constituent parts of the economy under the control of government. However it and most market based economies lack definition of a formal integration structure for these planning mechanisms. Consequently it also lacks, partly because of the relatively small and manageable physical size of the UK, a hierarchical planning structure that integrates local intra-regional inter-regional and national allocations.

Finally the UK Study despite commendably raising the planning system issue continues to frame the discussion using a static project approach to transport planning rather than use a dynamic planning process frame focused on continued improvement of ongoing institutional arrangements. The upshot is often a procession of announcements of *Plans* or even one off *Projects* with little support from ongoing institutional arrangements including organizations with budgetary power and expert staffs to drive implementation.

In sum the UK Study tackled more of these important institutional arrangement challenges than most and in so doing points Australia towards even greater focus on these matters.

## **5. Summary recommended strategy for Australia**

At its most fundamental level, this review of the UK Study highlights the need to establish transport planning in Australia as an ongoing integrated decision making process for planning the allocation of resources for service at local intra-regional inter-regional and national levels rather than a series of often unconnected one-off plans to justify specific major projects. The detail of such an ongoing integrated decision making process for planning transport service in Australia is a topic for another time.

The planning focus needs to shift from allocations driven by the end product of trips, to planning allocations made when each of the constituent products that result in trips are considered. Again these constituent products are the right to access a network of right of ways, the right to use facilities within the right of ways, the right to operate a licensed vehicle on such facilities and finally the right to make a trip.

As stated in 2.1 for efficiency, we should have as close a match in time between the scale of demand and scale of the relevant products. As a result the timing of the decisions for provision for the products that constitute transport service becomes more straight forward, as follows:

- The network of right of ways decision is one for action at the same time as land use planning (zoning) and its relative value is stable and reflected in the land cost.
- The facilities investment should be, as close as possible at a scale to match the scale of existing demand as the constraints of the size of the minimum supply unit (a lane for example) allows.
- The fleet size and mix of private and public vehicles would vary with the level of demand (and eventually congestion).
- And finally changes in the location of demand would occur as cost of consumption of all transport products in the current location exceeds costs for other locations.

The demand for these constituent products, and their associated supply arrangements, can be categorized by geographical concentration, and in order of size of economic resources allocated to satisfying demand for service, into local, intra-regional, and inter-regional, (including international gateways). All these levels are highly interconnected suggesting an integrated planning process driven from the lowest scale (see 1.4).

The UK Studies wide ranging discussion of the impacts of transport service on the economy provides a general justification for transport investment. But without the availability of a framework of causal relationships between specific resource allocation and increases in the nominated characteristic such as productivity, accompanied by data available at reasonable cost, the result is to grow the perception that political judgment driven by political rights should exercise more of the discretion over the choice mechanism allocating resources, rather than expert judgment founded in relevant professional experience and driven by property rights.

In summary the impact analysis presented in the UK Study contributes little that is new or useful in improving the efficiency of transport resource allocation.

The Study does take the discussion of impacts into the area of appraisal of alternative allocations at all scales from projects of local significance to regional and national projects. In sum the UK Study suggests expanding benefit cost analysis to include broader impacts such as GDP, social and environmental impacts, and suggests applying them at all scales. The unstated assumption is that these expanded choice mechanisms somehow provide an absolute measure of the impacts of alternative allocations at all scales rather than a rank ordering at local project (or any other) scale. Such an expanded application is not founded on either good theoretical concepts or on data availability that does not increase transaction costs beyond what is justifiable. In sum the existing BCA appraisal techniques as expanded to include social and environmental costs and benefits quantified by combinations of expert and political judgments, as practiced in Environmental Impact Assessment (EIA) frameworks, represents the practical state of the art.

The UK Study's discussion of engagement with the private sector reflects current commercial/political interpretations which ignore large sections of economic literature. The interchangeable use of competition and markets as the means to efficiency ignores the essence of the efficiency available in open markets for goods and services which comes from numerous participants being engaged on both demand and supply sides of the exchange. This is NOT the characteristic of most transport service which is monopolistic. And where efficient markets do exist for many of the separable inputs to supply (finance, design and construction, operations) efficiency is lost by requiring exclusive combinations to complete in PPP procurement processes as discussed in 4.2

Perhaps the most significant element of the UK Study for Australia is the Annex on Planning Proposals. The proposals include shifting some power to expert groups and a change in analytics from quasi legal adversarial to inquisitorial. Combining this with the recommendations in this paper for a four level transport planning mechanism reflecting the geographical boundaries of service demand and not the current political boundaries and we have the beginnings of a governance structure for planning transport service that would yield great economic benefits. It would also require a relative shift in power over decision making for resource allocation from the existing political "representatives" exercising political rights to local individuals exercising property rights through corporate supply entities directly governed by them at each of the local, intra-regional, inter-regional and national scales of supply/demand. And it would require a complementary shift in financial responsibility for transport service resources to landowners and away from the tax base of the population at large.

<sup>i</sup> Stone A. J. (2009) Commentary on the report to COAG by Infrastructure Australia [ITLS-WP-09-05](#)

<sup>ii</sup> See [www.lean.org](http://www.lean.org) for general informational resources and Shook J (2008) *Managing to Learn* The Lean Enterprise Institute, for details of the A3 approach

<sup>iii</sup> Adapted from UK Study Volume 1, Fig 1.2

<sup>iv</sup> Williamson O E (2000) *The New Institutional Economics: Taking Stock, Looking Ahead*,

*Journal of Economic Literature* V 38 Sept pp 595-613.

<sup>v</sup> Coase R (1991) Nobel Prize Lecture see [http://nobelprize.org/nobel\\_prizes/economics/laureates/1991/coase-lecture](http://nobelprize.org/nobel_prizes/economics/laureates/1991/coase-lecture)

<sup>vi</sup> Stone, A. (2008) *Institutional Reform: A Decision-Making Process View*, in Hensher, D.A. (editor) *Public Transport Reform: A Global Assessment*, *Research in Transportation Economics* Volume Series, Elsevier, Oxford, Chapter 25

<sup>vii</sup> See UK DfT Goodwin Study [www.dft.gov.uk/pgr/regional/strategy/dasts/funding-guidance.pdf](http://www.dft.gov.uk/pgr/regional/strategy/dasts/funding-guidance.pdf)

<sup>viii</sup> Stone, A. (2006) ARF Conference "Future of PPP's in Motorways"